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Editorial

Office-based surgery: how should the International Association for Ambulatory Surgery proceed?

Bernard Wetchler has recently written a timely editorial on office-based surgery (OBS) in this journal and his sage advice should be heeded, that office personnel should not learn from their mistakes but rather from their experience gained in managing ambulatory surgical patients [1]. Indeed several publications on OBS have now appeared and it would seem that this sub-speciality is expanding rapidly within the USA [2–4].

Fortunately many of these articles have stressed the need for patient safety and although scientific evidence is minimal most would agree that OBS should never be performed solely for financial gain. But where does the International Association for Ambulatory Surgery (IAAS) stand as regards OBS should its affiliated countries turn to it for advice?

One of the prime objectives of the IAAS, founded in 1995, was the safe expansion of international ambulatory surgery. So far this Association has not established any guidelines on the subject of OBS and it would now appear prudent to consider this aspect of healthcare as a matter of some urgency. For instance there is a need to insist that ongoing quality assurance programmes should be routinely practised in every establishment conducting OBS.

Whitwam has also indicated that with the development of minimally-invasive surgery (MIS) anaesthetic techniques should also be reviewed. [5] In future monitored anaesthetic care (MAC) will flourish and anaesthetists may not remain the sole administrators of anaesthesia within ambulatory units and offices. Indeed if surgeons, radiologists, endoscopists and nurses become single-handed operators there will be a need for further training and supervision. To say that this increased work-load would be acceptable for already busy anaesthetic departments would be a gross understatement. However, if OBS was to spread across Europe ancillary assistance would have to be recruited to monitor and resuscitate day cases undergoing procedures in remote hospital departments or offices. Unlike several recognised training centres for MIS, the practice of sedation is at present uncontrolled and there are no specialist training facilities. The IAAS will need to advise on the siting of such centres, the formulation of appropriate sedo-analgesic protocols and a decision will also have to be taken as to whether nurses who perform the bulk of day case sedation should remain attached to anaesthetic departments. As one informed observer remarked 'here is a potential time-bomb situation just waiting to explode'. Hopefully the IAAS will consider these aspects of OBS and issue instructions accordingly.

Major and minor complications may arise after ambulatory surgery performed even in the best of units and all personnel involved in OBS should be aware of these problems [6]. They should therefore check that their premises, equipment, resuscitation skills and staff are equal to the demands made upon them. A recent editorial on British anaesthesia for electro-convulsant therapy may be relevant to the question of OBS [7]. Of the 40 hospitals studied the percentage of ECT patients having no pre-treatment medical assessment was 73%, no ECG monitoring (19%), no blood pressure recordings (46%), no trained assistance for the anaesthetist (49%) and no trained recovery nurses within the immediate recovery area (70%). Furthermore no defibrillation facilities were available in 11% of the ECT units studied. Clearly these standards are unacceptable and who is to say that such activities would not extend to innovative programmes of European office-based surgery? If safety is to be the prime goal in OBS then those involved in this sub-speciality should have a high index of suspicion and they will need to be aware that there is a wide variation in the interpretation of medical and nursing practices within different countries. With this in mind the IAAS should be seen to support safe OBS treatment and it ought to ensure that state, national and international guidelines are established and adhered to.

Previous UK experience of office dental surgery performed under anaesthesia has received much attention. Such practices were not without incident and during 1979 there were 11 deaths recorded in the dental chair for non-emergency surgery. The Wylie Report (1981) deplored the practice of a single person acting as both the operator and the anaesthetist [8] and the later Poswillo Report (1990) stressed that office-based dental anaesthesia should be deemed a post-graduate subject

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serviced only be accrediated anaesthetists [9]. Clearly there is a pressing need for the IAAS to educate and inform as many OBS practitioners as possible that such practices are not as simple as they may at first appear and that the cost of medical litigation could be disastrous for doctors, nurses and managers alike.

So how should the IAAS advise its members on the safety and acceptability of OBS? Every country should produce their own accreditation standards and as a first step OBS personnel should liase with their National Associations for Ambulatory Surgery. Furthermore as a starting point the IAAS executive could constructively debate Smith's excellent OBS paper which appeared in this journal [10]. Briefly he has outlined and modified the Poswillo Report recommendations concerning the use of general anaesthesia in OBS. For instance the use of general anaesthesia should be avoided if at all possible and the same standard in respect of personnel, premises and equipment should apply irrespective of where general anaesthesia is administered. In addition anaesthetic training should include specific experience in office-based anaesthesia. Furthermore, Smith has made other recommendations and these include the use of sedation by non-anaesthetists, minimal monitoring standards and resuscitation facilities. Finally he has listed the drugs essential for emergency situations. Certainly these guidelines could form the basis of an interesting debate at the forthcoming IAAS Congress in Venice on 25–28th April 1999.

In conclusion the expansion of OBS in the USA may yet sweep across Europe. The IAAS should be prepared for this eventuality. The surgeon's office is a hostile environment for the administration of general anaesthesia or sedation and it goes without saying that trained staff should be immediately available to meet any emergencies which will inevitably occur. In future if OBS is to succeed then appropriate programmes of quality assurance, research and education must be established as a top priority. All the multidisciplinary staff working in ambulatory surgery units and offices should be involved in these programmes and perhaps the IAAS through its own journal and international congresses could co-ordinate this complex exercise. In the meantime past experience should be heeded and countries establishing programmes of ambulatory surgery will require appropriate assistance and sound advice. At this point in time surely these countries should, in the first instance, be encourage to develop ambulatory surgery and then only after considerable experience they may wish to debate whether or not their own healthcare systems should embark on programmes of OBS.

Tom Ogg,
President-Elect: IAAS
11 Worts Causeway,
Cambridge, CB1 4RJ,
UK

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Australian men's experience of cystoscopic day surgery Part 2

Judith Donoghue *, Dianne Pelletier, Christine Duffield, Maria Torres

Faculty of Nursing, University of Technology, Sydney, Australia

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Abstract

To investigate the preparation for and recovery from cystoscopic day surgery (DS) 100 male patients completed a preoperative written questionnaire and two postoperative telephone questionnaires. Findings indicated that DS cystoscopy minimally disrupted paid work, had minor postoperative symptoms, a readmission rate of only 2% and utilised few community support services such as visits to general practitioners. However, 37% of participants said that they would have liked more information. Participants' perceptions of their level of preparation were significantly related to various outcome measures such as the intensity of postoperative symptoms and the use of resources postoperatively.

Keywords: Day surgery; Cystoscopy; Educational preparation; Outcomes; Recovery

1. Introduction

The increase in DS numbers observed over the past 10 years in New South Wales (NSW) [1] follows international DS trends showing a growth in the numbers as well as in the variety and complexity of procedures being performed [2,3]. The need to contain escalating hospital costs has been postulated as one of the main reasons behind the emphasis given by the NSW government to the development of DS. However, clear evidence supporting this argument is not available in Australia [4]. In addition, technological advances, the availability of new anaesthetic agents and changing attitudes among health professionals [5] have contributed to a reduction in the time necessary to both perform and recover from a variety of procedures, thereby increasing the likelihood of these procedures being carried out on an ambulatory basis. It is important to evaluate how patients are coping with the changes in health care which result in a new and more active patient role with increased responsibility for their own recovery.

There has been limited research in Australia on patients' perceptions of their preparation for and recovery from DS procedures; O'Connor et al. (1991) assessed patient satisfaction with day surgery facilities in NSW public hospitals [6]. Overseas data suggest that outcomes following DS vary depending on previous experience of DS, employment status, education, expectations and preparation for surgery [7]. The new concept of 'satisfaction against need' proposed by Nelson et al. (1997) has two key aspects. The first is the patient's perception of the health benefit which resulted from the health care encounter. The second aspect has to do with meeting needs that may or may not be part of the patient's expectations. Nelson et al. argue that one of these needs is for useful information which has the potential to improve a patient's ability to assume more control over health status [8]. This factor then becomes a key element when considering patients recovering at home without the immediate support of health professionals.

* Corresponding author. Tel.: +61 2 93502184; fax: +61 2 95145513; e-mail: j.donoghue@uts.edu.au

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Cystoscopic DS procedures account for 6.7% of the NSW DS case load (NSW Heath, personal communication, 23 June 1997). Limited research has focused on the experiences of this particular population. The findings from a qualitative study involving in-depth interviews with 21 men following cystoscopic DS [9] showed that most participants had experienced uncomplicated recoveries and felt adequately prepared for the surgical experience and the recovery at home. However, some did not know who to contact or what to do if unexpected symptoms such as bleeding presented after discharge.

This study aimed to: identify preoperatively, selected pre-surgical lifestyle behaviours related to health status as perceived by participants; identify preoperatively, co-morbidities, psychological states and medication profile; determine patients' expectations of the recovery process prior to surgery; determine post operatively, the quality and quantity of preoperative educational preparation; investigate patients' outcomes following DS cystoscopy including duration and nature of postoperative symptoms patient satisfaction, patient' s educational preparation, time off work, readmission rates and community resources utilised.

2. Method

2.1. Design

The study involved 100 male cystoscopy patients. Data were collected on three separate occasions. The first questionnaire was administered preoperatively. The second and third questionnaires were completed via phone; the second between the 3rd and 6th postoperative days, and the third between the 21st and 24th postoperative days as these had been shown during a pilot study to be the minimum and maximum periods of recovery.

2.2. Sample

All males who spoke English, were 18 years old and over and who were undergoing cystoscopy at three free standing DS units were invited to participate. The researchers contacted DS staff on a weekly basis to ascertain if any male cystoscopy patients were booked for cystoscopy. More than 90% of patients approached agreed to participate. The reasons for non-participation were mainly language difficulties or an inability to be available for the period of data collection. Five of the participants who completed the first questionnaire but did not complete the next two were deleted from the sample and five additional participants were recruited. Patients were approached by the researchers within the first hour of arrival at the unit. Eligibility was determined and consent was sought. Eligible patients were made aware of their right to refuse or withdraw and confidentiality was assured.

2.3. Instruments

The pre and postoperative questionnaires used had been developed from questionnaires used overseas and from data obtained from previous studies by the authors [9,10]. The preoperative questionnaire aimed to obtain information on sociodemographic characteristics (age, sex, occupation and education), participants' perception of health status, lifestyle behaviours and health history, and their level of preparation for the surgical experience and home recovery. The postoperative questionnaires measured participants' perceptions of the recovery process including clinical problems experienced, resources used, impact of the surgery on lifestyle, satisfaction with the DS experience and re evaluation of their educational preparation. For most questions the response formats ranged from yes–no to variable response formats. Participants responded to open-ended questions which ranged from entering a number (e.g. the average number of cigarettes smoked in a 24-h period) to describing the characteristics and location of a symptom or commenting on any aspect of the DS experience.

Consultations with other researchers and the clinicians involved with the project during the pilot study were conducted to improve the instruments' content validity. An overall reliability coefficient was not calculated because of the variable response mode of the items.

2.4. Analyses

Basic descriptive statistics were performed on items with interval data. Categorical data were classified by frequencies. Selected interval variables such as age were recoded into categorical variables. Where indicated by cross-tabulations, χ^2-tests were conducted to determine whether an association existed between categorical variables.

3. Results

3.1. Demographic profile

The 100 participants' ages ranged from 19 to 81 years, with a mean of 54.3 (S.D. = 15.7). A total of 65% were employed full-time (23% self-employed), 21% were retired, 9% were pensioners, and the remaining 5% were employed part-time, unemployed, studying full-time or doing voluntary work. Participants were asked to identify their highest level of formal education—28% had a

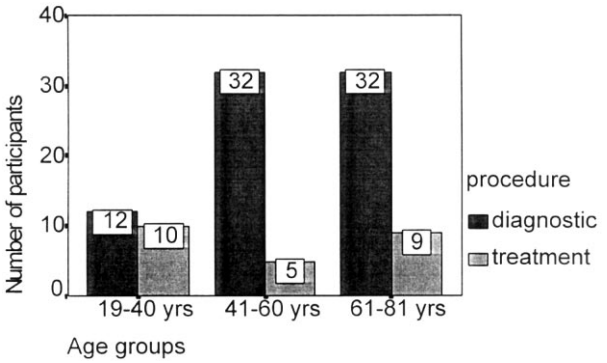

Fig. 1. Number of participants having a diagnostic or treatment cystoscopy in the different age groups ($n = 100$).

university degree, 22% had a technical (TAFE) certificate, 20% had completed their school certificate or equivalent, 19% had completed a high school certificate or equivalent, 10% had only attended primary school, and one participant reported no formal education.

Almost half of the sample (49.5%) had not been admitted to day surgery in the last 2 years, 26.3% had been admitted once and 23.2% had had day surgery more than twice in the 2 preceding years. A larger percentage of older participants than younger participants had previous DS experience, but no significant relationship was found between age and DS experience.

A total of 76 participants had a diagnostic cystoscopy, the remaining 24 participants had some form of treatment (e.g. diagnostic cystoscopy and vasectomy, diagnostic cystoscopy and removal of stent). The number of participants in the different age groups having diagnostic or treatment cystoscopies is presented in Fig. 1.

There was a significant association between age and procedure performed. The young participant group had more treatment cystoscopy than the older participants ($\chi^2 = 7.88$, df $= 2$, $P < 0.05$).

Smoking, drinking and exercise habits were investigated and a combined score was worked out with lower values representing healthier behaviours [11]. Scores ranged from 0 to 270 with a mean of 88.7 and a standard deviation of 58.94 showing that a substantial proportion of the sample regarded their lifestyle behaviours as healthy.

The participants' perceptions of their physical, psychological and overall health were determined (Table 1). They were asked to report any physical illnesses and psychological conditions they had experienced in the previous year, as well as any medications they were taking at the time of the interview.

Altogether, 35 men said they had had no physical problems, 52 had one or two problems and eight men had more than two problems. Hypertension was the comorbidity most frequently reported (21 participants), followed by arthritis (18), cancer and circulatory problems (ten each). No relationship was found between the presence and number of comorbidities and the length of recovery.

The most frequently identified psychological problem was anxiety (69% of participants), but only 18 participants said they were often or always anxious. No relationship between anxiety and the length of recovery was found. A total of 62 participants said that tiredness was a problem, but this symptom was not significantly related to other variables.

Finally, 45 participants were not taking any medications, 30 men were taking one, 14 were taking two, and nine were taking three or more. The most frequently reported medication was for hypertension (21), followed by coronary/cardiac medication (nine) and medication for depression/anxiety, constipation, hyperglycaemia and anticoagulants (five each).

3.2. Expectations of the recovery process prior to surgery

When participants were asked how long they thought it was going to take them to resume their usual activities, 69% said a few hours to 1 day, 10.3% thought it would take 2 days, and 8.2% said 3 or more days (refer to Table 6 for a comparison between expected recovery time and actual recovery time). Altogether 33% of employed participants had not planned to take any time off from their usual employment following the procedure. A total of 11 participants did not know how long their recovery was going to take. Surprisingly, these men were more likely to have had previous DS experience and to be having a diagnostic cystoscopy. Men with previous DS experience who did not know how long it was going to take them to recover from DS were older than those with no previous DS experience.

Table 1
Participants' perception of their physical, psychological and overall health

Perception	Physical ($n = 99$) (%)	Psychological ($n = 97$) (%)	Overall ($n = 99$) (%)
Very poor/poor	12.1	3.1	4.0
Fair	35.4	25.8	25.3
Good	44.4	53.6	59.6
Excellent	8.1	17.5	11.1

Table 2
Preoperative educational preparation

Type of information	Yes[a] (%)	No[b] (%)	Who[c]
Written information about DS ($n = 100$)	71	29	Surgeon, $n = 36$; DS staff (nurse/other), $n = 33$; >1 source, $n = 3$
Verbal information about DS ($n = 99$)	58	42	Surgeon, $n = 33$; DS staff (nurse/other), $n = 26$; >1 source, $n = 11$
Written information about procedure ($n = 98$)	22	78	Surgeon, $n = 12$; DS staff (nurse/other), $n = 6$; >1 source, $n = 2$
Verbal information about procedure ($n = 100$)	67	33	Surgeon, $n = 52$; DS staff (nurse/other), $n = 14$; >1 source, $n = 12$
Participant felt had received enough information ($n = 97$)	60	37% would have liked more information about the procedure and/or the recovery process	

[a] Percentage of participants who received information.
[b] Percentage of participants who did not receive information.
[c] Information provider.

3.3. Preoperative and postoperative educational preparation

The type of information regarding the participants' preparation for the DS experience as well as the most important sources of information are reported in Table 2. Some participants received more than one type of information.

Participants were also asked if they felt they had received enough information or if they would have liked more information about anything in particular. There is a significant relationship ($\chi^2 = 10.70$, $df = 1$, $P = 0.01$) between the participants' perception of the adequacy of preoperative information and how participants felt before the operation. Those participants who had received enough information were more likely to feel indifferent or relaxed before the operation, while those who would have liked more information were more likely to feel anxious or frightened before the procedure. This significant relationship persists when controlling for participants' DS experience.

During the first postoperative telephone follow up participants were asked to rate the quality of the information they had received preoperatively (Table 3). There were differences but no significant relationships between these findings and what participants said preoperatively about their level of preparation for the operation. It is interesting to note that a higher percentage of those who said preoperatively that they would have liked more information, when questioned postoperatively rated the preoperative information as insufficient (26%). A total of 33% of those who preoperatively said they had received enough information postoperatively rated the information provided preoperatively as excessive.

Participants were asked to identify the sources of information about recovery, the time this had been made available to them and its usefulness (Table 4). While some participants received information from only one source others said that they had received it from two (36%) or three sources (12%). Most participants found the information useful (41%) or very useful (49%). However, 4% did not find it useful. A total of 37 participants commented about other information they would have liked to receive preoperatively and 12 wanted to know how the procedure was done, twelve what to expect (postoperative symptoms, length of recovery), four why the procedure was needed and four more information about the anaesthesia. Concerns over actual costing details of the procedure and the location of the DS unit were noted. The majority of participants (94%) said that they would choose DS again for the same or a similar procedure.

3.4. Postoperative symptoms

In a previous study by the authors [9] four postoperative symptoms (pain, bleeding, tiredness and problems with voiding) were identified as causing concern. During the first postoperative telephone follow up, participants were asked if they had any symptoms, and if so, how intense had the symptom been. They were also asked, if they expected to have any symptoms, what measures had they taken for relief if these had been effective (Table 5). They were asked if they had experienced problems with or while doing certain activities (e.g. urinating, having sexual intercourse). The most frequently reported symptoms were mild bleeding and pain associated with voiding, some participants perceived these symptoms to be more intense than what they expected. Ten participants described symptoms of concern arising between the 1st and the 3rd postoperative week, but they had recovered by the second postoperative interview.

Pain was reported by 37% of participants. The location and characteristics of pain were strongly related to voiding. The majority of participants (64.9%) experi-

Table 3
Participants' postoperative evaluation of preoperative educational preparation ($n = 94$)

Perception of preoperative information	Postoperative evaluation of preoperative information		
	Insufficient	Adequate	Excessive
Have received enough information	10	57	33
Would have liked more information	26	56	18

enced the most severe pain on the first evening. Ten men (28%) said that it had taken them 24 h to be pain free. A further 27% were pain free by 48 h. The majority (70.3%) were pain free by the time of the first postoperative phone interview. Panadol® and Ural® were the medications usually given or suggested to participants for pain relief. Other measures mentioned were to drink lots of water and to try to occupy their minds in something different like gardening or walking. Overall, 20 of the 37 participants reporting pain took measures to relieve it and 16 reported these had been effective.

A non significant association was found between both the reason for the DS procedure (diagnosis or treatment) and DS experience and the report of pain. A total of 46% of those having a treatment cystoscopy reported pain as compared to 34% of those having a diagnostic procedure only; 41% of those with no previous DS experience reported pain while 34% of those with previous DS experience reported pain. Of those who experienced pain, 81% said that they expected it; 54.1% rated their pain as mild and 32.4% said that the pain was more than expected. Of those without DS experience, 60% identified the pain as intense as they had expected, compared to 35.5% of those with DS experience. In addition, 65% of those with no DS experience rated their pain as mild compared to 41.2% of those with DS experience.

The participants' perception of their level of preparation is significantly related to the intensity of pain. Those who said that they had received enough information were more likely to rate their pain as mild than those who said that they would have liked more information ($\chi^2 = 6.05$, df $= 2$, $P < 0.05$). A higher percentage of participants who wanted more information said that pain was more than expected than those participants who felt that they had received enough information (13.9% of those who wanted more information as compared to 10% of those who felt had received enough).

Table 4
Information about recovery for 100 participants

Type, time and source of information about recovery	Participants (n)
Written instructions from DS unit	34
Verbal information 1 week before surgery from surgeon	21
Verbal information minutes before surgery (DS nurse or surgeon)	10
Verbal information minutes after surgery (DS nurse or surgeon)	51
Did not recall receiving information about recovery	24

Altogether, 44 participants reported bleeding. The most intense bleeding was experienced on the first evening (71%). Regarding the bleeding characteristics 71% said that it was just blood, while the remaining 29% said that they had bleeding with clots. In 50% of cases the bleeding had stopped by 24 h, with a further 23% of participants reporting that it had stopped by 48 h post operation. Six participants were still bleeding by the time the first postoperative phone interview was conducted; one of them did not feel completely recovered from his surgery by the time of the second phone interview (postoperative day 21). A total of 57% of participants (25) who bled reported they had not been given instructions as to how to deal with bleeding. Some 15 participants took measures aimed at relieving the symptom, and in most cases these measures consisted of drinking lots of water. Four participants had been told to contact the DS unit or the surgeon if the bleeding was too severe or took longer than expected. One participant asked his general practitioner for postoperative advice.

Of the participants undergoing a treatment cystoscopy, 50% reported bleeding, while 42% of those having a diagnostic procedure reported bleeding. No significant association (0.05 level) was found between bleeding and the type of cystoscopy. Of participants who reported bleeding, 68% said that they expected to bleed. Of participants who perceived their level of preparation to be appropriate, 81% rated their bleeding as mild as compared to 50% of those who would have liked more information. Altogether, 23% of participants reporting bleeding said that it was more than what they had expected. Of those without DS experience, 27% experienced bleeding as intense as they had expected compared to 21% of those with DS experience. In addition, 15% of those with DS experience said that the bleeding was more intense than expected, as compared to 6% of those without previous DS experience.

Table 5
Postoperative symptoms of concern

Symptoms	Yes (%)	Severity (%)	Greater than expected (%)	Used remedy (%)	Who devised
Pain ($n = 100$)	37	Mild, 54.1 Moderate, 24.3 Severe, 21.6	32.4	54.6	DS nurse ($n = 5$) Surgeon ($n = 2$)
Bleeding ($n = 100$)	44	Mild, 65.9 Moderate, 20.5 Severe, 11.4	22.7	34.1	Surgeon ($n = 10$) DS nurse ($n = 8$) DS leaflet ($n = 1$) GP ($n = 1$) DS leaflet ($n = 4$)
Tiredness ($n = 100$)	16	Mild, 25 Moderate, 43.9 Severe, 35.1 Mild, 66.7	12.5	31.3	
Problems w/ voiding ($n = 97$)	45	Moderate, 17.8 Severe, 15.6	Pain was often present while voiding. Descriptions ranged from "sharp pain, like being cut by razor blades" to "only a sting when urinating".		

3.5. Recovery duration

The vast majority of subjects (85%) had recovered by postoperative day 3 or 4 (Table 6). Just over half of the participants (53%) recovered within the time-frame they had anticipated. This was more likely if participants had previous DS experience (56.5% of those with previous DS experience as compared to 37.8% of those without DS experience). This association is significant ($\chi^2 = 11.27$, df = 1, $P < 0.01$).

No significant relationship was found between age and recovery duration. When controlling for procedure performed at DS, there is a significant relationship between age group and recovery duration among those having a diagnostic cystoscopy. A total of 67% of participants in the older age group recovered within 24 h as compared to 38.7 and 27.3% in the other two age groups ($\chi^2 = 7.14$, df = 2, $P < 0.05$). A higher percentage of 19–40-year-old participants received treatment while more of the older participants had diagnostic cystoscopies (Fig. 1). Readmission rates were very low with only three participants being admitted to hospital following their cystoscopic DS. One participant was admitted to undergo treatment as a result of the findings of his diagnostic cystoscopy, another for a urinary tract infection and the third participant was admitted to hospital for bowel obstruction.

Table 6
Comparison between expected and actual recovery duration

Recovery duration	Expected recovery duration ($n = 97$) (%)	Actual recovery duration ($n = 94$) (%)
Hours	16.5	22.3
1 Day	52.6	24.5
2 Days	10.3	17.0
3–6 Days	5.1	22.4
≥7 Days	3.1	13.8
Didn't know	11.3	
Recovery time depends on operation	1.0	

3.6. Advice sought during recovery at home

General practitioners were the most often reported source of advice, followed by surgeons (Table 7).

Altogether, 32 participants asked for advice from different sources. Six participants asked for advice from more than one source. No association was found between the participants' DS experience and their likelihood to seek advice, even when controlling for the presence of symptoms of concern during the recovery

Table 7
Number of participants who sought advice from different sources as reported at first and second postoperative phone interviews ($n = 100$)

Source of advice	First postoperative phone interview	Second postoperative phone interview
GP	8[a]	10[a]
Surgeon	5[b]	8[b]
DS unit nurse	6	2
E dept. Nurse	1	2
Chemist	1	2
Family	1	Nil
Friend	4	Nil

[a] Two of these participants were the same, they asked the GP for advice on both occasions.
[b] One of these participants asked the surgeon for advice in the two occasions.

period. A significant relationship was found between the participants seeking advice from any source and the level of preparation for the DS experience. A higher percentage of participants who would have liked to receive more information (47.2%) than participants who felt they had received enough information (21.7%) sought advice during their recovery at home ($\chi^2 = 6.84$, df = 1, $P < 0.01$). When controlling for the presence of symptoms of concern, the significant association only persists for those who presented with symptoms postoperatively ($\chi^2 = 6.04$, df = 1, $P = 0.05$). When controlling for previous DS experience, the significant association between participants' level of preparation and seeking advice only persisted for those with previous DS experience ($\chi^2 = 8.52$, df = 1, $P < 0.01$). Not surprisingly, there is a significant association between the likelihood of seeking advice during the recovery phase at home and the presence of symptoms ($\chi^2 = 8.80$, df = 1, $P < 0.01$). Three participants who did not present symptoms during recovery reported seeking advice; one from his GP, another from a friend who was a GP and the third from the surgeon. In addition, there is a significant association between recovery duration and participants seeking advice ($\chi^2 = 19.68$, df = 3, $P < 0.001$). No significant relationship was found between participants' age and seeking advice.

4. Discussion

This study indicates that men having cystoscopic DS consider they were well served by the process. Men preferred DS to full hospital admission because of the limited time involved in obtaining a health related outcome which minimally disrupted their lifestyles. The study highlighted the safety, low complication and readmission rate of this procedure. Adequate patient education, particularly for first timers, was an important aspect of the findings. Men who received information about the DS procedure were less anxious than their peers who said they had received insufficient information. Being sufficiently informed appeared to give participants expectations about the procedure, the outcome and the recovery, which enabled them to formulate their responsive behaviours. While the study found that 34 participants were given written information, 24 participants (almost a quarter of the sample) stated they did not recall any information having been given to them. It cannot be inferred that information was not provided to participants. It may be that they could not recall information due to anxiety. It is for this reason that the research team considers written information to be so significant. Additionally, the provision of an opportunity for participants to reflect on, to discuss and clarify information with a health professional should also be addressed in the ambulatory surgery context where the access to professional assistance during the recovery period is minimal.

The value of effective information was reflected in the significant difference between participants who received sufficient information and who rated their pain as mild, while those who received insufficient information rated their pain as moderate to severe. Of participants who bleed postoperatively, 57% were not told how to deal with bleeding. Even participants with substantial experience with cystoscopy should be instructed on postoperative management. As cystoscopy is considered to be a simple procedure it is important for health professionals to be reminded of the benefits of effective education to the recovery process.

Preadmission clinics should be considered an essential component of the DS process. Health care professionals working in these venues perform preoperative patient assessment and provide patients with written and verbal information. In addition, patients have the opportunity to reflect on and discuss unclear aspects of the DS process, while staff have the chance to evaluate patients' expectations of recovery from surgery. This can be followed by instructions for the recovery at home that are practical and specifically applied to the patient and the procedure. This need to provide comprehensive, individualised information on recovery will become increasingly important as more complex procedures are performed on less healthy patients.

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Ambulatory Surgery

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Quality assurance and economical efficiency in ambulatory surgery The German situation in gynaecological day surgery

J. Hennefründ *, E. Dewitt

Tagesklinik fur operative Gynakologie, Laser und Reproduktionsmedizin, 26122 Oldenburg, Germany

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Abstract

In contrast to other countries, gynaecological ambulatory surgery in Germany today is mainly performed in private free-standing units. They perform approximately 98% of all ambulatory operations. A quality assurance programme in gynaecological ambulatory surgery started in the early 1980s and proved the safety of outpatient surgery in experienced hands. Gynaecological ambulatory surgery proved to be far more cost effective than inpatient operations. Independently specialised free-standing units seem to be able to work economically with a high level of quality. Due to the special legal situation in Germany the increasing number of outpatient operations led to a sharp drop in fees for individual operations. Quality assurance consists of many aspects. Most are well established and accepted. Apparently in ambulatory surgery the structural requirements of the operative unit, the organisation of postoperative care, the risk of thrombosis, the risk of infection and other aspects seem to be different to inpatient surgery. Comparative studies are required to investigate these differences. Only then it may be possible to optimise the integration of ambulatory surgery into the health system.

Keywords: Quality assurance; Economical efficiency; Germany; Gynaecological day surgery

1. Introduction

Until the early 1980s gynaecological day surgery in Germany mainly consisted of D and C procedures. With the development of endoscopic techniques it then expanded rapidly. Nowadays specialised units are able to perform any kind of operation that can be done endoscopically. In contrast to other countries like the USA, where 85% of all ambulatory surgery takes place in hospitals [5], outpatient operations in Germany mainly (98%) take place in free-standing units. The number of operations has increased within the last decade, although it still remains at a low level compared to other countries.

2. Quality assurance in gynaecological day surgery

In Germany the hospital system and the system of private practice are almost entirely separate. Therefore patients who are operated on in hospitals are normally sent from another gynaecologist. The hospital automatically has to check the indication. This forms a sort of second opinion. Day surgery mainly takes place in free-standing units which developed from specialised private practices. They operate on their own patients as well as on referred patients. Therefore, possible misuse by an uncontrolled widening of indications was thought to be possible.

As day surgery developed outside of the established system of hospital care, it also had to prove its safety. In 1984 gynaecologists in Lower Saxony started a quality assurance programme that focused on complications. At the same time they compared their own

* Corresponding author.

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patients to those who were referred to the centre. After the Federal Society of Ambulatory Surgery (Bundesverband ambulantes Operieren-BAO) was founded it took over the quality assurance programme. In 1995 it received data from 70 centres on more than 34000 operated patients (Table 1) [1]. The percentage of patients referred to the centres increased. The number of major operations like operative hysteroscopies and operative laparoscopies increased. The complication rate stayed low. Hitchcock [3] points out that one of the fundamental questions is whether there is a significant risk of complications after discharging the patient home. In our data postoperative complications seem to rarely happen and are mainly related to minor procedures like cone probe, marsupialisation or breast probes (Table 2). They normally consist of bleeding that is easily noticed by the patient herself. Major operative procedures like operative laparoscopies are associated with rare intraoperative complications. These data suggest that especially laparoscopies in experienced hands can be safely performed on an outpatient basis.

Centres differed very much in size from those operating on a few hundred patients per year up to several thousand operations annually. The rate of complications did not correlate with the size of the centre. These findings coincide with a prospective multicentre study on laparoscopies. In this study 1474 patients were interviewed 1 and 4 weeks after having had a laparoscopy. No conversions to laparotomies occurred, no thrombosis, 2.9% wound infections and 2.4% febril incidents were registered. A total of 3.7% of the patients were hospitalised for more than 24 h but no readmissisons were found [2].

Comparable data from inpatient or outpatient operations in German hospitals are not available.

The data of the quality assurance programme of the BAO were collected every 3 months. The results were analysed and sent to the operative units. They received a comparison of their own numbers to the average of the whole group. In cases of significant differences it is up to the physicians to analyse the situation and to draw conclusions. Some years before a similar voluntary system had been established in perinatology. During this time perinatal mortality in Germany dropped from the average to one of the lowest of the world. It was concluded that quality assurance systems do not necessarily need control and sanctions but that the main effect is to increase people's awareness of the problem of quality. Recently in ambulatory surgery in Germany a similar mandatory system of quality assurance has been established. This also asks for economic data like the number of the personnel involved. The item 'duration of operation' that formerly was thought to be an indicator of complications now figures in the section of economic data. At the same time the general payment system goes very much on time controls. Therefore it is suspected that the motivation of giving correct data could drop. The new madatory system could also be misused to control economic data rather than medical quality. Moreover, the system has been working since the beginning of 1996 but until now no results have been given to the involved physicians.

3. The economical situation of ambulatory surgery in Germany

Although day surgery in Germany increased over the decade to 1996, it is still less developed than in other comparable countries. Due to the economic situation this development seems to have stopped in 1996.

After World War II the health system in Germany developed into an internationally incomparable organisation. It is mainly characterised by an almost complete separation of hospital and outpatient treatment

Table 1
An overview of the annual statistics for the quality assurance programme

	1993	1994	1995
Number of operations	23 619	31 060	34 730
Number of centres	57	69	70
Admitted patients (%)	65	67	69
Own patients (%)	35	33	31
Complications (%)			
During operation	0.15	0.13	0.14
Before discharge	0.06	0.1	0.12
After discharge	0.11	0.15	0.12
Transfer to hospital/conversion to inpatient	0.15	0.22	0.1

Table 2
Types of complication in relation to operation

Type of operation	During operation	After discharge
Diagn. Hysteroscopy	0.17	0.07
Open hysteroscopy	0.14	0.0
D and C (diagnostic)	0.15	0.08
D and C (abortus)	0.0	0.08
D and C (artif. abortion)	0.11	0.09
Cone probe	0.06	0.52
Cerclage	0.0	0.0
Amniocentesis	0.13	0.27
Marsupialisation	0.32	0.32
Condylomata ac.	0.0	0.0
Diagn. laparoscopy	0.33	0.20
Oper. laparoscopy	0.33	0.13
Tubal sterilisation	0.18	0.11
Breast probe	0.0	0.26
Other breast operation	0.28	0.0

Table 3
Structural quality

Aspect	Controlling institution	Economically efficient	Cost reduction for operating unit
Operator has finished his specialisation	Medical board	Yes	Neutral
Additional qualifications of the operator	Scientific societies, medical board	Yes	No
Qualification of nurses	Board	Yes	No
Minimal demands to the rooms	Medical board	?	No
Quality circles	No control	Yes	Yes

Table 4
Procedural quality

Aspect	Controlling institution	Economically efficient	Cost reduction for operative unit
Organisation of work	Physician	Yes	Yes
Flow of information (letters, etc.)	Patient, admitting colleague	Yes	Neutral (paid for)
Leading personal	Patients, staff	Yes	Yes
Patient care	Patient	Yes	Basis of existence
Indication for operation	Quality assurance programmes, second opinion	Yes	Almost neutral

Due to the organisation and payment system of the hospitals (hospitals are not paid for the value of their work, but for every day a patient stays hospitalised) day surgery was mainly introduced and developed in independent free-standing private units and other private practices. They perform approximately 98% of all ambulatory surgery in Germany.

In 1992 a new law, the 'Gesundheitsstrukturgesetz' (SGB V) was introduced. It's task was to reduce the costs in the health system. Ambulatory surgery should be one of the instruments to realise this aim. At the same time, expenditures in the different parts of the health system were restricted by introducing global budgets. Hospitals got their own budgets and the whole of all private practices got another budget. With increasing numbers of outpatient operations done by private practices and free-standing private units under this limited global budget the fee for an individual operation decreased and ultimately fell below economically tolerable levels. Thus, today ambulatory surgeons face significant economic problems. They claim that money should follow their increasing amount of work. Insurance companies complain that despite the increasing number of ambulatory operations they can not register any savings in the hospital sector. Unfortunately there is no data available on the number of operations performed in hospitals in Germany. The overall expenses in the hospital sector are still increasing but it is unknown whether decreasing work in operative units coincides with increasing work in other sectors. The law opened the possibility of creating a separate budget to feed ambulant operations in hospitals and private units. It's realisation got stuck in the controversial political discussion.

4. The interrelation of quality and economy

The new German health law focuses on economic efficiency and quality assurance. Economic efficiency compares costs (input) to the benefit (output) of a measure. A developing new economic science, health economy, is analysing the related problems. Until now the output of medical care has been difficult to define or measure. In contrast to this basic definition the law uses the words economic efficiency but in fact it works by limiting expenses.

Secondly the word assurance can be misleading. It suggests a system made to prevent a possible decline of quality. But physicians have always attempted to improve patient treatment. In other words: improvement in economic efficiency may lead to declining expenses in the health system but it can also lead to increasing expenses if the output increases more than the necessary costs. Global cost reduction without defining targets and benchmarks within the health system will most likely reduce the quality of medical care.

5. The differentiation of quality assurance

Quality can not be defined. Most people agree that it is characterised by being something that can be improved. Efforts have been made to differentiate several aspects. It is generally accepted to differentiate output quality, structural quality and procedural quality. Quality assurance is a complex, non-defined system of measurements. Tables 3–5 enumerate various aspects. Many of them are well established and generally ac-

Table 5
Output quality

Aspect	Controlling institution	Economically efficient	Cost reduction for operative unit
Time of recovery	Insurance companies	Yes	Neutral
Duration of postoperative medical care	Insurance companies	Yes	Neutral
Reaching the goal of the operation	Scientific studies, health economy	Not evaluated	No relevance
Statistics of complications	Medical board	Yes	No

cepted. Some are also formally controlled. Looking at control we have to realise that this will most probably focus on easily controllable aspects. Output quality in the sense of reaching the goal of an operation will never be controllable systematically, but will always rely on scientific studies. Looking at the cost effect of quality assurance we have to distinguish between cost effects to the operative unit and to society as a whole. The economic effect of improving quality can be neutral, increase or decrease costs.

Many more aspects of quality assurance than mentioned in Tables 3–5 are possible. Only a few economic effects are examined. Therefore the expected effects partly represent the author's opinion.

All studies in Germany revealed that ambulatory surgery is far cheaper than inpatient treatment. The factor varies from 1–2 up to 1–7 [4,6]. The reasons are not examined. We believe that structural quality problems are the key to explain this observation. In German hospitals a triple hierarchy of physicians, administration and nurses needs to be co-ordinated. Private free-standing units are led by physicians who are entirely responsible for the clinic. They make all the decisions and take all the economic risks. This may enable higher flexibility and better organisation of work in the sense of care for the patient and economic effectiveness.

In a political process of consensus an agreement has been reached to define minimal requirements for the operation rooms and hygienic requirements. The rate of infection, postoperative fever and thrombosis seems to be comparably lower in ambulatory surgery than in inpatient surgery. Comparative data and studies are unavailable. Nevertheless an agreement was politically necessary to guarantee minimal structural quality but it could not be based on clinical data.

As has been described, the quality of results in terms of complication rates has proven to be excellent. The classical programmes of quality assurance in ambulatory operative gynaecology focussed on complications. In these programmes complications have never been defined. For example, a perforation of the uterus although it may not have any clinical relevance is regarded as a complication. Sterilisation patients have to be low risk patients. Nevertheless hospitalisation after a sterilisation is not counted as complication. After the first quality control studies have proven the safety of ambulatory surgery it is questionable whether further benefits can be expected from quality control focused on complication. An alternative could be a booklet to list all major complications and infections in order to discuss them in quality-circles.

Another very important aspect of output quality is the recovery time. In Germany a patient who is not able to work due to illness gets money either from the employer or the insurance company. Ambulatory surgery has proven to lead to far shorter recovery times and shorter times until the patients return to work. These economic effects are even higher than the direct savings in terms of the costs of the operation. The average time for return to work may be an objective, easy to control parameter of the quality of medical interventions.

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The economic framework of day surgery: a plea for appropriate appraisal

Richard Brooks

Department of Economics, University of Strathclyde, Glasgow G4 OLN, UK

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Abstract

It is essential to test the 'cost-effectiveness' or 'economic gains' of day surgery by the use of appropriate economic evaluation. This paper gives an overview of economic appraisal approaches, provides a framework for appraisal which covers the perspectives of both hospital decision-makers and that of society as a whole, and considers some important issues in the economic evaluation of day surgery.

Keywords: Economic appraisal; Costs; Cost-effectiveness; Cost-benefit analysis; Day surgery

1. Introduction

Day surgery has acquired great significance as a mode of delivering surgery. For example, day surgery increased more than 3-fold in Scotland between 1981 and 1995 [1]. This sharp rise in activity has been the product of advancing medical technology, a better understanding of procedures that can safely be undertaken on a day basis, and as a response to increasing pressure on hospitals to streamline care. There are major issues surrounding the social welfare implications of this development, including important economic matters that require to be addressed.

In the UK, a number of interesting papers on the economics of day surgery came out in the late 1970s, to be followed by a dearth of studies until quite recently. The change from the earlier period is startling: Russell et al. [2] compared the cost of day surgery with in-patient stays of 5 or 6 days, whilst more recent studies report in-patient stays as short as 48 h. Indeed, lengths of hospital stays in general have been falling [3]. The main message from these later studies is that day surgery is likely to be 'cost-effective' by comparison with in-patient surgery. In addition, a number of reports have urged the wider provision of day case surgery [1,4,5]. Hence decision-makers in hospitals and health service policy-makers have been encouraged to adopt day surgery as a way of making the best use of their limited budgets.

Some key questions ought to be raised about the enthusiasm for day surgery if the full economic implications are to be assessed. Does day surgery produce an 'optimal' allocation of scarce health sector resources, and what is meant by 'optimal' in this context? Will day surgery deliver 'value-for-money' at the hospital level? Is value-for-money simply a matter of delivering 'cost-effective' care? How important are the staffing implications of shifts to day surgery delivery patterns?

This paper gives an overview of economic appraisal approaches, provides a framework for appraisal which covers the perspectives of both hospital decision-makers and that of society as a whole, and considers some important issues in the economic evaluation of day surgery.

2. Economic evaluation

If resources are to be optimally or efficiently allocated, that is, the best use is to be made of constrained

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Table 1
Types of economic evaluation

Type of evaluation	Cost measurement	Outcome measurement	Outcome valuation
Cost-minimisation	Pounds (£)	Assumed equivalent	No valuation
Cost-effectiveness	Pounds (£)	Outcome common to alternatives being evaluated, but achieved to different degrees	Common units e.g. number of lives saved, number of cases treated
Cost-benefit	Pounds (£)	Any effects produced by the alternatives	Pounds (£)
Cost-utility	Pounds (£)	Single or multiple effects, common or unique to the alternatives and achieved to differing degrees	Quality-adjusted life years (QALYs), well years, other utility measures

resources in delivering health, programmes need constituent activities that are efficacious and are delivered effectively. Health interventions may be efficacious, e.g. surgical procedures may be successful, but they may not be delivered effectively (e.g. excessive use of staff time). Suppose an intervention does work and is delivered effectively, this does not guarantee efficient delivery since it could be extremely costly. Economic appraisal is about the marriage of resource use (inputs) with outcomes, it is not simply about costs, nor would outcome assessment on its own constitute an economic evaluation. Additionally equity should be addressed. This relates to 'fairness' in the allocation and distribution of resources.

Four forms of economic study are in use [6]: cost-minimisation analysis (CMA), cost-effectiveness analysis (CEA), cost-benefit analysis (CBA), and cost-utility analysis (CUA). These are listed in Table 1, where the distinctions between the approaches will be evident, appearing as they do on the outcome side. Briefly, CMA requires that outcomes be identical, a possibility in day surgery; CEA has agreed types of outcome such as life-years saved or day cases treated; CBA has no fixed outcome or type of outcome, and all elements of cost and outcome are valued in common units, usually the currency of the country of study; CUA measures the 'utility' (satisfaction, happiness, welfare) of outcomes, typically through measures of health-related quality of life [7].

Placing the word 'social' before each of the evaluation approaches indicates that the societal viewpoint is being taken. In a health system which involves public funding, taxpayers and citizens are entitled to know if the allocation of resources will maximise social welfare, and this requires that a broad approach be taken. Just how comprehensive this approach can be, in principle, is shown in the following general formula for CBA [8]:

$$\sum_{\text{i.k.t}}\left[\frac{P_{\text{ikt}}B_{\text{ikt}}}{(1+R)^{\text{t}}}\right]-\sum_{\text{j.k.t}}\left[\frac{V_{\text{jkt}}C_{\text{jkt}}}{(1+R)^{\text{t}}}\right]\gtreqless 0$$

If a project gives a positive result, measured in pounds or dollars say, an increase in social welfare is predicted: a negative result would predict social costs to exceed social benefits and therefore not be worth undertaking. The B and C symbols refer to benefits and costs, with different categories of benefit and cost indicated by the i and j subscripts respectively. The k subscript refers to the recipient of the benefit (individual or group), or the person or agency incurring the cost. Most projects have a significant time dimension: the t subscript caters for this. The expression C_{jkt} thus indicates C units of cost type j incurred in time period t by person or agency k. The valuation of social costs and benefits is represented in the formula by the P and V symbols. The use of a monetary unit such as the pound to value social costs and benefits does not imply that money has to change hands, simply that it is being used as the 'unit of account'.

The remaining aspect of the formula is R, the social discount rate, which allows adjustment for the time value of costs and benefits. This time value arises because the use or accrual of a resource within one time period is not equivalent to that in another time period. This is perhaps best understood in terms of the existence of interest rates, which requires that we either compound funds to obtain their future value, or reverse the process and discount future flows back to the present. In the UK the government specifies a cost of capital and a 'standard' discount rate, both currently set at 6% [9]: this is highly relevant in respect of the assessment of new capital expenditure, whether or not the full CBA framework is used.

There is a huge volume of literature on economic appraisal and its application in health, although only a very small proportion of this involves day surgery [10,11]. Unfortunately the quality of some of the published economic appraisals has not been of a good standard [12]. This was one reason why a multinational working party was convened to develop guidelines for authors and peer reviewers of economic papers submitted to the British Medical Journal [13]. Whilst critics have argued that guidelines can become too prescriptive, it is important to recognise that economic appraisal should be conducted on sound lines. The guidelines are concerned with (1) study design: the study question, the selection of alternatives, and the

form of evaluation; (2) data collection: effectiveness data, benefit measurement and valuation, costing, and modelling; and (3) analysis and interpretation of results: adjustments for timing of costs and benefits, allowance for uncertainty, and presentation of results. A 35-item checklist is provided based upon this framework. So clear criteria have been 'laid down' for economic appraisal, which can be expected to apply in the economic analysis of day surgery activities.

3. Economic framework: provider (hospital) perspective

It is important to be clear from whose perspective the appraisal is being conducted. Evidently hospital decision-makers are required to balance their budgets while delivering good quality care, so a framework is now outlined which shows how their perspective can be handled in economic studies. The study question here could be the following: from a provider perspective, which is the most cost-effective means of undertaking surgery?

Studies in Scotland [14] have indicated six alternative ways of delivering surgery:

- designated day surgery unit with its own committed and separate facilities,
- designated day surgery ward plus dedicated theatre(s),
- designated day surgery ward plus booked theatre time in main theatre(s),
- designated day surgery ward plus mixed lists in main theatre(s),
- day surgery patients in 'standard' surgical wards, and
- in-patient surgical wards.

To undertake economic appraisal requires the calculation of both recurrent costs and capital costs. In the case of capital costs the alternatives could be newly build or rebuild and/or modify e.g. theatre facilities. Alternative specifications should be costed along with all the associated equipment costs. A full economic appraisal should also provide estimates of the opportunity cost of space (the value of the next best alternative use of the space/land) taken up: for example such estimates are likely to be of considerable influence on a decision to build a designated unit on a crowded city hospital site, and thus on the mode of delivery of surgery. When assessing capital expenditure in respect of day surgery projects, hospitals would be required to use the government discount rate of 6% mentioned above.

Calculations of recurrent costs of alternative programmes should be undertaken. Table 2 indicates the data categories required. Although reasonably detailed it should not be viewed as completely comprehensive. Data requirements include calculations of medical and nursing staff time, supplies of anaesthesia, drugs and dressings, and the allocation of overheads such as administration, heating and lighting. A fully detailed design would specify the proposed valuation techniques for each item and the sources of data needed to proceed with these valuations. Detailed accounting and economic techniques are available for valuation [15–17]. No general prescription can be given on data sources since this will evidently vary with both local and national circumstances.

The study question is framed in terms of cost-effectiveness, so an appropriate outcome measure is required, in this framework the numbers of cases treated would suffice. Alternative delivery programmes are likely to differ on the costs incurred and on the numbers treated in a given time period, or on both: hence the need to compare programmes in terms of their cost-effectiveness. The study question could be made more specific and relate to one category of surgical procedure, or more commonly a 'basket' or group of procedures.

4. Economic framework: societal perspective

A typical study question could be: from the societal perspective, is it preferable to undertake a group of operations by day surgery or by in-patient surgery?

Table 2
Cost framework: provider viewpoint

Recurrent costs
Out-patient
Medical staff time
Nursing staff time
Other staff time
Overheads (e.g. administration, heating, lighting)
In-patient/day case bed
Medical staff time
Nursing staff time
Other staff time
Drugs
Direct supplies (dressings, sundries)
Overheads (ward/unit administration, heating, lighting)
Theatre
Medical staff time
Nursing staff time
Anaesthetist time
Drugs, anaesthesia
Direct supplies (dressings, theatre drapes)
Overheads
Hospital liaison nurse
Nurse time
Direct supplies
Travel
Overheads (administration)

Table 3
Cost framework: societal perspective

Health service recurrent costs
Out-patient, in-patient bed/day case bed, theatre, hospital liaison nurse/district nurse: as Table 2
General practice
Contacts with general practice: general practitioner time, practice nurse time
Drugs, supplies (e.g. dressings)
Overheads
Costs borne by other public sector bodies
e.g. Social work department
Costs borne by patients, family, friends
Out-of-pocket expenses: travel costs (accompanying patient to/from GP, hospital; visiting patient in hospital)
Child care costs
Costs of caring for other dependants
Purchase of items for hospital stay
Other expenses associated with informal caring
Further societal costs
Effect on national income: days off work
Disruption to other normal activity: lost housework time, lost leisure time
NB: this category applies to all involved—patients, family, friends
Psychological/emotional costs
In-patient case: pain; anxiety associated with hospitalisation and being away from family
Day case: pain; anxiety for both patient and family associated with early discharge

A social appraisal is likely to include most of the items listed in Table 2, but the framework is substantially broadened to a more comprehensive list of those affected, both institutionally and personally. Hence the inclusion in Table 3 of general practice costs, costs borne by other public sector bodies, costs borne by patients, family and friends, further societal costs in the shape of impacts on work, housework and leisure, and last but not least, the psychological and emotional costs associated with hospitalisation and surgery.

The benefits of alternative surgical procedure programmes will include reductions in some aspects of the listed costs (e.g. resource savings in hospitals, less travelling costs for patients and relatives), and improvements in patient health status, satisfaction, and quality of life.

The evaluation approach taken in the broader framework could be either CBA or CUA. In the CBA approach, all the listed costs and benefits should be valued in monetary terms as shown in the formula explained above. If the CUA approach is selected, measures of health-related quality of life would be needed to assess changes in patients' health status, satisfaction and well-being.

The comprehensive nature of this broader approach confirms the importance of the perspective taken in evaluation. Such evaluation clearly moves well beyond the confines of hospital budgets. We can note, however, that even within this broader framework equity considerations have not been explicitly addressed.

5. Some important issues in the economic appraisal of day surgery

Evidently the conduct of economic appraisal requires that considerable care be taken in formulating appropriate study questions and designing and evaluating alternative delivery programmes for surgery. A number of issues can be raised. Almost 20 years ago Jönsson and Lindgren [18] warned of five 'fallacies' surrounding the estimation of economic gains from early discharge after surgery. Their concerns are still highly relevant so their fallacies will be interwoven with a number of key issues, many of which are adopted from an invaluable paper by Mayston [19].

(1) First and foremost, it would be wrong to presume that day surgery is the optimal type of programme. It is strongly urged that the provision of alternative forms of surgery provision be fully evaluated, including economic considerations. This cannot be stated too forcefully in the face of the enthusiasm for day surgery shown in many quarters, not least in government agency reports.

(2) It is frequently asserted that day surgery is likely to produce 'savings' (usually for hospital budgets) by comparison with in-patient surgery. Which brings us to Jönsson and Lindgren's first fallacy: a reduction of 1 day in the length of stay means a cost saving equivalent to the average cost of 1 day in hospital. There are clearly 'days' and 'days' in hospital, with variations in cost incurred on behalf of patients. The precise (potential) savings to be made will depend on how much of the cost incurred is variable, and can thus be adjusted, and how much is fixed and thus cannot be adjusted (in the short run).

(3) For cost savings to be realised at a given hospital would require either (i) the closure of in-patient beds and perfect substitution (matching) between in-patient and day cases [1], or (ii) the functions of whole wards be transferred to other specialties. Hospital administrators should be aware that by moving more patients through the system they may require bigger budgetary allocations: a result which could be justified in terms of quality health care delivery, but may not be what was sought in terms of 'efficiency' savings. Further, there is no presumption in this context that, in the words of Jönsson and Lindgren's second fallacy: a reduction in length of stay means that the waiting list can be correspondingly reduced.

(4) Day surgery involves a saving at marginal (additional) cost of relatively cheap recovery time compared

with the more expensive cost of the operation itself. Further, total theatre costs for a particular medical condition may be higher for some types of operating procedure amenable to day surgery than other types of procedure already practised in the in-patient context.

(5) Day cases may require more experienced and more expensive medical staff, such as consultants rather than junior doctors. The consequences of expanding day surgery for staffing patterns and staff training could be considerable, and indeed for some programmes such considerations may need to be incorporated into the economic evaluation framework.

(6) Day cases may require a long 'day', such as 7:30–21:00 h, to carry out the required procedures within the day, resulting in reduced potential savings in total labour costs, particularly if overtime payments are required.

(7) It should be reaffirmed that the capital expenditure implications of day surgery programmes are likely to be crucial to decisions taken concerning these programmes, and should thus be included in economic evaluations. For example, day cases may require separate dedicated recovery rooms, thus requiring additional capital expenditure; or if patient hotels are included as part of a programme, the capital expenditure implications of the construction of such facilities should be included in relevant evaluations.

(8) There may be greater risks to patients who suffer complications after day surgery, with initial cost savings lost if readmission is necessary, or such complications may require general practitioner input, imposing additional costs on general practitioners (and possibly other community services). We should thus beware of the third fallacy: length of stay can be reduced without any corresponding increase in costs in the primary care sector.

(9) Day cases may result in higher costs of transport for each day patient to be home within the day (for example private transport being recommended rather than public transport), and may impose greater external costs on the patient's relatives, particularly if they are in employment. More generally, we can refer to the fourth fallacy: length of hospital stay can be reduced without increasing the care input or the welfare loss of the patient's family and friends.

(10) Jönsson and Lindgren's fifth fallacy is: length of stay can be reduced without causing any loss in welfare to the patient. Even amongst enthusiasts there is still some unease or uncertainty about the impact of day surgery on patient welfare. For example, amidst a wealth of recommendations aimed at a considerable expansion of cataract day surgery in Scotland, the National Audit Office [5] advocates that health boards should commission surveys to measure patients' quality of life. As noted earlier, the economic appraisal approach of cost-utility analysis is designed to incorporate patient quality of life outcomes.

6. Concluding commentary

Day surgery may indeed prove to be the appropriate, recommended, mode of surgery delivery in particular decision-making circumstances. The message of this paper is that the relevant alternatives require evaluation, part of which should be economic. It is not being argued here that the economic aspects of resource use dominate or override all other factors. Decision-making in surgery provision involves a wide range of considerations. In this respect a strong case has been made recently for economic appraisal to be embedded within the framework of decision analysis which, it is argued, is the only approach which can transparently integrate the three key components of health care decisions involving the use of public funds, namely clinical evidence, preferences, and costs [20].

So resource use should be evaluated: economic appraisal can be very helpful in explicitly pointing to, and evaluating, the costs and consequences of alternative actions. How much better it is to take decisions in the presence of such information than in its absence.

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Ambulatory Surgery

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Implant of subcutaneous central venous access devices in outpatient surgery

Francesco A. D'Angelo [a,*], Giovanni Ramacciato [a], Paolo Aurello [a], Alessandra Caramitti [a], Gaetano Lanzetta [b], Salvatore Lauro [b], Matilde Magri [a]

[a] *Istituto di I Clinical Chirurgica, Universita' degli Studi di Roma, 'La Sapienza' Policlinico Umberto I, Viale del Policlinico 155, Roma, 00161, Italy*

[b] *Istituto di Patolovia Generale, Universita' degli Studi di Roma, 'La Sapienza' Policlinico Umberto I, Viale del Policlinico 155, Roma, 00161, Italy*

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Abstract

Today, an increasing number of subcutaneous central venous access devices are implanted on a ambulatory basis either by percutaneous vein puncture or venous cut down. The aim of the present study was to prospectively evaluate which is the most suitable implant technique for ambulatory surgery by comparing subclavian vein puncture using a Seldinger technique with cephalic vein cut-down in terms of operative morbidity, patient acceptance and health costs. Analysis of a personal series of 189 subcutaneous central venous access device insertions did not show any significant difference between the two methods, with an overall morbidity of 9.6 and 6.5% (P = ns), respectively, a greater cost of $120 for percutaneous subclavian vein puncture and a slightly more painful experience during dilatation for catheter positioning during the Seldinger manoeuvre. Furthermore, subclavian vein puncture carries the risk of major complications, such as pneumothorax, major vessel injury or nerve palsy. In conclusion, we think that venous cut-down is the ideal technique for ambulatory surgery, limiting the Seldinger technique to cases where proper catheter insertion through the cephalic vein is impossible.

Keywords: Subcutaneous port; Surgical access; Ambulatory surgery

1. Introduction

Different techniques for subcutaneous central venous access device implant (SCVAD) are currently employed [1], but mainly percutaneous vascular access using the Seldinger technique or venous cut-down [1]. Morbidity of both insertion techniques is generally low and implants are currently performed by different specialists, including surgeons, anesthesiologists, radiologists and nephrologists [2]. A great number of SCVAD procedures are undertaken on an outpatient surgery basis. The aim of the present paper is to prospectively analyse a personal series of SCVAD insertions to evaluate the most suitable implant technique for outpatient surgery.

2. Materials and methods

A consecutive series of 139 subcutaneous central venous access devices implanted in the I Istituto di Clinica Chirurgica-SS Chirurgia Geriatrica of the Universita' degli Studi li Roma 'La Sapienza' has been prospectively analysed. Implants occurred between January 1992 and June 1997 in 187 patients, 103 (58%) male and 78 (42%) female (female to male ratio 1:1.3). Two patients experienced a second implant (1%). Age ranged from 19 to 79 years, median 59.6, mean 57. All the patients presented solid tumors and chemotherapy has been the main indication for implant. A total of 179 SCVAD implants occurred in outpatient surgery (95%), while ten occurred as inpatient surgery (5%) during the operation for the primary malignancy (inpatient to

* Corresponding author.

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Table 1
Ambulatory implant of subcutaneous central venous access device

Access	Complications					
	n	Overall *n* (%)	Sepsis *n* (%)	Displacement *n* (%)	Thrombosis *n* (%)	Occlusion *n* (%)
Cephalic	104	7 (7.4)	1 (1.4)	3 (2.7)	3 (2.7)	0
Subclavian	60	6 (9.6)	4 (6.4)	1 (1.6)	1 (1.6)	0
Basilic	6	1 (16.6)	0	0	0	1 (16.6)
I. jugular	6	0	0	0	0	0
Saphenous	3	0	0	0	0	0
Total	179	14 (7.4)	5 (2.6)	4 (2.1)	4 (2.1)	1 (0.5)

outpatient ratio 1:18.9). As outpatient surgery, different implant techniques have been utilised: cephalic vein cut-down in 104 cases, percutaneous subclavian vein puncture with Seldinger technique in 60 cases, internal jugular vein cut-down in six, basilica vein cut-down in six and saphenous vein cut-down in three. During the surgical operation for the primary malignancy implants occurred with cephalic vein cut-down in four cases, saphenous vein out-down in three cases, percutaneous subclavian vein puncture in two cases and internal jugular vein cut-down in one case. Saphenous vein cut-down was chosen when superior vena cave catheterization was contraindicated, while basilic vein access was used when patients requested the avoidance of an unesthetic scar in the upper thoracic girdle. All the other implant techniques were utilised according to the surgeon's preference. Ambulatory surgery was performed after evaluation of cardiac performance, chest X-ray and coagulation profile. After monitoring the patients with continuous ECG and pulse oximetry, local anaesthesia was induced with a solution of bupivacaine 0.50% and 0.9% NaCI in a ratio of 1:2. A peroperative intravenous single dose of third generation cephalosporine was given except in cases of known specific allergy. Intraoperative X-ray screening was utilised in all cases to asses the correct position of the catheter. In cases of percutaneous subclavian vein puncture, a chest X-ray was taken 2 h after the implant to rule out a pneumothorax, prior to hospital discharge. Patients were advised to take nimesulide 100 mg per os the night of the operation and the next morning; clinical control was performed on the second post operative day, before allowing the use of the device.

Three different kinds of device were employed, according to hospital availability: Port-a-Cath (Pharmacia Deltec, St. Paul, MN) in 20 cases, Celsite ST 201 (B. Braun Celsa, Chasseneuil, France) in 155 cases and R-Port (Boston Scientific, MA) in four cases.

Statistical analyse has been made by the χ^2-test. $P < 0.05$ was considered significant.

3. Results

In a total of 189 subcutaneous venous access device insertions, 179 occurred in outpatient surgery (95%). There were 14 (7.4%), complications: five sepsis (2.6%), four displacements (2.1%), four venous thrombosis (2.1%), one catheter occlusion (0.5%). In individual implant techniques we recorded seven complications with cephalic vein cut-down (6.5%): one sepsis (0.9%), three displacements (2.7%), three thrombosis (2.7%): six complications with percutaneous subclavian vein puncture (9.6%): four sepsis (6.4%), one displacement (1.6%), one thrombosis (1.6%). In case of basilic vein cut-down there was a catheter occlusion as the only complication (16.6%), while we did not experience complications in cases of saphenous vein placement (with catheter in the inferior vena cava) (Table 1). Comparing the two major groups of implants, percutaneous subclavian vein puncture versus cephalic vein cut-down, morbidity presented no statistically difference values (P = ns) (9.6 versus 6.5%, respectively); operative time has been recorded in a comparative series of 20 patients, with mean value of 40 and 50 min, respectively (range 35–60 min in both series), P = ns. Patients were requested to define the operations as a slightly, medium or strongly painful experience. Patients submitted to percutaneous subclavian puncture recorded a medium painful procedure in 50% of cases (30 patients) compared to cephalic vein cut-down where 70% of cases (73 patients) described the procedure as slightly painful. None of the patients felt the procedure was strongly painful. No cases of procedure failure occurred, but in 12 cases (10%) we converted the insertion technique from cephalic vein cut-down to subclavian vein puncture because of cephalic vein abnormalities, while in one case (1.6%), unsuccessful percutaneous subclavian vein puncture required cephalic vein cut-down technique for proper catheter implant. All the catheter placements were performed under X-ray control. Only in cases of percutaneous subclavian puncture was a chest X-ray performed before hospital discharge. In our Institution, the cost of the operative room is $300 per

hour, $360 for the device and $60 for the intraoperative X-ray control, with a total of $1260 for both type of implants. In case of percutaneous puncture of the subclavian vein there is an additional cost of $120 for the chest X-ray.

4. Discussion

Subcutaneous central venous access devices are requested with increasing frequency in clinical practice [3,4] Two different techniques of catheter positioning are usually utilized, percutaneous venous puncture or venous cut-down [5]. The procedure is performed by different specialists, such as surgeons, anesthesiologist, radiologists and nephrologists [1,2] Moreover, a large number of PSVAD implants take place in outpatient surgery, essentially to reduce health costs. The prospective analysis of our series of cases shows how 95% of implants occurred in outpatient surgery. On the basis of this consideration, we looked for the implant technique giving the least complications (thus not requiring the need for hospital stay), compared patients acceptance and looked at health costs and results. In this prospective non randomized series, we have compared percutaneous subclavian vein puncture to cephalic vein cut-down technique (Table 1). Morbidity of the procedures did not show any statistical significance ($P = \text{ns}$) (9.6 versus 6.5%). However, we did not experience any case of pneumothorax after subclavian vein puncture, though in the literature it is reported in 1–3% of cases, [1,2,6,7] leading to patient hospitalization and eventually pleural drainage. Furthermore, some major complications, such as subclavian artery puncture, SVC rupture or nerve palsy are sometimes reported, all consequences of the dilatation during the Seldinger procedure for catheter implant after subclavian vein puncture [8–12]. These did not occur in our series. Analysing health costs, the two procedures took place in the same outpatient operative room, with no difference in instrument preparation, type of device or waste material. Operative time for percutaneous subclavian vein puncture was a mean of 40′ versus 50′ for cephalic vein cut-down, showing no statistical difference. Percutaneous subclavian vein puncture required a post-operative chest X-ray to rule out pneumothorax, with a slight increase of overall costs. In our Institution, this is an additional cost of $120 in case of percutaneous puncture of the subclavian vein compared to cephalic vein cut-down. The same kind of local anaesthesia has been practised and none of the patients reported a strongly painful experience. In the case of percutaneous subclavian vein puncture, 50% of cases felt the procedure was medium painful, particularly during dilation for catheter implant, against 70% of patients having a slightly painful experience with cephalic vein cut-down. Analysing the complications occurring in the two major groups, there is a relative major incidence of catheter dislodgement in the cephalic vein cut-down group (2.7 versus 1.6%, $P = \text{ns}$). Our surgical technique consists of a single cutaneous incision over the deltoid-pectoral groove to prepare the cephalic vein and insert the subcutaneous port. This could lead to an excessive tension on the device during the movement of the upper thoracic girdle that could facilitate the displacement of the catheter. On the other hand, we did not notice any breakage of the catheters as reported in the literature [13,14]. Breakage of the catheter could cause severe complications, such as drug extraxvasation or venous migration into the right side of the heart or the pulmonary circulation, and essentially occurs due to the compression of the catheter between the clavicle and the first rib when the catheter is inserted by puncture of the subclavian vein [13,14]. In three cases we implanted the catheter in the inferior vena cave through saphenous vein cut-down, while the subcutaneous pocket was prepared in the anterior thoracic region, above the X–XI costal arch and the catheter tunnelled in the subcutaneous tissue [15]. Only in a very limited number of cases did we experience any kind of complication with this technique. Furthermore, with cephalic vein cut-down the Trendelenburg position is not needed, though it is in subclavian vein puncture. This is a great advantage in dyspnoeic patients.

In conclusion, the prospective analysis of our series shows no significant difference between cephalic vein cut-down and percutaneous subclavian vein puncture for ambulatory implant of subcutaneous venous access devices, in terms of surgical complications, patient's acceptance or health costs. On the other hand, we think that cephalic vein cut-down is the best method for a safe ambulatory surgical procedure avoiding the potential risk of pnuemothorax, major vascular or nerve injury, or catheter fracture which could occur using the percutaneous subclavian vein puncture technique. On the other hand in 10% of cases of cephalic vein cut-down, placement of the catheter was unsuccessful for anatomical reasons, requiring subclavian vein puncture for proper catheter positioning during the same procedure. Therefore, this technique should also be familiar to surgeons undertaking the ambulatory implantation of subcutaneous central venous access devices.

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Study of unilateral postherniorraphy analgesia with local anaesthetic and monitored anaesthesia care

J.L. Porrero Carro [a,*], C. Sánchez-Cabezudo Díaz-Guerra [b], P. Lee Wong [c]

[a] *Service of General Surgery and Digestive System II, Hospital Centre of Cantoblanco, Road of Colmenar Viejo, 14600 km, Madrid, 28043, Spain*
[b] *Service of General Surgery and Digestive System II, General University Hospital Gregorio Marañón, Madrid, Spain*
[c] *Service of Anaesthetics and Reanimation, General University Hospital Ramón y Cajal, Madrid, Spain*

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Abstract

Local anaesthetic with monitored anaesthetic care (MAC) is a very good technique for unilateral-inguinal herniorraphy. We looked at the analgesia produced by the infiltration with local anaesthetic, the intensity of pain in the immediate postsurgery period; the efficiency of oral analgesics and the satisfaction of the patients. Between January and July 1997, 63 patients underwent unilateral-inguinal herniorraphy (Shouldice type) using local anaesthetic (300 mg of mepivacain 1% and 50 mg of bupivacain 0.25%) and MAC (fentanyl, mydazolan and propofol). The intensity of pain was measured using two evaluation scales: visual analogue scale (EV) and verbal scale (Eve). When the patients asked for an analgesic they were given magnesic metamizol (Nolotil), every 6 h. Five patients (8%) felt no pain and 58 felt pain 4 h 36 min after local anaesthetic infiltration (EV = 2.5; Eve = 1.45) of these 58 patients, 49 took a first dose of 'Nolotil' 6 h 40 min after local anaesthetic induction (EV = 4; Eve = 1.97), 43 received a second dose of 'Nolotil' at 13 h 40 min (EV = 3; Eve = 1.49) and 22 a third dose at 17 h 40 min (EV = 3.2; Eve = 1.7). Every patient that was very satisfied with the anaesthetic technique, said that the postsurgery pain was bearable and they would be happy to be operated on again with the same anaesthetic-surgery technique. The efficacy of the anaesthetic technique (local anaesthetic with conscious sedation) was very good, 8% of the patients never felt pain and 21% never received any analgesic. The time passed until the first analgesic dose was 6 h 40 min, and the tolerance of the pain was excellent.

Keywords: Inguinal-postherniorraphy pain; Local anaesthetic; Monitored anaesthesia care

1. Introduction

Because of the growth of major ambulatory surgery in Spain over the last few years, it is thought that it is very important to know objectively the efficiency, comfort and acceptance levels by patients of unilateral-inguinal herniorraphy, under local anaesthetic and monitored anaesthesia care (MAC) [1]. This approach produces faster recovery and more rapid mobility.

In this study, the duration of the analgesia produced with the infiltration of local anaesthetic, the intensity of pain in the immediate postoperative period, the efficiency of local anaesthetic and oral analgesics and the satisfaction of the patients, have been measured.

2. Materials and methods

Between January and June 1997, 63 patients (57 males, median age 52 years and six females, median age 45 years) underwent unilateral-inguinal herniorraphy using the Shouldice technique and local anaesthetic and monitored anaesthetic care (MAC).

* Corresponding author.

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The local anaesthetic used was: 300 mg mepivacain 1% and 50 mg bupivacain 0.25% and MAC was undertaken using 0.10 mg fentanyl, 2–3 mg mydazolán and 2–3 mg/kg per h propofol.

The intensity of pain was measured with two evaluation scales [1,2]:

1. visual analogue scale (EV), the patient scored from 0 to 10 (Table 1);
2. verbal scale (Eve), based on the McGill-Pain Questionnaire this had several levels of pain: no pain, light pain, moderate pain, severe pain, very severe pain and crushing pain (Table 2).

These scales of pain evaluation were in a document which was given and explained to the patient in the immediate postsurgery period. The patient had to fill it in contemporaneously, annotating: when he felt pain and how intense it was; when he took the first dose of oral analgesic and how bad the pain was at that moment; and how bad the pain was when the next doses of analgesics were taken.

Oral magnesic metamizol (Nolotil) (575 mg capsules) was used as the analgesic. After the patient asked for the first analgesic dose, this was given to him again each 6 h as required. We studied patient satisfaction with the surgery through a six questioned form, which was included in the document given to the patient in the immediate postoperative period (Table 3).

3. Results

Of the 63 patients operated on six (8%) never felt pain and 58 felt pain 4 h 36 min after the local anaesthetic induction, with pain quantified according to a Visual Scale (EV) of 2.5 and a Verbal Scale (Eve) of 1.4 (light–moderate pain) (Table 4).

A total of 49 patients asked and had a first dose of analgesic (575 mg 'Nolotil' orally) 6 h 40 min from local anaesthetic induction, having at that time a pain score of EV = 4 and Eve = 1.97 (moderate pain) (Table 5).

A total of 43 patients received a second analgesic dose 13 h 40 min from induction with pain scores of EV = 3 and Eve = 1.49 (light–moderate pain) (Table 6) 22 patients took a third analgesic dose at 17 h 40 min with pain scores of EV = 3.2 and Eve = 1.7 (light–moderate pain) (Table 7).

It is important to note that 8% of the patients never felt pain and 21% never received any analgesic. Only ten (15%) patients did not sleep very well on the first night. Every patient was very satisfied with the anaesthetic technique, and they would be happy to be operated on again using the same anaesthetic surgery technique. They said that the postsurgery pain was bearable and the analgesia used was effective.

4. Discussion

Our study demonstrates very positive results about the efficiency of our anaesthetic technique (local anaesthetic with conscious sedation). The time that elapsed from local anaesthetic infiltration until the first dose of analgesic was 6 h 40 min in 80% of patients. The anaesthetic tolerance was excellent and every patient would be happy to undergoe surgery again using the same anaesthetic technique, 8% of the patients never felt pain and 21% never received any analgesic.

For obtaining our objectives, we used a mixture of two local anaesthetics mepicain and bupivacain. These were used in lower concentrations than normal (30 ml mepivacain 1% and 20 ml bupicain 0.25%, giving a final concentration of mepivacain of 0.6% and bupivacain of 0.10%). The total dose of both anaesthetics was 300 mg and 50 mg, respectively, which is very far from the maximum dose advised (500 mg for mepivacain and

Table 1
Scale of postoperative pain evaluation (visual analogue scale)

Analogic visual scale (score the pain intensity from 0 to 10)
Time of beginning of pain
Time of 1° analgesic dose
Time of 2° analgesic dose
Time of 3° analgesic dose
Next day
To the 24 h
To the 48 h

Table 2
Scale of postoperative pain evaluation (verbal scale)

Verbal scale (score the pain intensity from 0 to 5)	
0	No pain
1	Light pain
2	Moderate pain
3	Severe pain
4	Very severe or horrible pain
5	Crushing or atrocious pain

Table 3
Questionnaire for evaluating the patient satisfaction

	Patient satisfaction level (answer 'yes' or 'no')
Are you satisfied with the anaesthetic technique used?	
Will you be operated again with the same technique?	
Is the postoperative pain bearable?	
Is the analgesic efficient?	
Have you had a good night?	
Have you had any complication or problem?	

Table 4
Verbal scale of the 58 patients who felt pain

Verbal scale (Eve = 2)	
Light pain	37 (64%)
Moderate pain	16 (27%)
Severe pain	5 (9%)
Very severe pain	0
Crushing pain	0

Table 5
Verbal scale of the 49 patients who received a first Nolotil dose

Verbal scale(Eve = 1.97)	
Light pain	12 (24%)
Moderate pain	26 (53%)
Severe pain	11 (23%)
Very severe pain	0
Crushing pain	0

Table 6
Verbal scale of the 43 patients who received a second Nolotil dose

Verbal scale (Eve = 1.49)	
No pain	2 (5%)
Light pain	24 (55%)
Moderate pain	12 (28%)
Severe pain	4 (9%)
Very severe pain	1 (3%)
Crushing pain	0

200 mg for bupivacain) [3]. This is very important because the first symptoms of local anaesthetic intoxication are trembling, shaking, nervousness or nausea, making recovery and the early discharge of patients, which is so necessary in ambulatory surgery, more difficult. The long analgesic effect of bupivacain is well documented [4] and this has been confirmed in this study, even with the low dose used.

The drugs used in the conscious sedation were fentanyl, mydazolam and propofol; all of them with an adequate pharmacokinetic behaviour for use in ambulatory surgery, because they allow the early recovery of patients [5–7].

In this study we used a sedation scale of five levels [8].

1. Awake and orientated.
2. Sleepiness
3. Closed eyes, but answer verbal orders.
4. Closed eyes, but answer to soft physical stimulus.
5. Closed eyes, but do not answer to soft physical stimulus.

Our objective was to keep the patients in level 3 sedation, without loosing the verbal contact with them. Even the few patients who complained slightly during the operation were very satisfied with the anaesthetic technique after their surgery, due to the retrograde amnesia produced by the mydazolam.

Table 7
Verbal scale of the 22 patients who received a third Nolotil dose

Verbal scale (Eve = 1.7)	
No pain	1 (4%)
Light pain	9 (41%)
Moderate pain	8 (36%)
Severe pain	4 (19%)
Very severe pain	0
Crushing pain	0

In this study oral-magnesic metamizol (Nolotil), which is the most popular analgesic in our country, was used in the standard dose of 575 mg every 6 h. The results of the analgesia provided are not as good as they could have been. When the patients received the second dose of metamizol, 28% of them had moderate pain and 9% severe pain. This problem can then be looked at from two different points of view:

(1) Maybe it is only a dose problem. According to several authors, the analgesia produced by metamizol is the same as that for paracetamol analgesia for equivalent doses, i.e. 1 g of metamizol is equivalent to 1 g of paracetamol. In the literature there are a lot of studies proving greater effectiveness from efficiency of a 1 g paracetamol dose than a 0.6 g paracetamol dose [9]. Perhaps by using two pills of metamizol (2×575 mg) in the postoperative period the results would be better.

(2) Perhaps the problem can be tackled by exploring the concept of pre-emptive analgesia [10] and multinodal analgesia [11,12], using local anaesthesia with preoperative peripheral and central analgesics.

There are several studies (Tverskoy [13], Bugedo [14], Dueholm [15]) that demonstrate the excellence of pre-emptive analgesia in inguinal herniorraphy, with a diminution of postsurgery pain and the analgesic dose used.

Therefore it is believed in the future that pre-emptive analgesia should be used and this will be the main subject of our next studies.

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Ambulatory Surgery

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Home readiness after day-case knee arthroscopy: spinal, desflurane, isoflurane or propofol anaesthesia?

M. Martikainen *, P. Kaukoranta, T. Kangas-Saarela

Department of Anaesthesiology, Oulu University Hospital, Kajaanintie 52, 90220 Oulu, Finland

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Abstract

In this study, four accepted methods of anaesthesia were compared during out-patient knee arthroscopy (KA). Immediate (< 2 h) postoperative recovery was evaluated in terms of pain, sedation, nausea and time for home readiness. 173 patients undergoing elective KA were randomised to receive either spinal, propofol infusion, isoflurane or desflurane inhalation anaesthesia. Postoperative pain, sedation and nausea were recorded at 30, 60, 90 and 120 min after arrival in the recovery unit (RU). Discharge readiness was defined as fulfilment of the following criteria in all groups: alert, stable vital signs, able to ambulate, able to take oral fluids, no nausea and pain controllable by oral medication. Postoperative pain, in general, was low in all groups. The spinal patients had significantly lower VAS scores ($p < 0.001$) than the general anaesthesia patients at 30, 60 and 90 min after arrival in RU. At 120 min the pain level was equal in all groups. No remarkable differences between the general anaesthesia groups were noted in terms of pain and nausea. The overall incidence of nausea was 3.4%. Propofol and isoflurane patients were more sedated at 30 min postoperatively than spinal and desflurane patients. At 60 min postoperatively all groups were alert. The time required for home readiness was significantly shorter in all the general anaesthesia groups (propofol 55 min, isoflurane 56 min and desflurane 46 min) than in the spinal anaesthesia group (168 min) ($p < 0.001$). General anaesthesia is a practical alternative in elective knee arthroscopy. The immediate recovery profile is smooth with low levels of pain and nausea and home readiness is achieved significantly sooner than after spinal anaesthesia.

Keywords: Anaesthesia-ambulatory; Desflurane; Home readiness, Isoflurane; Knee arthroscopy; Propofol; Spinal

1. Introduction

Knee arthroscopy is a surgical procedure well suited to be performed on an out-patient basis [1]. The choice of the ideal anaesthetic technique, is still controversial [2,3]. Spinal anaesthesia is widely used in day surgery and has been proven to be safe and to provide satisfactory conditions for surgery [3,4]. However, the postoperative recovery period following spinal anaesthesia may be long compared to the short operation time. General anaesthesia with short-acting medication may be a practical alternative with a short postoperative recovery period.

The aim of this study was to compare four accepted methods of anaesthesia during out-patient knee arthroscopy, i.e. spinal, desflurane, isoflurane and propofol anesthesias. Postoperative recovery was evaluated in terms of pain, sedation, nausea and time for home readiness.

2. Methods

The protocol was approved by the Ethics Committee of the Medical Faculty, University of Oulu. After informed written consent, 173 patients (ASA I or ASA II, age under 65 years) scheduled for elective knee arthroscopy were randomly assigned into one of four groups. The exclusion criteria were: asthma, drug al-

* Corresponding author. Tel: +358 8 3152011; fax: +358 8 3155577.

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Table 1
Demographic characteristics, duration of operation and total time spent in operation theatre (OT)

	Group 1	Group 2	Group 3	Group 4
Number of patients (n)	55	32	38	48
Age (years)	41 (16–63)	37 (17–65)	41.5 (17–61)	37.5 (16--64)
Men/women (%)	46/54	38/62	62/38	63/37
Height (cm)	170 (153–187)	170 (153–183)	173 (153–184)	175.5 (155–186)
Weight (kg)	75 (46–95)	72 (51–95)	75.5 (52–95)	75 (54–95)
Operation time (min)	20 (7–75)	18 (6–77)	20 (7–67)	16 (7–70)
Total stay in OT (min)	64 (41–114)	64.5 (43–145)	65 (44–121)	60 (40–112)

Values are presented as medians and range (min–max).

lergy, non-steroidal anti-inflammatory drugs, obesity (women over 80 kg, men over 95 kg or BMI over 32), known epilepsy, pregnancy and active gastric ulcer. All patients had fasted for over 4 h before the anaesthesia. Upon arrival in the operating theatre, the patients were given 100 mg of ketoprofein diluted in 20 ml 0.9% NaCl intravenously over 30 min after i.v. cannulation, and 1000 ml of 0.9% NaCl was given i.v. during their stay in hospital. The patients received alfentanyl 0.5 mg i.v. as premedication just before the spinal puncture or the induction of anaesthesia. Group 1 ($n = 55$) was given spinal anesthesia with lidocaine 50 mg/ml in 7.5% glucose, 1.5–2.0 ml, through a 27 gauge needle. The block was performed laterally through the lumbar III/IV space with the patient lying on the side to be operated. Group 2 ($n = 32$) was anaesthetised with propofol, starting with a bolus 2 mg/kg i.v. followed by continuous infusion of 12 mg/kg per h for the first 15 min, 9 mg/kg per h for the next 15 min, and when needed, 6 mg/kg per h until the end of surgery. Group 3 ($n = 38$) was anaesthetised with isoflurane after a propofol bolus of 2 mg/kg. Isoflurane was given in rising concentrations up to 1 MAC before the skin incision. After that, anaesthesia was maintained with isoflurane on the 1 MAC level. Group 4 ($n = 48$) was anaesthetised with desflurane after the same induction dose of propofol as before. Desflurane inhalation was started at doses of 7.25% for patients aged over 30 and 6% for those less than 30 years old. The goal was to reach 1 MAC before the skin incision and to continue at that level during the operation. Anaesthesia was deepened if the patient showed evidence of light anaesthesia (sweating, haemodynamic and pupillary changes). All the general anaesthesia patients were relaxed with a single bolus of mivacurine 0.3 mg/kg and intubated. The patients were normoventilated ($EtCO_2$ 4.5–5.5%) with 30% oxygen in air. Alfentanil 0.5 mg was given for pain when needed (systolic blood pressure or heart rate rise of 20% over baseline value). All groups were anaesthetised by the same person. Preoperative monitoring included vital signs, such as blood pressure (BP), heart rate (HR), SaO_2 and the concentrations of inhaled and exhaled gases. Inhalation anaesthesia and propofol infusion were discontinued when skin closure was started. Postoperatively, all patients received 100 mg of ketoprofein i.v. or p.o. three times per

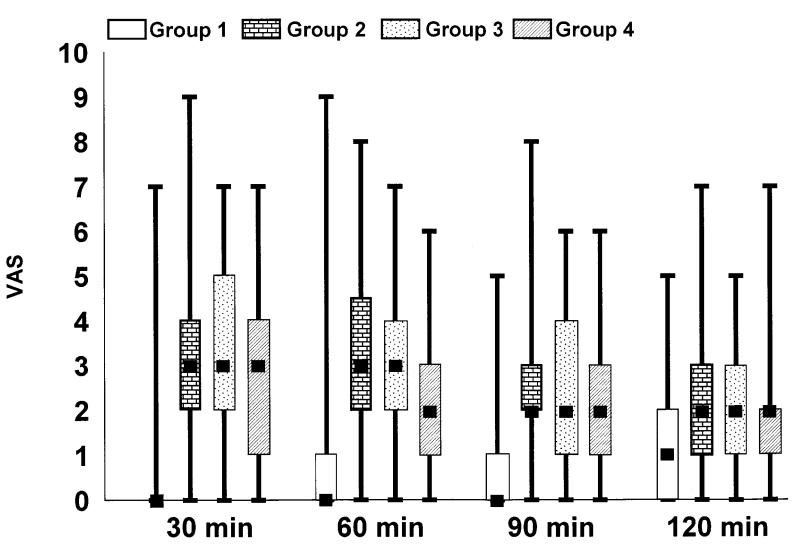

Fig. 1. Pain. Median, 25 and 75% percentiles and range.

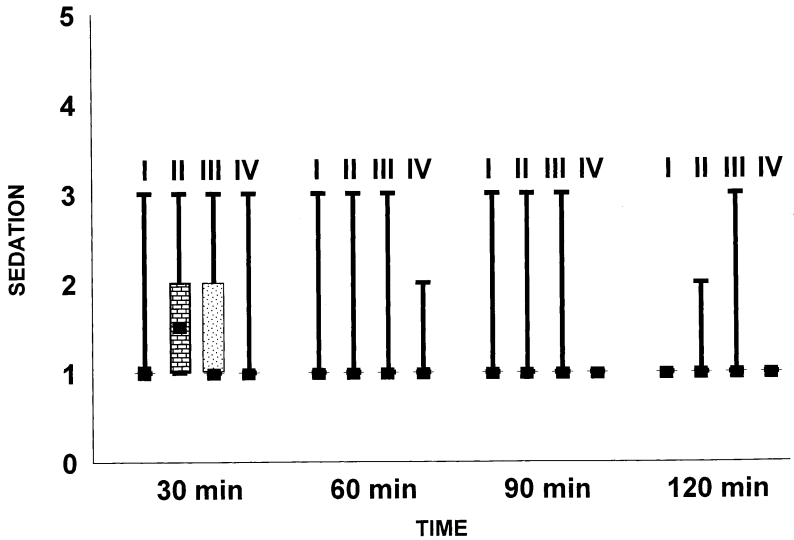

Fig. 2. Sedation. Median, 25 and 75% percentiles and range. I Group 1, II Group 2, III Group 3, IV Group 4.

24 h and 0.05 mg of fentanyl i.v. when needed for postoperative pain relief.

2.1. Postoperative period

The time of extubation, the patient's eye opening when asked, the ability to obey orders ('squeeze my hand') and orientation ('name and date of birth') were recorded. In the RU, vital signs were monitored regularly (HR, BP, SaO_2, alertness) at intervals of 30 min after arrival until discharge from the RU. The following parameters were recorded: degree of pain as estimated by VAS (0–10), degree of alertness (on a scale 1 = fully awake, 2 = sleepy, mostly awake, 3 = sleeps, wakable by words, 4 = sleeps, wakable, 5 = in coma), postoperative nausea and vomiting (PONV) (on a scale 0 = no PONV, 1 = mild PONV, no medical treatment, 2 = PONV with medical treatment, 3 = serious PONV, medical treatment ineffective). If the patient vomited or the nausea lasted for over 15 min, the patient was given metoclopramide 10 mg i.v. If the patient felt nausea after the metoclopramide dose, 4 mg of ondancetrone was given i.v. DSST [5] was administered preoperatively and 60 min after the end of anaesthesia to evaluate home readiness. In this test, the person is asked to replace random digits from 0–9 by a symbol given in the test paper. The score is calculated as the number of correctly substituted digits in 120 s. For Group 1, the time from the end of anaesthesia until full strength of the lower extremities was achieved and an ability to walk and void were noted. Discharge readiness was defined as fulfilment of the following criteria in all groups: alert, stable vital signs, able to ambulate, able to take oral fluids, no nausea and pain controllable by oral medication.

Table 2
DSST preoperatively (DSST 0), 60 min postoperatively (DSST 60) and difference between DSST 60 and DSST 0 (DSST-DIFF)

	DSST 0 (median)	DSST 60 (median)	DSST-DIFF (%)
Group 1	44.0	41.5	6.6
Group 2	46.3	39.4	15.0
Group 3	43.0	38.9	9.6
Group 4	44.4	38.7	13.0

2.2. Statistics

The Kruskall–Wallis test was used for the non-parametric variables and Anova for the parametric variables (Post Hoc Scheffe test). $p < 0.05$ was considered to be significant.

3. Results

5.5% of the patients who were asked to participate in the study refused, mainly because they wanted regional anaesthesia. 8.5% of the patients were excluded from the analyses because of lack of information or because the registrations had not been done according to the protocol. 173 patients were recruited for the study. 15.5% of the procedures were diagnostic scopies.There were no signifigant differences between the groups as to demographic data (Table 1). The patients were stable pre- and postoperatively and there were no significant differences in vital signs between the groups.

The level of postoperative pain, in general, was low in all groups. Group 1 had significantly lower VAS scores ($p < 0.001$) than the three general anaesthesia groups at 30, 60 and 90 min after arrival in RU (Fig.

Table 3
Recovery characteristics

	Group 2 ($n = 32$)	Group 3 ($n = 38$)	Group 4 ($n = 48$)
Opens eyes (min)	11 (2–32)	12 (4–29)	8 (1–18)
Extubation (min)	9 (2–32)	11 (3–24)	8 (1–18)
Follows order (min)	12 (2–32)	12 (4–29)	8 (2–18)
Orientation (min)	13 (2–32)	13 (5–33)	9 (2–19)
Sitting (min)	35 (2–75)	32 (17–60)	28 (12–57)
Drinking (min)	38 (13–97)	37 (14–110)	31 (12–117)
Standing (min)	51 (21–125)	46 (23–131)	38 (14–127)
Walking (min)	50 (22–102)	50 (23–131)	38 (14–127)
Home readiness (min in RU)	55 (22–107)	56 (23–165)	46 (19–154)
Total stay in RU (min)	184 (130–300)	204 (135–325)	197 (80–340)

Mean and range (min–max).

1). At 120 min after arrival in RU, the pain level was equal in all the groups. No remarkable differences between the general anaesthesia groups were noted. The need for opioid analgesia postoperatively was low. During the first 2 h in RU, 12.2% of the patients needed fentanyl 0.05 mg i.v. (2.0% in Group 1, 4.7% in Group 2, 2.7% in Group 3 and 3.4% in Group 4). Two patients were given oxycodone in RU: one because the spinal anaesthesia ended rapidly and one because the VAS level was high in Group 4. 2.3% of the patients (one in Group 1 and three in Group 2) had to stay in hospital until the next day because of pain. The incidence of postoperative nausea was 3.4% (no statistical difference between the groups). Because of nausea, 0.5% of the patients had to stay at hospital until the next day.

The patients were alert postoperatively (Fig. 2). At 30 min postoperatively, the Groups 2 and 3 were more sedated than the Groups 1 and 4 ($p < 0.001$). Although the patients were alert in all groups at 60 min postoperatively and no statistical difference was noted in terms of sedation, the preoperative DSST values were not reached (Table 2). The recovery characteristics are shown in Tables 3 and 4. The time before home readiness was significantly shorter in all the general anaesthesia groups than in the spinal anaesthesia group ($p < 0.001$).

Table 4
Recovery characteristics

	Group 1 ($n = 48$)
Moves toes (min after spinal injection)	100 (54–156)
Moves ankle	100 (54–137)
Flexes knee	90 (42–137)
Lifts foot	98 (55–152)
Sitting	108 (57–190)
Standing	169 (90–254)
Walking	173 (90–254)
Voiding	210 (130–314)
Home readiness (min in RU)	168 (90–260)
Total stay in RU (min)	208 (124–375)

Mean and range (min–max).

4. Discussion

The principal result of the study was that when spinal anaesthesia with short acting lidocain is used, the time before home-readiness is over three-fold longer compared to general anaesthesia with propofol, isoflurane or desflurane. This means that spinal anaesthesia patients need RU services for over 2 h longer than general anaesthesia patients. An elective knee arthroscopy patient, regardless of anaesthesia, stays in OT for about 1 h and the operation lasts for about 20 min. The choice of an anaesthesia method that shortens the postoperative period is an important determinant of how many patients per day can be operated on. In previous studies the costs of anaesthetic medication were estimated to account for less than 10% of the overall costs, while the salaries of the medical and nursing staff accounted for more than 85% of the total cost of anaesthesia [6]. While staff costs are difficult to reduce, overall savings may be achieved by increasing the number of cases operated per day. The cost of special anaesthetic drugs may not be then so important [7]. The total time of stay in RU (mean 198 min) was long compared to the home readiness time (mean 52 min in the general anaesthesia groups and 168 min in the spinal anaesthesia group). The most common reason for a long stay in RU was that the patient had to wait to be escorted from the hospital. After 1 h the vital signs were stable and the patients were alert and able to walk, drink and eat in all the general anaesthesia groups. DSST at 60 min was lower than preoperatively, showing that the higher cognitive functions had not been fully recovered. This does not mean that the patient should be in hospital. With an adult escort, recovery at home is possible.

In this study, immediate postoperative pain after knee arthroscopy was not a problem. The general level of pain was lower in this study than in other studies on knee arthroscopy [2,7]. We ascribe this to the fact that all the patients received pre-emptive analgesia with an anti-inflammatory drug as premedication. The inci-

dence of postoperative nausea and vomiting was low in all groups and the incidence of delayed discharge after surgery was lower than in earlier studies [2,8]. The low VAS scores due to pain and the minimal use of postoperative opioids may have reduced the risk of postoperative nausea and vomiting [9].

We conclude that general anaesthesia is a practical alternative in elective knee arthroscopy. The immediate recovery profile is smooth with low levels of pain and nausea and home readiness is achieved significantly sooner than after spinal anaesthesia. More studies will be needed to assess longer recovery profiles (24 h–1 week).

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Postoperative pain relief and recovery with ropivacaine infiltration after inguinal hernia repair

Patrick Narchi [a,*], Pierre Yves Carry [b], Patrick Catoire [c], Maher Fleyfel [d], Jean Luc Hermant [e], Patrick Laurent [f], Jean Michel Pinhas [g], Alphonse Pulcini [h], Nadine Jacquemet [i], Francoise Trinquet [i]

[a] *Department of Anaesthesia, Hotel Dieu de France, Beirut, Lebanon*
[b] *Department of Anaesthesia, Lyon Sud Hospital, Lyon, France*
[c] *Department of Anaesthesia, Clinique du Mail, La Rochelle, France*
[d] *Department of Anaesthesia, Claude Huriez Hospital, Lille, France*
[e] *Department of Anaesthesia, Jean Verdier Hospital, Bondy, France*
[f] *Department of Anaesthesia, CMC Porte de Choisy, Paris, France*
[g] *Department of Anaesthesia, Clinique du Parc Rambot, Aix en Provence, France*
[h] *Department of Anaesthesia, Saint Roch Hospital, Nice, France*
[i] *Laboratoires Astra France, Rueil-Malmaison, France*

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Abstract

The purpose of this study was to assess the analgesic effects of wound infiltration with 300 mg ropivacaine. A total of 77 inpatients scheduled for inguinal hernia repair were randomized, to receive postoperative local infiltration with 40 ml ropivacaine 7.5 mg/ml or placebo. Wound pain, consumption of analgesics and time when patients were fit for discharge were assessed. Pain scores upon mobilization and coughing were significantly lower in the ropivacaine group over 0–24 h. At rest, this difference was noted until 12 h. The mean time to the first request for analgesics was significantly longer in the ropivacaine group. The consumption of analgesics was comparable. The median time when patients were fit for discharge occurred significantly earlier in the ropivacaine group. Wound infiltration with ropivacaine after inguinal hernia repair results in lower postoperative pain scores, delays the requirement for additional analgesics, and allows earlier patient discharge.

Keywords: Postoperative local infiltration; Inguinal hernia repair; Ropivacaine; Postoperative pain relief

1. Introduction

Wound infiltration with local anaesthetics has been shown to be a simple and effective procedure for postoperative pain relief after inguinal hernia repair [1,2]. However, the need for the use of large volumes and the constraint of a 150 mg bupivacaine maximum dose, allow a relatively short lasting effect [3,4].

Ropivacaine is a new long acting local anaesthetic, structurally closely related to bupivacaine. It is the first enantiomerically pure local anaesthetic, and exists as the *S*-enantiomer [5]. Ropivacaine exhibits less central nervous system and cardiovascular toxicity than bupivacaine in healthy volunteers [6,7].

Because the duration of action of local anaesthetics is dose dependent, ropivacaine may provide long-acting analgesia following wound infiltration as a higher dose can be used. Until now, doses up to 200 mg ropivacaine infiltration have been evaluated for pain relief after

* Corresponding author.

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inguinal hernia repair [8–10]. These studies demonstrated a dose-related analgesic efficacy and significant pain relief for 6 h with 200 mg.

This study investigated the analgesic efficacy obtained after infiltration with 300 mg ropivacaine for inpatients undergoing inguinal hernia repair under general anaesthesia. Furthermore, postoperative recovery and criteria for discharge from hospital were assessed in order to investigate if infiltration with ropivacaine could reduce postoperative morbidity and the length of hospital stay.

2. Methods

This study was designed as a parallel, randomized, double blind, controlled, eight centres trial with two treatment groups.

After Ethical Committee approval and written informed consent, 77 adult, male inpatients, ASA group I–III, scheduled for open primary elective inguinal hernia repair under general anaesthesia were included in the study.

Patients received hydroxyzine or a benzodiazepine as premedication. Surgery was performed under general anaesthesia: propofol, fentanyl (3 μg/kg), and muscle relaxant were given for the induction; for maintenance, nitrous oxide–oxygen, inhaled anaesthetic agent, and muscle relaxant were administered. Reinjections of fentanyl were not allowed during maintenance. Patients were randomized to receive either 40 ml ropivacaine 7.5 mg/ml (300 mg) or 40 ml placebo (sodium chloride solution). At the conclusion of surgery, the solution was infiltrated as follows: before wound closure, 2 ml in the region of the ilioinguinal nerve, 6 ml around the neck of the hernia sac and 12 ml into the muscular layers; before or after wound closure, 20 ml into the subcutis and cutis. The surgical procedure was a MacVay or a Shouldice repair. For postoperative analgesic therapy, propacetamol IV (8 g/24 h) and–or oral paracetamol 500 mg–codeine 30 mg (6 tablets/24 h) were administered at the request of the patient.

Postoperative wound pain was assessed during the first 24 h after infiltration, on a visual analogue scale (VAS: 0 = no pain, 10 = worst pain) at rest, upon coughing, and during mobilization from supine to sitting position. The time when patients were fit for discharge from hospital was assessed using five criteria: ((1) vital signs; (2) activity and mental status; (3) pain, nausea and vomiting; (4) surgical bleeding; (5) per os fluids and defecation) quoted 0, 1 or 2. Patients scoring ^{3} 9 were considered fit for discharge. A questionnaire using a seven-item score (none, minor, mild, moderate, quite severe, severe, very severe), evaluated postoperative recovery in terms of the degree to which patients were bothered by difficulty in concentrating, difficulty in urinating, by pain when moving around, by a poor appetite and by nausea.

Table 1
Patients characteristics

	Ropivacaine $n = 37$	Placebo $n = 40$
Age (years)	55.7 ± 2.7	51.1 ± 2.6
ASA group I/II/III	21/15/1	26/12/2
Weight (kg)	73.6 ± 1.6	72.9 ± 1.6
Duration of surgery (min)	49.5 ± 3.2	52.4 ± 3.2

Values shown are means $\pm$ S.E.M.

Adverse events observed by the staff or reported spontaneously by the patient were recorded during hospitalization. For statistical analysis, stratified Wilcoxon rank sum test was used for pain scores, time to the first request and total consumption of additional analgesics. Pain scores were expressed as area under the curve (AUC) divided by time period. A survival analysis was used for time when patients were fit for discharge from hospital. $p < 0.05$ was considered significant. The last value carried forward to missing principle was utilized.

3. Results

A total of 77 patients were randomized (ropivacaine $n = 37$, placebo $n = 40$). There were no significant differences between groups with respect to demographic characterisffcs and duration of surgery (Table 1).

Pain scores over tune upon coughing, during mobilization and at rest were lower in the ropivacaine group compared to the placebo group (Figs. 1–3). The area under the curve (AUC) divided by time for pain scores was significantly lower in the ropivacaine group over 0–24 h upon coughing and during mobilization, and over 0–12 h at rest (Table 2).

Table 2
Median AUC divided by time for pain scores (cm)

	Ropivacaine	Placebo
Mobilization		
0–4 H	1.37*	3.91
0–8 H	1.78*	4.46
0–12 H	1.92*	4.07
0–24 H	2.07*	3.82
Coughing		
0–4 H	1.69*	4.26
0–8 H	1.91*	4.83
0–12 H	2.06*	4.87
0–24 H	2.45*	4.25
Rest		
0–4 H	0.75*	2.66
0–8 H	0.94*	2.29
0–12 H	1.10*	2.12
0–24 H	1.16	1.62

* $p < 0.05$ compared with placebo.

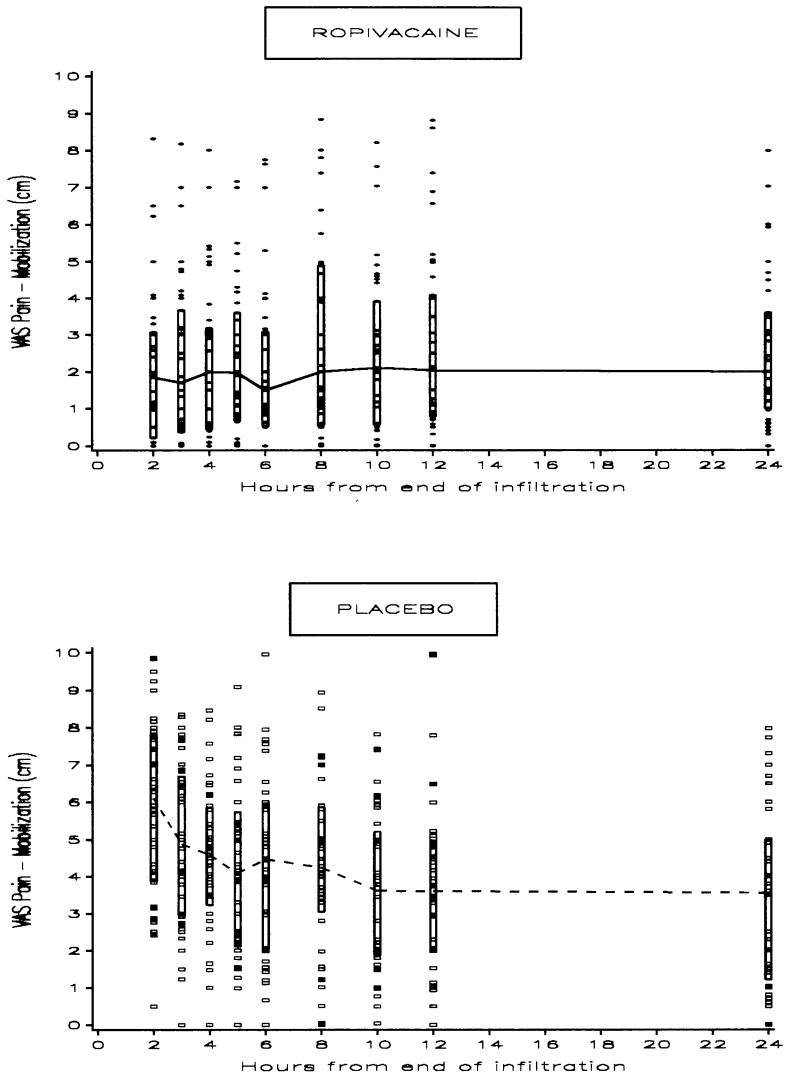

Fig. 1. Pain scores during mobilization over the 24-h postoperative period. Individual values and box plots (Q1, median, Q3), median scores connected.

A total of 31 patients in the ropivacaine group and 36 patients in the placebo group received postoperative analgesics with propacetamol and–or paracetamol-codeine, without significant difference between the two groups regarding the amount of analgesics. The mean time to the first request for analgesics was significantly longer in the ropivacaine group (7.7 h) compared to the placebo group (1.8 h) ($p < 0.05$). Four patients in the ropivacaine group and 13 patients in the placebo group required at least once an analgesic other than propacetamol or paracetamol-codeine due to insufficient pain relief.

A total of 31 patients in the ropivacaine group and 30 patients in the placebo group reached the criteria for discharge (score ^{3} 9) at 24 h. The median time when patients were deemed ready for discharge occurred significantly earlier in the ropivacaine group (10 h) compared to the placebo group (24 h) ($p < 0.05$) (Fig. 4). The actual mean duration of stay in hospital was similar between the two groups: 3.76 days in the ropivacaine patients and 3.25 days in the placebo patients.

The postoperative questionnaire did not show major differences for patients' distress due to difficulty in concentrating and urinating, poor appetite and nausea. Pain when moving around was found to bother more patients in the placebo group, especially during the first six postoperative hours; 16, 18, 11% of the ropivacaine patients experienced moderate to very severe discomfort due to pain when moving around, compared to 74, 55, 50% of the placebo patients at 2, 4, 6 h postoperatively.

From 8 h, the proportion of the ropivacaine patients bothered by moderate to very severe discomfort increased slightly (26–36%), but was still less than in the placebo group (36–45%).

The frequency of adverse events was similar in the two treatments groups. The most common adverse event was bradycardia at the time of induction of general anaesthesia or during surgery. Three postopera-

tive wound haematomas of mild intensity were reported in the ropivacaine group, and none in the placebo group.

4. Discussion

The results of this study confirm the efficacy of ropivacaine infiltration in preventing postoperative pain after inguinal hernia repair. At a dosage of 300 mg, a significant effect on pain during mobilization and coughing was observed during the 24 h postoperative study period. Previous studies using lower amounts of ropivacaine failed to demonstrate such a long period of postoperative analgesia. Johansson et al. [9] using 200 mg of ropivacaine preoperatively demonstrated a dose-dependent analgesia limited to 6 h postoperatively, regarding pain during mobilization. Mulroy et al. [10] showed a significant dose-related reduction in postoperative pain after inguinal hernia repair when comparing 37.5, 75 and 150 mg of ropivacaine. The longer postoperative analgesia found in our study is probably due to the higher dose of ropivacaine infiltrated (300 mg). Potency of bupivacaine and ropivacaine is similar. Indeed, Erichsen et al. [8] showed that wound infiltration after hernia repair using 100 mg of either ropivacaine or bupivacaine yielded similar pain scores at rest, upon coughing or during mobilization. However, the greater safety of ropivacaine regarding cardiac toxicity, enables the physician to prolong postoperative analgesia by increasing the dose without jeopardizing the patient. This represents the major advantage of preferring ropivacaine to the older bupivacaine drug during wound infiltration.

Many studies have indicated a beneficial effect of adding local anaesthetics, either as topical [11] or as

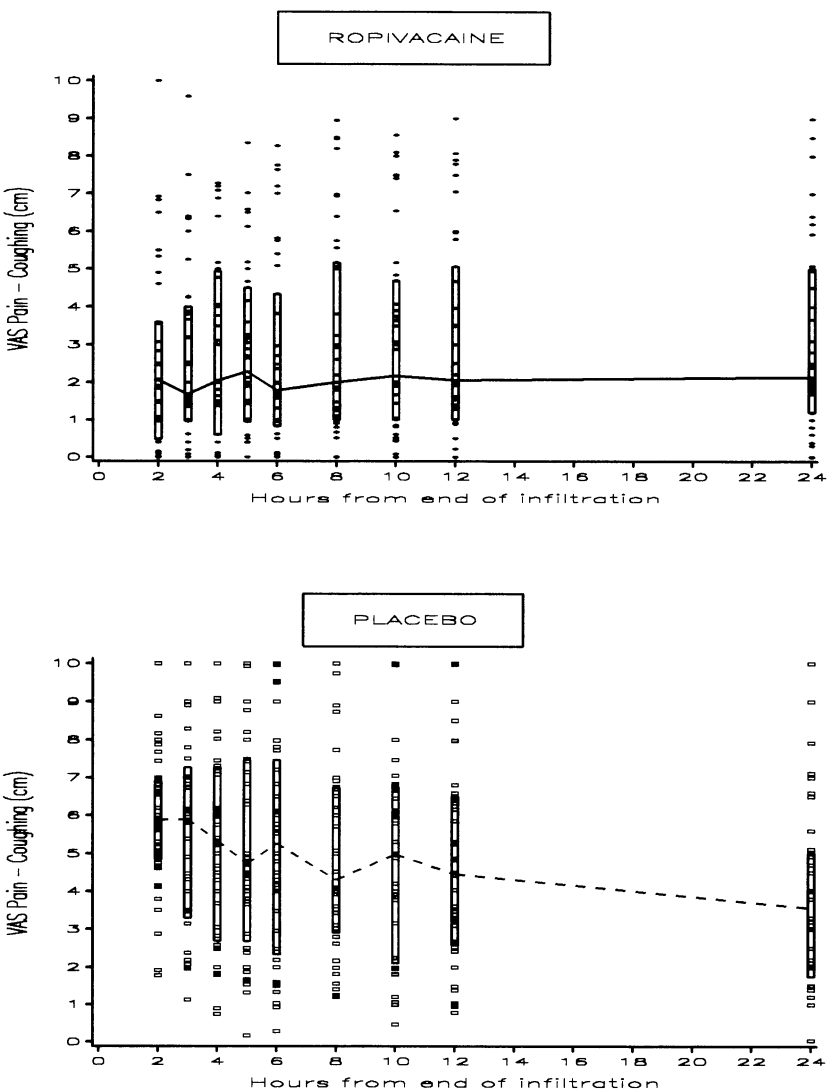

Fig. 2. Evolution of painscores at rest (VAS) over the 24-h postoperative period. Individual values and box plots (Ql, median, Q3), median scores connected.

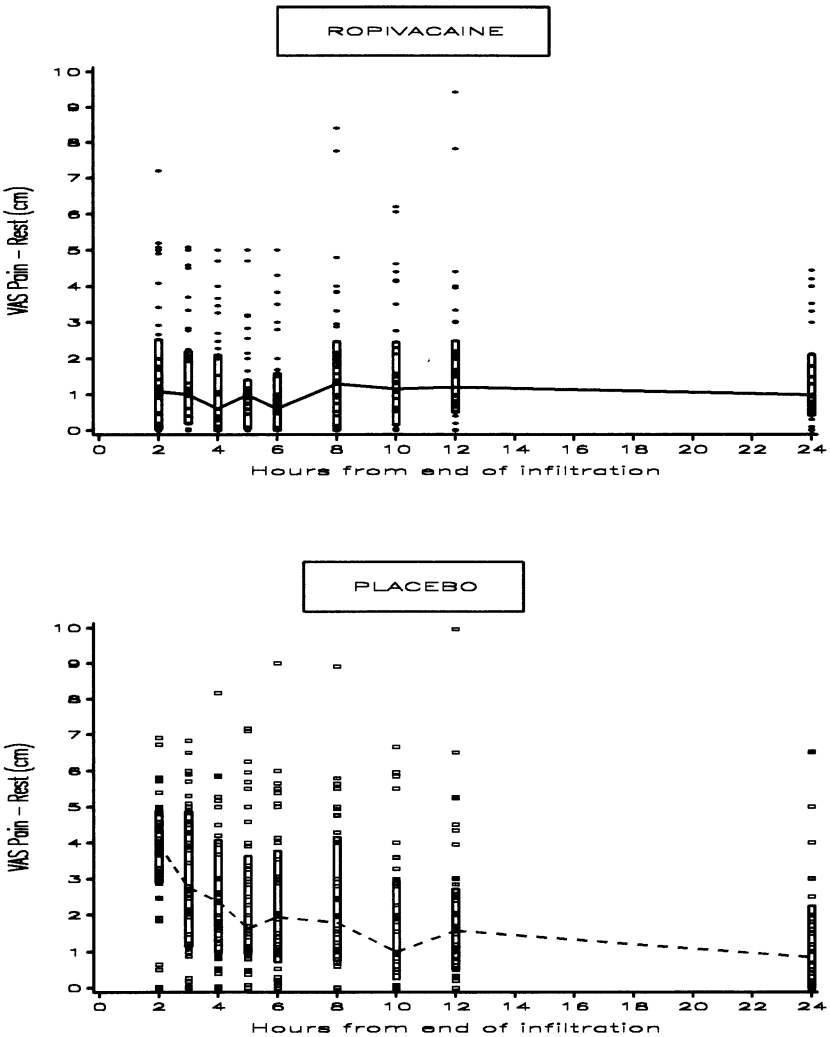

Fig. 3. Evolution of pain scores at rest (VAS) over the 24-h postoperative period. Individual values and box plots (Q1, median, Q3), median scores connected.

infiltration in the surgical layers [12], in reducing postoperative pain after inguinal hernia repair. Furthermore, Johansson et al. [13] showed that preoperative wound infiltration with ropivacaine before open cholecystectomy was followed by a significant dose-related decrease in wound pain during mobilization lasting only 6 h. This short lasting analgesia after cholecystectomy is probably due to the longer and stronger postoperative pain patterns after open cholecystectomy when compared to inguinal hernia repair.

The influence of ropivacaine on postoperative recovery is difficult to assess. It seems that ropivacaine infiltration had no influence on nausea, poor appetite, difficulty in concentrating and urinating. This may be due to the fact that all patients received comparable depths of general anaesthesia i.e., amounts of hypnotics and opioids, because infiltration was done at the end of surgery. We speculate that if the infiltration was performed before the surgical incision, patients in the ropivacaine group may have required less general anaesthetic, than patients in the placebo group, and in this setting, patients in the former group would probably have less discomfort during postoperative recovery. Another alternative would be to operate on these patients under spinal anaesthesia followed by infiltration at the end of the procedure.

Ambulatory surgery represents nearly 30% of all procedures in France which is obviously insufficient when compared to other European countries or to the United States. The French legislation as well as the absence of an optimal incentive system to encourage ambulatory surgery in this country explain the relative lack of enthusiasm for ambulatory surgery. Although our study population consisted of only inpatients, this surgical procedure is performed on an outpatient basis in many institutions. Indeed, such an orientation toward outpatient surgery should be encouraged since advantages clearly outweigh risks: less separation from home, reduced health care costs, limited postoperative nursing. However, pain control as well as nausea and

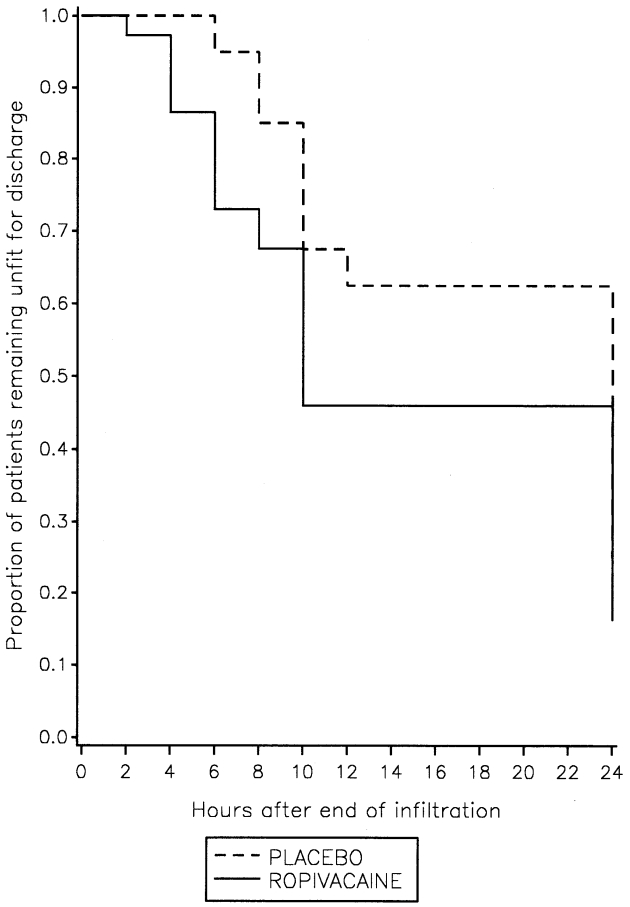

Fig. 4. Time when patients are fit for discharge.

vomiting control should be prompt and reliable, otherwise unplanned postoperative admissions to the hospital should be expected. Despite an identical duration of stay in hospital between both groups, the theoretical time when patients were fit for discharge occurred significantly earlier in the ropivacaine group (10 h) compared to the placebo group (24 h).

Thus, patients given ropivacaine wound infilkation experienced significantly less postoperative pain, were less bothered by pain when moving around postoperatively and finally met criteria for discharge earlier. If we intended to discharge patients fulfilling these criteria at the 8-h hour postoperatively, we would find that 32% of patients in the ropivacaine group and only 15% in the placebo group would have been discharged. This difference of 17% in patient discharge, when correlated to the number of these procedures performed annually and to the cost of an extra day stay at the ward, represents a significant economical benefit for institutions. All these clinical, humanistic and economical benefits of ropivacaine infiltration outweigh the cost of the drug and the limited extra-time required to perform this simple technique.

In conclusion, wound infiltration with 300 mg of ropivacaine after inguinal hernia repair is safe and effective in reducing postoperative pain scores at mobilization, coughing and rest. This reduction is observed during the 24-h postoperative period, delaying the need for additional analgesics and allowing early patient discharge from hospital.

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Day case hernia repair under local versus general anaesthesia: patient preferences

Kanna K. Gnanalingham *, Misra Budhoo

Department of General Surgery, Wythenshawe Hospital, South Manchester University Hospitals Trust, Southmoor Road, Wythenshawe, Manchester M23 9LT, UK

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Abstract

In selected patients, day case herniorrhaphy has a similar clinical outcome but is more economical than in-patient care. Herniorrhaphy may be performed under local (LA) or general anaesthesia (GA). GA requires an anaesthetist and greater post-operative nursing care. A survey of 75 patients awaiting open hernia repair revealed that when allowed to make an 'informed choice', 91% of patients who were fit for GA or LA preferred day case surgery. Whilst 20% did not express a preference for the type of anaesthesia, 33% had a strong preference for LA and 47% for GA. Preference for GA was associated with previous adverse experiences with LA and an assumed feeling of anxiety if awake during surgery. Measures are needed to improve patient acceptability of day case hernia repair, especially under LA, which makes clinical and economic sense.

Keywords: Hernia repair; Day case surgery; Local anaesthesia; General anaesthesia and patient views

1. Introduction

Day case herniorrhaphy under local (LA) or general anaesthesia (GA) is more economical, but of similar clinical outcome compared to in-patient care [1,2]. It is therefore likely to ease the current pressures on finances and in-patient beds in the NHS without detrimental effects on patient care. Despite the advantages of day case surgery it is not fully exploited in many hospitals. This is in part due to a lack of enthusiasm and adequate facilities [2]. In this respect, patient preference for day case hernia repair is also likely to be important. We report our findings on patient willingness to undergo day case hernia surgery under LA or GA.

2. Patients and methods

A sample of 75 consecutive patients awaiting open hernia repair in 1997 and considered suitable for day case surgery, under LA or GA were chosen according to the following criteria: age between 20 and 75 years; American Society of Anesthesiologists classification I or II; primary hernia repair (irreducible or complicated hernias were excluded); and a responsible adult available to supervise patient on return home.

The patients were interviewed by one of the authors at the hospital and by telephone at home, to complete a 2-page questionnaire. Informed consent was obtained. The procedures for day case or in-patient hernia repairs, under LA or GA were explained as follows: provided there are no complications the patient will be discharged the same day (day case) or the following day (in-patient surgery); herniorrhaphy under LA or GA involves the same type of repair and overall, the post-operative discomfort, size of scar, complication and

* Corresponding author. Present address: 20 Wensley Drive, Withington, Manchester M20 3DD, UK. Tel: +44 161 9987070 (ext. 2404) fax: +44 161 2912365.

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Table 1
Patient preference for day case hernia repair and type of anaesthesia

	Preference for day case surgery		Anaesthetic preference		
	Yes	No	GA	LA	Either
N (% study sample)	68 (91)	7 (9)	35 (47)	25 (33)	15 (20)
Age (mean+S.E.M.)[a]	56 ± 2	66 ± 3*	54 ± 3	60 ± 2	58 ± 4
Social class (median) (% group)[b]	III (57)	III (53)	III (56)	III (46)	10 (67)
Employed (% group)[b]	26 (38)	3 (43)	11 (31)	11 (44)	7 (47)
Previous hernia repair (% group)[b]	14 (21)	4 (57)*	8 (23)	7 (28)	3 (20)
Previous day case surgery (% group)[b]	31 (46)	1 (14)	14 (40)	14 (56)	4 (27)
Previous adverse experience with surgery under LA (% group)[b]	—	—	7 (20)[§]	0 (0)	0 (o)
Previous adverse experience with surgery under GA (% group)[b]	—	—	4 (11)	6 (24)	2 (13)

[a] Student's *t*-test or one way ANOVA.
[b] χ^2 test.
* $P<0.05$ vs. patients preferring day case surgery; [§] $P<0.01$ vs. patients preferring LA or 'either' type of anaesthesia.

recurrence rates are similar [1,3]; earlier mobilisation may be possible with LA [1,3]; the patient is awake under LA, although they are unlikely to feel any pain, need not see the operation itself and may choose to have light sedation. The questionnaire ascertained the patients' willingness to have day case hernia repairs under LA or GA, the reasons for their choice and any previous experience of these procedures.

3. Results

All 75 patients approached, agreed to take part. There were 57 (76%) males and 18 (24%) females, with a mean age of 57 ± 2 years (range 21–75). Hernia types were 49 (65%) inguinal, 15 (20%) paraumbilical, 6 (8%) small incisional and 5 (7%) femoral.

The majority (91%) preferred day case hernia repair and these patients were younger in age in comparison to those opting for in-patient surgery ($t = 2.7$; d.f. = 73; $P < 0.05$; Table 1). Of the 9% unwilling to undergo day case surgery, 6% preferred to be discharged when fully recovered and 3% preferred an in-patient stay, due to adverse experiences following previous hernia repairs. Eighteen (24%) patients had previous hernia repairs (all under GA and only 2.7% as day cases). There was a negative association between previous hernia repair and preference for day case surgery ($\chi^2 = 4\ 7$; d.f. = 1; $P < 0.05$). Thirty-two (43%) patients had previous experience of day case surgery and 19 (25%) knew of others who had had day case surgery. There was a tendency for a positive association between previous experience with day case surgery and a preference for day case surgery ($\chi^2 = 2.5$; d.f. = 1; $P = 0.1$).

Thirty-five (47%) patients expressed a strong preference for GA, all of whom also stated 'a dislike or feeling of anxiety if awake during surgery' (Table 1). The reasons stated for choosing LA (33%) included, 'dislike/fear of loss of consciousness with GA' (16%), previous adverse experiences with surgery under GA (8%) and slower post-operative recovery with GA (4%). Seven (9%) and 12 (16%) patients had previous adverse experiences with surgery under LA and GA, respectively. There was a positive association between previous adverse experiences with surgery under LA and a preference for GA ($\chi^2 = 8.8$; d.f. = 2; $P < 0.01$). There were no other associations between the parameters studied.

4. Discussion

We observed that when allowed to make an informed choice, the vast majority of patients prefer day case hernia repair. This bodes well for the future of day case herniorrhaphy. A small minority of patients preferred 'in-patient surgery' and these patients were older and had previous herniorrhaphy, with adverse experiences from this in some cases.

There was a greater preference for GA as the mode of anaesthesia, partly due to previous unfavourable experiences with LA and an assumed feeling of anxiety if awake during the operation. A significant proportion of the patients undergoing herniorrhaphy with LA experience discomfort and anxiety (38–83%), although this is mild and acceptable to most patients [3]. A greater preference for GA has important resource implications, since this requires the services of an anaesthetist and increased nursing care in the immediate recovery stage [1,3]. In contrast, for herniorrhaphy under LA it is recommended that the patient be monitored intra-operatively by an anaesthetic nurse and that an anaesthetist should be available if conversion to GA becomes necessary [1].

We are unaware of similar pre-operative studies investigating patient preference for day case hernia repair

under LA or GA. Uncontrolled follow-up studies and a limited number of randomised clinical trials comparing day case herniorrhaphy under LA and GA have reported high rates of patient satisfaction post-operatively [3–5]. However, in these studies, as in most busy surgical out-patient clinics, the patients are not routinely offered an informed choice of anaesthesia. The choice of anaesthetic is often influenced by the facilities available within the day case surgical unit and the personal preferences of the surgeon.

GA is still the preferred mode of anaesthesia for complicated hernias and uncooperative and highly anxious patients. LA is desirable for those who are at high risk of morbidity from GA. But, for a majority of patients awaiting hernia repair, day case surgery under GA and LA is feasible, although herniorrhaphy under LA makes greater economic sense. Specific measures to create a more patient friendly atmosphere in the theatre, such as greater explanation, reassurance to the patient during the operation and music in theatre may help to counter the feelings of anxiety and enable greater acceptability of LA.

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The limits of ambulatory surgery

Jesús María Villar del Moral *, Juan Bautista García Martos, José Tomás Torres Alcalá, Pedro Manuel Ruiz Lorenzo, Manuel Rodríguez Pérez, Sebastián Molina García, Francisco Gil García, José Manuel Martín Ruiz de la Herrán

Major Ambulatory and Short Stay Surgery Unit, Centro San Juan de Dios, Hospital Virgen de las Nieves, Granada, Spain

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Abstract

The objectives of this study were to analyse the results of an ambulatory surgery unit and the influence of short stay hospitalisation (24 h) on its activity. Between May 1992 and January 1998, 12412 patients have been treated. The most active speciality was general surgery, with 5567 interventions: 3.756 were performed on an ambulatory basis, and 1811 with 24 h hospitalisation. The global substitution index for this speciality was 54.7% (78.7% if we include the patients admitted overnight). 24 h Hospitalisation favours an increment of the substitution indices by allowing more flexibility in the selection criteria and more complex cases to be treated.

Keywords: Ambulatory surgery; Day surgery; Short stay surgery; Substitution indexes; Complications; Safety

1. Introduction.

In the public Spanish Health System, ambulatory surgery programs have been implemented since the mid 1980s, but the development of ambulatory surgery units has not been even across Spain. Thus, regions like Catalonia, Andalucia, Valencia, Madrid, Castilla-La Mancha, the Basque Country, Cantabria and Galicia have a great number of units disseminated throughout their territories, while in other regions the development level in this field is less [1].

The different units have different attitudes toward short stay surgery (SSS). Some work exclusively as 'day hospitals', while in others there is the possibility of 24–48 h stays for some patients [2].

In Granada, the implementation of ambulatory surgery began in 1991, with the development of a pilot program which utilised the surgical areas of the general surgery service of the Hospital Virgen de las Nieves, without forming an organised and independent unit.

In May 1992, a satellite multidisciplinary unit was opened in a building belonging to the Hospital: the San Juan de Dios Centre. In this area, until that date there coexisted a chronic inpatient unit and an under utilised surgical area, endowed with the personnel and infrastructure necessary for the setting up of an ambulatory surgical unit [3].

From the beginning we have had a day hospital and available rooms. This has allowed us to offer our patients both ambulatory surgery and SSS with 24 h hospitalisation.

We seek to evaluate the results obtained by this unit, analysing the influence that the use of SSS techniques has exercised.

2. Material and methods

The patients are first evaluated in the unit's outpatient clinic, where the surgical and anaesthetic selection is made. Complete oral and written information is given about the particulars of the process. Informed consent

* Corresponding author. Present address: Calle Hoya de la Mora, 9, 1° B, 18008 Granada, Spain. Fax: +34 58 241282.

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is obtained, and the relevant preoperative tests carried out.

Admission takes place at 08:00 on the day of surgery, and a premedication with benzodiazepines and ranitidine is given. According to the pathology and characteristics of the patients, antiemetic prophylaxis with ondansetrón, single-dose antibiotic prophylaxis and anti-thrombotic prophylaxis with low-molecular weight heparin may also be used.

At the present time, the unit has four operating theatres and a postanaesthetic recovery area is open from 08:30 to 15:00 from monday to friday. From the outset we have had a day hospital (open from 08:00 to 21.00, monday to friday), and eight rooms in a conventional inpatient hospital area. In the latter the SSS patients spend the night as do those following ambulatory surgery (AS) requiring transfer from the day hospital (those that for any reason had not been discharged after 4–8 h of postsurgical observation).

At the time of discharge, the patient receives written instructions about medication, diet, follow-up care, etc. We use oral metamizol for postoperative analgesia. The patients are seen at 48 h (if the wound needs redressing) or at seven days post surgery. They have permanent access to a medical telephone hotline to receive medical information or to resolve any worries. We have never had home hospitalisation services, and hospital hotels do not exist in our area.

During our first five years of activity, the initial results have encouraged us to include more complex surgery and newer specialities. Equally, the exclusion criteria have being made progressively less strictly [4]. The only absolute contraindications at present are shown in Table 1. The term 'deficient social conditions' refers to patients that do not live with a responsible adult, or to those whose home does not meet minimum conditions of hygiene or infrastructure.

We have undertaken a retrospective study of the patients operated in the unit from its creation in May 1992 up to January 1998, analysing the participating specialities and types of pathology treated, the anaesthesia used and the type of hospitalisation. Also we have evaluated (for the general surgery patients) the results in terms of morbidity and substitution indices (percentage of patients dealt with on an ambulatory basis) for different pathologies.

Table 1
Absolute exclusion criteria

Non patient acceptance
Non-compensated ASA III or ASA IV status*
Deficient social conditions
Serious psychiatric pathology
Epilepsy
Drug abuse

* Levels of anaesthetic risk according to the American Society of Anesthesiology.

Table 2
Participating specialities

	Number of patients	Percentage
General surgery	5.567	44.8
Urology	2.835	22.8
Orthopaedics	2.560	20.6
Plastic surgery	391	3.2
Oral and maxilofacial surgery	378	3.1
Ear, nose and throat	318	2.6
Vascular surgery	215	1.7
Ophthalmology	148	1.2
Total	12.412	100.0

To analyse the impact of the 24 h hospitalisation on the unit's activity we have defined two indexes: ASI and GSI. The ambulatory substitution index (ASI) refers to the percentage of patients operated on on an ambulatory basis (AS) in the unit of the total operated on electively for each pathology (in the unit as well as in the reference hospital). The global substitution index (GSI) is the percentage of the total of elective operations undertaken in the unit (AS or SSS).

3. Results

A total of 25253 patients were operated on. 12841 (50.8%) Underwent minor surgery. The remaining 12412 patients (49.2%) underwent AS or SSS. For these patients, the participating specialities are shown in Table 2. The most active specialities were general surgery (44.8% of the total), urology (22.8%) and orthopaedics (20.6%).

With regard to the 5567 general surgery patients 3.756 (67.5%) were discharged after a postoperative period of 4–8 h, while 1811 (32.5%) stayed in the unit overnight. The mean number of surgical procedures performed in each session was approximately 4. Local anaesthesia with sedation was employed in 77.1% of the cases and general anaesthesia in 22.9%.

Table 3
General surgery: groups of operated pathologies

	Number of patients	Percentage
Abdominal wall hernias	3.028	54.4
Proctological conditions	834	15.0
Pilonidal cysts	770	13.8
Soft tissue lesions	544	9.8
Cholelithiasis	128	2.3
Miscellaneous	263	4.7
Total	5.567	100.0

Table 4
Evolution of the substitution indices in different pathologies

	1992–1993		1994–1995		1996–1997		Global	
	ASI	GSI	ASI	GSI	ASI	GSI	ASI	GSI
Inguinal hernia	45.9	78.1	50.2	80.6	51.3	75.4	49.2	78.3
Abdominal wall (total)	45.9	75.7	47.3	74.2	48.8	70.5	47.2	73.6
Proctology	27.9	72.6	35.4	76.7	69.0	90.4	49.5	82.2
Pilonidal cysts	74.8	85.9	83.6	93.6	89.4	95.4	83.0	92.0
Soft tissue lesions	54.3	65.2	80.0	91.3	85.3	96.0	80.6	91.6
Total	48.0	76.5	52.6	78.4	62.3	80.7	54.7	78.7

Table 3 summarises the different conditions treated. Abdominal wall hernias (54.4% of cases) were the commonest, followed by benign anorectal disorders (15%) and pilonidal cysts (13.8%).

The most frequently treated hernias were inguinal hernias, with 2335 patients (77.1% of abdominal wall surgery). Also 399 umbilical, 117 femoral, 114 epigastric, 54 incisional and 8 spigelian-type hernias were treated. The proctologic conditions treated were 315 fistulas-in-ano, 271 anal fissures and 248 haemorrhoids.

The substitution indices for the different groups of pathologies are shown in Table 4, divided into two year periods to evaluate incremental or decreasing trends.

For the total period of the study an ASI of 54.7% was obtained, and this percentage increased to 78.7% if patients admitted overnight (GSI) were included. Over the six years studied, both indices showed an increment, much more marked for ASI. The percentage of general surgery patients treated as day cases in the unit was 62.7% in the first biennium, 67.1% in the second and rose to 77.2% in the period 1996–1997.

Analysing these indices by pathology, we found that in inguinal hernia and total abdominal wall surgery there was a small increase in ASI and a slight decrease in GSI over the 1992–1997 period. With pilonidal cyst surgery there was an increment in both indices, bigger for ASI. This tendency was also apparent—even more clearly—in anorectal and soft tissue surgery.

There were no deaths or serious morbidity. Complications were related to postanaesthetic disorders (nausea, vomiting, hypotension, sickness, etc.) in 6.8% of the patients, and operative wound problems in 4.5% of cases, with a 1.9% infection rate. Only 45 patients (0.8%) were readmitted for various reasons to the unit or the reference hospital. There have been no judicial claims in the six years of activity.

4. Discussion

At present it is generally accepted that AS produces benefits for the patients (low morbidity rate, quicker recovery and socio-economic reinstatement, lesser anxiety levels thanks to a greater understanding of the surgical procedures, etc.). The health system also benefits (decreased costs, better use of resources, reduction in the waiting lists, etc.) [1,2]. Consequently, day surgery is developing world wide [5]. In Spain there is great variation in day surgery activity with some areas undertaking a great deal and others very little [6].

In an area supported by an established and experienced unit, it would be desirable that the greatest number of patients and pathologies benefit from the advantages of ambulatory treatment [1]. To obtain this and to expand those current 'limits' of ambulatory surgery, the following possibilities should be considered:

(1) To make the selection criteria flexible [4]. In different units, circumstances like home distance, age, compensated ASA III status, obesity and surgery lasting longer than 1 h cause the exclusion of many patients. The effectiveness of these measurements has not been really demonstrated [7–9].

(2) To incorporate into the activity of each centre the pathologies susceptible to being dealt with on an ambulatory basis, but not performed at present [10].

(3) In those units where their infrastructure and resources allow it, carrying out SSS techniques could allow the safe treatment of patients with more complex pathology and those requiring more complex surgery. Exclusion criteria could be all but eliminated and the unit's services enlarged [1,7].

A not inconsequential number of patients (although receiving exhaustive information [11]) are reluctant to return to their homes only a few hours after surgery. 24 h Admission could allow these patients to be treated.

(4) The use of home hospitalisation services could also be beneficial. Increased postoperative control could permit the treatment of more complex cases and higher surgical risk patients in ambulatory units. These services would reduce the stress generated in some patients returning home a few hours after an operation [6,7].

(5) Finally, the availability and use of hospital hotels would favour the treatment of patients who live

alone or whose home lacks the minimum conditions of hygiene and infrastructure [8,12].

In our area, we do not have home hospitalisation teams or hospital hotels. However, the SSS development has not been costly, because the centre where the unit was developed had the necessary underutilised personnel and infrastructure [3].

Analysing the results obtained, it is appreciated that general surgery has been the most active surgical speciality. It was—together with urology—the initiating speciality in our unit. At the beginning, because of material limitations and lack of experience and personnel, our services were limited to primary unilateral inguinocrural hernia repair, small umbilical or epigastric hernia repair, and pilonidal cyst excision. Later, with increasing experience and resources, we included the treatment of bilateral, large or recurrent inguinal hernias, incisional hernias, benign anorectal disorders and cholelithiasis [4].

Globally, thanks to SSS, almost an additional 25% of patients operated on electively with these pathologies have been treated in the unit.

Nevertheless, during the period of study a larger increment is seen in ASI, indicating that all the time we are dealing with more patients on an ambulatory basis, despite including more complex cases and pathologies. This has been possible due to better patient information, improved collaboration at the primary assistance level and more extensive experience [11].

Analysing the data for the different pathologies, it is evident that abdominal wall pathology is treated increasingly in the day surgery setting, but with a slight and progressive decrease of GSI. To explain this tendency it is necessary to clarify that in the 1992–1993 period and also—although in smaller quantity—in the 1994–1995 period there was a great number of these patients on the surgical waiting lists [3]. In these periods they were treated in the unit, making up the fundamental nucleus of its activity. In the last biennium, with a waiting list of around two months, the reference hospital general surgery service also 'needed' these patients to complete its surgical programs, therefore inducing the decrease in the GSI percentages.

In relation to the rest of the treated pathologies (anorectal disorders, pilonidal cysts, skin or subcutaneous lesions, etc.) the unit has progressively centralised their treatment, mainly on an ambulatory basis.

Analysing the results obtained, we highlight the absence of mortality, the low rate of surgical infections and the very small number of patients readmitted due to complications. This data is similar to that of other similar series [1,13].

In conclusion, we believe it necessary to make the advantages of ambulatory surgical treatment available to the largest number of patients. In our area, thanks to SSS we have increased by an additional 25% the indices of substitution of different general surgery pathologies. Improvement of the administration policy, technological development and creation of facilities that could increase the patients' acceptance, such as hospital hotels, will favour greater development of the units that carry out these techniques with safety and efficiency.

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Ambulatory Surgery

Ambulatory Surgery 6 (1998) 235–254

Literature Review[1]
Selected abstracts from the current literature

Utricular macular ablation for benign paroxysmal positional vertigo

PF Anthony

Ear, Nose Throat J. (1996) 75/7 (416–421)

This report describes a new technique using the argon laser to ablate the utricular macula in the affected ear in patients with benign paroxysmal positional vertigo. This procedure is done as outpatient surgery under local anesthesia. The procedure successfully resolved benign paroxysmal positional vertigo in 14 patients. Symptoms in these patients improved from 20–100% (median 87%; mean 80%) as measured by the Dizziness Handicap Inventory.

Complications of endoscopic resection of colorectal adenomas

J Bichsel, B Meyer-Wyss, C Lang

Schweizerische Medizinische Wochenschrift (1996) 126/49 (2144–2148)

Endoscopic polypectomy is associated with a small but definite risk of bleeding and perforation. Patients with large adenomas are thus usually hospitalized for endoscopic resection. In order to evaluate whether these procedures can be performed in the setting of one day surgery, we retrospectively analyzed the complications and results of polypectomy done in the period from 1. 1. 1990 through 31. 12. 1994. Of 1399 colorectal adenomas resected in 680 patients, 385 (28%) were larger than 1 cm. Altogether we observed only 3 (0.2%) clinically significant complications: bleeding was seen in 2 patients, of whom only one required transfusion of one unit. One patient required surgery because of perforation after removal of a sessile cecal adenoma with uneventful outcome. These results show that endoscopic resection of colorectal adenomas is safe even if the polyps are large.

Organization and results of ambulatory laparoscopic inguinal hernia repair. Immediate results

H Johanet, P Marichez, F Gaux

Ann. Chir. (1996) 50/9 (814–819)

Since 1993, we have performed laparoscopic inguinal hernia repair by ambulatory surgery. We report the population of patients with inguinal hernia operated in this way from the first case operated by ambulatory surgery to May 1, 1996. The aim of this prospective and non-controlled trial was to present the organization of our day care department and to report the results of our experience, comparing the ambulatory and hospitalized population, identifying the reasons why we decided to operate on an inpatient basis, assessing the rate and the reasons why the patient was kept the night after an initially scheduled ambulatory procedure. Four hundred and thirty-three consecutive cases were operated during this period. 53.6% of patients were operated by ambulatory surgery, 89.4% of whom returned home at night. The reasons for an inpatient procedure were: bilateral repair in 25.2% of cases, medical in 16.4%, surgical in 20%, social in 13.5% of cases. The unilateral nature of the repair and the young age of the patients were two factors which led us to chose ambulatory surgery.

Efficacy of nonsteroidal antiinflammatory drugs in postoperative pain

J Joris

Acta Anaesthesiol. Belg. (1996) 47/3 (115–123)

NSAIDs have been increasingly used over the past ten years in the treatment of postoperative pain, such that they now play an important role in the management of postoperative analgesia, either alone or combined with opioids. When used alone, they are effective in relieving minor or moderate pain such as that seen after maxillofacial, minor orthopedic, or some ambulatory surgical procedures, and postpartum pain (episiotomy). In these indications, the main benefit as compared with opioids is the lack of respiratory depression, nausea and vomiting. Since these side effects delay discharge from the hospital after ambulatory surgery, the use of NSAIDs may result in faster recovery and earlier discharge. Because of the ceiling effect of NSAIDs, their efficacy as sole agents is usually insufficient to treat pain after major surgery (orthopedic, abdominal, thoracic). NSAIDs should then be combined with opioids. As part of a balanced analgesia regimen, NSAIDs will allow for opioid-sparing, and might subsequently reduce opioid-mediated side effects. A 20 to 50% reduction in opioid consumption, sometimes with improved quality of analgesia, has been reported using different NSAIDs following various types of surgery. Better respiratory function, improved sleep quality, and faster recovery of gastrointestinal function have been reported with NSAIDs. However, the use of NSAIDs has not been shown to be associatecl with improved outcome or more rapid recovery.

Pressure on acupoints decreases postoperative pain

D Felhendler, B Lisander

Clin. J. Pain (1996) 12/4 (326–329)

Our objective was to study the analgesic effect of acupoint pressure on postoperative pain in a controlled single-blind study. Forty pa-

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PII S0966-6532(98)00023-7

tients undergoing knee arthroscopy in an ambulatory surgery unit were randomized to receive either an active stimulation (AS) or a placebo stimulation (PS) 30 min after awakening from anesthesia. We stimulated 15 classical acupoints in the AS group, on the side contralateral to surgery, with a firm pressure and a gliding movement across the acupoint. In the PS group, 15 nonacupoints were subjected to light pressure in the same areas as the acupoints in the AS group. We assessed pain using a 100-mm visual analog scale (VAS) before sensory stimulation, after 30 and 60 min, and after 24 h. We recorded heart rate, systolic arterial pressure, and skin temperature before stimulation and after 30 and 60 min. We assessed skin blood flow with laser Doppler before stimulation and after 1 and 30 min. Sixty minutes and 24 h after AS, VAS pain scores were lower than in the placebo group ($p < 0.05$ and 0.0001, respectively). There were no significant changes in the autonomic variables. The results indicate that pressure on acupoints can decrease postoperative pain.

Ambulatory anesthesia: past, present, and future

FK Orkin

Anesthesiol. Clin. North Am. (1996) 14/4 (595–608)

Ambulatory surgery is arguably among the most important trends affecting health care today. As the title of this article suggests, the history and current status of ambulatory anesthesia are discussed. Reviewing the way ambulatory anesthesia has developed helps us understand not only this rapidly growing anesthesiology subspecialty but also how the field is likely to evolve in the coming years.

Preoperative assessment of common diseases in the outpatient setting

GA Van Norman

Anesthesiol. Clin. North Am. (1996) 14/4 (631–654)

In this article, evaluation of patients for outpatient surgery is discussed with regard to patients who suffer from diseases known to have potentially major effects on outcome of anesthesia and surgery. One section deals specifically with patients who have cardiopulmonary disease and/or diabetes. The goal of the article is to outline the principles underlying cost-effective preoperative evaluation and treatment of major medical disease before outpatient surgery.

What are the best agents for ambulatory general anesthesia, and are they cost effective?

BK Philip

Anesthesiol. Clin. North Am. (1996) 14/4 (695–710)

To determine cost-effective anesthesia care, we must first define our goals, e.g. effectiveness. We need to assess an agent's impact on all phases of anesthetic care, including positive and negative side effects as well as recovery times. In light of these considerations, we can evaluate the cost of an agent, i.e. the acquisition price, how that cost compares with the cost of other agents in its class, and how use of the agent will affect other nonanesthetic perioperative costs. The least expensive agent is not a priori the best, and neither is the most expensive one. Cost effectiveness is the value obtained for the money spent; that is what we must determine.

Current status of regional anesthesia for adult outpatients

D Fitzgibbon

Anesthesiol. Clin. North Am. (1996) 14/4 (711–727)

In this article, the author discusses the benefits of regional anesthesia for the ambulatory surgery patient who at discharge must be 'street ready' and pain-free. Thereafter follows a discussion of factors involved in selection of appropriate blocks and local anesthetic drugs. Special attention is paid to upper extremity blocks. Concerns related to post-dural puncture headache and to toxicity of lidocaine and chloroprocaine are addressed.

Evaluation of the difficult pediatric patient

R Patel, P Leith, R Hannallah

Anesthesiol. Clin. North Am. (1996) 14/4 (753–766)

Many pediatric ambulatory surgical patients have chronic diseases with important anesthetic implications. A brief review of the relevant clinical features of asthma, cystic fibrosis, cancer, diabetes, malignant hyperthermia, chronic renal failure and congenital heart disease in children is presented. Appropriateness of ambulatory surgery as well as intraoperative and postoperative management are outlined.

Controversies in pediatric ambulatory anesthesia

RJ Orr, C Ramamoorthy

Anesthesiol. Clin. North Am. (1996) 14/4 (767–780)

Several contentious issues are discussed in this article. Opinions differ about the practice of same day discharge of some pediatric tonsillectomy patients, and there is still argument regarding discharge of the ex-premature infant after short surgical procedures. Masseter muscle spasm as an entity is described and its potential significance explored; in the same vein, the routine use of succinylcholine is questioned. Lastly, the authors comment on the use of the laryngeal mask airway and on the issue of preoperative pregnancy testing of adolescents.

Regional anesthesia and pain management in ambulatory pediatric patients

Y-C Lin, EJ Krane

Anesthesiol. Clin. North Am. (1996) 14/4 (803–816)

This article reviews the pharmacology of local anesthetics in pediatric patients, describes nerve blockades used in ambulatory pediatric surgery, and discusses postoperative pain management in ambulatory pediatric patients.

Recovery and discharge

SE Rapp

Anesthesiol. Clin. North Am. (1996) 14/4 (817–834)

Discharge from the ambulatory surgery unit is dependent on resolution of anesthesia, normalization of physiologic functioning and adequacy of analgesia without side effects. This article focuses on guidelines and treatment of troublesome side effects that prolong discharge.

No change in ST segment during instillation of eyedrops for ophthalmic surgery: a study in elderly patients with heart disease (is present software/technology sufficiently sensitive?)

GH Botz, J Miser, S Hoopes, S Zweig, JG Brock-Utne

J. Clin. Anesth. (1996) 8/8 (631–633)

STUDY OBJECTIVE: To study the safety of instillation of eyedrops prior to ophthalmic surgery, which may potentially affect myocardial function, using continuous ST segment recording.
DESIGN: Prospective study.
SETTING: Ambulatory surgery preoperative area at a university hospital.
PATIENTS: 30 nonpremedicated ASA status III adults (aged 73–92 years) scheduled for cataract surgery with monitored anesthesia care (MAC).
INTERVENTIONS: All patients were given opthalmic drugs consisting of phenylephrine 2.5%, flubiprofen 0.03%, mydriacyl 1% and cyclopentolate 1%.
MEASUREMENTS AND MAIN RESULTS: ST segments were continuously monitored after the instillation of the eyedrops for a period of up to 15 min. A change of 2 mm or more in ST segments from baseline was considered significant. Results showed no significant change in ST segment. No patient reported any new cardiac symptoms or showed any evidence of dysrhythmias or hemodynamic changes.
CONCLUSIONS: The lack of significant finding most likely reflects the safety of these ophthalmic drops in their present dilute concentration, but it is also possible that the software and/or monitors used were not sensitive enough in their current configuration to detect possible subtle changes. Based on the results of this study, we conclude that the preoperative ophthalmic drugs used in our institution do not seem to have any adverse cardiovascular effects in this elderly patient population who are about to undergo cataract surgery with MAC.

Ondansetron prevents postoperative emesis in male outpatients

AL Kovac, MH Pearman, SN Khalil, PE Scuderi, AF Joslyn, BA Prillaman, F Cox

J. Clin. Anesth. (1996) 8/8 (644–651)

STUDY OBJECTIVES: To determine (1) the efficacy and safety of ondansetron in the prevention of postoperative nausea and vomiting (PONV) in male outpatients; (2) prognostic factors for PONV in male outpatients; and (3) patients' perceptions of the debilitating effects of PONV in the ambulatory surgery setting.
DESIGN: Prospective, randomized, stratified, double-blind study.
SETTING: Multicenter—24 medical centers.
PATIENTS: 468 ASA physical status I and II males at least 12 years of age scheduled for general anesthesia.
INTERVENTIONS: All patients received intravenous ondansetron (4 mg) or placebo prior to undergoing general balanced (opioid) anesthesia.
MEASUREMENTS AND MAIN RESULTS: In the postanesthesia care unit (PACU), the number of emetic episodes, vital signs, adverse events and nausea assessments were recorded by a blinded observer. After discharge, and until the end of the 24-h study period, patients completed a diary that collected emetic episodes, adverse events, nausea and pharmacoeconomic data. There were no differences in patient demographics or safety profiles between groups. The number of patients with no emesis and no nausea during the 24-h study period was significantly greater ($P < 0.05$) with ondansetron (4 mg) compared with placebo. Prognostic factors for an increased likelihood of developing PONV in males included a history of motion sickness or previous PONV, patients undergoing nonorthopedic procedures, and surgeries lasting longer than 1 h. Finally, 38% of patients experiencing PONV perceived PONV to be as, or more debilitating than, the after effects of surgery itself.
CONCLUSIONS: Ondansetron (4 mg) was more effective than placebo in preventing PONV in male outpatients. Males at potential risk for developing PONV include; (1) those with a history of motion sickness and/or PONV; (2) patients undergoing nonorthopedic procedures; and (3) procedures lasting longer than 1 h. Such patients may benefit from receipt of a prophylactic antiemetic. Postoperative nausea and vomiting has a debilitating effect that can be differentiated by patients from the effects of surgery itself.

Staging of abdominal cancer by local anesthesia outpatient laparoscopy

J Sand, K Marnela, I Airo, I Nordback

Hepato-Gastroenterology (1996) 43/12 (1685–1688)

BACKGROUND/AIMS: Our aim was to review the results of one trocar staging laparoscopies performed under local anesthesia in outpatients with intra-abdominal cancer.
MATERIALS AND METHODS: 215 patients with intra-abdominal cancer (predominantly esophagogastric and pancreatohepatobiliary) underwent one trocar staging laparoscopy on lidocain infiltration anesthesia under conscious sedation. In 43 patients computed tomography (CT) or ultrasonography (US) had raised a suspicion of hepatic metastases, but percutaneous needle biopsy had failed to confirm it; 172 patients had negative CT or US. Peritoneum and liver were examined and biopsies were taken under direct laparoscopic control.
RESULTS: 14 patients (7%) received narcotics during the 2–6-h observation. Mortality was zero. Complications occurred in five patients (2%): one small bowel perforation (operated), one bleeding from the abdominal wall, one acute atrial fibrillation, and two wound infections. In 79 patients histology demonstrated hepatic or peritoneal metastases. Out of 136 patients 123 were operated on for whom laparoscopy did not demonstrate metastases. Thirty-eight of these were unresectable at laparotomy: five patients (4%) had peritoneal or liver metastases and 33 (27%) proved locally inoperable. The sensitivity of laparoscopy to ascertain peritoneal or lover metastases was 94%.
CONCLUSIONS: We conclude that one trocar local anesthesia outpatient laparoscopy is a fairly safe and effective method to detect peritoneal and liver metastases in abdominal cancer.

Cost comparison of mivacurium and rocuronium for ambulatory anesthesia

GP Joshi, SA Garg

Anesthesiology (1996) 85/3 A (xxx)

INTRODUCTION: Reducing costs while maintaining quality has become a major goal in the delivery of health care. With increased emphasis on ambulatory surgery, the costs of new drugs have assumed increased importance. Nivacurium and rocuronium are new muscle relaxants which have recently been introduced into clinical practice. This randomized study was designed to determine the comparative costs of mivacurium and rocuronium during anesthesia for ambulatory surgery.
METHODS: Following IRB approval and informed consent. A total of 78 healthy patients undergoing peripheral ambulatory surgery were studied. All patients received a standardized midazolam-fentanyl-propofol-isoflurane-N20 anesthetic. Tracheal intubation was facilitated using either mivacurium ($n = 36$) 0.25 mg/kg (in divided doses) or rocuronium ($n = 42$) 0.6 mg/kg. If necessary, 25% of the intubating dose was administered with the aim of maintaining one twitch of the TOF response at the wrist. Residual neuromuscular blockade was reversed with neostigmine and glycopyrrolate only if deemed clinically

necessary. Time to extubation and duration of stay in the PACU and the phase II unit were recorded. In addition. the incidence and severity of nausea and vomiting and need for treatment were recorded. Patients were contacted 24 h and 7 days postoperatively to assess their satisfaction and evaluate any post-discharge complications. An incremental cost comparison was performed. Total costs of all drugs (including cost of wastage) were calculated. In addition, costs of any side effects arising from the use of muscle relaxants and indirect costs related to duration of OR, PACU or phase II unit stay were included in the analysis. The costs of OR time, PACU time and phase II unit time were based on the salary of personnel in these units. The personnel costs in the OR consisted of two nurses and one technician. The ratio of nurses to patients for our hospital was one nurse for two patients in the PACU and one nurse for six patients in the phase II unit. The average salary of a nurse with fringe benefits was taken as $20/h. The cost of medical personnel was not included in the analysis.
RESULTS: There was no difference between the groups with respect to demographic data and surgical or anesthetic time. All patients in the rocuronium group required reversal, compared to two patients in the mivacurium group. Although there was no difference in the time to extubation and PACU time in the two groups, the phase II unit time was significantly shorter in the mivacurium group. The incidence of nausea and vomiting and need for treatment was similar in the two groups. The costs of anesthetic drugs (apart from muscle relaxants and reversal drugs) were similar in the two groups. The total costs (muscle relaxant and reversal drugs) were higher with the use of rocuronium compared to mivacurium.
DISCUSSION: The results of this study show that both direct (drug costs) and indirect costs were lower with the use of mivacurium in peripheral ambulatory surgeries lasting for 1–2 h. The reason for patients receiving mivacurium being judged 'fit for discharge' significantly earlier than those receiving rocuronium, may possibly be related to early ambulation. As an increasing number of patients are now being transferred directly from the OR to the phase II unit (bypassing the PACU), early discharge from the phase II unit should compensate for the increase in the work load of the nurses from the direct admissions. This should result in significant cost savings because there would be no need to employ additional nurses.

Effects of succinylcholine on the maintenance requirements and recovery profiles of atracurium, mivacurium and rocuronium during outpatient surgery

GP Joshi, DW Kim, PF White

Anesthesiology (1996) 85/3 A (xxx)

INTRODUCTION: A rapid onset and short duration of action makes succinylcholine the drug of choice for rapid tracheal intubation. However, following recovery from succinylcholine-induced neuromuscular blockade, maintenance of surgical relaxation usually involves the use of a nondepolarizing neuromuscular blocking drug. Atracurium, mivacurium and rocuronium are nondepolarizing muscle relaxants with differing onset and recovery characteristics. This study was designed to compare the effects of prior administration of succinylcholine on the pharmacodynamics and recovery profiles of atracurium, mivacurium or rocuronium in women undergoing outpatient laparoscopic surgery.
METHODS: Following IRB approval and informed consent, 60 healthy women undergoing outpatient laparoscopic surgery were randomly assigned to one of three muscle relaxant treatment groups. A standardized fentanyl-propofol induction followed by destlurane 3% and N_2O 60% in O_2 for maintenance was used in all patients. Tracheal intubation was facilitated with succinylcholine 1 mg/kg followed by mivacurium 2–4 mg (Group 1), rocuronium 5–10 mg (Group 2), or atracurium 5–10 mg (Group 3) for maintenance of neuromuscular blockade. Neuromuscular function was assessed using electromyography with a TOF mode of stimulation every 10 s at the wrist. The onset (to 95% depression of T1), clinical duration (to 25% recovery of T1), and recovery index (25–75% recovery of T1) were recorded. Residual neuromuscular blockade was reversed with a combination of edrophonium and atropine only if clinically indicated. The occurrence of side effects (e.g. cutaneous, edema, nausea or vomiting) were noted in the PACU and 24 h postoperatively. Data were analyzed using ANOVA or Kruskuall–Wallis test (as appropriate), with $P < 0.05$ considered statistically significant.
RESULTS: There were no differences between the groups with respect to demographic or clinical data. The onset time and recovery profile of succinylcholine was similar in all the patients. Although patients receiving mivacurium required a greater number of maintenance doses as compared to the other two groups, the need for reversal drugs was decreased. Of interest, there was no difference in the recovery profile after the first maintenance dose of the three muscle relaxants. Transient erythema on the upper body was noted in one patient in Groups I and III. The incidence of nausea was similar in all three treatment groups. However, more patients in Groups II and III had vomiting requiring treatment. A table is presented.
CONCLUSIONS: When succinylcholine is used for tracheal intubation, mivacurium, rocuronium and atracurium are equally effective for maintenance of muscle relaxation during outpatient laparoscopic procedures. The clinical duration of the initial maintenance bolus of each relaxant was similar. However, the rapid spontaneous recovery with mivacurium allows faster recovery without the need for reversal drugs.

Cost-effectiveness and patient outcome—comparison of prophylactic ondansetron vs. dimenhydrinate in laparoscopy

H Sandhu, S Ganapathy, C Moote

Anesthesiology (1996) 85/3 A (xxx)

INTRODUCTION: The purpose of this study was to compare cost-effectiveness and outcome of the cheapest and most expensive antiemetic agents for outpatient laparoscopy.
METHODS: After IRB approval, informed written consent was obtained from 87 women scheduled for gynecological laparoscopy. The study was randomized ard blind. Patients received either placebo (P), ondansetron 8 mg (O), or dimenhydrinate 50 mg (D) intravenously immediately prior to the induction of anaesthesia. All patients received propofol, mivacurium, nitrous oxide, isoflurane and fentanyl. No reversal agents were used. Postoperative nausea, drowsiness and satisfaction were measured prior to discharge using a 10 cm visual analogue scale (VAS). The following day, in a telephone interview, measurements were obtained using a verbal rating scale (VRS) 0–10. Willingness to repeat the same antiemetic therapy and to pay for antiemetic drugs was also determined. Nursing time and supplies were measured. Statistical analysis was performed using ANOVA for parametric data, chi-square for nonparametric data, and a P-value of < 0.05 as significant.
RESULTS: No savings in discharge time, nursing care or supplies could be documented. Immediate recovery from anaesthesia was delayed by D and more patients in this group could not complete the questionnaire at 1 and 2 h postoperatively. Patients were willing to pay an average of $\$32 \pm 17$ for antiemetic medication. A table is presented.
DISCUSSION: This anaesthetic protocol produced minimal postoperative nausea and vomiting, even in the placebo group. While dimenhydrinate is a commonly used antiemetic, sedative properties make it undesirable for outpatient anaesthesia. The cost of prophylactic antiemetic therapy (O $34.80, D $0.38), is difficult to justify given the marginal benefits we observed.

Effect of ondansetron on resumption of normal activities after outpatient laparoscopy

J Tang, BG Wang, J Qi, RH Wender, PF White

Anesthesiology (1996) 85/3 A (xxx)

INTRODUCTION: Postoperative nausea and vomiting (PONV) is a major concern for patients undergoing ambulatory surgery. Although ondansetron, 4 mg i.v., has been reported to decrease emesis in the first 24 h after surgery, the effect of this antiemetic on the patient's quality of life and resumption of normal activities has not been carefully assessed after discharge from the ambulatory surgery unit. Using a placebo-controlled study design, the impact of prophylactic ondansetron on postoperative recovery variables when administered either before or after laparoscopic surgery.
METHODS: 105 healthy consenting women undergoing laparoscopic procedures on an ambulatory basis were randomly assigned to one of three treatment groups according to an IRB-approved protocol. After premedication with midazolam, 2 mg iv, patients received 5 ml of study medication (# 1) containing either saline (Group I), ondansetron 4 mg (Group II) or saline (Group III). Anesthesia was induced with fentanyl 1.0–1.5 μg/kg, and propofol 1.5–2.0 mg/kg i.v., and maintained with desflurane 3–6% in combination with nitrous oxide 60–70% in oxygen. At the end of surgery, 5 ml of a second study medication (# 2) containing either saline (Group I), saline (Group II) or ondansetron 4 mg (Group III) was administered. Nausea and vomiting was assessed at 30 min intervals in the PACU, and at 24 h after discharge. Quality of life issues were assessed at 24 h, 72 h and 7 days after the operation. Data were analyzed using ANOVA (for continuous variables) and Chi-square test or Fisher's exact test (for categorical data), with $P < 0.05$ considered statistically significant (* vs Group I). Data are presented as mean values $\pm$ S.D. and percentages (%).
RESULTS: The three groups were comparable with respect to their demographic characteristics. When ondansetron, 4 mg i.v., was administered at the end of surgery it facilitated the resumption of normal alimentation and enhanced patient satisfaction with their surgical experience. The prophylactic use of ondansetron was also associated with a shorter time to return to work. A table is presented.
DISCUSSION: Prophylactic ondansetron, 4 mg i.v., administered at the end of laparoscopic surgical procedures facilitated resumption of dietary intake and may have contributed to an earlier return to work.

Prophylactic ondansetron vs droperidol plus metoclopramide: effect on nausea and vomiting after laparoscopic cholecystectomy

D Freiberger, JL Gosnell, DC Brooks, RA Steinbrook

Anesthesiology (1996) 85/3 A (xxx)

INTRODUCTION: Postoperative nausea and vomiting (PONV) are unpleasant for the patient and may delay discharge from the ambulatory surgery unit or result in overnight hospitalization following laparoscopic cholecystectomy. This study compared the effects of three commonly used anti-emetic drugs, ondansetron, droperidol and metoclopramide, in preventing PONV after laparoscopic cholecystectomy.
METHODS: With IRB approval and written informed consent, 215 patients were enrolled in a randomized double-blind crossover study. Patients were sedated preoperatively with intravenous midazolam (1–2 mg) and fentanyl (50–100 μg). Following preoxygenation, general anesthesia was induced with propofol (1.5–2.5 mg/kg). Following tracheal intubation, patients received either ondansetron 4 mg i.v. (Group O) or droperidol 0.625 mg IV together with metoclopramide 10 mg IV (Group DM). Anesthesia was maintained with desflurane-air-oxygen and additional fentanyl and vecuronium. Ketorolac 30 mg i.v. was administered during skin closure: Neuromuscular blockade was reversed with glycopyrrolate (0.6–1.0 mg) and neostigmine (3.0–5.0 mg) IV prior to extubation. In the PACU, patients were asked to rate their degree of nausea on a four-point scale (0 = none, 1 = mild, 2 = moderate and 3 = severe) every 30 min until discharge home or admission to the hospital. Moderate or severe nausea in the PACU was treated with the crossover drug, i.e. ondansetron for patients in Group DM, or droperidol plus metoclopramide for patients in Group O. Data were analyzed using t-tests and chi-square analyses, with $P < 0.05$ considered statistically significant.
RESULTS: 15 patients required conversion to open cholecystectomy and were therefore eliminated from the study; thus, 200 patients completed the protocol and are included in the following analysis (A table is presented). The groups were similar with respect to gender, age, weight, duration of surgery, number receiving intraoperative atropine or ephedrine, number admitted to hospital overnight and time to discharge home. Of the 102 patients in Group O, 44 required antiemetic treatment in the PACU, compared to 24 of the 98 patients in Group DM ($P < 0.01$). Pain medication was requested by 87 patients in Group O vs 73 patients in Group DM ($P = 0.06$). Of patients admitted overnight, only one (in Group DM) was admitted for PONV.
CONCLUSIONS: Droperidol 0.625 mg i.v. in combination with metoclopramide 10 mg i.v. was more effective in preventing PONV than was ondansetron 4 mg i.v. in patients undergoing laparoscopic cholecystectomy. There were no differences in the numbers of patients admitted to the hospital or in time to discharge.

Effect of the timing of ondansetron administration on postoperative nausea and vomiting after outpatient laparoscopy

J Tang, B Wang, J Qi, RH Wender, PF White

Anesthesiology (1996) 85/3 A (xxx)

INTRODUCTION: It has been recommended that ondansetron be administered prior to induction of anesthesia when it is used for prophylaxis against postoperative nausea and vomiting (PONV). However, the effect of the timing of ondansetron administration on its antiemetic efficacy has not been previously evaluated. Therefore, we designed a randomized, double-blind, placebo-controlled study to compare the efficacy and recovery profile when ondansetron, 4 mg, is administered either before induction of anesthesia or at the end of surgery, as well as a split dose (2 mg) before and after the operation.
METHODS: 140 healthy consenting women undergoing gynecologic laparoscopic procedures on an ambulatory basis were randomly assigned to one of four treatment groups ($n = 35$/group) according to an IRB-approved protocol. After premedication with midazolam, 2 mg i.v., patients received 5 ml of study medication (# 1) containing either saline (Group I), ondansetron 2 mg (Group II), ondansetron 4 mg (Group III) or saline (Group IV). Anesthesia was induced with fentanyl 1.0–1.5 μg/kg, and propofol 1.5–2.0 mg/kg i.v., and maintained with destlurane 3–6% in combination with nitrous oxide 60–70% in oxygen. At the end of surgery, 5 ml of a second study medication (# 2) containing either saline (Group I), ondansetron 2 mg (Group II), saline (Group III) or ondansetron 4 mg (Group IV) was administered. Nausea and vomiting was assessed at 30-min intervals in the PACU and at 24 hr after discharge. Recovery times to tolerating oral fluids, ambulating, 'home readiness' and discharge were recorded. Data were analyzed using ANOVA and the Chi-square test (or Fisher's exact test), with $P < 0.05$ considered statistically significant (* vs Group I; Group II).
RESULTS: The four groups were comparable with respect to demographic characteristics (A table is presented). Although prophylactic ondansetron decreased PONV, it was most effective when administered at the end of surgery. The efficacy of ondansetron administered

prior to the start of surgery was related to the length of the operation. When ondansetron was administered at the end of surgery, it significantly improved the recovery process compared to the placebo group. When ondansetron is administered for prophylaxis against PONV, in the ambulatory setting, these data would support the use of a 4 mg dose at the end of surgery.

Acupuncture and postoperative vomiting in day-stay paediatric patients

KL Schwager, DB Baines, RJ Meyer

Anaesth. Intensive Care (1996) 24/6 (674–677)

The stimulation of the acupuncture point P6 has been used to prevent nausea and vomiting in the adult population. It has, however been subject to limited comparative evaluation in children. We proposed that stimulation of P6 and the analgesic point Li4 would reduce the incidence of postoperative vomiting. Eighty-four unpremedicated paediatric patients having day-stay surgery (circumcision or herniotomy/orchidopexy were included in a randomized double-blind, placebo-controlled study of trasnscutaneous stimulation of P6 and Li4, or no stimulation. The incidence of vomiting was recorded for 24 h postoperatively. There was no statistically significant difference in total postoperative vomiting in those patients who were stimulated, compared with the control group ($P = 0.909$), or between any group postoperative vomiting in the recovery ward, day-stay ward or at home. For all groups, vomiting was more common within the first 4 h and more likely to occur in the day-stay ward.

Spinal anaesthesia with lidocaine 5% for ambulatory surgery in infants

A Sadraoui, B Idali, M Laraki, S Benchekroun, B Yousri, M Benaguida

Cahiers d'Anesthesiol. (1996) 44/6 (485–487)

Spinal anaesthesia has been suggested as the anaesthetic technique of choice for surgery in ex-preterm infants because of the risk of postoperative apnoea associated with general anaesthesia. However, this technique is rarely used today in paediatric patients. We report our experience with spinal anaesthesia using hyperbaric lidocaine in 18 infants scheduled for ambulatory surgical procedures below the umbilicus. Mean age was 15 months and mean weight was 10 kg; spinal anaesthesia was performed at L4–L5 and 3 mg kg^{-1} of hyperbaric lidocaine were injected; motor block was obtained 2 min after injection. Only minor changes in heart rate and blood pressure were observed; the duration of spinal anaesthesia was 40 ± 9.7 min, while the duration of the operative procedure was 40 ± 9.4 min. The anaesthesia was considered satisfactory in 16/18 cases. No complication was observed in the peri-operative period. Spinal anaesthesia with hyperbaric lidocaine is a reasonable option in infants scheduled for ambulatory sub-umbilical surgery lasting less than 45 min.

Total intravenous anesthesia with alfentanil, etomidate and midazolam for outpatient gynecological surgery. Assessment of the influence of the dose of midazolam

SD Belzarena

Rev. Bras. Anestesiol. (1996) 46/6 (387–393)

There are several pharmacological interactions among benzodiazopines, hypnotics and opioids when they are administered in combination. Alfentanil, etomidate and midazolam are widely used for ambulatory procedures. The aim of this study is to assess clinical changes in the quality of anesthesia as a function of the dose of midazolam. After informed consent, 60 female patients, submitted to curettage with or without dilatation under total intravenous anesthesia were randomly allocated into three groups of 20. After appropriate monitoring in the OR they received a solution diluted to a volume of 5 ml containing: saline in Group 0, 0.05 mg kg^{-1} of midazolam of midazolam in Group 10. Fixed doses of alfentanil (20 μg kg^{-1}) and etomidate (0.15 mg kg^{-1}) were administered 2 min later. Time to induction of and recovery from anesthesia was measured and side-effects were recorded. Heart rate, arterial blood pressure, respiratory rate and oxygen saturation (SpO_2) were registered at six moments before and after induction of anesthesia. Induction and recovery times were short. Cardiovascular variables were stable. Respiratory rate and oxygen saturation decreased in all patients. This effect was more prominent and sustained with increasing doses of midazolam. Nine patients from Group 10, six from Group 5 and two from Group 0 required ventilatory support due to a respiratory rate of less than 10 or SpO_2 less than 94%. This combination of drugs produce anesthesia of good quality for outpatient gynecological procedures. Our data suggest that there is an agonism between etomidate and midazolam for the production of hypnosis and among the three drugs for the production of respiratory depression. A moderate dose of midazolam (0.05 mg kg^{-1}) is recommended when this combination of drugs is used in outpatient anesthesia.

The influence of the mother's presence on the quality of the anesthetic induction in pediatric surgery

SA Dos Santos, E De Sena e Silva Vieira, EB Ramos Jr., M Herminio de Aguiar Oliveira, D Tavares Silveira

Rev. Bras. Anestesiol. (1996) 46/6 (394–398)

The participation of the mother during the anesthetic induction has been stimulated, aiming at decreasing stress and achieving a less traumatic induction. The purpose of this study was to verify whether the presence of the mother makes induction of anesthesia smoother and modifies the parameters which reflect adenergic overactivity such as heart rate, arterial blood pressure and plasma glucose levels. Two groups of children (Group 1; $n = 22$ and Group 2, $n = 24$), aged between 2 and 12 years were anesthetized with halothane and nitrous oxide in oxygen (50%). In Group 1 the mother was present at the induction stage, which did not occur in Group 2. Arterial blood pressure, heart rate, plasma glucose levels and the characteristics of the induction were recorded. Smooth induction was observed in 19 children in Group 2, in the absence of the mother. Agitation during induction prevailed in Group 1, with the presence of the mother (13 children). Before induction, the majority of the children showed tachycardia and arterial hypertension. There was not a significant difference in plasma glucose levels between the two groups. These results led us to conclude that under the conditions of this study, involving outpatient pediatric surgery, the majority of the patients exhibit signs of adrenergic overactivity as they arrive at the operating room. The presence or the absence of the mother during the induction of anesthesia does not influence glucose plasma levels; most importantly, her presence seems to have a negative influence on the qualify of the induction.

Suture haemorrhoidectomy: a day-only alternative

N Patel, T O'Connor

Aust. New Zealand J. Surg. (1996) 66/12 (830–831)

BACKGROUND: Haemorrhoidectomy is a common treatment for third degree symptomatic haemorrhoids, and day surgery has increased because of increasing pressure for hospital beds. The aim of the present study is to describe a technique of suture haemorrhoidectomy (SH), conducted as a day-only procedure, and compare the

effectiveness and outcomes of this method with the conventional Milligan–Morgan haemorrhoidectomy (MMH).
METHODS: The results of 18 consecutive patients, mean age 52 years (31–73) undergoing SH between April 1994 and June 1995 were compared with a historical control group of 17 consecutive patients, mean age 45 years (29–72), who had MMH in the preceding year. Seven patients were excluded because of intercurrent anal pathology (one), thrombosed haemorrhoids (one) or loss to follow-up (five). An interviewer followed up patients using a telephone questionnaire.
RESULTS: Mean follow-up was 6 months in the SH group and 18 months in the MMH group. There was no significant difference in total operative time. The SH group had a significantly shorter mean time to first void of 3 versus 11 h ($P < 0.005$), mean time to first bowel action of 11 versus 48 h ($P < 0.005$) and mean in-hospital stay of 10 versus 77 h ($P < 0.005$). The SH group had a significantly decreased linear analogue pain scale, a mean of 1 versus 3 ($P < 0.05$). The complications were: two readmissions for pain relief in the SH group and urinary retention in one MMH patient. None of the study group have had recurrence of haemorrhoids.
CONCLUSION: Suture haemorrhoidectomy as a day-only procedure is safe, less painful and reduces in-hospital admission time. The long-term effectiveness and complications of the technique are as yet undetermined.

The utility of preoperative laboratory testing in general surgery patients for outpatient procedures

T-A Wattsman, RS Davies, EH Wiser

Am. Surg. (1997) 63/1 (81–90)

The utility of obtaining routine preoperative laboratory (lab) screening tests was evaluated for a 1-year period in general surgery clinic patients undergoing ambulatory surgical procedures at a teaching hospital. This study sought to determine whether those lab tests not indicated by patient history or physical examination would identify abnormalities that might influence perioperative care of the ambulatory surgical patient or predict perioperative complications. The charts of 142 patients undergoing 155 procedures were reviewed. A total of 300 tests were ordered, with 92 (30.6%) being abnormal. Of the 125 tests indicated, 54 (43.2%) were abnormal, whereas in those lab tests not indicated, 38 (21.7%) were found to be abnormal. In four instances, an abnormal lab test (four out of 300) result was clinically significant (1.3%), causing cancellation of the surgical procedure in two cases (both indicated lab tests) and diagnosis of urinary tract infection in two patients (both routine urinalyses). Forty-eight of the 142 patients had no preoperative lab tests ordered (34%), with no perioperative complications resulting. Patient charges totaled $15725 for all lab tests ordered, with $8573 in charges attributed to those tests not indicated. If lab tests for all general and subspecialty surgical outpatients had been ordered as dictated by patient medical history and physical examination rather than by either routine or by arbitrary criteria, our medical facility could have potentially reduced patient charges by more than $400000 in the year reviewed, assuming a 52.4% savings as noted above, with no expected adverse outcomes.

Small-dose hypobaric lidocaine-fentanyl spinal anesthesia for short duration outpatient laparoscopy. I. A randomized comparison with conventional dose hyperbaric lidocaine

H Vaghadia, DH McLeod, GWE Mitchell, PM Merrick, CR Chilvers

Anesth. Analg. (1997) 84/1 (59–64)

A randomized, single-blind trial of two spinal anesthetic solutions for outpatient laparoscopy was conducted to compare intraoperative conditions and postoperative recovery. Thirty women (ASA physical status I and II) were assigned to one of two groups. Group I patients received a small-dose hypobaric solution of 1% lidocaine 25 mg made up to 3 ml by the addition of fentanyl 25 μg. Group II patients received a conventional-dose hyperbaric solution of 5% lidocaine 75 mg (in 7.5% dextrose) made up to 3 ml by the addition of 1.5 ml 10% dextrose. All patients received 500 ml of crystalloid preloading. Spinal anesthesia was performed at L2–3 or L3–4 with a 27-gauge Quincke point needle. Surgery commenced when the level of sensory anesthesia reached T-6. Intraoperative hypotension requiring treatment with ephedrine occurred in 54% of Group II patients but not in any Group I patients. Median (range) time for full motor recovery was 50 (0–95) min in Group I patients compared to 90 (50–120) min in Group II patients ($P = 0.0005$). Sensory recovery also occurred faster in Group I patients (100 ± 22 min) compared with Group II patients (140 ± 27 nin, $P = 0.0001$). Postoperative headache occurred in 38% of all patients and 70% of these were postural in nature. Oral analgesia was the only treatment required. Spinal anesthesia did not result in a significant incidence of postoperative backache. On follow-up, 96% said they found spinal needle insertion acceptable, 93% found surgery comfortable, and 90% said they would request spinal anesthesia for laparoscopy in future. Overall, this study found spinal anesthesia for outpatient laparoscopy to have high patient acceptance and a comparable complication rate to other studies. The small-dose hypobaric lidocainefentanyl technique has advantages over conventional-dose hyperbaric lidocaine of no hypotension and faster recovery.

Outpatient management of superficial venous insufficiency at a naval medical facility

KL Greason, JD Murray

Ann. Vasc. Surg. (1996) 10/6 (524–529)

Superficial venous insufficiency is common in a young, working population. It can result in disability and lost time from work because of chronic pain, inflammation and/or ulceration. We reviewed our experience in the management of 104 patients with superficial venous insufficiency secondary to saphenofemoral and/or perforator venous incompetence. The main treatment objective was to control venous insufficiency in a manner that would allow a rapid return to duty. The technique involved ligation of the incompetent saphenofemoral junction and/or perforating veins (i.e. point ligation) under local anesthesia. Patients returned to normal duty status the day after treatment. At 6 weeks later any persistent disease was controlled with compression sclerotherapy. Significant morbidity included postoperative wound complications in 4% and thrombophlebitis in 14%. Objectives of treatment, with excellent functional and cosmetic results, were achieved. True recurrence was noted in 8% of patients, whereas new disease developed in only 4%; the total recurrence rate was 12%. This mode of therapy is ideally suited to outpatient management. This study demonstrates the excellent control of venous dysfunction that is achievable with the use of selective therapy based on proximal venous ligation and staged sclerotherapy.

Audit of patient acceptance of nasal surgery as a day case procedure

PA Tierney, D Samuel, DM Thomas

Br. J. Clin. Pract. (1996) 50/7 (357–359)

A greater emphasis on day case surgery within the health service is seen as a method of improving efficiency and reducing expenditure, We interviewed 90 consecutive patients undergoing nasal surgery who had been preoperatively assessed as being fit for day case surgery, They were randomised into three groups regarding the duration of postoperative nasal packing. All patients stayed overnight following

surgery and were interviewed prior to discharge. Some 52% of the overall sample would be happy to have nasal surgery performed as a day case. If the nasal pack was removed after 2 hours, this figure rose to 67%, This difference in patient acceptance did not attain statistical significance overall, but there was a significant difference in those undergoing submucosal resection. There was no difference in the age, sex distribution or type of surgery performed between each group. The audit commission quotes patient satisfaction with day case surgery at 80%. Nasal surgery was not examined in their report, but was included as one of a set of procedures suitable for consideration. Although day case nasal surgery may be safe, further research regarding patient acceptance is required.

Day-case surgery in children under 2 years of age: Experience in a district general hospital and survey of parental satisfaction

G Stiff, PN Haray, M Chilcott, I Williams, G Watkins, ME Foster

J. R. Coll. Surg. Edinburgh (1996) 41/6 (408–411)

One surgeon's experience of day-case paediatric surgery in a population aged less than 2 years at a district general hospital is reported. During a 6-year period from 1989 to 1994, 82 day-case operations were performed in 79 infants and young children. All children were managed by a multidisciplinary team including surgeon, paediatric anaesthetist and paediatric nurses. There was no mortality and minimal morbidity. A telephone survey of parents enquiring into satisfaction with all aspects of pre-, peri- and post-operative care revealed that the procedures are well-accepted. The survey also showed that there was no increased utilization of primary health care professionals when day-case surgery is performed in this young age group. We conclude that paediatric day-case surgery is safe and well-tolerated by both infants and parents and is suitable for performance in non-specialist centres provided a team approach is adopted.

Economic outcomes analysis from an Ambulatory Surgical Center

DE Marcinko, HR Hetico

J. Foot Ankle Surg. (1996) 35/6 (544–549)

In the competitive healthcare marketplace, foot surgeons are being placed under pressure to demonstrate the economic value of surgical care. The management methodology of 'fiscal outcomes review' is one tool being used to evaluate such care. Initially developed for internal corporate management as an executive decision support system, the process is being used as an external cost control technique to 'economically credential' providers of surgical care. Consequently, the economic outcomes analysis of a single surgical procedure represents a first attempt to gather, allocate, analyze and interpret meaningful charge information relative to the podiatric Ambulatory Surgery Center setting. When compared with the traditional outpatient hospital setting, charge reductions are documented without compromising quality. The long-held belief that Ambulatory Surgery Center surgery is more efficient than traditional outpatient surgery, can then be corroborated.

Development and preliminary validation of a postoperative pain measure for parents

CT Chambers, GJ Reid, PJ McGrath, GA Finley

Pain (1996) 68/2-3 (307–313)

Parents are now primarily responsible for the at home assessment and treatment of their children's pain following minor surgery. Although some research has suggested that parents underestimate their childrens pain following surgery, no behavioral measure exists to assist parents in pain assessment. The Postoperative Pain Measure for Parents was developed based on cues parents reported using to assess their children's pain (e.g. changes in appetite and activity level). The purpose of the present study was to develop and validate this measure by examining the relation between parent-report of child behaviors and child-rated pain. Subjects were 110 children (56.4% male) aged 7–12 years undergoing day surgery at a tertiary-care children's hospital and their parents. Parents and children completed a pain diary for the 2 days following surgery. Children rated their pain and emotional distress and parents rated the presence or absence of specific behaviors from a checklist. Correlations were conducted between each of the 29 behavioral items and child-rated pain on Day 1; 14 items with correlations less than 0.30 were dropped. The remaining 15 items were subjected to a principal axis factor analysis. A one-factor solution was the best fit for the data. The items were then summed to yield a total score out of 15. Internal consistency reliabilities for the measure and correlations with child-rated pain were high on both days following surgery. Child-rated pain and emotional distress were moderately correlated. The Postoperative Pain Measure for Parents was also positively correlated with child-rated emotional distress on both days following surgery. As child-rated pain decreased from Days 1 to 2, so did scores on the behavioral measure. The Postoperative Pain Measure for Parents was successful in discriminating between children who had undergone no/low pain surgeries and children who had undergone moderate to high pain surgeries. There were no significant differences in scores on the behavioral measure for child age or sex. Using a cut-off score of six out of 15, the measure showed excellent sensitivity ($> 80\%$) and specificity ($> 80\%$) in selecting children who reported clinically significant levels of pain. This study provides preliminary evidence for the use of the Postoperative Pain Measure for Parents as a valid assessment tool with children between the ages of 7 and 12 years following day surgery. It is internally consistent and strongly related to child-rated pain. Future research should explore the use of this measure with a younger sample and children with developmental delays.

Endoscopic transnasal dacryocystorhinostomy. Long-term results

GWR Watters, HB Whittet, GA Shun-Shin, CA Milford

Minimally Invasive Ther. Allied Technol. (1996) 5/6 (505–510)

Endoscopic dacryocystorhinostomy (DCR) was successfully performed in 40 patients, with four patients having bilateral surgery. Follow-up data were obtained on 43/44 eyes using clinical notes and a patient questionnaire. Range of follow up was 1–46 months, with an average of 18 months (in nine patients follow-up was at least 3 years). Epiphora was successfully relieved in 86% of patients and there was no evidence of a recurrence of nasolacrimal obstruction in the long term. Endoscopic DCR is a relatively quick and simple procedure with low morbidity, and as such is suitable for day case surgery. Satisfactory long-term results make endoscopic DCR an alternative to external DCR as primary surgical treatment for nasolacrimal duct obstruction. In cases of failed external DCR, or when epiphora is iatrogenic following surgery to the lateral nasal wall, a transnasal endoscopic approach is probably the treatment of choice.

Can remifentanil be considered an ideal opioid for managing anaesthesiology in the 21st century?

J Scholz, M Steinfath

Anasthesiol. Intensivmed. Notf.Med. Schmerzther. (1996) 31/10 (592–607)

Current trends toward outpatient surgery and closed loop computer-controlled drug administration have created a demand for short acting

anaesthetic agents. Such agents not only provide the anaesthetist with rapid patient recovery after completion of the procedure, but also with almost immediate intra-operative control over the anaesthetic state of the patient. Shorter acting anaesthetic agents are being developed in several therapeutic areas including volatile anaesthetics, neuromuscular blockers as well as injectable anaesthetics. In the injectable anaesthetic area, propofol has been introduced and offers some significant advantages over the previously existing induction agents. Remifentanil is a novel member in the family of the 4-anilidopiperidine opioid analgesics which also include the traditional agents fentanyl, alfentanil and sulfentanil. Remifentanil undergoes widespread extrahepatic metabolism by blood and tissue nonspecific esterases, resulting in an extremely rapid clearance. Because of its unique metabolic pathway among this group of drugs, remifentanil represents a new pharmacokinetic class of opioids which is named esterase metabolised opioid (EMO). Rapid biotransformation to minimally active metabolises results in a short and predictable duration of action with no accumulation of effect on repeated dosing or with continuous infusion. Clinical experiences presented so far indicate that remifentanil can be safely administered in different anaesthesic regimens as well as in the great variety of patients including children and patients with renal, hepatic or cardiovascular diseases. However, its use also presents the anaesthetist with a significant challenge. If remifentanil is the only opioid analgesic administered during anaesthesia, it must be remembered that shortly after the end of the surgical procedure, the patient will not benefit from opioid-based analgesia. This problem must be addressed if remifentanil is to be used for procedures associated with significant postoperative pain. Reducing the infusion rate of remifentanil to analgesic doses suitable for the postoperative pain management or immediate administration of longer acting opioids at the end of anaesthesia might solve this problem. At present it is difficult to predict precisely the future ranking of remifentanil. However, the unique pharmacokinetic profile of remifentanil should make it useful in the various surgical settings and in all circumstances where precise control over the analgesic state are desirable.

Proposed scoring system for assessing synovial membrane abnormalities at arthroscopy in knee osteoarthritis

X Ayral, A Mayoux-Benhamou, M Dougados

Br. J. Rheumatol. (1996) 35/Suppl. 3 (14–17)

The synovial membrane is thought to play an important role in both the clinical and the anatomical evolution of osteoarthritis. Arthroscopy performed under local anaesthesia on an outpatient basis has been proposed as a means of cartilage and synovial assessment for research purposes. The authors propose a scoring system for assessing anterior synovial abnormalities at arthroscopy in knee osteoarthritis. This synovitis score takes into account the intensity and the extent of synovial lesions.

Visual impairment and general health among Danish cataract patients. Results from the Danish Cataract Surgery Outcomes Study. I

JC Norregaard, P Bernth-Petersen, T Folmer Andersen

Acta Ophthalmol. Scand. (1996) 74/6 (598–603)

This Danish multicenter study was undertaken to evaluate current indications for cataract extraction and to compare the health status among patients enlisted for cataract surgery with that reported for the background population. A consecutive sample of 290 patients from all ophthalmic hospital departments in Denmark was examined and interviewed prior to cataract extraction. The mean visual acuity in the eye enlisted for surgery was 0.17. A visual acuity of < 0.05 occurred in 11.1% and 46.7% had a visual acuity of ≤ 0.05 to < 0.3. Comparing these figures to other recent European studies it seems reasonable to conclude that in Denmark surgery is performed at an earlier stage of the disease. Only a few patients with no functional impairment were seen; other appropriate indications for surgery were seen for these patients. Occurrence of angina, bronchitis and prior myocardial infarction was higher in the cataract sample as compared to the random sample of Danes. The likelihood of preferring an outpatient procedure was significantly increased among younger patients, patients of better general health and among patients with better pre-operative visual acuity in eye enlisted for surgery.

Transvaginal colpourethropexy with fibrin sealant: 4 years-follow up in 23 cases

HJ Philippe, M Perdu, P Dompeyre, A Wahid, DT Dien

Eur. J. Obstet. Gynecol. Reprod. Biol. (1996) 70/2 (157–158)

A method of transvaginal colpo-urethropexy, using fibrin sealant was studied clinically. After a fingertip vaginal retropubic dissection, fibrin sealant is instilled in the retropubic space with the intent of inducing fibrosis between the elevated urethro–vesical junction and the retropubic periosteum. Twenty-three patients with urinary stress incontinence underwent this procedure with 82% of satisfactory results and 18% failure. Complications were minimal. In the future, this technique could be useful for ambulatory surgery.

Retrospective assessment of antibiotic and tourniquet use in an ambulatory surgery center

C Reyes, S Barnauskas, V Hetherington

J. Foot Ankle Surg. (1997) 36/1 (55–62)

In this study, 459 lower extremity surgeries were evaluated to assess and improve the quality of patient care at the Carnegie Surgery Center, Cleveland, OH. Two aspects of surgery were studied: the antibiotic usage and tourniquet application. The authors analyzed the rate of infection and the number of tourniquet complications that resulted from the surgeries. The infection rate was 0.65%, and there were no tourniquet complications. Using the information learned from the study and reviewing pertinent literature, recommendations were made to further enhance patient care.

Venous levels of lignocaine and bupivacaine after peribulbar block

F Gao, AJ Budd

Anaesthesia (1996) 51/12 (1109–1112)

Twenty-five patients undergoing elective cataract day surgery were studied after receiving a dual-injection peribulbar block with a mixture consisting of equal volumes of 2% lignocaine and 0.75% bupivacaine with hyaluronidase. A maximum of 10 ml of solution was used for the initial block; supplementary injections of up to 10 ml were given to five patients. Venous blood was taken prior to the block and then 1, 10, 20, 30, 60 and 90 min after the block. The peak mean concentrations of lignocaine (0.722 μg ml^{-1}) and bupivacaine (0.353 μg ml^{-1}) were found at 10–20 min after injection when no top-up was given and at 10 min after the top-up injection when required. All measured serum concentrations of lignocaine and bupivacaine were below the accepted toxic levels of the two drugs. However, the highest individual toxicity score after a top-up was 0.915 which was very close to the toxicity threshold (= 1) when a scoring system was used to assess the combined levels.

The effect of glycopyrrolate on postoperative pain and analgesic requirements following laparoscopic sterilisation

BC Guard, SJ Wiltshire

Anaesthesia (1996) 51/12 (1173–1175)

In order to evaluate the contribution of tubal spasm to pelvic pain following laparoscopic sterilisation, we have studied the effect of glycopyrrolate, an anticholinergic agent with antispasmodic properties, on 60 ASA 1 and 2 patients presenting as day-cases for laparoscopic sterilisation using Filshie clips. In a randomised, double-blind, controlled trial, patients received either glycopyrrolate 0.3 mg or saline intravenously prior to induction of anaesthesia. Compared with the control group, patients receiving glycopyrrolate had significantly reduced immediate postoperative pain scores ($P < 0.02$) and required significantly less postoperative morphine ($P < 0.01$). Nausea, vomiting and anti-emetic requirements were also reduced though not significantly. We conclude that glycopyrrolate 0.3 mg at induction of anaesthesia is an effective, method of improving the quality of recovery after day-case laparoscopic sterilisation using clips.

Pre-operative oral administration of morphine in day-case gynaecological laparoscopy

R Rasanayagam, G Harrison

Anaesthesia (1996) 51/12 (1179–1181)

The analgesic effect of morphine sulphate (10 mg, by mouth) given pre-operatively on pain after gynaecological laparoscopy was studied in a randomised prospective, double-blind, placebo-controlled comparison. Two groups of 56 patients were studied, one group undergoing diagnostic laparoscopy and the other laparoscopic sterilisation. All patients received a standard anaesthetic after premedication with morphine or placebo 1 h before the operation. Morphine premedication did not significantly influence postoperative pain as assessed on a visual analogue scale in either group and postoperative opioid consumption was unaffected. Premedication with morphine (10 mg, orally) does not sigificantly decrease pain after day-case gynaecological laparoscopy.

Quality of life in patients undergoing inguinal hernia repair

K Lawrence, C Jenkinson, D McWhinnie, A Coulter

Ann. R. Coll. Surg. England (1997) 79/1 (40–45)

Inguinal hernia repair is one of the most common surgical procedures undertaken in the NHS. Despite this, no previous work has examined quality of life in this patient group. This study examines quality of life preoperatively and at 3 and 6 months postoperatively in 140 patients undergoing inguinal hernia repair in the context of a randomised controlled trial of laparoscopic versus open hernia repair. Surgery was undertaken on a day case basis, and quality of life was assessed using the Short Form 36 (SF36). In the initial phase of the study, 57% of those screened for suitability met the study inclusion criteria and were randomised. No significant differences were found between laparoscopic and open hernia repair in terms of quality of life at 3 and 6 months postoperatively. No difference was found between 3 and 6 month scores, suggesting that patients had already made a good recovery by 3 months. A significant improvement was found between preoperative and postoperative scores, with the greatest change arising on dimensions assessing pain, physical function, and role limitation owing to physical restriction. After standardising for age, sex and social class, a comparison of the hernia patients to population norms for the SF36 was consistent with improvement from preoperative to postoperative assessment. This study has demonstrated the improvement in quality of life in patients undergoing elective inguinal hernia repair by experienced surgeons on a day case basis. It has also demonstrated the feasibility of assessing quality of life using generic measures in this patient group. Further work in this area is required. Ultimately, the priority given to elective inguinal hernia repair will depend on how the demonstrated benefits compare with those derived from other elective surgical procedures.

What happens after discharge? Return hospital visits after ambulatory surgery

R Twersky, D Fishman, P Homel

Anesth. Analg. (1997) 84/2 (319–324)

The purpose of this study was to examine the frequency of return hospital visits after ambulatory surgery discharge and to identify any predictor variables for its occurrence. A retrospective review of hospital records for all patients returning to the same hospital within 30 days after ambulatory surgery was conducted. Data on return hospital visits that resulted in rehospitalization (as an inpatient or to the ambulatory surgery unit—ASU) or treatment as an outpatient in the emergency room were recorded. A total of 6243 patients underwent ambulatory surgery over 12 consecutive months and 187 returned to the same hospital of which 1.3% were for complications. Of all the returns, 54% returned to the emergency room (ER) and 46% were rehospitalized as inpatients or to ASU. To identify factors associated with an increased likelihood of return, two case controls for each return visit were obtained from medical records of ambulatory surgical patients operated on during the same time period. Results of the multivariate analysis on the matched case controls identified urology as the only significant surgical service that predicted returns. (Odds ratio 27.87; confidence interval (CI) 3.78–74.86; $P = 0.0002$). A separate analysis of the most common ASU procedures performed identified two surgical procedures that predicted hospital return as compared with overall ambulatory surgery population: patients undergoing varicocelectomy and hydrocelectomy procedures were 8.3 times more likely to return (CI 2.090–23.75; $P = 0.0042$); patients undergoing dilation and curettage were three times as likely to return (CI 1.78–5.55; $P = 0.0002$). Bleeding was the most common reason for all hospital returns (41.5%), with 76.5% of these patients treated and discharged through the ER. The increased likelihood of return visits after urology procedures warrants further evaluation. As patients with bleeding were most likely to return to the ER and discharged, more effective pre- and postprocedure patient education may further reduce this occurrence. Better informing patients regarding the prognosis of bleeding, and advising them of medical alternatives, could reduce inappropriate patient returns to the ER.

Intravenous dolasetron for the prevention of postoperative nausea and vomiting after outpatient laparoscopic gynecologic surgery

SG Graczyk, R McKenzie, S Kallar, CB Hickok, T Melson, B Morrill, WF Hahne, RA Brown

Anesth. Analg. (1997) 84/2 (325–330)

The newer 5-hydroxytryptamine type 3 (5-HT3) antagonists are sometimes considered for routine prophylaxis of postoperative nausea and vomiting (PONV) in high-risk patients. This multicenter, randomized, double-blind, placebo-controlled study compared the efficacy and safety of three single intravenous (IV) doses of dolasetron mesylate salt (12.5, 25 or 50 mg) for the prevention of PONV in 635 females undergoing outpatient laparoscopic gynecologic surgery. Antiemetic efficacy was evaluated over a 24-h postoperative period by recording the number and timing of emetic episodes; effects on nausea were evaluated by a visual analog scale (VAS). The propor-

portion of complete responders (no emetic episodes and no escape medication in 24 h) was significantly higher with each dolasetron mesylate dose (> 50% for each dose; $P \leq 0.0003$) than with placebo (30.6%). Fewer patients given dolasetron required or requested escape antiemetic medication compared with placebo ($P < 0.0003$). Dolasetron-treated patients had significantly ($P < 0.0357$) lower median postdose maximum nausea VAS scores compared with placebo-treated patients. Patient satisfaction with dolasetron was high and, overall, was significantly ($P = 0.0131$) greater than that with placebo. Dolasetron was an effective and well tolerated preventive treatment for PONV resulting from laparoscopic gynecologic surgery.

The effect of timing of ondansetron administration in outpatients undergoing otolaryngologic surgery

R Sun, KW Klein, PF White<sp = 1 >
Anesth. Analg. (1997) 84/2 (331–336)

A randomized, double-blind, placebo-controlled study was designed to compare the relative efficacy of prophylactic ondansetron, 4 mg intravenously (IV), when administered before induction of anesthesia or at the end of surgery to an outpatient population at high risk of developing postoperative nausea and vomiting (PONV). Patients undergoing otolaryngologic surgery were randomly assigned to one of three different treatment groups: Group I (placebo) received saline (5 ml) prior to induction of anesthesia and again at the end of surgery; Group II received ondansetron (4 mg in 5 ml) prior to induction of anesthesia and saline (5 ml) at the end of surgery; and Group III received saline (5 ml) prior to induction of anesthesia and ondansetron (4 mg) at the end of surgery. All patients received the same general anesthetic technique. A standardized regimen of rescue antiemetics was administered in the recovery room to patients with two or less emetic episodes or at the patient's request for persistent nausea. Episodes of nausea and vomiting, as well as the need for rescue antiemetics, were recorded for 24 h after the operation. The incidences of nausea and emesis in the recovery room after prophylactic ondansetron, 4 mg IV, administered either before induction (68 and 20%, respectively) or at the end of surgery (60 and 4%, respectively) were not significantly decreased compared to the placebo control group (80 and 12%, respectively). However, when ondansetron was administered at the end of the operation, it significantly reduced the need for rescue antiemetics in the recovery room (36 vs 64% in the control group). The postanesthesia care unit and hospital discharge times were similar in all three study groups. One patient in Group II and one patient in Group III were hospitalized because of intractable symptoms related to PONV. After discharge from the ambulatory surgery unit, the incidence of nausea, vomiting, and the need for rescue antiemetic drugs were similar in all three treatment groups. In conclusion, ondansetron (4 mg IV) was more effective in reducing the need for rescue antiemetics in the recovery room when administered at the end versus prior to the start of otolaryngologic surgery. Therefore, when ondansetron is used for antiemetic prophylaxis in outpatients undergoing otolaryngologic procedures, it should be administered at the end of the operation rather than prior to induction of anesthesia.

Day-case tonsillectomy—Is it appropriate?

MB Pringle, E Cosford, P Beasley, AP Brightwell

Clin. Otolaryngol. Allied Sci. (1996) 21/6 (504–511)

There is continued encouragement to increase the use of day surgery. Recent publications have suggested that day-case tonsillectomy is a safe procedure due to the low primary haemorrhage rates (0.14–3.5%). One of the suggested benefits of day surgery is that patients want it. They prefer to recover at home after an operation. With tonsillectomy, personal experience suggested that this was not the case. A review of 117 patients having tonsillectomy was undertaken. All patients stayed in for at least one post-operative night. No patients or parents thought that the post-operative stay was too long (80% 'just right', 20% 'too short') and only 7% would have been happy to go home on the day of operation. 'Safety' does not automatically make an operation suitable for day-case surgery. Pain, nausea, vomiting, drowsiness and anxiety about the operation and post-operative course were all reasons given for not wanting to go home on the day of surgery. The justification for the increased use of day surgery is that it increases efficiency by reducing costs per case while maintaining the quality of care. One aspect of quality of care is patient acceptability and before day-case tonsillectomy is acceptable to patients the factors responsible for the post-operative morbidity need to be addressed.

Postoperative symptoms 24 hours after ambulatory anaesthesia

F Chung, V Un, J Su

Can. J. Anaesth. (1996) 43/11 (1121–1127)

PURPOSE: To test the hypothesis that the type of surgical procedure influences the incidence of postoperative symptoms. Also the effect of demographic and clinical risk variables: age, sex, ASA status, duration of anaesthesia on the postoperative symptoms were evaluated for each type of surgery.
METHODS: Demographic, medical, anaesthetic and surgical data on 1017 patients were prospectively collected by a research assistant who telephoned each patient 24 h after discharge to administer a questionnaire to determine postoperative symptoms. Postoperative symptoms included incisional pain, nausea/vomiting, drowsiness, dizziness, headache and fever. In addition, 270 patients were asked the percentage (0–100) of their return to daily living function at 24 h.
RESULTS: Incisional pain (26.9%), headache (11.6%) and drowsiness (11.5%) were the most frequently reported symptoms. Dizziness was reported by 9.7% and nausea/vomiting by 7.1%. Approximately 50% of patients undergoing laparoscopy, orthopaedic and general surgery reported 24-h postoperative incisional pain. The incidence of 24-h postoperative nausea/vomiting was highest after general (17.4%), orthopaedic (11.2%) and laparoscopic surgery (9.4%). Drowsiness was highest after laparoscopy (36.1%), followed by general surgery (21.4%). Dizziness was most frequent after laparoscopy (24.1%), followed by general surgery (16.1%). After laparoscopy, postoperative drowsiness or dizziness was related to anaesthesia duration. After general surgery, postoperative dizziness or drowsiness were related to age; the younger the patient, the more likely the symptoms.
CONCLUSIONS: Postoperative pain, nausea/vomiting, drowsiness, dizziness and headache were the more frequent postoperative symptoms 24 h after ambulatory surgery and they were influenced by the type of surgical procedure. In addition, the type of surgery and the 24-h postoperative symptoms determined the degree of return to daily living function.

The Jehovah's Witness family, transfusions and pediatric day surgery

JE Morrison Jr., G Lane, S Kelly, S Stool

Int. J. Pediatr. Otorhinolaryngol. (1997) 38/3 (197–205)

The pediatric otolaryngologist and anesthesiologist, when encountering a family of the Jehovah's Witness (JW) faith, should be aware of the potential problems which may arise when deciding to proceed with surgery. Two case reports are presented which illustrate the difficult situations which can occur when unanticipated complications (i.e. profound bleeding) arise perioperatively. An overview of the history and common tenets of the JW faith, previous legal perspectives, pertinent clinical information from the medical literature, and the protocol of The Children's Hospital, Denver, for dealing with this sensitive issue (drafted with the cooperation of the local JW Hospital Liaison Committee) are presented.

A dose response study of ketorolac in patients undergoing ambulatory hand surgery under intravenous regional anesthesia

SS Reuben, G Gardner, KM Duprat

Anesthesiology (1996) 85/3 A (xxx)

INTRODUCTION: Intravenous regional anesthesia (IVRA) with lidocaine (L) and ketorolac (K) has been shown to provide elective postoperative analgesia following ambulatory hand surgery. Recently the drug manufactuer has recommended using lower doses of intravenous K in the management of postoperative pain. By concentrating K at the surgical site we believe that even lower doses of K may provide optimal postoperative analgesia. This study was designed to determine the optimal dose of K when used in conjunction with IVRA using lidocaine.
METHODS: Following IRB approval for this double-blind study, written informed consent was obtained from 70 patients scheduled to undergo elective carpal tunnel release or tenolysis by the same surgeon. All patients received IVRA with 40 ml 0.5% L, and were randomly assigned to one of seven study groups receiving either 0, 5, 10, 15, 20, 30 or 60 mg K added to the IVRA. Postoperative pain was assessed using a 10 cm visual analog scale (VAS) at 1 and 2 h after deflation of the tourniquet. Analgesia in the recovery room was provided by administering fentanyl 25 μg every 5 min until VAS ≤ 3. The time to first analgesic request, total fentanyl requirement and discharge time were recorded. Patients were instructed to take one Tylenol #3registered trademark sign (T#3) tablet every 4 h as needed for pain. They were contacted by telephone the day after surgery; the time of the first dose and the amount of T#3 tablets required in the initial 24 h postoperative period were recorded.
RESULTS: There were no differences noted in demographic variables, surgical procedures, operative or tourniquet times among the seven groups. Analgesic duration increased in a dose-dependent manner for the 0, 5, 10, 15 and 20 mg groups which were (min): 113 ± 79, 190 ± 113, 301 ± 104, 423 ± 57 and 605 ± 331. The analgesic duration for the 30 and 60 mg groups: 661 ± 543 and 617 ± 456 were not statistically different from 20 mg. VAS scores were noted to be significantly lower in the 20 mg group when compared to groups 0–15 mg. There were no differences in VAS scores between the 20-, 30- and 60-mg groups. The T#3 requirements followed a similar pattern in that the 20-mg group consumed (1.8 ± 1.2) tablets which was significantly lower than 0 mg (4.9 ± 1.2), 5 mg (4.2 ± 1.1), 10 mg (4.1 ± 1.6), or 15 mg (3.1 ± 1.3). There were no differences noted between 20 mg (1.8 ± 1.2), 30 mg (1.7 ± 1.3), and 60 mg (1.9 ± 1.3). A figure is presented.
CONCLUSION: The addition of 20 mg of K to IVRA with lidocaine provides optimal analgesia for patients undergoing ambulatory hand surgery. By utilizing lower doses of K the potential for adverse side effects as well as cost containment may be realized.

Ketorolac for inguinal hernia repair in children: less nausea and faster recovery than after caudal anesthesia or nerve block

LE Jacobson, A Poinier, JM Geiduschek, SS Sasaki, HW Karl, C Ramamoorthy, S Bratton

Anesthesiology (1996) 85/3 A (xxx)

INTRODUCTION: Ilioinguinal-iliobypogastric nerve blocks (NB) and caudal anesthesia (CAU), have been recommended for postoperative analgesia for children undergoing inguinal herniorrhaphy. The reported need for supplemental analgesics after NB has varied from 3 to 72%. Morphine (MS) administration, as an adjunct to NB may double the incidence of vomiting after inguinal surgery. The present study tested the hypothesis that ketorolac (K), alone or in combination with NB, provides better analgesia with less need for MS rescue, fewer side effects and shorter time to discharge than CAU or NB.
METHODS: After obtaining institutional approval and parental consent, 81 children, 18 months to 11 years of age, undergoing inguinal herniorrhaphy were studied. All children received oral premedication with midazolam, general anesthesia with N_2O, O_2, halothane, and one of the following treatments: K: Ketorolac 1 mg/kg IV; NB: 0.25% bupivacaine with epi 1:200000–1 ml/kg; NB-K: the combination of NB and K administered as above; CAU: 0.25% bupivacaine with epi 1:200000–0.75 ml/kg. Postoperatively, a blinded observed recorded pain scores (CHEOPS), emergence and behavior scores, MS requirement, nausaea/vomiting (Hosp N/V), and time to achieve criteria for discharge from the recovery room (RR) and day surgery unit (DSU). Children with a CHEOPS greater than '9' or specific complaints of pain, received 0.03 mg/kg MS intravenously. Data collected after discharge via a written questionnaire and telephone interview included a log of analgesic use, episodes of vomiting (Home N/V), difficulty urinating (UR), and a ten-point parental satisfaction-with-analgesia (SATIS) score. A high degree of satisfaction was defined as SATIS > 8. Nominal data were analyzed with Chi-square tests and continuous data with ANOVA with Bonferroni correction. $P < 0.05$ was considered statistically significant.
RESULTS: All groups were comparable with regard to age, sex, procedure (unilateral or bilateral), operative time, MS requirement, emergence and behavior scores and time in RR. Statistically significant findings are indicated. A table is presented.
CONCLUSIONS: In this study of children undergoing inguinal hernia repair, ketorolac, alone or in addition to a nerve block, resulted in less postoperative nausea and vomiting than either caudal anesthesia or nerve block alone. Analgesia was equivalent in all grueps. The combination of ketorolac and nerve block was also associated with shorter recovery time in the DSU.

Analgesia after day-case knee arthroscopy: double-blind study of intra-articular tenoxicam, intra-articular bupivacaine and placebo

TM Cook, JP Tuckey, JP Nolan

Br. J. Anaesth. (1997) 78/2 (163–168)

Arthroscopy of the knee is performed regularly on a day-case basis. Intra-articular bupivacaine produces transient analgesia and reports of analgesia using intra-articular morphine have produced conflicting results. Non-steroidal anti-inflammatory drugs given systemically can provide effective analgesia for this procedure. In this study we attempted to determine if intra-articular tenoxicam provided useful analgesia after day-case arthroscopy. Sixty-three ASA I–II patients were allocated randomly to one of three groups to receive 40 ml of a solution containing 0.9% saline (group Pla), 0.25% bupivacaine (group Bup) or tenoxicam 20 mg (group Ten). The injection was made into the knee joint at the end of surgery, 10 min before tourniquet deflation. Verbal rating and visual analogue pain scores (at rest and on knee flexion), use of analgesia, mobilization and disturbance by pain at home were recorded for the next 48 h. There were no differences between pain scores in any of the three groups when tested at rest or on movement. Less analgesia was used in the first 24 h by patients in the tenoxicam group but the difference in time to first analgesia was not statistically significant. Side effects and disturbance by pain were similar in all groups. The use of intra-articular tenoxicam 20 mg at the end of arthroscopy reduced oral analgesic requirements during the first day after operation but did not alter patients' perception of pain.

Resolution of chronic anal fissures after treatment of contiguous internal hemorrhoids with direct current probe

GA Machicado, S Cheng, DM Jensen

Gastrointest. Endosc. (1997) 45/2 (157–162)

BACKGROUND: Purposes: (1) to prospectively evaluate efficacy and safety of direct current (DC) probe treatment of chronic anal fissures associated with internal hemorrhoids, and (2) to estimate direct and indirect costs of anoscopic treatment versus surgery.
METHODS: Ten patients with chronic fissures of 11 mm (mean length) had symptoms for 5 months (mean) in spite of medical management; all had internal hemorrhoidal disease. DC coagulation was applied to two or three contiguous internal hemorrhoids per outpatient session. A total of 11 mA (mean) of DC current was delivered for 7 min (mean) per hemorrhoid segment.
RESULTS: All ten patients had relief of chronic anal pain within two treatments and nine anal fissures healed within 4 weeks. One patient developed a perianal abscess and fistula requiring surgery. There were no recurrences in 20 months (mean) of follow-up with medical management. Mean direct and indirect costs (in terms of lost time from work or usual activity) of DC probe treatments were estimated to be 10–30% lower and twice to ten times less, respectively, than standard surgery for chronic anal fissures.
CONCLUSION: DC probe treatment for chronic anal fissures associated with internal hemorrhoidal disease is an important advance as an effective, safe and cost-effective nonsurgical treatment in selected patients.

The effects of midazolam and flumazenil on psychomotor function

A Gupta, S Lind, A Eklund, C Lennmarken

J. Clin. Anesth. (1997) 9/1 (21–25)

STUDY OBJECTIVE: To determine the effects of midazolam and its antagonism with flumazenil on psychomotor function as assessed by the perceptive accuracy test (PAT) and choice reaction time (CRT).
DESIGN: Double-blind, cross-over, randomized, placebo-controlled study.
SETTING: Department of Anaesthesiology, University Hospital, Linkoping, Sweden.
SUBJECTS: 11 healthy volunteers (six females, five males, mean age 32 years).
INTERVENTIONS: Midazolam 0.1 mg/kg (Group MH), midazolam 0.035 mg/kg (Group ML), or placebo (Group PL) were injected intravenously (IV) in a cross-over design. Flumazenil 0.5 mg was injected after 60 min. Plasma concentrations of midazolam were measured at 3, 30, 60 and 75 min.
MEASUREMENTS AND MAIN RESULTS: Baseline values were first obtained on psychomotor tests including the PAT and CRT. These tests were then repeated 30 and 60 min after the IV injection of midazolam or placebo, and repeated 15 and 30 min following the injection of flumazenil. A dose-dependent effect of midazolam was seen on the PAT and CRT. Flumazenil completely reversed the psychomotor effects of midazolam in Group ML at 60 min but not in Group MH, and this action was clearly detected by the PAT. Psychomotor tests had returned to baseline values when the plasma concentration of midazolam was below 33 ng/ml. A marked inter-individual variation was seen on the PAT, CRT and in the correlation between the plasma concentration and the results on the PAT.
CONCLUSIONS: There was a dose-dependent deterioration in psychomotor performance in subjects given midazolam. The PAT was sensitive in the detection of these residual effects, but a large inter-individual variation in the psychomotor effects of midazolam was evident that could be due to pharmacodynamic and pharmacokinetic variability between individuals. Flumazenil in a dose of 0.5 mg IV completely reversed the effects of low-dose, but not high-dose, midazolam.

Cost effectiveness of cataract surgery. A comparison of conventional extracapsular surgery and phacoemulsification at Flinders Medical Centre

P Asimakis, DJ Coster, DJ Lewis

Aust. New Zealand J. Ophthalmol. (1996) 24/4 (319–325)

PURPOSE: To compare the cost of conventional extracapsular cataract surgery and phacoemulsification at Flinders Medical Centre.
METHODS: The costs of the two forms of cataract surgery were assessed over a 12-month period. During this period 410 cataract operations were performed.
SETTING: The cataract surgery was carried out in a dedicated day surgery unit in a teaching hospital.
OUTCOME MEASURE: The direct, indirect and tangible costs were measured.
RESULTS: Conventional extracapsular cataract surgery with posterior chamber lens implant costs $1000.85 and phacoemulsification with lens implantation costs $1231.00.
CONCLUSIONS: Although conventional extracapsular surgery generates slightly lower costs than phacoemulsification, the cost difference is small. In generating these figures, some assumptions must be made and the real difference may prove to be less than this.

Mechanism of femoral nerve palsy complicating percutaneous ilioinguinal field block

DJ Rosario, S Jacob, J Luntley, PP Skinner, AT Raftery

Br. J. Anaesth. (1997) 78/3 (314–316)

Femoral nerve palsy has been reported after percutaneous ilioinguinal field infiltration with general anaesthesia for inguinal herniorrhaphy. The mechanism whereby this could occur was studied in cadaver dissections. It was found that the plane between the transversus abdominis muscle and the transversalis fascia was continuous laterally with the tissue plane deep to the iliacus fascia, which is the plane containing the femoral nerve. Injection of methylene blue 1 ml into this plane resulted in pooling of dye around the femoral nerve. Femoral nerve palsy may result from infiltration of a sufficient volume of local anaesthetic into the plane between the transversus abdominis muscle and the transversalis fascia with tracking of the injectate deep to the iliacus fascia to affect the femoral nerve. This finding has important implications for the performance of a percutaneous ilioinguinal field block particularly in day surgery provision.

Evaluation of morphine versus fentanyl for postoperative analgesia after ambulatory surgical procedures

AR Claxton, G McGuire, F Chung, C Cruise

Anesth. Analg. (1997) 84/3 (509–514)

Adequate postoperative analgesia without side effects is necessary to facilitate same-day discharge of ambulatory patients after ambulatory surgery. This study compared the use of intravenous morphine and fentanyl after painful ambulatory procedures with respect to analgesic efficacy, the incidence of side effects and impact on the patient's readiness for discharge. Fifty-eight patients undergoing ambulatory surgery were prospectively randomized to receive morphine or fentanyl for postoperative analgesia and studied in double-blind fashion. The drugs were administered in equipotent doses in the postanesthesia care unit (PACU) and were titrated against pain scores until a

visual analog score of less than 40 mm was achieved and the patient was satisfied with the level of analgesia. In the ambulatory surgical unit, oral analgesia was available. Pain scores, amount of analgesia used, the incidence of side-effects (nausea and vomiting, sedation and dizziness), the times to achieve recovery milestones, and fitness for discharge were studied. Equal amounts of morphine and fentanyl were used in the PACU, but pain scores were higher in the fentanyl group in the ambulatory surgical unit. In addition, the fentanyl group required more oral analgesia than the morphine group (69 vs 17%; $P < 0.0002$). The incidence of in-hospital side effects was similar. However, the morphine group had a more frequent incidence of postdischarge nausea and vomiting than the fentanyl group (59 vs 24%; $P < 0.016$). There was no significant difference in the duration of stay in the PACU (morphine vs fentanyl, 69 ± 15 min vs 71 ± 20 min), the times to achieve recovery milestones, and fitness for discharge (morphine vs fentanyl, 136 ± 41 min vs 132 ± 40 min). The short duration of fentanyl was not associated with faster discharge times; most patients required additional analgesia to control pain. Morphine produced a better quality of analgesia but was associated with an increased incidence of nausea and vomiting, the majority of which occurred after discharge.

Remifentanil compared with alfentanil for amoulatory surgery using total intravenous anesthesia

BK Philip, PE Scuderi, F Chung, TJ Conahan, W Maurer, JJ Angel, SK Kallar, EP Skinner, BD Jamerson

Anesth. Analg. (1997) 84/3 (515–521)

The purpose of this study was to test the hypothesis that using a 1:4 ratio of remifentanil to alfentanil, a remifentanil infusion would provide better suppression of intracperative responses and comparable recovery profiles after ambulatory laparoscopic surgery than all alfentanil infusion, as part of total intravenous anesthesia. Two hundred ASA physical status I, II or III adult patients participated in this multicenter, double-blind, parallel group study. Patients were randomly assigned 2:1 to either the remifentanil-propofol or alfentanilpropofol regimens. The anesthesia sequence was propofol (2 mg/kg intravenously (IV) followed by 150 μg kg^{-1} min^{-1}), and either remifentanil (1 μg kg^{-1} IV followed by 0.5 μg kg^{-1} min^{-1}) or alfentanil (20 μg kg^{-1} IV followed by 2 μg kg^{-1} min^{-1}), and vecuronium. After trocar insertion, infusion rates were decreased (propofol to 75 μg kg^{-1} min^{-1}; remifentanil to 0.25 μg kg^{-1} min^{-1}; alfentanil to 1 μg kg^{-1} min^{-1}). Alfentanil and propofol were discontinued at 10 and 5 min, respectively, before the anticipated end of surgery (last surgical suture); remifentanil was discontinued at the end of surgery. Recovery times were calculated from the end of surgery. The median duration of surgery was similar between groups (39 min for remifentanil vs 34 min for alfentanil). A smaller proportion of remifentanil patients than alfentanil patients had any intraoperative responses (53 vs 71%, $P = 0.029$), had responses to trocar insertion (11 vs 32%, $P < 0.001$), or required dosage adjustments during maintenance (24 vs 41%, $P < 0.05$). Early awakening times were similar. Remifentanil patients qualified for Phase 1 discharge later and were given postoperative analgesics sooner than alfentanil patients ($P < 0.05$). Actual discharge times from the ambulatory center were similar between groups (174 min for remifentanil vs 204 min for alfentanil) ($P = 0.06$). In conclusion, remifentanil can be used for maintenance of anesthesia in a 1:4 ratio compared with alfentanil, for total IV anesthesia in ambulatory surgery. This dose of remifentanil provides more effective suppression of intraoperative responses and does not result in prolonged awakening.

Fat graft myringoplasty in children—a safe and successful day-stay procedure

RB Mitchell, KD Pereira, RH Lazar

J. Laryngol. Otol. (1997) 111/2 (106–108)

The surgical closure of dry tympanic membrane perforations in children remains a controversial issue due to conflicting opinions on the appropriate technique, graft material and success rate. We present a review of 342 children who underwent fat graft myringoplasty as a day stay procedure over a 6-year period. Successful closure of the tympanic membrane perforation was achieved in 92% of ears. Subsequent recurrent otitis media with effusion required insertion of ventilation tubes in 12%. No relationship was observed between the age of the child and a successful outcome. We conclude that day-stay fat graft myringoplasty is a safe and successful procedure which results in a dry and safe ear in the majority of children.

Propofol: an alternative general anesthetic for outpatient oral surgery

MN Pastuovic, ME Cohen, RG Eurton, RA Dionne Jr.

J. Oral Maxillofac. Surg. (1996) 54/8 (943–948)

PURPOSE: This study compared propofol with methohexital for use in outpatient general anesthesia for oral surgery procedures.
PATIENTS AND METHODS: 50 American Society of Anesthesia (ASA) class I or II patients undergoing elective minor cral surgery procedures were selected for inclusion in the study. Participants were randomly divided into two groups—propofol-treated and methohexital-treated. All anesthetic agents were titrated in bolus using dosages standardized by weight. After premedication with intravenous midazolam and fentanyl, general anesthesia was induced either by propofol or methohexital. The quality of the anesthesia was subjectively evaluated by the anesthetist, surgeon, and the patient. Also, a standardized battery of tests was developed to quantitatively evaluate recovery from anesthesia.
RESULTS: Propofol showed significantly less percentage increase in diastolic blood pressure and heart rate than methohexital. However, at the same time, propofol showed significantly greater percentage lowering of diastolic blood pressure. The mean low heart rate percentage data of preoperative baseline were different, but both were greater than 100%. The anesthetist and patient evaluations showed no statistically significant difference in the acceptance of either agent. No patient in either group had any recollection of pain with induction or any recollection of the operation itself. There were no statistically significant effects of group in recovery test performance, although patients tended to recover more quickly in the symbol digit test and object recall test with propofol. No patient complained of any postoperative complications secondary to the anesthetic.
CONCLUSIONS: Propofol is a suitable agent for induction and maintenance of general anesthesia for outpatient oral surgery procedures. It provides a smooth induction of anesthesia with few excitatory effects.

Patients with cardiac disease for ambulatory surgery

ML Mingus

Anesthesiol. Clin. North Am. (1997) 15/1 (171–188)

Patients with CAD and valvular disease can safely undergo ambulatory surgery. Patient selection is critical to evaluate the patient's medical condition and optimize any unstable angina and CHF

prior to surgery. Hemodynamic changes, which are common in brief but stressful ambulatory procedures, should be controlled to decrease the potential for complications (despite a lack of scientific evidence to support this concept). Surveillance for perioperative cardiac dysfunction should be continued into the postoperative period and by telephone communication after discharge.

Comparison of postoperative emesis, recovery profile, and analgesia in pediatric strabismus repair: rectal acetaminophen versus intravenous fentanyl-droperidol

GS Padda, OA Cruz, JL Krock

Ophthalmology (1997) 104/3 (419–424)

BACKGROUND: Postoperative nausea and vomiting comprise of significant morbidity in pediatric patients undergoing strabismus repair and can prolong hospitalization. Many authors recommend routine intraoperative opiate analgesia and prophylactic antiemetics.
METHODS: A prospective, comparative, randomized study to assess rectal acetaminophen ($n = 45$) to intravenous fentanyl-droperidol ($n = 45$) to resolve recovery profile, emesis rate, and adequacy of analgesia in a pediatric strabismus repair population was performed, with standardization of the anesthetic technique. Data on pharmacoeconomic cost-effectiveness analysis, willingness to pay, and willingness to repeat were elucidated.
RESULTS: Emesis rate in the acetaminophen group was 9%, and the fentanyl-droperidol group was 13% (not statistically significant). There was a statistically significant shorter wake-up time, time in postanesthesia recovery, time in ambulatory surgery unit, time to first verbal command, time to first oral intake, time to ambulation, and time to return to normal activity in the acetaminophen group ($P < 0.05$). Postoperative analgesic potency of rectal acetaminophen was adequate and equivalent by the Observer Pain Scale. Parental satisfaction was similar by willingness-to-pay and willingness-to-repeat postoperative survey. Cost-effectiveness ratio (i.e. cost per treatment success) for acetaminophen and fentanyl-droperidol groups was $0.33 and $87.91, respectively.
CONCLUSIONS: Prophylactic fentanyl-droperidol prolongs the length-of-stay and recovery time and provides no discrete identifiable benefit over acetaminophen alone in this population. Cost-effectiveness analysis strongly favors use of acetaminophen over fentanyl-droperidol prophylaxis in children undergoing primary strabismus surgery.

Total intravenous anaesthesia for day care surgery

VN Swadia

J. Anaesthesiol. Clin. Pharmacol. (1997) 13/1 (57–61)

With the advent of newer intravenous anaesthetic agents and increasing awareness of environmental pollution, total intravenous anaesthesia (TIVA) has become the need of the hour. In this study, a new combination of drugs viz. diazepam, ketamine and thiopentone was tried for the purpose of TIVA as all the three drugs are easily available and commonly used in our institution. Minor surgical procedures lasting 5–50 min were selected for the study keeping in mind the criteria for day surgery. Clinical evaluation of good quality recovery from anaesthesia was done by various tests. Immediate recovery from anaesthesia occured within 15 min of injecting the drug combination. Recovery of physical and cognitive functions took a maximum of 6 h. All the patients were declared fit for 'home readiness' 6 h after the surgery was over. This method is found to be safe, reliable and economical.

Vaginal misoprostol for cervical dilatation before operative office hysteroscopy

V Atay, NK Duru, R Pabuccu, A Ergun, G Tokac, BA Aydin

Gynaecol. Endosc. (1997) 6/1 (47–49)

OBJECTIVE: To assess the efficacy of misoprostol as an adjunct for easy cervical dilatation before operative office hysteroscopy under local anaesthesia.
DESIGN: Randomized, placebo-controlled clinical trial.
SETTING: Tertiary centre for treatment of infertility.
SUBJECTS: Patients undergoing hysteroscopy, for simultaneous diagnostic and operative indications such as uterine septae, synechiae, submucous myomas, endometrial polyps and lost intrauterine devices, were included into the study.
INTERVENTION: 43 cases were randomized to misoprostol ($n = 22$) and placebo ($n = 21$) groups. The drug was administered vaginally 4 h before hysteroscopy. Hysteroscopy was performed under local anaesthesia in an examination room as an office procedure. Main outcome measures: rapid and easy dilatation, decreased pain, decreased incidence of cervical haemorrhage, laceration and uterine perforation.
RESULTS: In the misoprostol group, a 7-mm hysteroscopic sheath passed easily without dilatation in 20 (91%) cases while it passed easily without dilatation in six (28%) of the placebo group ($P < 0.001$). The average dilatation time for groups was 1.6 and 2.8 min, respectively ($P < 0.05$). Mean dilatation pain scores for the misoprostol and placebo groups were 5.1 and 9.3, respectively ($P < 0.05$). Cervical bleeding was noted in two cases in the misoprostol group and laceration of the cervix was noted in three cases. In the placebo group there were eight cases each of both bleeding and laceration.
CONCLUSION: Application of misoprostol does provide a safe, painless and effective means of cervical dilatation by chemical, rather than mechanical forces and reduces complications such as cervical bleeding, laceration and uterine perforation.

An update for Bassini procedure in the treatment of inguinal hernia under local anesthesia. Preliminary note

A Vitali, S Biagiotti, L Talamucci, S Nardi, GC Biliotti

Minerva Chir. (1997) 52/1-2 (149–152)

Inconvenience due to tension along the suture, a relative high recurrence rate, the availability of optimal prosthetic materials and the tendency to reduce hospital stay are the motivations which induced many surgeons to adopt alternative techniques instead of the traditional ones for inguinal hernia repair. Among these latter it is worthwhile to add a personal update of the Bassini's technique: the plasty tailored upon the polypropylene mesh performed in local anesthesia. Thanks to the use of the prosthetic mesh, the plasty is performed using only four stitches tied loosely without much high tension on the conjoined tendon. Such technical expedient reduced postoperative pain and give better warrant for the plasty and allow hernia repair in local anesthesia and on a daily basis.

Benchmarking the perioperative process. I. Patient routing systems: a method for continual improvement of patient flow and resource utilization

AJ Rotondi, C Brindis, KK Cartees, BM DeRiso, HM Ilkin, JS Palmer, HB Gunnerson, WD Watkins

J. Clin. Anesth. (1997) 9/2 (159–169)

The article presents an overview of the design and application of a real-time patient routing system, based on barcode and local area network technology, that was designed to track the progress of patients

during the perioperative process. We present data on all patients undergoing ambulatory surgery. Patients' progress during their surgical stay was recorded at 17 strategic events using this real-time patient tracking technology. These times were used to identify inefficiencies in the perioperative process by icentifying bottlenecks and areas of high variation. We found that both raw and actual operating room (OR) utilization efficiency was less than 50%. Points of high variation in a patient's progress occurred during the time from admit to the hospital until the patient was ready for the OR; the time from when a patient was ready for the OR until they were called for; and the time a patient spends in the OR preoperative holcting room. Causes for variation were identified and traced back to individual procedures, activities, and work processes. Multidisciplinary improvement teams were created to improve the pinpointed problem areas. The real-time patient routing system is a process that has proven to be highly valuable to all participants in the surgical process in bringing about rational, data driven efficiencies in perioperative services. This process has the potential to facilitate multidisciplinary cooperation in efforts to contain and reduce costs of perioperative services.

Caudal epidural butorphanol plus bupivacaine versus bupivacaine in pediatric outpatient genitourinary procedures

CD Lawhorn, JM Stoner, ML Schmitz, RE Brown Jr., FW Stewart, P Volpe, R Shirey

J. Clin. Anesth. (1997) 9/2 (103–108)

STUDY OBJECTIVE: To investigate the efficacy of adding butorphanol to bupivacaine administered in the caudal epidural space in children undergoing genitourinary (GU) procedures.
DESIGN: Randomized, double-blinded, controlled study.
SETTING: University affiliated pediatric hospital.
PATIENTS: 200 ASA physical status I and II male patients between 6 months and 10 years of age.
INTERVENTIONS: Patients were randomized to receive either 0.25% bupivacaine with 1: 200000 epinephrine alone (Group 1) or 0.25% bupivacaine with 1:200000 epinephrine plus 30 μg/kg butorphanol (Group 2) administered via the caudal epidural space prior to surgical incision.
MEASUREMENTS AND MAIN RESULTS: Patients were evaluated postoperatively until discharge. Measurements included requirement of additional analgesic, sedation, pain/comfort scores, and a 24-h analgesic follow-up. Significantly fewer patients in the butorphanol group required rescue morphine sulfate in the postanesthesia care unit ($P \leq 0.001$). The total number of morphine doses administered to Group 2 was significantly less than Group 1 ($P \leq 0.001$). A total of 52% of patients in Group 1 compared with 28% in Group 2 required administration of additional analgesics following discharge from the hospital ($P \leq 0.003$), with 23% of Group 1 requiring a codeine compound compared with 8% in Group 2 ($P < 0.03$).
CONCLUSIONS: The addition of 30 μg/kg butorphanol to 0.25% bupivacaine with epinephrine via the caudal epidural space is a safe, effective means to increase duration of analgesia following GU procedures.

Outpatient general anesthesia: a comparison of a combination of midazolam plus propofol and propofol alone

DJ Reinhart, DR Grum, J Berry, D Lensch, CR Marchbanks, E Zsigmond

J. Clin. Anesth. (1997) 9/2 (130–137)

STUDY OBJECTIVE: To compare the hemodynamics, efficacy, safety and postoperative recovery of patients following the use of either midazolam plus propofol or placebo plus propofol for induction and maintenance of general anesthesia for outpatient surgical procedures of less than 2 h duration.
DESIGN: Prospective, parallel, randomized, double-blind, placebo-controlled, multicenter study.
SETTING: Ten outpatient surgery centers.
PATIENTS: 203 ASA physical status I, II, and III patients undergoing various outpatient surgical procedures.
INTERVENTIONS: Patients were randomly assigned to one of the two treatment groups. For induction of anesthesia, Group 1 received midazolam (0.077 ± 0.0021 mg/kg) via slow intravenous (IV) push plus continuous infusion propofol (provided in a concentraticn of 5 mg/ml), and Group 2 received placebo plus full-concentration (10 mg/ml) propofol. Thereafter, Group 1 received half-concentration propofol and Group 2 received full-concentration propofol via continuous infusion for maintenance of anesthesia. Investigators administered doses of study medication in a blinded fashion as required to achieve the desired clinical effect. Drugs used to maintain anesthesia were restricted to study drug, short-acting opioids and nitrous oxide. Succinylcholine chlcride or vecuronium were used to facilitate intubation of study patients.
MEASUREMENTS AND MAIN RESULTS: There were no statistically significant differences between the midazolam/propofol and placebo/propofol groups with respect to the mean (S.E.) decrease in mean arterial pressure from pre-dose to time of intubation or from time of intubation to initiation of surgery; the mean (S.E.) time required from initiation of study medication to completion of intubation (6.7 (0.23) vs. 7.0 (0.26) min, respectively); or the mean (S.E.) amount of propofol required to induce and maintain anesthesia (6.03 (0.329) vs. 9.71 (0.489) mg/kg, respectively). There was no significant difference between the two treatment groups in the time to recovery following the completion of surgery (as assessed by Aldrete Post Anesthesia Recovery Score). Most patients (approximately 79%) in both groups rated the quality of the anesthetic regimen as excellent; however, as assessed by patient questionnaires, fewer patients in the midazolam/propofol group were able to recall the events surrounding their surgical procedure as compared with patients in the placebo/propofol group (89.2 vs. 77.9%; $P = 0.022$). There were no differences between the two groups with respect to the frequency or severity of adverse events.
CONCLUSIONS: Concomitantly administered midazolam and reduction-concentration propofol did not exacerbate the well-described hypotensive effects of full-strength propofol during induction of anesthesia. The time to intubation was equivalent with the combination of midazolam/propofol as compared with propofol alone. Recovery from the two regimens was not significantly different. However, reduced recall of perioperative events was observed more often in the midazolam/propofol regimen compared with propofol alone.

Acupuncture in anesthesia or analgesic-induced nausea and vomiting

M Meinecke-Machens

Schmerz (1997) 11/1 (9–12)

The most common and distressing symptoms following anesthesia and surgery are pain and emetic problems. Under most circumstances, pain causes the greater amount of suffering, particularly after major surgery, but in some instances postoperative nausea and vomiting (PONV) may be more distressing, particularly after minor surgery. In outpatient surgery, emesis may also have important economic implications, for example, admission to hospital beds because of intractable vomiting. Antimetic drugs given during the perioperative period may be associated with unwanted side effects, including sedation, hypotension and extrapyramidal reactions. Since 1986 there have been studies reporting beneficial antiemetic effects for Pe 6 stimulation on the right or both forearms in adults using either

needling (acupuncture) or pressure (acupressure). The majority of these studies have investigated postoperative nausea and vomiting. But Pe 6 stimulation has also been shown to be an effective antiemetic for symptoms associated with pregnancy and chemotherapy. Although Pe 6 electro-acupuncture and acupressure are recognized as having an antiemetic effect, its inconvenient instrumentation may limit its clinical applicability. There have also been studies reporting beneficial antiemetic effects of P 6 acupoint injection with 50% glucose and acupuncture of the ear.

Tumescent mini abdominoplasty

TT Nguyen, KA Kim, RB Young

Ann. Plastic Surg. (1997) 38/3 (209–212)

The tumescent technique for liposuction has become a widely accepted procedure in the plastic surgical community. We have used this technique as primary anesthesia for a limited abdominoplasty (mini abdominoplasty) in a series of 35 patients over a 2-year period on an outpatient basis. Anesthesia for the procedure consists of tumescent lidocaine solution and minimal sedation with oral Valium or low-dose intravenous Versed. All patients had good hemodynamic stability and tolerated the procedure well. No complications were noted intra- or postoperatively. The tumescent technique provides adequate and safe anesthesia for mini abdominoplasty with supplemental liposuction. The main advantages of the procedure include avoidance of risks associated with general anesthesia, less bleeding, faster recovery, and probably reduced cost of the operation.

Discharge criteria after ambulatory surgey in general anaesthesia

C Wiesenack, G Wiesner, J Hobbhahn

Anasthesiol. Intensivmed. (1997) 38/2 (61–68)

There are at present only a few papers on discharge criteria following ambulatory surgery in general anesthesia. This article therefore describes the stages of recovery after general anaesthesia and provides an overview of discharge criteria from PACU or the ambulatory recovery area and of postoperative instructions for the out-patients in the current literature. In the stage of immediate recovery consciousness, protective reflexes and motor activity return and the patient can be discharged from PACU if specific clinical criteria are satisfied. The return of co-ordination and physiological functions in the stage of intermediate recovery allows to discharge ambulatory patients home accompanied of a responsible adult (home-ready). A patient is considered completely recovered and 'streetfit' after the return of all psychomotorical functions. The evaluation of patients recovery and readiness for discharge from PACU using score-systems can be considered a valuable alternative to the individual assessment by the anaesthetist that would allow delegation of patient discharge to qualified nursing staff. The Aldrete-Score for adults and the Soliman-Score for children are simple and practical scoring systems to determine patient discharge from PACU. The 'Post-Anesthesia-Discharge-Scoring-System' (PADSS) developed by Chung and the modified 'Postanesthetic-Recovery-Score' (PAR) by Aldrete are scoring systems to evaluate home-readiness of ambulatory patients. The PAR seems especially too complex and time consuming which renders it of lesser practical value. To avoid post-operative complications after discharge, patients should receive written instructions in the premedication interview. Possible complications should be explained to the patient and the accompanying adult and written instructions for the next 24 h should be handed to them before the patient is discharged.

National survey of MRSA: Ireland, 1995

Z Johnson, P Fitzpatrick, C Hayes, G Sayers, H Pelly, B McDonnell, L Thornton, J Buttimer

J. Hosp. Infect. (1997) 35/3 (175–184)

The objective of this survey was to obtain an indication of the size of the methicillin-resistant *Staphylococcus aureus* (MRSA) problem in Ireland prior to introducing national MRSA control guidelines. A survey of all microbiology laboratories in Ireland was carried out over 2 weeks in Spring 1995. For patients from whom MRSA was isolated during the study period standard demographic and clinical data were requested and period prevalence/1000 discharges was calculated. All 45 microbiology laboratories surveyed responded. MRSA was isolated from 448 patients during the 2-week period. The period prevalence of MRSA was 16.5/1000 discharges. Males aged 65 or less had the highest rate (50/1000 discharges). Half of all isolates were from patients in surgical or medical wards, but 4% were from community-based sources such as GPs, nursing homes and hospices. Thirty-two percent of MRSA patients were infected rather than colonized. MRSA is clearly a significant problem in Ireland. While it is largely a hospital problem at present, the increasing trend towards day procedures and shorter hospital stay means that infection will increase in the community.

Acupressure treatment for prevention of postoperative nausea and vomiting

C-F Fan, E Tanhui, S Joshi, S Trivedi, Y Hong, K Shevde

Anesth. Analg. (1997) 84/4 (821–825)

Postoperative nausea and vomiting are still common problems after general anesthesia, especially in ambulatory surgery. Drug therapy is often complicated with central nervous system symptoms. We studied a nonpharmacological method of therapy-acupressure-at the Pericardium 6 (P.6) (Nei-Guan) meridian point. Two hundred consecutive healthy patients undergoing a variety of short surgical procedures were included in a randomized, double-blind study: 108 patients were in the acupressure group (Group 1) and 92 patients were in the control group (Group 2). Spherical beads of acupressure bands were placed at the P.6 points in the anterior surface of both forearms in Group 1 patients, while in Group 2 they were placed inappropriately on the posterior surface. The acupressure bands were placed before induction of anesthesia and were removed 6 h postoperatively. They were covered with a soft cotton wrapping to conceal them from the blinded observer who evaluated the patients for presence of nausea and vomiting and checked the order sheet for any antiemetics prescribed. In both groups, the age, gender, height, weight, and type and duration of surgical procedures were all comparable without significant statistical difference. In Group 1, only 25 of 108 patients (23%) had nausea and vomiting as compared to Group 2, in which 38 of 92 patients (41%) had nausea and vomiting ($P = 0.0058$). We concluded that acupressure at the P.6 (Nei-Guan) point is an effective prophylaxis for postsurgical nausea and vomiting and therefore a good alternative to conventional antiemetic treatment.

Negative pressure induced airway and pulmonary injury

K Bhavani-Shankar, N Saliba Hart, PS Mushlin

Can. J. Anaesth. (1997) 44/1 (78–81)

PURPOSE: To describe negative pressure injury occurring during the use of a laryngeal mask airway (LMA) in which airway bleeding rather than pulmonary oedema was the major complication.

CLINICAL FEATURES: A patient presented to the day surgery unit for resection of a ganglion cyst on her right wrist. She underwent general anaesthesia using an LMA, and experienced severe laryngospasm and transient hypoxaemia (oxygen saturation to 66%) 7 min after incision. This resolved within 90 s of succinylcholine administration. Nonetheless, the LMA was removed, a tracheal tube was inserted atraumatically and positive pressure ventilation was maintained until the time of emergence, when fresh blood appeared in the tracheal tube. The blood ultimately became frothy, resembling pulmonary oedema fluid. Haemoptysis, continued postoperatively and led to the hospitalization of this ambulatory patient.
CONCLUSION: Rapid development of large subatmospheric pressures, as can occur during severe laryngospasm, may disrupt the tracheobronchial vasculature causing airway bleeding. This bleeding should be distinguished from negative pressure pulmonary oedema.

Preoperative ultrasound to predict conversion in laparoscopic cholecystectomy

S Jansen, J Jorgensen, J Caplehorn, D Hunt

Surg. Laparosc. Endosc. (1997) 7/2 (121–123)

Laparoscopic cholecystectomy (LC) is the established treatment for symptomatic cholelithiasis. With its decreased postoperative stay, it is being performed increasingly in short-stay or outpatient settings. It is particularly important to identify preoperative factors that may predict conversion to open cholecystectomy (QC) at LC, with its concomitantly prolonged hospital recovery. In this series of 738 patients, the ultrasound features of stone size, gallbladder wall thickness, diameter of the common bile duct, number of stones and the appearance of a contracted gallbladder were assessed preoperatively in all patients. The overall conversion rate was 3.5% (26/738). By logistic regression analysis, factors found to increase significantly the risk of conversion were patient age >70 years ($P<0.01$), a stone at least 20 mm in diameter ($P<0.05$), a gallbladder wall thicker than 4 mm ($P<0.05$), a common bile duct wider than 6 mm ($P<0.05$), and a contracted gallbladder on ultrasound ($P<0.02$). The number of stones in the gallbladder was not significant. Using these risk factors, it was possible to divide patients into high- and low-risk groups. The 118 patients in the high risk group had 18 of the 26 conversions, for a conversion rate of 15.3%. The 620 patients in the low-risk group had eight of the 26 conversions, for a conversion rate of 1.3%. This low-risk subgroup represented 84% of the series of 738 LC procedures and may have been suitable for outpatient LC. Using preoperative ultrasound, it is possible to predict patients who are at low risk of conversion and are suitable for ambulatory surgery.

Intravenous regional anesthesia in ambulatory surgery

A Mozo Barrales

Rev. Mex. Anestesiol. (1997) 20/1 (32–34)

With the purpose to evaluate the efficacy and safety of using minimum or low doses of lidocaine in intravenous regional anesthesia, in orthopedic and reconstructive surgery of superior extremity and the utility in short stay at the hospital, 20 patients of both sex, child and adults, were evaluated at the Orthopedia Hospital 'Magdalene de las Salinas' of the Institute Mexicano del Seguro Social. We obtain good analgesia in 98% of the patients, hemodynamic stability, and no complications secundaries to the technique as well as of local anesthetics or by ischemia, with a predictable recovery of the sensitive and motel functions in a short time. We concluded that the method is effective, sure and economic in the management of ambulatory surgery. This alternative should be considered in all patients that fulfill the requirements.

Tonsillectomy and its complications

J Rous, R Sakar

Otorinolaryngol. Foniatrie (1997) 46/1 (25–32)

During the five year period from 1989 to 1993 at the ENT Clinic in Plzen 995 tonsillectomies were made, i.e. in 8.66% of the total number of patients hospitalized during that period. The mean age of the operated patients was 20.44 years, whereby the age group from 16 to 20 years accounted for more than one quarter (28.64%) of the whole group. Women predominated (56.98%). A non-complicated afebrile course was recorded in 800 (80.40%) of the operated patients, in the remaining 195 (19.60%) after tonsillectomy various complications developed such as early (11.86%) and late (5.53%) haemorrhage, postoperative fever (4.22%), subautaneous emphysema of the face, neck and thoracic wall (0.3%) and the trismus (0.3 %). In two instances aspiration bronchopneumonia was diagnosed and postintubation oedema of the larynx. Except for early haemorrhage which was less frequent after operations under general anaesthesia in the remaining postoperative complications no correlation with the type of anaesthesia used was found. The total relatively high number of complications may be to a certain extent be influenced by the fact that the authors included in the group of patients with early haemorrhage (11.86%) cases treated conservatively (10.35%) as well as those treated by surgery (1.51%). The authors' experience with a relatively frequent incidence of postoperative complications and their development usually before the 3rd day after surgery indicates unequivocally that it is not advisable to perform tonsillectomy as ambulatory surgery, while on the other hand the possibility to reduce the traditional 6-day hospitalization of the majority of patients should be ruled out.

Complications of ambulatory phlebectomy: Review of 1000 consecutive cases

JA Olivencia

Dermatol. Surg. (1997) 23/1 (51–54)

BACKGROUNDP: Complications of ambulatory phlebectomy performed in an office setting.
OBJECTIVE: Complications of phlebectomy.
METHODS: Review of 1000 consecutive cases performed in an office setting.
CONCLUSIONS: Ambulatory phlebectomy is a satisfying procedure for the treatment of most patients presenting with varicose veins. Its clinical as well as cosmetic results are very gratifying. As pleasing as ambulatory phlebectomy has proven to be, complications do result and must be dealt with. The two most frequent complications were: blister formation and localized thrombophlebitis, and the most serious were two cases of skin necrosis.

Recent trends in utilization of procedures in otolaryngology—head and neck surgery

PD Manoukian, JR Wyatt, DA Leopold, EB Bass

Laryngoscope (1997) 107/4 (472–477)

The development of minimally invasive techniques and increasing performance of surgery in outpatient settings have had a major influence on otolaryngologybead and neck surgery (OLHNS), but little is known about the extent to which these forces have affected the overall distribution and total rate of performance of OLHNS procedures. The aims of this study were to determine whether there has been a change in the total number of people undergoing OLHNS

procedures between 1989 and 1992 in Maryland and to identify those procedures for which there has been a significant change in utilization. Data were obtained on 171579 patients undergoing OLHNS procedures between 1989 and 1992 in Maryland's nonfederal, acute care hospitals, hospital-based outpatient centers, and freestanding multispecialty surgical centers. Age-adjusted annual surgical rates were calculated by direct standardization using 1990 Maryland census data, and changes in rates over time were examined using linear regression. From 1989 to 1992, there was no significant change in the total age-adjusted annual rate of performance of the most commonly performed OLHNS procedures ($P > 0.05$), yet there was a significant increase ($P < 0.05$) in the rates of ethmoidectomy from 37/100000 to 73/100000, intranasal antrotomy from 25/100000 to 44/100000, and septoplasty from 70/100000 to 89/100000, and a significant decrease ($P > 0.05$) in the rate of rhinoplasty from 44/100000 to 36/100000. The data show an annual average decrease in inpatient surgery of 5.2% ($P = 0.006$), and a corresponding increase in outpatient surgery of 5.1% ($P = 0.005$). Maryland surgeryrates for commonly performed procedures in OLHNS remained stable overall, except for an increase in sinus surgery and septoplasty rates and a decrease in rhinoplasty rates.

Ambulatory surgery. Organization and results after 5-years experience

H Johanet, P Marichez, F Gaux

Chir. Mem. Acad. Chir. (1997) 122/1 (35–38)

Ambulatory surgery has been organized and regulated in France since 1991. We report the organisation of this activity in our unit and the results in 22476 patients. Endoscopies, not specifically surgical, were 25.7% of procedures. Overnight hospitalization was needed in 3.1% of patients, including about 40% of them for social and familial conditions or follow up of diagnosis or therapeutic sequences. This rate is growing, because we developed diagnosis or therapeutic sequences for interest of the patient. Since 1994, we operated more patients in ambulatory surgery than in classical hospitalization.

Inhalation induction with sevoflurane: a double-blind comparison with propofol

A Thwaites, S Edmends, I Smith

Br. J. Anaesth. (1997) 78/4 (356–361)

We conducted a randomized, double-blind comparison of 8% sevoflurane and propofol as induction agents for day-case cystoscopy in 102 patients. All patients received an i.v. cannula and breathed oxygen 5 l min^{-1}. Anaesthesia was induced with propofol i.v. or inhalation of 8% sevoflurane and 10% intralipid (as a placebo) i.v., delivered by a blinded observer. Anaesthesia was maintained in all patients with 2% sevoflurane via a face mask. Induction of anaesthesia with sevoflurane was significantly slower compared with propofol (mean 84 (S.D. 24) vs 57 (11) s), but was associated with a lower incidence of apnoea (16 vs 65%) and a shorter time to establish spontaneous ventilation (94 (34) vs 126 (79) s). Induction complications were uncommon in each group but the transition to maintenance was smoother with sevoflurane and was associated with less hypotension compared with propofol. Emergence from anaesthesia induced with sevoflurane occurred significantly earlier compared with propofol (5.2 (2.2) vs 7.0 (3.2) min) and anaesthetic induction was also significantly cheaper with sevoflurane. According to a postoperative questionnaire, the majority of patients found both anaesthetic techniques acceptable. Nevertheless, significantly more patients (14%) rated induction with sevoflurane as unpleasant compared with propofol (0) and significantly more patients (24%) would not choose sevoflurane induction compared with propofol (6%). This phenomenon may have been related to the particular patient population studied, however. Inhalation induction with 8% sevoflurane would appear to offer several objective advantages compared with induction with propofol in day-case patients, although a significant minority may dislike this technique.

Mivacurium in daycase surgical patients

L Cade, P Kakulas

Anaesth. Intensive Care (1997) 25/2 (133–137)

Laparoscopy is commonly performed as a dayease procedure and requires satisfactory but brief and readily reversible muscle relaxation with good intubating conditions. We have examined the use of the new nondepolarizing muscle relaxant, mivacurium, in this setting and compared it with the two most commonly used such drugs in day surgery, atracurium and vecuronium, in a prospective randomized trial of 107 patients. Mivacurium provided a significantly more rapid onset and briefer duration of muscle relaxation, which was readily reversible with or without pharmacological antagonism.

Moran repair for inguinal hernias

RM Moran, J Brauns, CR Petrie, BP Novak, JM Johnsrud

Am. Surg. (1997) 63/5 (430–433)

A total of 1282 inguinal hernia repairs were performed between September 1989 and June 1994 using polypropylene mesh inserted in the preperitoneal space to reinforce a two-layer transversalis fascia technique. There was a recurrence rate of 0.4% with a minimal follow-up of 14 months. All the operations were performed as outpatient surgery, under local anesthesia or general anesthesia, with immediate ambulating home and early return to normal activities and work. Complications were minimal, with no mortality.

Day care surgery for advanced Dupuytren's contracture

LB Ebekov, MEH Boeckstyus, AI Sorensen, M Haugegaard, AM Logan

J. Hand Surg. (1997) 22 B/2 (191–197)

Seventy-six consecutive patients suffering from advanced Dupuytren's contracture were analysed in order to evaluate the safety of day care surgery. The complication rates for haematoma, necrosis, infection and reflex sympathetic dystrophy mere acceptable, but we found an unacceptably high percentage of nerve lesions. Day care treatment was achieved in all but seven cases. We concluded that advanced Dupuytren's contracture can be treated by day care surgery but the operations should be performed by surgeons who are skilled in hand surgery, and individual selection of patients with recurrence seems advisable.

The treatment of enchondromas in the hand by endoscopic curettage without bone grafting

I Sekiya, N Matsui, T Otsuka, M Kobayashi, D Tsuchlya

J. Hand Surg. (1997) 22 B/2 (230–234)

Nine patients with enchondromas in the hand were treated by endoscopic curettage of the tumour without bone grafting. The procedure was performed on an out-patient basis using axillary block anaesthesia. New bone formation and remodelling cf the lesions were observed in all patients. There were no postoperative fractures, infections, recurrences or other complications. Functional recovery was rapid. We conclude that endoscopic curettage without bone grafting is an effective treatment of enchondroma in the hand.

Patient safety in accredited office surgical facilities

DC Morello, GA Colon, S Fredricks, RE Iverson, R Singer

Plast. Reconstr. Surg. (1997) 99/6 (1496–1500)

The medical profession is besieged by concerns about cost containment. This in turn has focused attention on the use of ambulatory surgical facilities. However, the costs of hospital outpatient surgery programs usually prevent them from being competitive when compared with the costs of using office surgical facilities. To address the question of patient safety in office surgical facilities, the American Association for Accreditation of Ambulatory Surgery Facilities (AAAASF) sent a questionnaire to its accredited facilities. Two-hundred and forty-one (57.7%) of the 418 accredited facilities returned the anonymous questionnaires, a very high response rate. Of interest are the following findings: 400 675 operative procedures were reported during a 5-year period. Significant complications (hematoma, hypertensive episode, wound infection, sepsis and hypotension) were infrequent, occurring in 1 in every 213 cases. Return to the operating room within 24 h and preventive hospitalization were less frequent. A death occurred in 1 in 57 000 cases (0.0017%). The overall risk is comparable in an accredited office (plastic surgical facility) and in a free-standing or hospital ambulatory surgical facility. This study documents an excellent safety record for plastic surgery done in accredited office surgical facilities by board-certified plastic surgeons.

Ambulatory phlebectomy of the foot: Review of 75 patients

JA Olivencia

Dermatol. Surg. (1997) 23/4 (279–280)

BACKROUND: Review of 75 patients on whom ambulatory phlebectomy of the foot was performed as part of their varicose vein treatment.
OBJECTIVE: To demonstrate that ambulatory phlebectomy is an effective modality of treatment for varicosities of the foot.
METHODS: Ambulatory phlebectomies were performed on an outpatient basis under local anesthesia.
RESULTS: The overall satisfactory result of ambulatory phlebectomy of the foot employed in the 75 patients in this study revealed the procedure to be very effective with few complications resulting and with a high degree of patient satisfaction.
CONCLUSIONS: Ambulatory phlebectomy of the foot has proven to be a most satisfactory procedure for the treatment of varicose veins of the foot.