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Ambulatory Surgery

Editorial

The 2nd International and 4th European Congress on Ambulatory Surgery is to be held from the 15th–18th April 1997 in London. The British Association of Day Surgery also plans to hold its 8th Annual Scientific Meeting during this Congress.

At the 1st International and 3rd European Congress on Ambulatory Surgery in Brussels (1995) approximately 800 delegates from 40 countries attended. Since then an International Association of Ambulatory Surgery (IAAS) has been founded and so far 12 National Associations have combined to advance the course of ambulatory surgery worldwide.

The success of this venture is probably due to the fact that a multidisciplinary approach to ambulatory surgery has been actively encouraged. During the past 10 years there has indeed been a growing international interest in the concept of ambulatory surgery and this is one area of health-care provision where people from different professional backgrounds may co-operate to provide a first-class, quality service.

The basic objectives of the London Congress will be:

- To raise the awareness of ambulatory surgery among public and private health authorities, thereby establishing adequate national guidelines and policies.
- To review the development of ambulatory surgery in the international setting.
- To establish fundamental protocols for the safe practice of ambulatory surgery.
- To structure and co-ordinate international research, education and quality assurance.

The Congress is intended for any organisation or individual involved in the practice or management of health-care. All personnel with an interest in ambulatory surgery are therefore urged to attend the London Congress in 1997. The stimulating programme and a large exhibition area should make this conference a focus for the future development of international ambulatory surgery. Do please make a note of this Congress in your diaries and come to London in April 1997 and meet your worldwide colleagues in Ambulatory Surgery.

Tom W. Ogg

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Ambulatory Surgery

A 3-day postoperative study related to pain, nausea, vomiting and tiredness in patients scheduled for day surgery

L. Westman*, M. Legeby, A. Ekblom

Department of Anaesthesiology and Intensive Care, Karolinska Hospital, S-171 76 Stockholm, Sweden

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Abstract

Day surgery is increasingly used and to be able to evaluate and improve the work of ambulatory surgery, outcome and follow-up studies are a necessity. We decided, therefore, to study 100 consecutive patients scheduled for day surgery. A questionnaire, dealing with pre- and postoperative anxiety, stress and expectations, pain (rest and movement), tiredness, nausea, vomiting and consumption of analgesic, was filled in by the patients during 3 days at home. Visual analogue scales were used to rate these parameters, except for consumption of tablets. Patients experienced more anxiety before than after surgery and they anticipated the postoperative period to be more painful than actually experienced. Local anaesthesia procedures were expected to be more painful peroperatively than spinal and general anaesthesia, when asked before surgery. Pain intensity reached its maximum 12 h after surgery and pain intensity was significantly higher for 'pain at movement' as compared to 'pain at rest'. Twenty-two patients considered the postoperative pain to be worse than anticipated and nine patients found the analgesics available ineffective. Seven patients expressed an opinion of a hospital stay the first postoperative night to have been preferable. Nausea, vomiting and tiredness were no major concern. Paracetamol and dextropropoxyphene were used as analgesic treatment at home and it is obvious that more potent analgesics should be administered the first postoperative day. Copyright © 1996 Elsevier Science B.V.

Keywords: Day surgery; General anaesthesia; Local anaesthesia; Nausea; Pain; Spinal anaesthesia; Tiredness

1. Introduction

Day surgery is an increasing part of surgical services. Some advantages of day surgery are, in theory, decreased cost for society, reduction of waiting lists and a quicker return to home for the patient. To accomplish a successful day surgery, among other things a correct selection of patients must be done, skilful and dedicated staff and experienced surgeons and anaesthesiologists must be engaged. A safe return home is a result of well balanced anaesthesia and well performed surgery. Of utmost importance is a stringent and determined way to treat nausea and pain postoperatively. An evaluation of the reaction of each patient for pain and nausea at the unit is an instrument for how to carry out effective pain relief. This treatment of pain at the unit is the platform for a continued successful pain relief management at home.

It is of crucial importance to give the patients an effective program for their pain relief at home, to be able to provide adequate analgesia. During the first 2–3 days at home an aggressive treatment should be performed. However, few data exist describing postoperative pain as well as nausea and tiredness during the first days in patients subjected to day surgery. The present study was designed to gain such data and of equal importance is to continue to collect such data to be able to change management.

* Corresponding author. Tel: +46 8 7292000; fax: +46 8 307795.

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2. Materials and methods

We asked 100 consecutive patients scheduled for day surgery (Table 1), if they were willing to participate in a study, to evaluate how they managed during the 3 first days at home. All patients asked volunteered. The questionnaire was divided into three parts; the first part dealt with pre- and postoperative anxiety, stress, relief and expectations in the hospital. The second part involved parameters such as pain at rest, pain at movement, nausea and tiredness and amount of analgesics taken at home. The patient recorded these parameters, at 8 a.m., 12 p.m. and 8 p.m., 3 times per day during 3 days. All questions were constructed using the VAS (visual analogue scale), a 10 cm horizontal line equipped with the words telling the extremes, such as 'no pain' and 'worst pain ever', at left and right hand ends of the line, respectively. The third part consisted of questions concerning experiences of surgery, pain, effectiveness of analgesics, satisfaction of treatment by staff of the unit and if they were willing to be subjected to surgery again on an ambulatory basis. A nurse made a telephone-call to every patient on the third postoperative day to enquire how the patient managed at home. General anaesthesia consisted of propofol as anaesthetic agent and alfentanil as analgesic agent, lidocaine with 7.5% glucose was used for spinal anaesthesia and lidocaine 1–2% or prilocaine 0.5% was used for local anaesthesia.

2.1. Statistical methods

Data were analysed using Pearson product-moment correlation (Pearson), Student's t-test (t-test), χ^2-test, Kruskal-Wallis ANOVA by ranks (Krus-W), Friedmans ANOVA (Friedman) or parametric ANOVA/MANOVA including Scheffé post-hoc test when appropriate. A P-value less than 0.05 was considered significant.

Table 1
Demographic data

Number of patients	100
Age (median and range)	38.5 years (16–76)
Sex (M:F)	63:37
Type of surgery	
Orthopedic	
Knee	59
General surgery	
Inguinal hernia	19
Varicose veins	4
Plastic surgery	
Breast	4
Other[a]	14

[a]Cutaneous and subcutaneous surgery.

Table 2
Type of premedication given to patients

Type of premedication	Number of patients
Analgesics	
Diclofenac	55
Ketorolac	14
Paracetamol	31
Antiemetics	
Metoclopromide	11
Number of patients not receiving premedication	0

3. Results

3.1. Patients

The demographic data from the 100 patients studied is shown in Table 1. The majority of cases (59/100) involved knee surgery (all arthroscopically, mainly surgical procedures (51/59) such as meniscal resection; only 8/59 were diagnostic) and hernia repair (19/100).

3.2. Premedication and type of anesthesia used

All patients received premedication using NSAID's, Table 2. Some (11/100) received metoclopromide due to a history of nausea and emesis related to earlier anaesthesia and surgery. The anaesthetic techniques used were spinal and local anaesthesia with or without sedation using midazolam, or general anaesthesia, Table 3.

3.3. Psychological assessments

All patients rated anxiety before and following anaesthesia/surgery, Fig. 1. The patients were significantly more anxious before versus following surgery revealed by the significant shift in the factors tension, stress and calm ($P < 0.05$; t-test). The patients, furthermore, rated anticipated discomfort and pain in relation to the surgical procedure, also including a postoperative question if the procedure was more painful/uncomfortable than expected, Fig. 2. The patients expected the procedure to be associated with significantly more pain and discomfort than actually experienced, as rated in the PACU following surgery (χ^2 33.2–66.4, d.f. 2, $P < 0.05$; Friedman). This view as expressed by the patients did not change when confronted with the same questions 3 days postoperatively, i.e. the pain and discomfort experienced during surgery, as reported in the PACU was still valid. Interestingly, the patients subjected to knee surgery, using local anaesthesia and sedation, already before anaesthesia/surgery anticipated the procedure to

Table 3
Number of patients subjected to various types of anaesthesia with respect to main surgical procedure

Type of surgery	Type of anaesthesia		General anaesthesia
	Local anaesthesia	Spinal anaesthesia	
Orthopedic surgery ($n = 59$)	24	2	33
General surgery ($n = 23$)	4	17	2
Plastic surgery ($n = 18$)	0	5	13
Total number	28	24	48

be significantly more painful and uncomfortable than the patients to receive spinal or general anaesthesia (χ^2 9.83–11.80, $P < 0.001$; Krus-W). This was also found following surgery at the PACU and 3 days later.

3.4. Postoperative pain intensity and consumption of analgesics

All patients rated pain intensity both at rest and during active movement for 3 days postoperatively, Fig. 3A–B. Pain intensity at rest and at movement changed significantly over time ($F_{(10,861)} = 5.59$–9.28, $P < 0.001$; MANOVA) reaching a maximum at 12 h postoperatively. Pain intensity was significantly higher at movement as compared to rest except at 12 h postoperatively ($F_{(1,861)} = 573.44$, $P < 0.0001$; 2-way ANOVA and Scheffé post-hoc test). If considering the total postoperative period, the total sum of pain scores at movement (mean ± S.D., 314.7 ± 214.0) were significantly higher as compared to values at rest (165.7 ± 149.2) (t-value 12.75, $P < 0.0001$), and with a significant correlation between the two ($r = 0.87$, $P < 0.001$; Pearson). The total sum of pain scores at rest or during movement, for the 3 day postoperative period, did not differ significantly between patients if analysed with regard to anaesthetic technique used (local, spinal or general anaesthesia) or main surgical procedure (orthopedic, general surgery or plastic surgery).

Postoperatively at the hospital, mainly paracetamol, dextropropoxyphene and ketobemidone were used as analgesic treatment, with the latter being omitted for treatment at home, Table 4. The number of patients needing analgesics postoperatively increased significantly following discharge, 36/100 not needing analgesics at hospital compared to 20/100 at home during the 3 days postoperative period (χ^2 6.35, $P < 0.02$).

At 3 days postoperatively the patients gave some overall comments on pain and analgesics. Twenty-two patients reported postoperative pain intensity to have been more intense that expected, but only nine found the analgesics available to them to be ineffective. No patient contacted the hospital for additional analgesic therapy. Seven of the patients expressed a desire of having the opportunity to stay at the hospital during the first postoperative night.

3.5. Postoperative nausea

Generally, nausea was of no major concern following surgery, Fig. 4. There was no significant change over time and the values for all patients were very low. The four female patients subjected to breast reconstructive

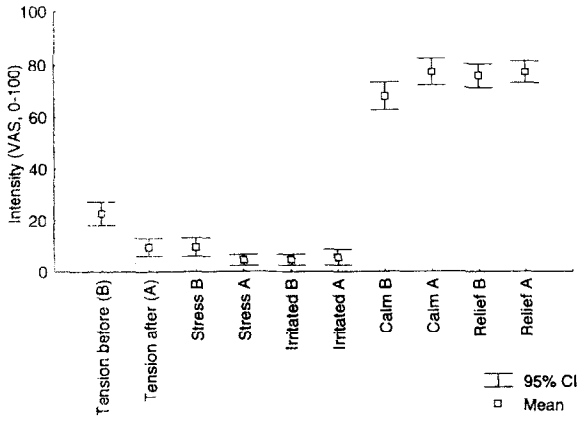

Fig. 1. The degree of state anxiety in patients subjected to surgery. Relief B = 'do you think that you will feel relief postoperatively that surgery was at last performed?', Relief A = 'do you feel relieved that surgery has been done?' Mean values with 95% confidence interval represented by whiskers.

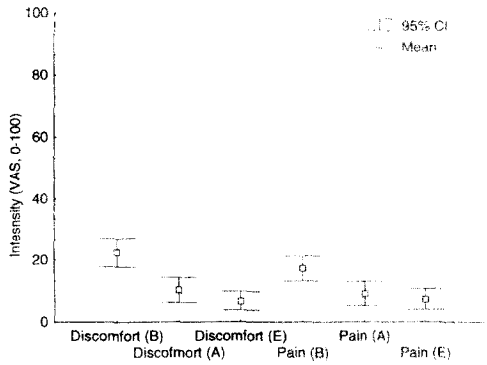

Fig. 2. Anticipated and experienced discomfort and pain with regard to the surgical procedure. (B) = anticipated discomfort/pain, (A) = actually experienced discomfort/pain and (C) = discomfort/pain during surgery as reported on active questioning 3 days postoperatively. Mean values with 95% confidence interval represented by whiskers.

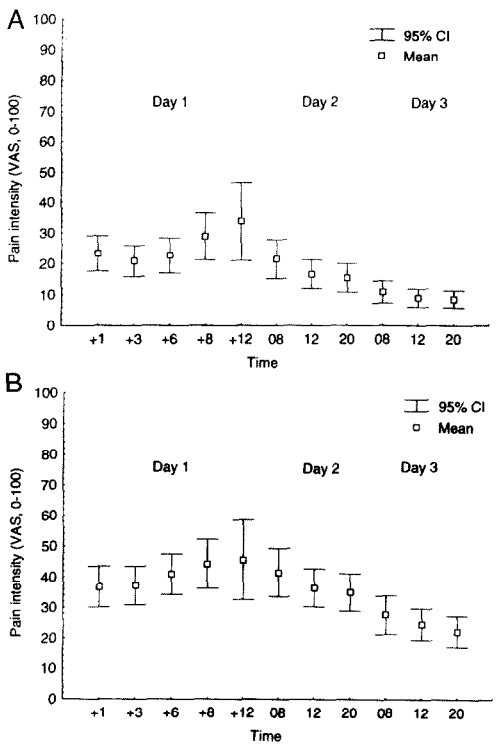

Fig. 3. A and B. Pain intensity at rest (A) and during active movement (B) during the first 3 postoperative days. Measurements during day 1 given as hours postoperatively (1–12 h), and during days 2 and 3 at 8 a.m., 12 a.m. and 8 p.m. Mean values with 95% confidence interval represented by whiskers.

surgery reported more intense nausea than the others (11.2; 2.6–19.8 respectively 3.2; 2.6–3.8, mean VAS; with ±95% C.I.). Three quarters of the breast patients received metoclopromide due to nausea.

Table 4
Type of analgesics given to patients for treatment postoperatively at hospital and at home

Type of analgesics	Number of patients	
	At hospital	At home
NSAID's		
Diclofenac	1	7
Ketorolac	6	—
Paracetamol	44	73
Opioids		
Codeine	0	1
Dextropropoxyphene	50	73
Ketobemidone	26	—
Alfentanil	1	—
Patients not receiving analgesics postoperatively	36	20

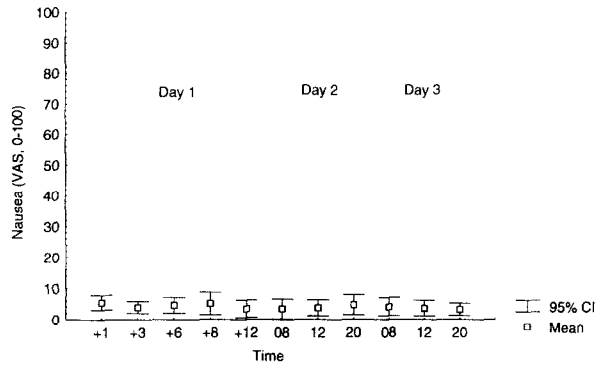

Fig. 4. Nausea during the postoperative period. No patient reported vomiting. Measurements during day 1 given as hours postoperatively (1–12 h), and during days 2 and 3 at 8 a.m., 12 a.m. and 8 p.m. Mean values with 95% confidence interval represented by whiskers.

3.6. Postoperative tiredness

Intensity ratings changed significantly over time ($F_{(1,10)} = 10.65$, $P < 0.0001$: 2-way ANOVA), increased during the first 12 h and then declined over time, Fig. 5. No major differences were detected between patients exposed to various surgical or anaesthetical procedures.

4. Discussion

Successful day surgery should always include an effective management of pain and nausea 2–3 days postoperatively at home. It is interesting to note that patients anticipate discomfort and pain to be more serious than actually experienced. One reason for this attitude is probably bad personal experience or bad experience of surgery told by friends and relatives. Patients subjected to arthroscopy or surgery under local anaesthesia anticipated the procedure to be more painful and discomforting than patients having general anaesthesia or spinal block, indicating that a very care-

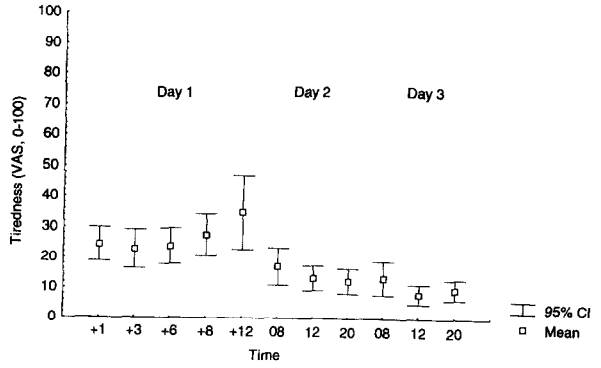

Fig. 5. Degree of tiredness reported postoperatively. Measurements during day 1 given as hours postoperatively (1–12 h), and during days 2 and 3 at 8 a.m., 12 a.m. and 8 p.m. Mean values with 95% confidence interval represented by whiskers.

ful selection of patients is necessary. These patients need a very thorough and informative presentation, preoperatively.

Not surprisingly, movement caused more pain than rest in our study. Of great interest is, how we shall be able to combat pain at movement. We are probably not able to reduce pain completely at movement, but our results show a peak of pain 12 h postoperatively. Paracetamol and dextropropoxyphene were used for the first 24 h of the postoperative period and it is obvious that this regime is not sufficient. Nine patients in our study reported analgesics available to be ineffective. Twenty-two patients experienced pain to be more severe than anticipated. Baker et al. proposed that when severe pain was expected more potent analgesics should be prescribed, such as methadone [1]. Oberle et al. reported that about 30% of the patients undergoing arthroscopy had severe pain the first postoperative day. In patients undergoing tubar ligation, 60% scored 4 or more on a 5 point scale during the immediate postoperative period. In the same study 5–15% of the patients were in severe pain the third postoperative day [2].

This panorama of pain described is of great concern, many of the patients of our study were in no pain at the unit and consequently developed pain at home. The standard or goal of our hospital for pain management is that pain >3–4 on VAS (0–10) should not be experienced by the patient. This standard is achieved in the hospital but not at home. Different types of analgesics, wound infiltration with local anaesthetics, local anaesthetics without, or in combination with, opioids administered into joints are different ways to manage pain postoperatively. Careful evaluation of the patient, type of surgery and consumption of analgesics in the hospital will give you an idea of how the postoperative period at home will be for the patient and a suitable program of pain management should be instituted. More potent analgesics seem to be warranted during the first postoperative day.

Postoperative nausea and vomiting are of major concern. Even though management is successful in the hospital, the crucial moment often comes when the patient ambulates and many patients do have problems with nausea and vomiting for several days at home [3,4]. Nausea is very complex and a specific management is hard to obtain. There are several centres in the brain involved, the emetic centre, chemoreceptor trigger zone and the vestibular portion of the 8th cranial nerve. Receptors for serotonin, dopamine, muscarine and histamine take part in this system [5]. We did not find nausea and vomiting a major problem, but some procedures are correlated to a higher incidence of nausea and vomiting. Among our patients, four female patients had breast surgery and all of them experienced nausea at home for all 3 days. These groups of patients having surgery of high risk for nausea and vomiting should be treated pre- and peroperatively with antiemetic drugs. A careful history has to be taken and if a risk for nausea and vomiting is revealed adequate measures must be taken [6]. We used metoclopramide and/or droperidol during the period of this study [6,7], now we also use ondansetron, depending on the severity of the situation [8,9].

Tiredness was rated as rather severe during the first 12 h postoperatively. Oberle et al. reported that a sizeable percentage of patients were severely bothered by fatigue for several days [2]. We did not notice among our patients such a severe tiredness for 2–3 days. Information about what will happen is of course essential, since patients do not expect to be tired for such a long period, which is important among other things from a medico-legal point of view, such as in driving a car.

Seven patients indicated a desire to stay overnight at the hospital, which might suggest that these patients had such a terrible postoperative period at home and expressed the view of a possibly better postoperative care at the hospital. Some patients do have a hard postoperative period at home which necessitates a change in postoperative management. More potent analgesics must be available to the patients and a more continuous use of drugs for the first days must be emphasized. Roberts et al. [10] stated that potential discomfort and recovery should not be underestimated. Possible rest and assistance at home are important factors and should be considered before scheduling a patient for day surgery [10]. We have according to our results changed our therapeutical measures for our patients at home. When moderate to severe pain is expected; ketobemidone/paracetamol shall be used the first postoperative day and dextropropoxyphene/paracetamol for the two following days. We will study whether such a regime results in improved analgesia at home.

Peripherally administered opioids is an elegant way to approach the problem of postoperative pain management when adequate, but more experience and research are warranted [11,12]. We have studied pethidine compared to prilocaine, both given locally, in the knee joint and found both less pain and consumption of analgesics postoperatively with pethidine [13]. In orthopedic patients such a model of peripherally administered opioids probably would be a step forward in producing good pain relief with few side effects.

A necessity is to continuously make quality controls and outcome studies and accordingly be able to change therapy and management of the day-care unit to improve the care and the satisfaction of the patient.

Acknowledgements

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A comparison of ketorolac and fentanyl for controlling postoperative uterine cramping pain in ambulatory surgery patients

Thomas J. Conahan*, Chrys Delling, Warren J. Levy, Roger J. Bagshaw, Marie L. Young, Ralph T. Geer

Department of Anesthesia, Hospital of the University of Pennsylvania, 3400 Spruce Street, Philadelphia, PA 19104-4283, USA

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Abstract

Non-steroidal anti-inflammatory drugs (NSAIDs) have been shown to reduce the pain of dysmenorrhea by inhibiting the synthesis of prostaglandins that cause the uterus to contract. Studies have not been undertaken previously to determine the effectiveness of NSAIDs in controlling uterine pain resulting from gynecological surgery. This study compares the NSAID ketorolac tromethamine to fentanyl, a commonly used opioid, in 100 women undergoing gynecological surgery in an ambulatory setting. Subjects were randomly assigned to receive either fentanyl or ketorolac IM at the end of the surgical procedure. Uterine cramp pain and non-uterine pain were rated on separate verbal analog scales in the recovery room. Incidence of nausea and vomiting and need for postoperative opioid analgesics were also compared between the two study groups. No significant differences were found between the two groups in the severity of uterine cramp pain, in the need for supplemental analgesia or in the incidence of nausea or vomiting. Both drugs appeared to provide reasonable patient comfort, but in the sub-group of patients who required postoperative opioid, the ketorolac group had lower non-uterine pain scores in the late postoperative period than did the fentanyl group. The absence of clear superiority of the NSAID may indicate that a biochemical pathway other than the prostaglandin mechanism is involved in the production of postoperative uterine cramping pain. Copyright © 1996 Elsevier Science B.V.

Keywords: Fentanyl; Ketorolac; Uterine pain; Ambulatory anesthesia; Postoperative analgesia; Prostaglandins

1. Introduction

Non-steroidal anti-inflammatory drugs (NSAIDs) have been shown to reduce menstrual uterine cramping by inhibiting the synthesis of prostaglandins which cause the uterus to contract [1–3]. Gynecological surgery such as laparoscopy with uterine instrumentation and hysteroscopy can also produce uterine cramping pain postoperatively. Because NSAIDs are thought to be more effective than opioids in relieving menstrual cramps, it has been reasoned that they may also be more successful in controlling postoperative uterine pain. Several studies have compared NSAIDs and opioids as analgesics after outpatient laparoscopic surgery, however, none of these studies distinguished uterine cramping pain from other postoperative pain [4–7]. The results of several of these studies appear to be in conflict, but the inconsistencies may be due to differences in experimental protocol such as dose, method, and time of drug administration.

Studies comparing analgesics after cesarean section and vaginal delivery have looked specifically at uterine cramp pain [8–10]. These studies, in contrast to the dysmenorrhea literature, have not consistently shown NSAIDs to be superior to opioids in analgesic performance. The question of whether NSAIDs are effective analgesics for uterine cramp pain resulting from gynecological surgery remains open.

* Corresponding author. Tel.: +1 215 6623746; fax: +1 215 3498133.

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Ketorolac tromethamine is the first injectable NSAID available in the United States. It inhibits prostaglandin synthesis and is an effective analgesic for pain resulting from a variety of surgical procedures [4]. Studies indicate that its analgesic properties are comparable or superior to opioids such as meperidine, morphine and fentanyl when equivalent doses are compared [5,11–13]. It has been shown to reduce the pain of dysmenorrhea as well as postpartum uterine cramping [14,15]. The present study compares ketorolac tromethamine to fentanyl, a commonly used opioid, for analgesic performance in women undergoing gynecological surgery in an ambulatory setting. The drugs' performances are analyzed specifically for effectiveness in relieving uterine cramp pain. Control of other pain resulting from the surgical procedure and the incidence of nausea and vomiting are also compared.

2. Materials and methods

One-hundred healthy women (ASA physical status I or II) scheduled to undergo laparoscopy, hysteroscopy or dilatation and curettage (D and C) were enrolled in this study. This protocol was approved by our Institutional Review Board and informed consent was obtained from each patient. Candidates were excluded from the study if they had taken any NSAID within 24 h of surgery or if they were allergic to or had other contraindications to ketorolac, fentanyl or aspirin. Patients were not asked to participate if they were minors, over 65 years of age, pregnant, or if their weight did not fall between 41–100 kg. Subjects were stratified by whether or not laparoscopy was a likely part of the surgical procedure. Computer generated randomization sequences were used to assign subjects of each stratum to one of two study groups: those given ketorolac (0.86 mg/kg, maximum dose 60 mg) and those given fentanyl (1 μg/kg). Patients who underwent laparoscopy after being assigned to the non-laparoscopy group were transferred to the appropriate laparoscopy group. We subsequently found no differences between laparoscopy and non-laparoscopy patients, and for purposes of analysis created two study groups, ketorolac and fentanyl.

The study design was double-blinded. Anesthesia, surgery, and nursing staff involved in the patient's care were unaware of which drug the patient received, as were the patient and the research specialist who conducted the postoperative interviews.

A standard anesthesia protocol was followed. Subjects were given no premedication. Anesthesia was induced with thiopental (4–6 mg/kg) and maintained with a combination of nitrous oxide, isoflurane and oxygen. Succinylcholine was administered for relaxation during intubation only. Study drug was prepared by an investigator not otherwise involved in caring for the patient. The anesthesiologist injected the solution into the deltoid muscle at the end of the surgical procedure. End of procedure was defined as the time at which the endoscope or the uterine curette was removed, whichever came first. At the end of laparoscopy procedures, 5 ml of 0.25% bupivacaine was infiltrated at incision/puncture sites. Any breaks in the anesthesia protocol resulted in the subject's removal from the study.

Upon arrival in the recovery room, patients were asked by a research specialist to rate their uterine cramping pain on a verbal numerical scale [16] ranging from 0 to 10, with 0 being no pain and 10 being the worst pain possible. Patients were then asked to rate any other pain that they were experiencing on the same scale. They were also asked if they were feeling nauseated. This evaluation was repeated at 0.5 h intervals for 3 h or until the patient was discharged, whichever came first. Incidents of retching and vomiting were recorded as they occurred. The clinical judgment of the attending anesthesiologist and the recovery room nurses (all blinded to the study drug administered) determined the need for additional analgesic medication postoperatively. This determination was not dependent on the verbal analog pain score. Patients requiring additional analgesia were given meperidine in 12.5 mg i.v. doses repeated as necessary. Patients requiring an antiemetic were given prochlorperazine in 2.5 mg i.v. doses. Time of administration and total dose of meperidine and incidence of prochlorperazine administration were recorded. Upon discharge, the length of the recovery room stay was recorded. The criteria for discharge were the absence of severe pain or nausea, the ability to sit up in a chair, ambulate, void, and verbalize understanding of discharge instructions.

Patients were telephoned the day after their surgery and asked if they had experienced nausea or retching/vomiting after leaving the hospital the previous day. They were also asked if they had taken any medication

Table 1
Distribution of surgical procedures between study groups

Surgical procedure	Fentanyl group ($n = 50$)	Ketorolac group ($n = 50$)
D and C	1	2
Hysteroscopy	2	4
D and C/ and hysteroscopy	5	5
Laparoscopy		
Tubal coagulation	2	4
Diagnostic	11	8
Laser ablation/lysis	8	8
+ hysteroscopy and/or D and C	21	19

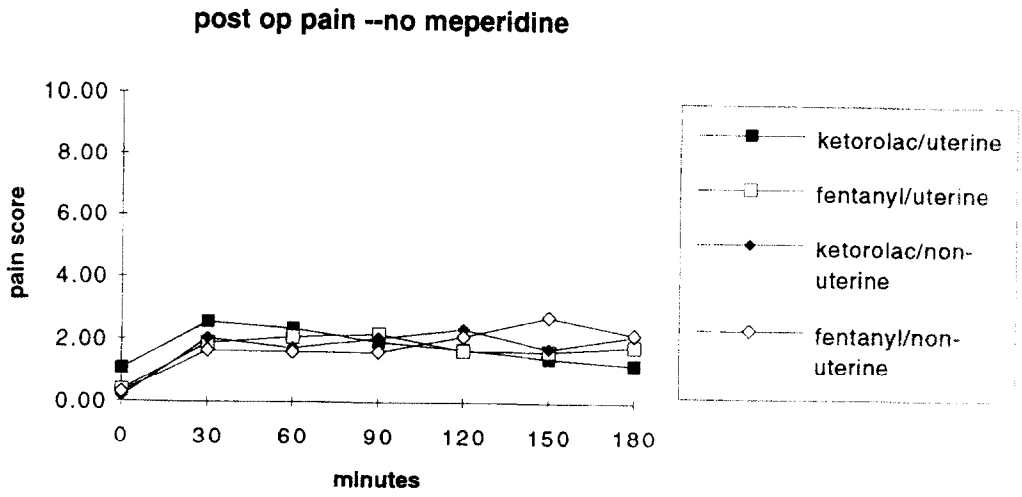

Fig. 1. Mean pain ratings for uterine cramping pain and non-uterine pain in patients not requiring postoperative opioid.

Table 2
Postoperative pain scores (patients requiring no supplemental analgesia)

		Uterine							Non-uterine						
		Time (min) after admission to recovery room							Time (min) after admission to recovery room						
		0	30	60	90	120	150	180	0	30	60	90	120	150	180
Ketorolac	*n*	30	29	30	27	21	14	7	30	29	30	27	21	14	7
	Mean	1.07	2.53	2.33	1.93	1.69	1.43	1.21	0.17	2.02	1.73	2.04	2.33	1.17	2.14
	SD	2.38	2.73	2.68	2.61	2.11	1.87	1.58	0.91	2.76	2.66	2.87	2.76	2.06	1.65
Fentanyl	*n*	28	27	29	28	23	18	8	28	27	29	28	23	18	8
	Mean	0.38	1.87	2.07	2.18	1.65	1.64	1.81	0.30	1.63	1.60	1.61	2.11	2.72	2.19
	SD	1.11	2.72	2.51	2.38	2.37	2.34	2.62	1.61	2.32	2.13	2.18	2.28	2.41	1.44

There is no significant difference between the Ketorolac group and Fentanyl group pain scores at any time period.

on the day of their surgery after being discharged. Incidence of nausea, retching/vomiting and use of analgesics during this post-discharge period were recorded.

The significance of differences in pain scores between the ketorolac and fentanyl groups was determined by repeated measures analysis of variance (ANOVA) or *t*-tests where appropriate. Demographic variables were tested for differences with one-way ANOVA and variables with discrete values were tested for significant differences by Chi-square analysis. A value of $P < 0.05$ was used as the criterion for significance in all statistical analyses.

3. Results

There were no significant differences between the two study groups in age, weight, ASA physical status, or length of surgery. The weights and ages of the study population ranged between 44–96 kg and 22–62 years, respectively. Each study group consisted of 50 women. Two patients, one from each group, were lost to telephone follow-up. Table 1 shows the distribution of procedures between the two groups. Three patients, one in the fentanyl group and two in the ketorolac group, were admitted to the hospital overnight. The reasons for the three admissions were (1) unresolved nausea, (2) possible surgical perforation of the uterus, and (3) unavailability of a person to be with the patient at home. All three admissions were thought to be unrelated to the study. Post-discharge data were collected as though the patient had been discharged after 3 h in the recovery room.

The mean time between administration of the study drug and the initial pain assessment was 32.7 min. This time was occupied with closing laparotomy puncture sites, treating minor bleeding points, cleaning prep solution from the patient, positioning the patient on a litter, and transport to the recovery room.

Sixty-one patients (31 fentanyl, 30 ketorolac) did not require supplemental analgesia in the recovery room. In these patients, there was no difference between the study groups in either uterine cramping or non-uterine pain scores at any time in the postoperative period (Fig. 1, Table 2).

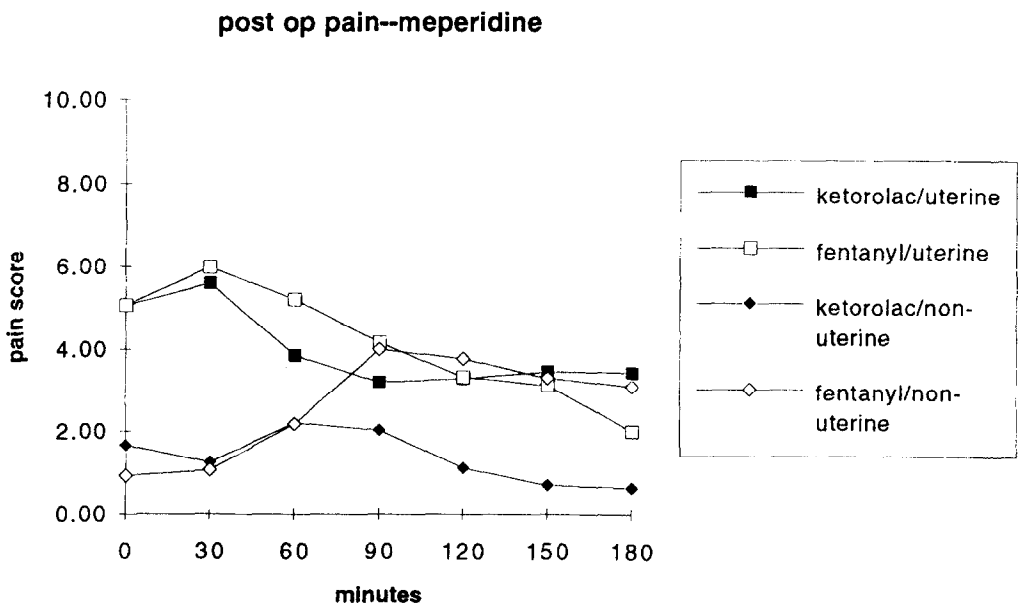

Fig. 2. Mean pain ratings for uterine cramping pain and non-uterine pain in patients requiring postoperative opioid.

Table 3
Postoperative pain scores (patients requiring supplemental analgesia)

		Uterine							Non-uterine						
		Time (min) after admission to recovery room							Time (min) after admission to recovery room						
		0	30	60	90	120	150	180	0	30	60	90	120	150	180
Ketorolac	*n*	20	19	20	20	16	12	8	20	19	20	20	16	23	8
	Mean	5.05	5.58	3.85	3.20	3.28	3.46	3.44	1.65	1.24	2.20	2.03	1.09	0.69	0.63
	SD	3.74	3.35	3.34	3.45	3.25	3.07	1.99	3.10	2.74	3.09	2.77	2.60	1.25	1.06
Fentanyl	*n*	16	18	18	19	17	12	11	16	19	18	19	17	12	11
	Mean	5.06	5.97	5.19	4.16	3.32	3.13	2.00	0.91	1.05	2.17	4.00	3.76*	3.29**	3.09*
	SD	3.91	3.19	3.32	2.93	2.55	2.45	2.38	2.49	2.63	3.00	3.51	3.43	3.24	2.67

*Significantly different from Ketoralac group ($P<0.01$).
**Significantly different from Ketorolac group ($P<0.02$). There are no other significant pain score differences between the ketorolac group and the fentanyl group.

Thirty-nine patients required meperidine in the recovery room (19 fentanyl group, 20 ketorolac group). These patients were separated from the remainder of the study group for further pain analysis.

Average time from recovery room admission to first dose of meperidine was: fentanyl patients, 47 ± 32 min (SD); ketorolac patients, 34 ± 32 min (SD) ($P = 0.25$).

In the meperidine-requiring patients, there was no difference between the ketorolac group and the fentanyl group in uterine pain scores. However, non-uterine pain was significantly less at 120, 150 and 180 min in patients who had received ketorolac (Fig. 2, Table 3).

The ketorolac and fentanyl groups did not differ significantly in the mean duration of recovery room stay (2.6 versus 2.7 h). Table 4 shows the incidence of nausea and vomiting for each group in the recovery room and during the post-discharge period. There were no statistically significant differences between the two groups in the incidence of nausea or retching/vomiting throughout the course of the study. The two groups did not differ significantly in the number of subjects requiring prochlorperazine or meperidine, the number of doses of meperidine required, or the incidence of analgesic use after discharge (Table 5).

4. Discussion

We found no difference between ketorolac and fentanyl in relief of either uterine cramping pain or non-uterine pain at any point in the study in patients who did not require supplemental analgesia. Late in the recovery room stay (120–180 min) patients who had received ketorolac and meperidine rated their non-uterine pain as less severe than did patients who had received fentanyl and meperidine. This is not surprising

Table 4
Number of subjects experiencing gastrointestinal effects

	Recovery room nausea	Recovery room retching/vomiting	Post-discharge nausea	Post-discharge retching/vomiting
Fentanyl group	35	25	29	15
Ketorolac group	33	16	24	13

There were no statistically significant differences between the groups.

since fentanyl has a faster onset than ketorolac, but a shorter duration of action [17,18].

Previous studies have suggested that ketorolac may not provide any significant advantage over opioids in reducing nausea and vomiting following gynecological as well as other types of surgery [18–20]. Our results lend further support to these findings, as we found no difference in the incidence of nausea and vomiting between the two study groups. The contribution of postoperative analgesics to total length of stay is controversial. Ding [5] found no difference between ketorolac and fentanyl. Lysak [7] demonstrated more rapid discharge for patients receiving ketorolac, but that study was confounded by the administration of postoperative morphine to more than half of the patients. Our data, including patients who received supplemental opioid, do not demonstrate a difference between ketorolac and fentanyl in discharge times.

We attempted to identify factors associated with the need for meperidine. The most obvious possibility is more extensive or more painful surgery (laparoscopy with lysis of adhesions or laser ablation of endometriosis). There was no correlation between type of operation and need for meperidine. There was no statistically significant difference in the need for meperidine between the fentanyl and ketorolac groups regardless of the extent of the operation. Patients with a preoperative diagnosis of pain (pelvic pain, dysmenorrhea, dyspareunia) might be more prone to postoperative pain needing opioid therapy. No statistical relationship could be demonstrated.

We identified several clinical sources of potential error or confusion. First, it may have been difficult for patients to distinguish between uterine cramp pain and more generalized abdominal pain. On several occasions, subjects said that they believed they had mislocated their pain earlier in the study, i.e., they originally said they were experiencing uterine cramping pain when in retrospect they believed they had been feeling incisional or abdominal pain or vice versa. In such cases, pain ratings were left as they had originally been reported. Analysis of the pain scores of patients requiring meperidine suggests that patients can distinguish between uterine and other pain. Uterine pain scores were significantly ($P < 0.01$) higher than non-uterine pain scores in both ketorolac and fentanyl patients at the initial evaluation and 30 min later (Fig. 2). This may have been the result of local anesthesia infiltration in the surgical wound sites. Intrauterine pressure monitoring might offer a more objective measure of uterine cramping in the postoperative setting but may also act to stimulate uterine contractions. Such intrauterine monitoring has been used in the study of dysmenorrhea [3,21] and to investigate patients' ability to localize uterine cramp pain [22].

Table 5
Postoperative medication

Medication	Fentanyl group	Ketorolac group
Required prochlorperazine	8	9
Required meperidine	19	20
Average number of meperidine doses	1.5	1.6
Used analgesic after discharge from hospital	31	23

There were no statistically significant differences between the groups.

For the majority of patients, either ketorolac or fentanyl provided adequate postoperative analgesia. Demand for supplemental analgesia was not particularly associated with either study drug. Among patients who required meperidine in the recovery room, those who had received ketorolac had significantly less non-uterine pain at 120, 150, and 180 min.

The biochemical mechanism involved in postoperative uterine cramping pain may differ from the mechanism of menstrual (dysmenorrheic) cramps. Several substances in addition to prostaglandins are known to have effects on uterine contractility. These include leukotrienes, estrogen, progesterone, oxytocin and vasopressin [2,23–25]. About 20% of dysmenorrheic women do not respond to NSAID therapy. In these women, it is thought that cramping is not due to elevated levels of prostaglandins but rather to an excess of leukotriene. Postpartum uterine cramping can be significantly relieved by aspirin [8,15], which is the only NSAID that is ineffective against menstrual uterine cramping [1].

Prostaglandin production may be the primary factor in most cases of dysmenorrhea but not necessarily in

postpartum and postoperative uterine cramping pain. NSAIDs may provide superior analgesia only for a subset of patients in whom the prostaglandin pathway is primarily responsible for uterine cramping pain. We found no significant difference between ketorolac and fentanyl in relieving postoperative uterine cramp pain, and infer that factors other than, or in addition to prostaglandins, are involved.

Acknowledgements

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Ambulatory Surgery

Analgesia after laparoscopic tubaligation using a technique of bilateral mesosalpinx infiltration

R. van Ee[a,*], D.J. Hemrika[b], S. de Blok[b], J.W. ten Velden[c]

[a]*Department of Anaesthesia, Onze Lieve Vrouwe Gasthuis (OLVG), Eerste Oosterparkstraat 279, 1090 HM Amsterdam, The Netherlands*
[b]*Department of Gynaecology and Obstetrics, Onze Lieve Vrouwe Gasthuis (OLVG), Amsterdam, The Netherlands*
[c]*Department of Clinical Pathology, Onze Lieve Vrouwe Gasthuis (OLVG), Amsterdam, The Netherlands*

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Abstract

Mesosalpinx-infiltration in ambulatory laparoscopic sterilization provides good postoperative pain relief. Probably due to anatomical and practical reasons, this block is used infrequently by gynecologists. If performed inadequately, this block could have its own set of complications whilst no technical description that we are aware of has been published. In relation to these considerations, we present a detailed technical approach for mesosalpinx-infiltration. Copyright © 1996 Elsevier Science B.V.

Keywords: Mesosalpinx infiltration; Laparoscopic tubaligation

1. Background

Prolonged postoperative pain relief following laparoscopic sterilisation has been reported with the injection of local anaesthetic solution (LAS) into both mesosalpinxes [1–3]. Nevertheless, this blocking technique has not gained much popularity among gynaecologists, for whom performing local anaesthetic blocks is not part of their daily practice. In addition, anatomical and technical aspects might also be reasons for its infrequent use.

Macro-anatomically, the thin and fragile mesosalpinx is not firmly anchored to its immediate surroundings but is loosely attached to its uterine origin. Technically, it is not easy to percutaneously direct a thin and flexible spinal needle, as suggested in some papers, through the abdominal wall, to cross the distended intra-abdominal cavity and to inject the membranous mesosalpinx.

Micro-anatomically, nociceptive visceral afferent outflow from the oviduct is dual [4]. Proximally, fibers conducting pain sensation may travel medially and upward with visceral nerves. Nociception from the peripheral part of the oviduct may be conducted laterally via the ovarian and renal plexus-continuum to synapse in the spinal cord at the level of the lower thoracic vertebrae. Overlap between these two nerve structures probably exists. Partly successful blockade after placing falope rings can probably be explained by missing either of the two outflow tracts. Because of this dual innervation, LAS may have to be deposited more laterally as well.

Adequate postoperative analgesia is important for successful ambulatory surgery. On the basis of the above considerations, we describe an analgesia blocking technique for tubaligation by adding several practical modifications to the protocol of routine laparoscopy.

2. Method

The mesosalpinx is brought into clear laparoscopic view, by stretching and immobilising the organ instrumentally, with the proposed site of injection located in

* Corresponding author.

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the part of the inner nerve containing connective tissue compartment where it is likely to be the widest. A suitable location for needle entry is the area where the fallopian tube and the ovarian ligament originate from the cornual part of the uterus. At this location, the distance between the two serosal coverings of the mesosalpinx measures approximately 5 mm. To be able to reach it without difficulty, the injection needle should be long enough to cross both the abdominal wall and the distance between this structure and the mesosalpinx. To avoid unwanted bending, introduction and advancement of the needle is facilitated with the aid of a rigid introducer needle/trocar set.

We propose the following technique (Fig. 1):

(1) Laparoscopy is carried out in the usual way. As soon as pneumoperitoneum is established, with the aid of an atraumatic uterine manipulator (a), the uterus is anteflexed and pushed slightly upward and towards the abdominal wall. This procedure immobilises the uterus, shortens the distance between the oviduct and the abdominal wall and anchors the proximal part of the oviduct. With atraumatic forceps (b), the mesosalpinx is grasped at the distal end and pulled slightly laterally. A clear view of the stretched mesosalpinx is presented with the oviduct lying ventrally. Dorsally, the ovarium ligament is visible.

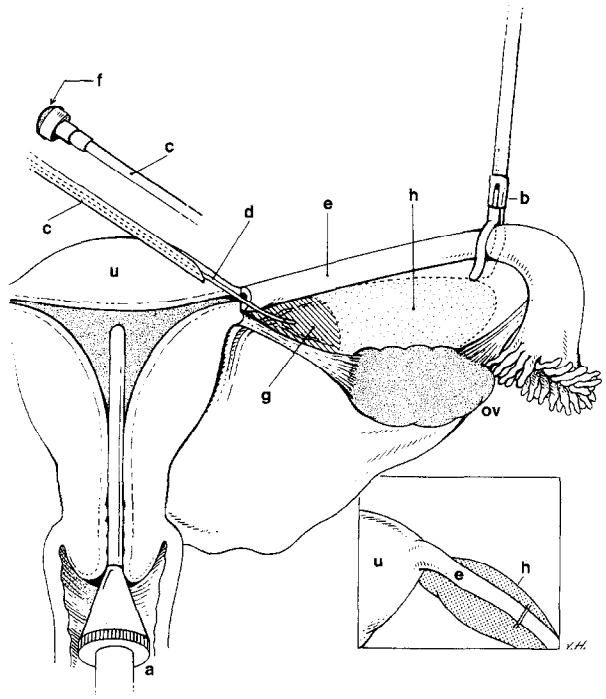

Fig. 1. Mesosalpinx infiltration technique. (a) Atraumatic Valtec Uterine mobilizer; (b) attraumatic grasping forceps; (c) rigid trocar with inner stylet removed; (d) 18-cm aortography needle; (e) oviduct; (f) sealing cap; (g) test dose with 1 ml saline; (h) 5 ml mesosalpinx infiltrate.

(2) Under direct laparoscopic vision, a trocar/needle-set (c) can then be introduced suprapubically in the midline. For this procedure, an 8-cm thoracoscopy needle-set is useful. The inner trocar of this set is removed and replaced with a closely fitting rubber seal.

(3) An 18-cm aortography needle (d) with a long bevel is then introduced through the rubber seal (f).

(4) Under direct vision, the rigid introducer with the long needle inside is directed towards the cornual part of the uterus. The inner needle can then be advanced to reach the mesosalpinx between the origin of the oviduct and the ovarian ligament. The site of subserosal entry for the needle is at the insertion of the mesosalpinx on the uterus and should be located more towards the ovarian ligament than the oviduct. During injection the bevel of the needle is turned away from the oviduct. In this way, LAS will distend the mesosalpinx only while the oviduct remains free of LAS.

(5) The inner stylet of the long needle is replaced with a 2-ml syringe containing saline and after negative aspiration a small amount of saline (1 ml) is injected. If the needle is in the proper position, only the mesosalpinx will bulge and a small balloon will form (g). At this stage, the direction of the bevel of the needle can still be adjusted to optimize the spread of LAS within the mesosalpinx only. A second 5-ml syringe containing 5 ml of LAS is applied. Five millilitres Bupivacaine 0.5% with epinephrine 1: 200.000 for each side is sufficient to infiltrate the lateral part of the mesosalpinx (h). After completion the same procedure is repeated for the other side.

3. Results and discussion

Sixty patients have been treated. In 57, bilateral mesosalpinx infiltration was successful. One patient needed a mini-laparotomy because of multiple intra-abdominal adhesions. No mesosalpinx infiltration was performed. In two other patients, injection of the mesosalpinx was unsuccessful and the structure was repeatedly perforated. This resulted in a torn mesosalpinx in one patient. As the mesosalpinx can easily be punctured and ruptured, it is possible for this complication to occur with any kind of attempt at infiltration. One of these 60 women became pregnant. Subsequently, at laparoscopy it was observed that sterilization had been unsuccessful with the falope ring lying on top of the oviduct. This could have been due to a technical failure. However, in our training institution, checks and re-checks during all stages of the procedure are part of the protocol. Following routine sterilisation, pregnancies may still occur in 3–5/1000

cases when falope rings are used. This can be due to the method itself or result from surgical failure [5,6]. We cannot rule out the possibility that in our case, during the first laparoscopic attempt at sterilisation, the ring could have been placed in a segment of the oviduct which was previously rendered oedematous as a result of injection of LAS around the duct. However, this should not discredit our proposed modifications to routine laparoscopy, as this event might also occur with other injection techniques. As such, it would seem to be an inherent complication of any approach aiming at direct infiltration of the mesosalpinx. However, it may be advisable to occlude only such a part of the mid-isthmic portion of the oviduct which has a normal anatomical aspect and which is clearly discernible without having been rendered oedematous by infiltration of LAS.

Infiltration as we have described it, adds approximately 10 more minutes to the usual time taken for laparoscopic tubaligation.

No hematoma was observed following mesosalpinx infiltration. Nevertheless, this block may have its own set of complications and it could be possible that so far, these have not been reported.

In our group of patients, two such events have occurred. In relation to the clinical consequences of such complications, more clinical investigation into these matters is indicated.

4. Conclusion

On the basis of anatomical and technical considerations, we describe an improved injection technique for bilateral mesosalpinx infiltration for analgesia after laparoscopic tubaligation. For complete analgesia, local anaesthetic solution should also reach the lateral part of the mesosalpinx. Tubal occlusion devices are preferably placed only in clearly visible and non-oedematous parts of the mid-isthmic portion of the oviduct.

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Ambulatory Surgery

Effect of pethidine and esmolol on the cardiovascular changes occurring during upper gastrointestinal endoscopy

A.K. Gupta[a,*], K.E.A. Nicholson[b], I.K. Driver[a], C. Woollard[c], G.D. Bell[c]

[a]*Department of Anaesthesia, Addenbrooke's Hospital, Box 93, Hills Road, Cambridge CB2 2QQ, UK*
[b]*Department of Anaesthesia, Southampton General Hospital, Tremona Road, Shirley, Southampton SO9 4XY, UK*
[c]*Department of Gastrointestinal Medicine, The Ipswich Hospital, Heath Road, Ipswich, Suffolk IP4 5PD, UK*

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Abstract

The cardiovascular effects of patients undergoing upper GI endoscopy when sedated with midazolam and pethidine, or midazolam and esmolol have been compared. A significant rise in heart rate ($P < 0.006$), systolic blood pressure ($P < 0.001$) and rate pressure product (systolic blood pressure × heart rate) ($P < 0.001$) occurred in both the patients receiving midazolam alone and those receiving pethidine in addition to midazolam. There were no significant differences in the peak rises in heart rate, blood pressure and, thus, rate pressure product between these two groups of patients. Those patients receiving a bolus dose of esmolol just prior to oesophagoscopy demonstrated a significantly smaller rate pressure response to oesophageal intubation than those in the first two groups. Copyright © 1996 Elsevier Science B.V.

Keywords: Upper gastrointestinal endoscopy; Esmolol; Pethidine; Midazolam

1. Introduction

In the USA, most endoscopic procedures are carried out using an opioid analgesic such as pethidine together with a benzodiazapine for sedation [1]. Quine et al. in their recent audit of gastrointestinal endoscopy in two regions in England found that between 10 and 20% of endoscopists routinely use pethidine in addition to midazolam for sedation [2]. This confirmed the findings of Daneshmend et al. in their previous nationwide survey [3]. The combination of an opioid drug with a benzodiazepine can increase the potential for cardiorespiratory events including hypoventilation, respiratory arrest, hypoxaemia, cardiac arrest and death [3–5].

Oesophageal intubation causes a rise in heart rate and blood pressure during upper GI endoscopy, increasing myocardial oxygen demands. Some groups have suggested that pethidine and other opioids may offer advantages over benzodiazepine sedation alone in terms of attenuation of this pressor response [6,7].

We evaluated the effect of pethidine in addition to midazolam on the pressor response to oesophageal intubation and then the effect of a bolus dose of esmolol given just prior to oesophageal intubation. Esmolol is a cardio-selective beta-blocker with an elimination half-life of 9 min when administered intravenously. A number of studies have demonstrated that esmolol can attenuate the pressor response to laryngoscopy and tracheal intubation when given by infusion or bolus dose [8–10]. This profile might be appropriate for a drug used in the endoscopy suite as it is non-sedative with no effect on respiratory drive.

* Corresponding author.

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2. Methods

Fifty patients presenting for routine upper gastrointestinal endoscopy were entered into this study, after written informed consent and with local ethical committee approval. Thirty-five patients were randomly allocated into one of two groups prior to their arrival in the endoscopy suite. Group one, the control group, received midazolam sedation alone and group two received pethidine in addition to midazolam as sedation prior to endoscopy. A third group received midazolam followed by esmolol.

Group one patients received a saline bolus as placebo whilst group two patients received an age-related dose of pethidine intravenously (50 mg aged under 70 years and 25 mg aged over 70 years) prior to sedation. All patients received intravenous midazolam for sedation at time zero. Patients under the age of 70 received 5 mg and patients over the age of 70 received 2.5 mg. Two minutes later oesophagoscopy was performed by one endoscopist (GDB) using a Pentax EG 2901 endoscope (time = 120 s).

Subsequently, 15 patients received midazolam at time zero followed, by a bolus dose of esmolol (200 mg) at time = 90 s, i.e. just prior to endoscopy at $t = 120$ s. Exclusion criteria for this group included (i) asthma, (ii) cardiac failure, (iii) heart block, (vi) resting heart rate < 60 beats per min, (v) resting sysolic BP < 100 mmHg, (vi) patients taking beta-blocker medication.

On arrival in the endoscopy suite, all patients had a pulse oximeter applied to the right index finger and a continuous non-invasive blood pressure monitor (Finapres, 2300e) applied to the right middle finger. Baseline measurements of heart rate, systolic, diastolic and mean arterial blood pressure together with oxygen saturation were recorded continuously for 2 min prior to giving sedation. All the patients routinely received supplemental oxygen via nasal cannulae at 2 l per min.

During the procedure heart rate, systolic, diastolic and mean arterial blood pressures were continuously recorded by the Finapres monitor. Rate pressure product (RPP) was calculated as systolic blood pressure x heart rate. The measured variables were averaged over 30-s epochs and downloaded onto computer for later analysis. Continuous monitoring ceased approximately 1 min after completion of the procedure. The patients were transferred to recovery for routine monitoring.

Comparison between the groups were made using analysis of variance and Student's t-test with a P value < 0.05 taken as being statistically significant.

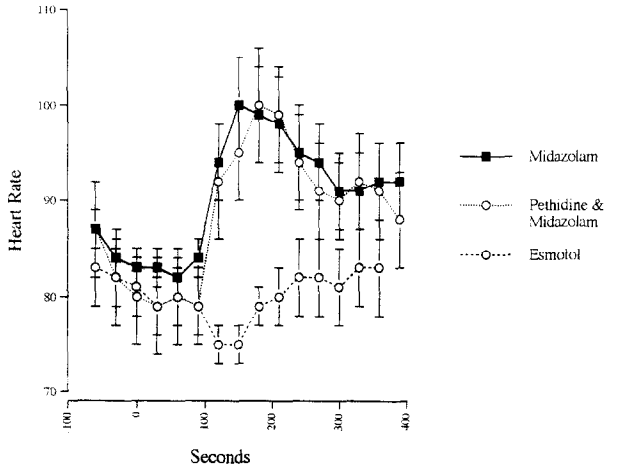

Fig. 1. Upper gastrointestinal endoscopy using midazolam sedation, pethidine and midazolam sedation, or esmolol and midazolam sedation. Effect on heart rate (mean ± S.E.M.).

3. Results

Two patients were excluded from the study because data failed to download onto the computer. There were no significant differences in age or sex between group one and group two patients. There were no significant differences in baseline resting values of heart rate, systolic BP or RPP between group one and group two patients.

Our results show a significant rise in heart rate ($P < 0.006$), systolic BP ($P < 0.001$) and RPP ($P < 0.001$) on oesophageal intubation in both group one and group two patients (Figs. 1–3). There were no significant differences between the peak values of heart rate, systolic BP or RPP on oesophageal intubation between groups one (midazolam alone) and two (pethidine and midazolam). The peak values occurred at 150 s and within 1 min of oesophagoscopy.

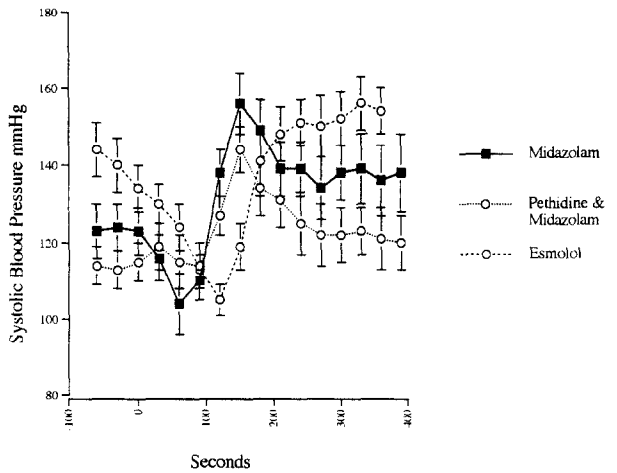

Fig. 2. Upper gastrointestinal endoscopy using midazolam sedation, pethidine and midazolam sedation, or esmolol and midazolam sedation. Effect on systolic blood pressure (mean ± S.E.M.).

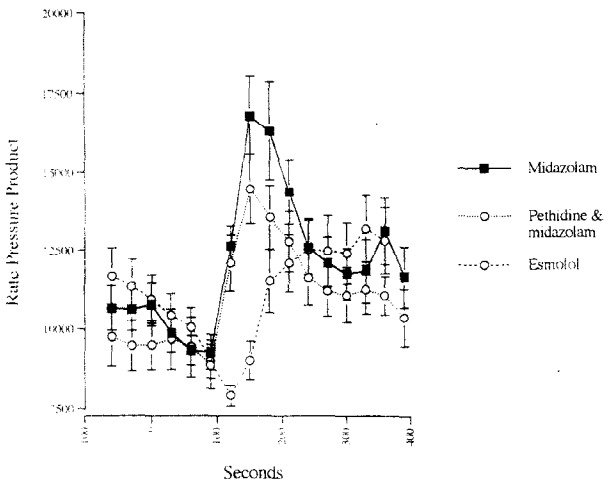

Fig. 3. Upper gastrointestinal endoscopy using midazolam sedation, pethidine and midazolam sedation, or esmolol and midazolam sedation. Effect on rate pressure product (mean ± S.E.M.).

Patients receiving esmolol (group three) had a significantly higher resting systolic BP than the other two groups. These patients had no significant change in heart rate throughout the procedure (Fig. 1). Systolic blood pressure fell significantly following sedation and esmolol administration ($P < 0.01$) however, diastolic BP did not fall significantly. There was no significant rise in systolic BP over baseline levels in those patients receiving esmolol (Fig. 2). RPP fell significantly following esmolol administration ($P < 0.01$). The peak rise in RPP occurred at $t = 330$ s and was not significant (Fig. 3).

4. Discussion

This study demonstrated that pethidine in combination with midazolam has no significant effect on heart rate, systolic BP or RPP when compared to midazolam alone. These results supported the results of our prevous study which showed that midazolam has no effect on the cardiovascular changes occurring during upper GI endoscopy. The addition of pethidine increases the potential for hypoventilation and hypercabia and may lead to hypoxia. This may be of significance in the elderly, the obese or those suffering from ischaemic heart disease. Murphy et al. demonstrated that cardiac arrhythmias are concurrent with desaturation and that desaturation occurs most frequently at oesophageal intubation [13]. This coincides with peak rises in blood pressure and heart rate.

Using continuous non-invasive blood pressure monitoring, we previously demonstrated that the rise in RPP was comparable in magnitude to the rise in RPP that occurs on tracheal intubation under general anaesthesia (unpublished data). Numerous studies have investigated the attenuation of the pressor response to tracheal intubation because of its association with myocardial ischaemia.

The effect of esmolol given as a bolus and an infusion has been investigated [8–10]. Esmolol appears to blunt, but not abolish the cardiovascular response to tracheal intubation, having its main effect on reducing stress induced tachycardia. We have similarly shown that esmolol has a significant effect on the cardiovascular changes occurring during upper GI endoscopy and its most significant effect is on reducing the tachycardia associated with oesophageal intubation although the effect on RPP is also significant.

A 200-mg dose of esmolol was chosen as this dose has been shown to provide adequate haemodynamic control after tracheal intubation [9]. The timing of the dose would seem to be important, in that the maximal effect with a significant fall in systolic blood pressure occurred within the first minute and therefore a bolus dose just prior to intubation is the most appropriate timing.

Esmolol has a short half-life (9 min) and this was manifest by peaks in heart rate, systolic blood pressure and rate pressure product occurring 4 min after its administration, suggesting that its effects were wearing off.

Although systolic blood pressure and heart rate fell prior to oesophageal intubation, diastolic BP was maintained. This suggests that despite a fall in systolic BP, coronary artery filling may be preserved and thus myocardial oxygen balance optimum. Esmolol has no respiratory depressant effects. Oxygen saturation was not affected.

Upper gastrointestinal endoscopy induces a rise in blood pressure and heart rate on oesophageal intubation and has been associated with a fall in arterial oxygen saturation [6,7,11,12]. Increasing myocardial oxygen demands at a time of reduced supply may be detrimental to some patients. It is recognised that the combination of a benzodiazepine with an opioid can increase the risk of adverse cardiorespiratory events [3–5].

Kinoshita et al. recognised the importance of the pressor response to oesophogoscopy and advocated the use of intravenous pethidine for sedation during upper GI endoscopy [6]. They found that pethidine increased the tolerance of the patients to the procedure (over topical local anaesthesia alone) and attenuated the rise in systolic blood pressure and heart rate. This is in direct contrast to our study. We monitored patients continuously throughout the procedure and although the patients in both studies achieved similar peak rises in heart rate and systolic blood pressure, we were not able to demonstrate that pethidine in addition to midazolam prevented a significant rise in HR or BP on oesophagoscopy. The patients in the control and study

groups received topical local anaesthetic spray whereas the patients in our study all received midazolam sedation. In a previous study we had demonstrated no differences in cardiovascular changes in patients receiving topical local anaesthetic spray compared to patients receiving these doses of midazolam for sedation (unpublished data). The doses of midazolam used in our study had previously been found to produce a dysarthric and drowsy patient, who was still able to cooperate and in whom oesophageal intubation was easy and well tolerated. This was based on a study of 800 consecutive cases using bolus doses in this unit [14].

Ishido et al. advocated the use of fentanyl in addition to topical local anaesthetic spray to attenuate the endoscopy induced rise in RPP. As previously explained, our control group of patients received midazolam sedation rather than topical local anaesthetic spray. In contrast to their patients, our control group of patients achieved far higher increases in RPP over baseline levels and the addition of an opioid drug did not prevent significant rises in RPP on intubation. In our previous study, we monitored patients receiving topical local anaesthetic spray and these patients also achieved far higher increases in RPP over baseline levels. It is possible that these brief but dramatic rises in RPP are not observed when monitoring is intermittent.

The addition of pethidine to midazolam increases the risks of respiratory depression. Pethidine has a relatively long half-life compared to esmolol and may prolong recovery, particularly in the elderly. We could not demonstrate that pethidine has any beneficial effect on reducing the pressor responses to oesophagoscopy when used together with midazolam for sedation. These factors implicate pethidine as an unsuitable and potentially dangerous adjunct to midazolam for sedation for upper GI endoscopy. There is no advantage to this combination.

The number of patients in this study is small and definitive conclusions cannot be drawn. However, these initial observations do suggest that esmolol is a useful drug during upper GI endoscopy, and pethidine is less suitable to control cardiovascular changes due to oesophagoscopy. In view of the high morbidity and cardiorespiratory complications associated with this procedure, esmolol may be beneficial in patients, particularly where the balance of oxygen supply and demand is critical. No adverse events were recorded with the dose used in this study.

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Ambulatory Surgery

Local anaesthesia in postoperative analgesia for herniorrhaphy

Anna Abad[b], Ricard Calabuig[a,*], Albert Sueiras[a], Felip Pi[a], M[a] José Galera[a], Carles Ortiz[a], Jaume Prat[a], Tomas Casasin[c], Caterina Ramón[b], Enrique Sierra[a]

[a]*Department of Surgery, Hospital de Viladecans, Barcelona, Spain*
[b]*Department of Anaesthesiology, Hospital de Viladecans, Barcelona, Spain*
[c]*Department of Pharmacy, Hospital de Viladecans, Barcelona, Spain*

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Abstract

Objective: To test the hypothesis that local infiltration with bupivacaine at the time of herniorrhaphy would decrease postoperative pain. Design: Sixty-five patients in whom a polypropylene mesh was implanted to treat an inguinal hernia were included in a random double-blind study. Operative anaesthesia was intradural with prilocaine 5%, 1.25 mg/kg. After the procedure, an ilioinguinal and iliohypogastric block was performed by infiltration of soft tissues with 0.25 ml/kg of either bupivacaine 0.5% or NaCl 9 g/l. Postoperative pain was assessed with an analog pain scale, (range 0–5) in the recovery room, 8 h later and 24 h later. The patient assessed the pain 24 h after surgery (range 0–5) and the relationship with the pain he expected (range 0–2). The time when the first dose of analgesia (diclofenac 75 mg i.v.) was given was also noted (range 0–6). A score (range 0–28) was calculated to quantify postoperative pain. Results: Thirty-three patients were infiltrated with bupivacaine and 32 patients received placebo. Both groups were similar in sex, age, weight and operating time (44 (20 min)). No pain was reported for bupivacaine (score 1.4 (0.9)) and minor pain for placebo (score 2.1 (1.0)) in the recovery room ($P < 0.05$). Further pain assessment was similar in both groups (scores range: 1.1–1.5). The first dose of analgesia was administered 2–3 h postoperatively (score 4.4 (2.0)) in the placebo group and 4 to 5 h postoperatively (score 2.9 (2.4)) in the bupivacaine group ($P < 0.05$). The final postoperative pain score was 11.3 (3.9) in the placebo group and 9.2 (4.4) in the bupivacaine group ($P < 0.05$). Conclusions: Local infiltration of the abdominal wall with bupivacaine reduces immediate postoperative pain and delays the administration of postoperative analgesia.

Keywords: Hernia; Analgesia; Local anesthetics

1. Introduction

The control of pain during surgery and in the postoperative period results not only in comfort for the patient, but it also reduces the metabolic and inflammatory response to surgery. Recent studies on the pathophysiology of acute postoperative pain [1–4] suggest that it is induced by functional changes on the peripheral nerves (hyperalgia) as well as in the central nervous system (hyperexcitability). The combination of hyperalgia plus hyperexcitability increases pain perception. Most of nociceptive stimuli induce the local release of histamine, serotonin, prostaglandins, substance P and other messengers that contribute to hyperalgesia [1,4,5]. Local anaesthetics block the peripheral neural pathways of pain and, therefore, limit the release of pain messengers that induce the hyperalgesia and, indirectly cause the hyperexcitability in the central nervous system.

The objective of this study was to test the hypothesis that the peripheral nerve blockade with the local anaesthetic, bupivacaine, at the time of surgery in patients

* Corresponding author. Servei de Cirurgia, Hospital de Viladecans. Avgda. de Gavà. 38. Viladecans 08840. Spain. e-mail: rcala@abaforum.es

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operated on for inguinal hernia might decrease postoperative pain.

2. Patients and methods

All patients operated on for inguinal hernia under hospital admission, and in whom a polypropylene mesh was implanted were admitted into the study. Intradural anaesthesia with prilocaine 5%, 1.25 mg/kg was used in all patients. An ilioinguinal and iliohypogastric nerve block was performed by the local infiltration of soft tissues, with a 21 G needle, of either bupivacaine 0.5% without epinephrine, or NaCl 9 g/l, at a dose of 0.25 ml/kg, injected at the end of the surgery on a random double-blind basis. This was achieved by tissue infiltration with bupivacaine or placebo of the area medial to the antero-superior iliac spine, approximately at a depth between the major and minor oblique muscles aponeuroses. Postoperative analgesia was given when required by the patient as opposed to the usual practice of mandatory administration before the beginning of pain. Diclofenac, 75 mg intravenously was used unless the intensity of pain indicated the administration of meperidine, 0.5–1 mg/kg subcutaneously. Patients in whom diclofenac was contraindicated received paracetamol, 500 mg p.o., and were not included in the study.

Postoperative pain was assessed by the nursing staff using an analog scale of pain with 6 degrees: 0: no pain; 1: minor pain; 2: moderate pain; 3: pain; 4: intense pain; 5: unbearable pain. Pain intensity was evaluated immediately in the recovery room (range 0–5), 8 h postoperatively (range 0–5) and 24 h postoperatively (range 0–5). At 24 h, the patient was asked whether he had experienced less, equal or more (range 0–2) pain than he had expected. Finally, the time at which the patient required the first dose of analgesia was carefully annotated, and quantified in a score scale (range: < 1 h: 6; > 6 h: 0). Patients with incomplete evaluation or who were unreliable due to difficulty in comprehension of the questionnaire were excluded from the study.

Comparisons were made between bupivacaine and placebo groups using the independent Student's t-test. Data are presented as mean (S.D.) unless stated otherwise. A degree of probability of less than 5% was regarded as significant.

3. Results

Sixty-five patients entered the study. Bupivacaine was infiltrated in 33 patients and placebo in 32 patients. No complications, such as hematomas were observed as a result of local infiltration of tissues. Both groups were similar in sex, age, weight and operating time (44 (20) min). The nursing staff reported no pain (score 1.4 (0.9)) for bupivacaine and minor pain for placebo (score 1.9 (1.1)) in the recovery room ($P < 0.05$). Further pain assessment was similar in both groups (scores range: 1.1–1.5). The first dose of analgesia was administered 2–3 h postoperatively (score 4.4 (2.0)) in the placebo group and 4–5 h postoperatively (score 2.9 (2.4)) in the bupivacaine group ($P < 0.05$).

4. Discussion

Postoperative analgesia after herniorrhaphy is important for patient comfort, early mobilization and hospital discharge in ambulatory surgery. The present study demonstrated that the blockade of the peripheral sensitive pathways of pain in the inguinal region with the local anaesthetic bupivacaine reduces immediate postoperative pain and delays the administration of the first dose of analgesia after inguinal herniorrhaphy. This is in agreement with the studies of Tverskoy et al. [6] that investigated postoperative pain in 36 patients operated on for inguinal hernia and found that patients who had undergone general anaesthesia plus infiltration with local anaesthetic were significantly more comfortable than patients operated on under epidural or general anaesthesia alone. Similarly, Buguedo et al. [7] observed that the association of subarachnoidal block with ilioinguinal and hypogastric blocks with bupivacaine reduced pain and delayed the administration of postoperative analgesia after herniorrhaphy.

Infiltration with bupivacaine was only effective in the immediate postoperative period. At the 8 h evaluation and thereafter the pain scores were similar for the bupivacaine and placebo groups. This was an expected finding, since the duration of the effect of bupivacaine administered by local tissue infiltration is approximately 9 h longer than the anaesthesia provided by its epidural administration, which is 3–4 h [6,8]. Patients in the bupivacaine group did not realize the fact that they had less pain than patients in the placebo group. Despite the additional analgesia provided by bupivacaine, they considered that the pain experienced was similar to what they had expected, as in the placebo group.

As a result of bupivacaine infiltration, the first dose of diclofenac was required 4–5 h postoperatively as opposed to 2–3 h in the placebo group. This is relevant for patients operated on in ambulatory surgical units, that leave the hospital within the first 4 h postoperatively, in whom an appropriate control of pain is important to achieve early ambulation and home return. Infiltration with bupivacaine is also relevant for patients with peptic ulcer disease or other reasons that prevent the use of diclofenac.

In conclusion, the peripheral neural block with bupivacaine at the end of herniorrhaphy is a safe and simple manoeuvre that contributes to an effective analgesia in the early postoperative period. This is of interest for patients that need early mobilization, such as ambulatory surgery patients.

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Ambulatory Surgery

Patients' opinions of information given and postoperative problems experienced in conjunction with ambulatory surgery

Inger Lindén[a], Ingegerd Bergbom Engberg[b,*]

[a]*Department of Anesthesiology and Surgery, Ryhov County Hospital, S-551 85 Jönköping, Sweden*
[b]*Borås University College of Health Science, Box 551 40, S-504 04 Borås, Sweden*

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Abstract

The aims were to obtain and describe ambulatory surgery patients' opinions about information provided before, during the day of surgery and prior to discharge from the post-anesthesia care unit (PACU) and to explore relationships between patients' opinions of information received and their experience of postoperative problems. Of 127 patients invited to complete a questionnaire, 110 returned this within 14 days. Five patients were excluded due to hospital admission. Most patients found the information satisfactory. Patients did not find the written information as adequate or as satisfactory as the oral. About a third of the patients found both types of information unsatisfactory. More patients who found the information unsatisfactory reported more postoperative problems than the others. The most common problems experienced at home were pain, sleeping disturbance and nausea. Copyright © 1996 Elsevier Science B.V.

Keywords: Ambulatory surgery; Preoperative information; Patients' experience; Day surgery

1. Introduction

Reasons for the increase in day-care surgery are multiple, including cost containment, the development and application of new technology and new shortacting anesthetics with fewer side effects [1]. However, not all patients are suitable subjects for day-surgery. Psychological, medical and nursing care factors exclude some patients. Patients who are unwilling or unable to follow pre- and postoperative instructions are not suitable for ambulatory surgery [1]. As most patients want to come to the post-anesthesia care unit (PACU) immediately before surgery and leave the unit as soon as possible afterwards [2], all the necessary communication, information and care has to be carried out during a limited period of time. It is often difficult to assess if the information and instructions provided are appropriate to the patients' perceptions, to their needs in relation to the ambulatory procedure and to the postoperative recovery period at home. It is important to understand and evaluate patients' opinions about the information provided and to be aware of patients' reported postoperative problems.

Few studies have reflected patients' opinions of information provided in the preoperative phase, during their stay at the PACU and prior to discharge. Several authors [1,3,4] indicate that it is important to prepare ambulatory surgery patients for post-anesthetic and postoperative discomfort, and inform them that complications may occur both at the PACU and at home. Explanations of what to expect perioperatively, coupled with gentle reassurance, can decrease premedication requirements [1]. Payne et al. [5] have shown that preoperative anxiety is positively correlated with the level of pain following discharge home. Education may decrease patients' postoperative pain, nausea and anxiety and allow earlier discharge from hospital [6]. Pa-

* Correspondence author. Tel: +46 33 163108; fax: +46 33 161481.

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tients informed about postoperative discomfort were found to have greater tolerance for their situation and also experienced less anxiety [3,7]. Following Payne et al. [5] it is important to prevent preoperative anxiety and pain during the PACU stay. However, information given before elective minor surgery must be adjusted to patients' individual needs [8]. Kempe and Gelazis [9] found that information given by a nurse provided opportunities for patients to ask questions at the time of the decision for surgery, and that this, together with a presurgical telephone call by a nurse the day before surgery, were the most significant factors in reducing preoperative worries. Patients' pre-surgical visits to the surgical department may also provide opportunities for preoperative education. At this time patients can confer with the anesthesiologist, discuss postoperative pain management and meet with the PACU nurses to obtain information about the procedure and care needed. Elsass [10] showed that patients who had met a supportive anesthesia nurse the day before surgery who was to care for them in the preoperative room had fewer postoperative problems with shivering, dizziness and vomiting compared to those who did not receive this support.

Pain is one of the most common postoperative problems. It has been discussed by Dwyer and McGoldrick [1], White [4] and Gupta et al. [11]. Pain can be caused by the anaesthetic technique, not only the surgical procedure. Burden [12] claims that after dural puncture, headache resulting from spinal anesthesia may occur up to the 6th postoperative day. After wound infiltration with bupivacaine, more severe pain than usual may occur after discharge, and the nurse must inform the patient of these possibilities [3,4]. The PACU nurse must also give patients advice prior to discharge about managing postoperative pain treatment at home and must, therefore, have knowledge about the anesthetic and surgical techniques used. According to the Swedish Health Law [13], patients must be informed about possible side-effects of the different anesthetic and surgical techniques and, if possible, be able to choose the techniques to be used in consultation with the physician. The PACU nurse must inform patients about what to expect postoperatively together with possible postoperative problems, that might occur.

Rawal and Berggren [14] claim that it is not only information that is of importance for patients' experience of pain. It may depend on several factors such as patients' preoperative psychological and pharmacological preparation, the quality of nursing care at the PACU and the occurrence of postoperative complications. The relationship between pain and nausea has also been explored. Larsson [7] found that as many men as women experienced pain and nausea, but of those patients who had been vomiting, 28% felt worried and anxious during the first postoperative day. Andersson and Krogh [15] found that the occurrence of nausea could be diminished if patients postoperative pain was treated in the hospital.

In addition to prevention [7,13,16,17] and treatment of postoperative problems, quality care in the PACU involves providing time for patients to ask questions and nurses and physicians to answer them. Establishing a trusting relationship, allowing communication between patients and nurses and physicians, and providing relevant and valuable information [2] can also be seen as important parts of the care process. This encounter enhances the relationship and informalizes the way information is given and its content, i.e., relevant and appropriate 'facts' which aim to facilitate the patient to undergo the procedure with the minimum of discomfort. Information may include the care of dressings, suture lines, the surgical wound, limitations of activity, personal hygiene, diet, lethargy and tiredness [12]. This information can be provided both by oral and written means. Preferably it should be given prior to surgery. Sarvimäki [18] found that 58% of patients wanted written information about their condition and how they should continue treatment at home. An example of written information and instructions about postoperative self-care at home has been presented by Kang et al. [19].

1.1. Aims and questions

The aim of the study was to obtain and describe patients' opinions about information provided preoperatively, during and after the ambulatory surgery procedure. These patients had undergone arthroscopy, inguinal herniorrhaphy, varicose vein surgery or hallux valgus correction. Another aim was to explore relationships between these opinions and problems experienced during the PACU stay and after discharge.

The following questions were asked:- Do patients find the pre- and postoperative information provided, both written and given verbally, sufficient and satisfactory?- Are any differences apparent between males and females with the surgical procedure or the anesthetic technique?- Is there any relationship between patients' opinions, the information provided and their experience during the whole procedure?

2. Patients and methods

2.1. Patients

In total, 127 patients scheduled for elective varicose vein surgery, hallux valgus correction, inguinal herniorrhaphy or arthroscopic knee surgery in the ambulatory setting were consecutively invited to participate in the study. These groups of patients were chosen because

Table 1
Mean age, standard deviation (S.D.), gender, anesthetic techniques (general, spinal, intravenous regional (IVRA) and local) used for patients who had undergone varicose vein surgery, hallux valgus correction, inguinal herniorrhaphy and arthroscopic knee surgery ($n = 105$)

Surgical procedure, n, mean age in years (S.D.)	Male/female (n)	General anesthesia (n)	Spinal anesthesia (n)	IVRA (n)	Local anesthesia (n)
Varicose vein, $n = 25$, 48 (11.39)	10/15	7	18	0	0
Hallux valgus, $n = 25$, 53 (10.95)	1/24	2	2	20	1
Inguinal herniorrhaphy, $n = 27$, 54 (12.54)	24/3	10	17	0	0
Arthroscopy, $n = 28$, 40 (12.62)	19/9	24	4	0	0
Total, $n = 105$, 49 (13.02)	54/51	43	41	20	1

these surgical procedures are common and involve the potential risk of postoperative complications such as bleeding and pain. Instructions to these patients about allowed and forbidden activities in the recovery period are of importance for a satisfactory outcome. Additional inclusion criteria were that the patients were able to understand Swedish and were 18 years of age or older. Of the 127 patients, 110 (87%) completed and returned the questionnaire within 14 days. Five of these 110 (5%), were admitted to the hospital and were excluded from the study. A total of 105 patients were included in the study. Demographic data is shown in Table 1. More females ($n = 15$) than males ($n = 10$) were operated on for varicose veins and hallux valgus (24 and 1 respectively) and more males ($n = 24$) than females ($n = 3$) had undergone inguinal herniorrhaphy and arthroscopic knee surgery (19 and 9 respectively). More males reported being offered a choice of anesthetic technique than females (42 and 29 respectively; $P < 0.01$). Almost all patients ($n = 101$) received premedication with benzodiazepines. Almost as many patients received general as spinal anesthesia (Table 1). Patients undergoing hallux valgus correction were usually offered intravenous regional anesthesia (IVRA, also called Bier block) in the foot.

2.2. Setting and questionnaire

The study was carried out at the County Hospital, Ryhov in Jönköping, Sweden. This is a general hospital with 300 beds, covering a geographical area with about 200 000 inhabitants. The data was collected during a 7-month period in 1994.

A questionnaire, consisting of 47 questions was designed by the authors. The questionnaire and the validation have previously been described [20]. This article only reports the results of 11 of these questions. The following themes were explored: The patients' experiences of received oral and written information before the ambulatory surgery, during the procedure and prior to discharge from the PACU. Patients' experienced postoperative problems are also reported. One of these 11 questions concerned postoperative discomfort experienced in the PACU.

The alternatives given in this question were pain, nausea, dizziness, headache, difficulties in urinating and other discomfort, which the patients could describe in their own words. Another question concerned postoperative problems experienced at home. The following alternatives offered were pain, nausea, difficulties in sleeping or urinating, worry or anxiety, problems with dressings, bleeding and wound infection. Two main questions of the 11, asked if the patients found the written and verbal information sufficient or not. Questions about the information provided concerned pain relief drugs, permitted and prohibited postoperative activities, personal hygiene, how to care for the wound and dressings. At the end of these two questions it was asked if patients lacked any information and if so, what did this concern. Information about awareness of where to turn to if postoperative complications arose or further questions arose needing a response was also asked about. Finally six questions concerned information received from both the physicians and the nurses, prior to the ambulatory procedure, during the operation day at the PACU and before discharge. As patients participating in the pilot study stated that the quality of the information received from the nurses and the physicians was different, they are presented separately. Finally, one question was open-ended, where the patients were encouraged to freely express their opinions and experiences of the ambulatory surgery procedure. This method is supported by Fallo [21].

The study was approved by the Ethical Committee, University Hospital in Linköping.

2.3. Procedures

Oral and written information about the study was given to the patients upon arrival in the waiting room at the surgical department by one of the investigators.

No patients were premedicated before this information was given. The questionnaire was first given to the patients just before their discharge from the PACU.

Each patients' final decision about participation in the study was made at home. If they decided to participate, they answered the questionnaire and sent it to the hospital. From an ethical point of view it was impor-

Table 2
Males and females' opinions concerning verbal information provided at the PACU prior to discharge ($n = 105$)

Sufficient verbal information about:	Males, $n = 54$, n (%)	Females, $n = 51$, n (%)	Total, $n = 105$, n (%)
The surgical wound	45 (83)	48 (94)	93 (89)
Pain relief drugs	50 (93)	48 (94)	98 (93)
Activities	45 (83)	40 (78)	85 (81)
Personal hygiene	44 (82)	41 (80)	85 (81)

tant that the patients were unaffected by any medication and that they did not feel forced to participate.

During the study period the preoperative information was verbally provided by the physician and the nurse. The nurse provided information about the procedure, about postoperative problems, the fact that patients are not allowed to eat or drink before the anesthesia and surgery and about preoperative personal hygiene. The nurse also provided written information. On the day of surgery the patients were offered premedication and the nurse again informed them about the procedures. Sometimes the physician also gave information, but this varied depending on the circumstances. Patients were given information, adjusted to their condition, postoperatively and during their stay at the PACU. Before discharge the PACU nurse provided information about pain relief drugs, how to take care of the wound, allowed and forbidden postoperative activities during the recovery period, personal hygiene and where to call if problems, complications or questions occurred. Written material reinforced the same information.

A limitation of this study is that there is no real control of how the information was given, i.e., if there was a dialogue between the physician, the nurse and the patient or if the information given was adapted to the patients needs. The content of the information should include the above described subjects but there may have been some occasions where not all of the information was given.

2.4. Data analysis

Descriptive statistical methods such as mean and standard deviation were used. Mann-Whitney-Wilcoxon U-rank sum test, Fisher's exact test and Pearson's χ^2-test was used when analysing data. Pearson's correlation coefficient was used when exploring the relationship between variables.

3. Results

A majority of the patients reported that they had received sufficient information from nurses, prior to the ambulatory surgery procedure (96%), during the surgery day at the PACU (96%) and prior to discharge (95%). Eighty-six percent of the patients reported sufficient preoperative information provided by the physicians. During the day of surgery, 81% reported they had received sufficient information, and prior to discharge 64%. In total, 67 patients reported that they received sufficient information, both from nurses and physicians, and 38 stated that they thought the information provided was insufficient. Seventeen patients did not answer questions concerning the information given by the physicians just before discharge. Three patients did not answer the same question concerning information given by the nurses.

Patients were asked if they were provided with sufficient verbal and written information. As can be seen in Table 2, a majority of the patients reported that they received sufficient verbal information at the PACU prior to discharge. Compared to verbal information received, the written information was not reported to be sufficient to the same extent (Table 3). However, most patients found the written information sufficient. Between 66 and 72% of the patients reported that they received sufficient written information about how to care for the operative wound, use of analgesics at home, permitted and prohibited activities and personal hygiene. Ninety-one patients (87%) reported that they received sufficient verbal information about where to seek help if complications and problems occurred. Questions concerning verbal and written information also provided the patients the opportunity to comment on their answers. One patient commented that written information is better as it is difficult to understand and remember verbal information. Some patients also wanted information about how much housework they could do and where to find help if the dressing is filled with blood.

3.1. Problems experienced

The most common problems patients experienced at home were pain (42%), sleeping problems (15%) and nausea (11%). Nine patients reported problems with the wound and dressings and three reported anxiety. No patients reported postoperative difficulties in urinating when home. Two operated on for hallux valgus reported bleeding from the surgical wound.

Table 3
Males and females' opinions concerning written information provided at the PACU prior to discharge ($n = 105$)

Sufficient written information about:	Males, $n = 54$ n (%)	Females, $n = 51$ n (%)	Total, $n = 105$, n (%)
The surgical wound	34 (63)	39 (77)	73 (70)
Pain relief drugs	36 (67)	40 (78)	76 (72)
Activities	34 (63)	35 (69)	69 (66)
Personal hygiene	36 (67)	35 (69)	71 (68)

Fifty patients (22 males and 28 females) experienced pain during their stay at the PACU and 46 experienced pain at home. Significantly more females (58%) experienced pain at home than males (32%; $P < 0.01$). More patients experienced nausea at home ($n = 12$) than at the PACU ($n = 9$). By using Fisher's exact test (two-tailed), it was found that significantly more patients who experienced pain at home also experienced nausea (20%) compared to those who did not report pain (5%; $P < 0.05$).

3.2. Relationship between opinions about information received and problems experienced

More patients who had expressed that the preoperative information given by physicians was unsatisfactory reported dizziness (5 of 14; 36%) at the PACU and problems in sleeping at home (5 of 13; 39%) compared to patients who found the information satisfactory (11 of 87; 13%; 10 of 88; 11%; $P < 0.05$ respectively $P < 0.02$). During the operation day more patients who had found the information given by nurses unsatisfactory reported pain, (100%) problems in sleeping (50%) and worries at home (50%; $P < 0.05$ and $P < 0.01$) than those who found the information satisfactory (41 of 98; 42%; 13% respectively 1 of 98). Patients dissatisfied with the information given by nurses prior to discharge were subject to a higher level of experienced pain (5 of 5 $P < 0.02$) and anxiety at home (2 of 5; $P < 0.001$) than others (39 of 95; 41% respectively 1 of 94).

A positive correlation was found between patients opinions concerning the information received from the nurses during the day of operation at the PACU and information given about self-care before discharge (0.8898; $P < 0.001$). A less positive relationship between preoperative information and information given by the nurses during the operation day at the PACU was also found (0.4800 $P < 0.001$). A moderate relationship was also found concerning the patients opinions of the information provided by physicians. Information received on the day of surgery at PACU and the patients opinions about information given prior to discharge was correlated (0.5776; $P < 0.001$).

The last question in the questionnaire offered the patients an opportunity to freely express opinions about the whole ambulatory surgery experience. One patient commented that the physician gave information when the patient was not quite awake and therefore could not remember what he had said. The nurse later repeated the information. Patients also complained that the physician did not inform them before surgery about what to expect during the first postoperative week and how to prepare for resuming normal functions. After his herniorrhaphy, one patient claimed that the information was not satisfactory as he did not realize how the operation would affect him (he mentioned that he slept for over 36 h upon his return home, which he had not anticipated). Other patients found the information satisfactory, felt that they had their 'own' staff and that they continuously received information during the whole procedure. Some patients who received a Bier block found it beneficial to be able to talk to the physicians and nurses during the operation. Several patients found it very unsatisfactory not to have been given any opportunity to meet and receive information and question the surgeon before the operation, during the stay in the PACU and before discharge. Patients also wanted to discuss with the surgeon the results of the operation and receive assurance that everything was alright and no complications had occurred.

4. Discussion

The questionnaire included mainly close-ended questions but with some opportunities for patients' comments. At the end of the questionnaire the patients were encouraged to express their opinions about the whole ambulatory surgery experience. It has been shown that patients experience difficulty in expressing negative criticism about the care they receive [18] at the time the treatment and care is being given. If the patients' expected results of the operation are fulfilled, satisfaction with the care and the procedure probably will be more positive [22]. The time the patients stay at the surgical unit is very short and may contribute to this inability to comment on possible disadvantages.

The questionnaire was delivered to the patients just before discharge from the PACU, which enabled the patients to choose if they wanted to participate and, if so, to complete the questionnaire within 14 days at home. Most follow-up studies [21,23] are carried out

within 24 h after discharge, but this study made it possible for the patients to make a long-term evaluation. Some patients returned the questionnaire within a few days and others at the end of the 14-day period. After 2 weeks, recollection and memory of discomfort, experiences and received information may well have deteriorated. Findings by Larsson [7] showed that patients expressed amnesia of the perioperative course. Philips [24] claimed that some anaesthetic drugs can cause patients to forget having seen the surgeon on the day of surgery and forget being given postoperative information. Seventeen patients in this study did not answer questions about information received from the physicians. The reason for this incomplete data may be amnesia caused by the anaesthetic agents, but also reluctance to express criticism in case further problems might occur during the recovery period.

Most patients who had undergone ambulatory surgery found the information sufficient. The relationships found between patients' opinions about the information given on the day of surgery at the PACU and prior to discharge imply that relevant and useful information can create a trusting relationship, based on good communication [2,3]. This shows that satisfactory information was provided, first of all by the nurse but also that the patient felt free to ask questions. This may also mean that if patients feel that information is insufficient during one stage of the ambulatory procedure then there is a risk that this will reflect on the whole of the procedure and they will find any further and complementary information 'insufficient'. Therefore, it is of great importance to ensure satisfactory information and the establishment of a trusting relationship as soon as possible in the ambulatory procedure.

In this study it was found that patients who felt dissatisfied with preoperative information, information given on the day of surgery and prior to discharge also experienced increased problems such as dizziness, sleeping problems, anxiety and pain either at the PACU or at home. In accordance with the findings of Payne et al. [5] these patients may have experienced preoperative anxiety and the information given was not appropriate to their needs and, therefore, their anxiety and worries were not dealt with. In these cases it is perhaps more important to initially establish a trusting relationship, encourage the patient to express their worries and ask about these, to talk about their needs and expectations and then provide the information required.

Verbal information about pain relief drugs may reflect the nurses' ambition to lessen patients' pain at home, as pain can lead to anxiety and nausea as claimed by Larsson [7], and lead to patients' contact with or admittance to hospital. Written information was reported not to have been as sufficient as verbal. This may be explained by the lack of adequate information, or that nurses may have neglected to give it to the patients or that verbal information presented to patients and to relatives or spouses is deemed to be sufficient. However, patients may have received written information but left it at the PACU upon discharge, or may have brought it home but not read it, or found it difficult to understand. In spite of this few patients mentioned that practical information about the type of housework allowed and wound dressing care is needed. Written information is also important as amnesia may occur [7,24] as was claimed by some patients.

Sixteen patients reported sleeping problems at home, but it is unclear if the patients have slept too much as one patient commented, or have had difficulties in sleeping or both in different periods within the 14 days. Burden [12] states that patients on the operation day may feel tiredness and sleepy because of the effects of sedatives. More patients who had pain at home also experienced nausea, which is in agreement with Larsson's [7] findings. It is therefore important to explain to patients that pain prevention diminishes the risk of nausea. It is also important to inform patients about the different pain relief drugs and recommended dosages. More women reported pain at home than men, which could be linked to insufficient information about permitted activities including housework, having no adequate pain relief or no time for resting or having returned to work too early. But it could also depend on the fact that 24 women were operated on for hallux valgus, which may cause more postoperative pain than the other procedures.

Sufficient information given about self and home care and what can be regarded as normal and unusual in the postoperative phase could preclude patients anxiety about returning to hospital or worrying when experiencing discomfort.

5. Conclusion

A majority of the patients found the information preoperatively, during the day of surgery and prior to discharge satisfactory. The verbal information was found more adequate than the written. However, about one third of the patients reported that they did not find the total information in conjunction with ambulatory surgery sufficient. The physicians received more criticism than the nurses who were preferred in patients' comments. Patients who perceived the preoperative information as unsatisfactory also seem to find any subsequent information given as unsatisfactory and vice versa, i.e., information experienced as satisfactory information means that further information will also be experienced as satisfactory. Pain, sleeping problems and nausea were the most common problems experienced by patients at home.

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Ambulatory Surgery

Local anesthesia for parotidectomy — a new technique

K.S. Sethna*, M.A. Sengupta, S. Prabhakar

Department of General Surgery, Lokmanya Tilak Medical College, Sion, Bombay, India

Abstract

This article describes a hitherto undescribed technique of administering local anesthesia to undertake a superficial parotidectomy. The technique is based on precise nerve blocks keeping in mind the regional nerve supply and the facial dermatomes. The advantages of such an anesthesia are, a conscious patient allows identification of the facial nerve and testing the integrity of its branches without the use of a nerve stimulator, the small dose of local anesthetic agent required minimises drug toxicity and it promotes the concept of out-patient parotidectomy. Copyright © 1996 Elsevier Science B.V.

Keywords: Superficial parotidectomy; Nerve block; Local anesthesia

1. Introduction

Superficial parotidectomy is a common procedure for most surgically correctable lesions of the parotid. Hypotensive general anesthesia is ideal. Certain patients may be considered to be at risk or deemed unfit for general anesthesia. In developing countries where backup facilities are either unavailable or heavily burdened, local anesthesia can be used equally effectively. A method of obtaining an effective nerve block is outlined below.

2. Materials and methods

Eleven patients presented to this hospital with parotid tumors clinically involving the superficial lobe. Nine patients were chronic smokers, hypertensive and had severe chronic obstructive lung disease. Bronchodilator therapy for upward of 2 weeks failed to produce the desired improvement. The other 2 patients had suffered a cerebrovascular accident a few months earlier with minimal residual effects. All were considered to be a high risk for general anesthesia. Therefore, superficial parotidectomy was done using local anesthesia.

The nerves blocked were maxillary, mandibular and the greater auricular nerve. The technique used for these nerve blocks was that as described by Katz [1] (Fig. 1). The agent used was 0.50% bupivacaine. The patients were also sedated with a combination of pentazocine and promethazine. The surgical procedure took on average 2 h. Anesthetic supplementation was required only in one case when traction was applied to the anterior flap to complete excision of the gland.

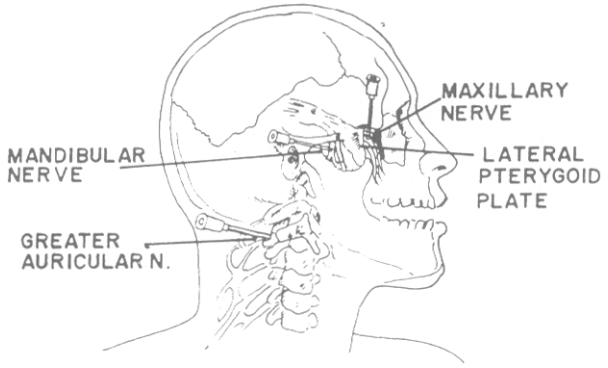

Fig. 1. Site of localising nerves to be blocked.

* Corresponding author, c/o Z.D. Palkhivala, Shalimar 3rd Floor Flat No. 1, 216 Netajl Subhash Road, Bombay 400 020, India.

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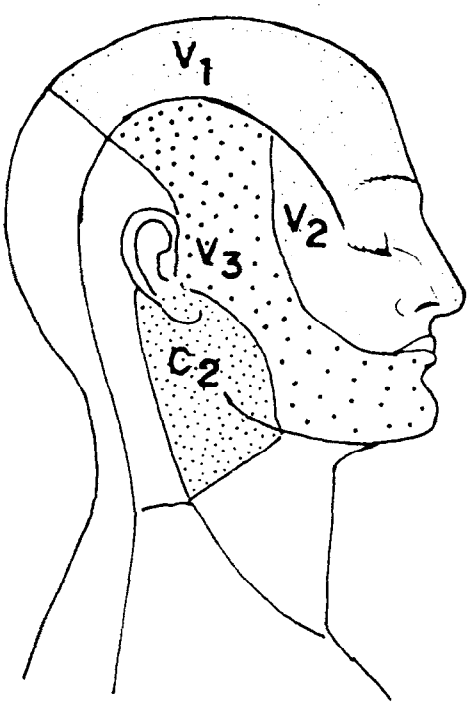

Fig. 2. Dermatomes of $\bar{V}$ nerve and C_2.

3. Discussion

Local anesthesia has long been used for head and neck surgery. This has been mostly in the form of a field block or infiltration anesthesia. The disadvantages of such methods are:

(1) A large amount of fluid is needed for infiltration. This results in either drug toxicity or ineffective anesthesia due to excessive dilution.
(2) Severe postoperative edema of the facial tissues can occur, especially in areas where the skin is lax.

Thorek [2] described a technique 'blocking the auriculotemporal, auricular and anterior branch of the facial nerve'. With our present knowledge we know this block cannot be effective. The auriculotemporal nerve supplies secretomotor fibres to the parotid and does not contribute to cutaneous supply to the area of interest. The sensory root of the facial nerve (nervus intermedius) contains taste fibres and a few somatic afferents to the auricular concha [3]. The fact that the block was effective was probably due to a mandibular block rather than an auriculotemporal block and generous supplementation by infiltration anesthesia Fig. 1. The technique described in this article is based on a thorough knowledge of the regional nerve supply Fig. 2. A block which is correctly given permits the surgeon to complete the procedure comfortably.

The advantages of a parotidectomy using local anesthesia are:

(1) No muscle relaxants are required as the surgery is conducted in a relatively superficial plane. This allows for easy testing of the integrity of the facial nerve.
(2) Various manoeuvres for identifying the facial nerve, such as use of a nerve stimulator or injecting a dye into the parotid duct are rendered superfluous.
(3) Chances of drug overdose are minimised as not more than 20–25 ml of 0.50% of bupivacaine are required.
(4) The present day concept of out-patient parotidectomy [4] is promoted, as a procedure under local anesthesia facilitates early discharge.

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Ambulatory Surgery

Day surgery: banalisation and multiplication of surgical procedures, transfer or additional activity?

E. Guzzanti, F. Mastrilli, I. Mastrobuono*, M.C. Mazzeo

National Multidisciplinary Working Group for the Diffusion of Day Surgery, Agency for Regional Health Care Services (ARHCS) Rome, Italy

Keywords: Day surgery; Healthcare changes

The health care systems in all countries of the European Community face similar problems, as reported in the study 'The future of European Health Care', elaborated by Andersen Consulting in co-operation with Burson-Marsteller and supported by the Hospital Committee of the European Community and the European Association of Hospital Managers [1].

Together with the movement towards greater European unity, these problems include:

- aging populations,
- changing disease patterns,
- new developments in diagnosis and treatment,
- increasing specializations and subspecializations,
- increasing citizen expectations.

These problems, which contribute significantly to the increasing of costs, concern all western countries, above all the USA, to which Europe refers, aware of the important influence of North American medicine on our continent.

In particular, the aging of populations will greatly influence the transformation of western health care systems and will contribute, together with new developments in diagnosis and treatment, to implementing the increase in the demand for services.

In Europe, in 1960, those 65 years old and over accounted for under 10% of the general population, but, by 1990, they formed over 15% (about 50 million of people).

Life expectancy has increased in the different European countries and nowadays is between 74.2 years for men and 80.2 for women in Sweden, 71.3 years for men and 75.5 for women in France, 71.9 for men and 77.6 for women in Great Britain and 73.5 for men and 80.2 for women in Italy. Furthermore, in 1991, in this country the percentage of people 65 years old and over was 14.8% of the general population while those of 75 and over was 6.4%.

On the other hand, in the USA, where life expectancy is 71.3 years for men and 78.3 for women, people 65 years old and over accounted, in 1990, for 12.5% of the total population and those of 75 and over 5%.

Although these values are lower than those reported for Italy, people 65 and over represented 33.6% of patients discharged from hospitals and used 45.4% of hospitalization, with an average length of stay of 8.7 days against the 6.45 of general average (National Discharged Survey, 1990) [2].

People of 75 and over were 18.3% of discharged patients and used 26.4% of hospital stay while the average length of stay was 9.24 days.

In the same year, about 6 600 000 surgical operations, including cardiac catheterism, prostathectomy, coronaric by-pass, implantation of pace-makers, etc. were performed on patients 65 and over.

These data show how the potential of modern medicine together with prevention are increasing life expectancy in the oldest age groups extending the limit in which surgical and medical interventions can be successfully performed. Therefore, the 'absolute' aging of populations, influenced by the increase in life expectancy, and the 'relative' aging of populations, produced by a lower birth rate, have brought about an extensive transformation, in both quality and quantity, of hospital services, particularly surgical.

* Corresponding author. Agenzia per i Servizi Sanitari Regionali, 00144 Roma, Piazza Guglielmo Marconi, 25, Italy.

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In the last decade, the total number of hospital inpatient beds has declined while home care and ambulatory surgery have increased.

In 1991, the index of acute hospital beds was 7.2 per thousand in Germany, 6.9 in France, 6 in Belgium, 4.8 in Denmark, 4.6 in Sweden, 4.2 in Netherlands and Norway, 3.5 in Spain, 2.6 in England and 4.5 in Italy. According to the O.E.C.D. (Organization for Economic Cooperation and Development) [3] our country has shown the greatest decrease in hospital beds (169 198 units), the equivalent of 31.2% for the period 1980 to 1991.

Furthermore, the Tomlinson report 'An Inquiry into London's Health Service, Medical Education and Research' published in October 1992 by Sir Bernard Tomlinson recommended the reduction in number of inpatient beds in central acute hospitals, while, at the same time, increasing day care facilities, community based health services and home care.

The competition among hospitals and between hospitals and day-care facilities, which will increase in the next 5 years is another factor that will favour the decrease of acute hospitals beds.

Therefore, hospitals will strive to offer more outpatient and ambulatory services, in order to compete with ambulatory providers that threaten their ongoing viability and revenue base.

The constant increase in the demand for services is also due to the reapperance and changes in the patterns of many illnesses. In particular, there have been large increases in cancers, in chronic and infectious illnesses, above all AIDS, tuberculosis, and cardiovascular diseases that can be treated surgically both in neonates and patients over 80 years [4].

Thus the need, especially in surgery, of alternative organizational models to satisfy the increasing demand for services and, at the same time, guaranteeing quality and efficiency.

Day surgery is the model that best responds to such needs by diversifying the flow of patients. However, day care must not be considered less important than traditional surgical care in terms of quality, efficiency and reduction of risk for patients. Day surgery will therefore allow traditional methods to provide assistance to a smaller number of patients, who will be affected by more complex pathologies. A future consequence could be an increase in the average length of stay in relation to the increasing demand for emergency care.

For these reasons day surgery must be considered as additional to inpatient care, which leads to the following considerations:

(a) day surgery is a different organizational model with important consequences on the function, management and expenditure of the facilities in which it operates. The development of day surgery may influence the allocation of human and technological resources both in hospitals and community care [5];

(b) day surgery must be performed by experienced medical and nursing staff in order to achieve optimal results in terms of fewer complications and satisfying patient expectations;

(c) day surgery increases and improves the overall surgical activity and for this reason must operate in both large and small hospitals. In the case of large hospitals, day surgery can be more effectively carried out in separate facilities, functionally connected to the main structure but autonomous from an administrative, organizational and economical point of view. In the case of small hospitals, especially in rural areas, day surgery can be part of a more general program of rationalizing services and staff activities in order to provide the local population with the care most frequently guaranteed by larger hospitals. This third point requires further consideration: a consequence of the diversification of patient flow may cause in Europe, the overall increase in the amount of surgery performed with a consequent reflection on the cost of health care as has already happened in the USA. In this regard some explanations are necessary. Medical practice in European countries is not esclusively private, as confirmed by the smaller number of surgical operations performed in Europe as compared to the USA [6].

As an example, for a population of 47 500 000 in 1990 in England, 3 176 983 surgical operations were performed, while in the USA, 22 million operations were performed for a population of 245 million [7].

On the other hand, in the United Kingdom, as in Italy, the scheme for financing health care activities included in the national health service foresees a limit to annual expenditure, while this concept has never been introduced in the USA.

This is why the reform of the European health care systems will induce 'controlled' competion amongst providers of health care services and create a market for buying and selling health care services [8].

The simultaneous start of programs for internal and external control should result in the activities of diagnosis and care being carried in a correct and coordinated manner, without the competition necessarily bringing about an uncontrolled increase in hospital care, including surgery.

In conclusion, as a consequence of aging populations and new developments in technology, in all industrialized countries, there is an increase in the demand for services and above all surgery. It is necessary to guarantee the diversification of the flow of surgical patients so that through razionalized surgical activity, an improvement of services given to both minor and major surgical patients can occur.

While traditional inpatient units will continue to provide care for those having major surgery and the elderly, patients having 'minor' surgery will increasingly be dealt with in alternative care units.

Day surgery is a health care and organizational model that is well suited to this need, as it provides a service to appropriately selected patients on the basis of a high turnover rate. The acute hospital beds that become available can be used to provide better care to severely ill or complicated patients.

The committment of various European countries to promote this health care model could be in vain without serious policies for training and updating all those operating in the context of health care, that is to say the regional organs of the hospital administrations, the management staff, as well as medical and nursing personnel.

At the same time, it will be necessary to inform the public that this health care model will be adopted not only to rationalize and contain expenses, but to better meet their increasing needs, in terms of reducing the waiting lists and providing psychological and social support.

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Ambulatory Surgery

Unplanned admissions in day surgery

A.M. Verco*, V. Ratne, D.W. Robins

Department of Anaesthetics, North Hampshire Hospital, Basingstoke, Hampshire, England RG24 9NA, UK

Abstract

The incidence of and reasons for unexpected admissions from day-surgery wards to in patient wards over a three month period in the Wessex region were assessed. The multi-centre study included ten hospitals in which 11,749 procedures were performed and 258 patients admitted, giving an admission rate of 2.25%. Pain, post operative nausea and vomiting, and delayed recovery were found to be the most significant anaesthetically related factors responsible for those admissions. Copyright © 1996 Elsevier Science B.V.

Keywords: Daycase surgery; Admissions

1. Introduction

In 1993 the main conclusion of the British NHS Task Force Report on Day Surgery was that day surgery represented the best care option for 50% of all elective surgical procedures, and that this target should be reached by the year 2000 [1]. The number of day operations in the UK is now greater than 2 million per year. The potential benefits of day surgery are numerous, but these may be undermined by excessive unplanned admissions to the general wards [2]. Acceptance of day surgery by patients and hospital personnel could then be affected, and the expansion of day surgery could be delayed. We therefore undertook an audit to assess the incidence and reasons for unplanned admissions from day case units to the general wards in the Wessex region.

2. Methods

Questionnaires were sent out to 10 hospitals in the Wessex region requesting the exact number of procedures done over the three month period May, June and July 1995, the number of admissions to the general wards over the same period, and the reasons for those admissions. The hospitals included in the study are shown in Table 1. (The order of the hospitals have been altered to preserve anonymity).

3. Results

All patients were either ASA class 1 or 2. There were a total of 11,749 procedures done in the 10 selected hospitals over the three month period (Fig. 1) 258 patients were admitted to an inpatient ward (Fig. 2), giving an average admission rate of 2.25%. Admission rates varied between hosiptals from 0.72% to 3.74% over the three month period (Fig. 3). The reasons for these admissions could be grouped into 9 different categories, as shown in Table 2.

Category A, B and C are self-explanatory. Surgical complications (D) included haemorrhage and the necessity to leave packs and drains in situ and one case of urinary retention which required catheterization. Category E included reasons such as a patient who underwent a diagnostic laparoscopy for lower abdominal pain and was then found to have an ectopic pregnancy. It also included an admission of an arthroscopy patient who required more extensive surgery than anticipated. One ophthalmology patient was admitted post trabeculectomy: a gynaecology patient underwent a mini-

* Corresponding author.

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Table 1
Hospitals from the Wessex region participating in the study

Royal Boumemouth	Winchester
Salisbury	North Hampshire. Basingstoke
Southampton	Swindon
St. Mary's – Newport	West Dorset – Weymouth
Portsmouth (Queen Alexandra)	Poole

laparotomy and could not be discharged the same day. Anaesthetic complications (F) included anaphylaxis, aspiration pneumonia, suxamethonium apnoea and a high block secondary to an epidural. Medical complications (G) included headache, epilepsy, angina, an abnormal ECG during surgery, and other medical complications which were not elaborated upon by the relevant hospitals. Some social reasons (H) were specified as living alone or insufficient home support. The admission rate for social reasons is slightly inflated since patients in some of the hospitals were admitted electively because of inadequate home support. The category 'Others' (I), included episodes of fainting and hypothermia Idiosyncratic usage of the day surgery unit as the primary gynaecological referral area in some hospitals led to the discounting of some patients from these hospitals.

4. Discussion

The incidence of minor morbidity does not appear to have changed much over the last 25 years in spite of very significant improvements in anaesthesia and general surgery [2]. The admission rate at any particular hospital had no correlation with the number of procedures that were done at that particular hospital (Figs. 1 and 2). Dedicated day – case unit centres tend to have very low unexpected admission rates (< 1%) whereas hospital – based centres tend to be slightly higher (1 to 9.5%) [3,5]. Our average regional admission rate of 2.25% compares favourably with these latter figures (Fig. 3). The commonest reasons quoted for unexpected admissions in other studies are slow recovery, nausea

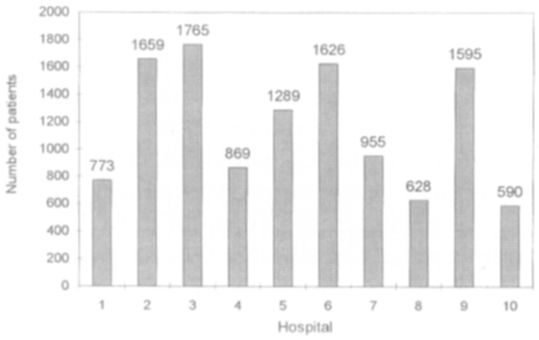

Fig. 1. Total number of procedures per Hospital.

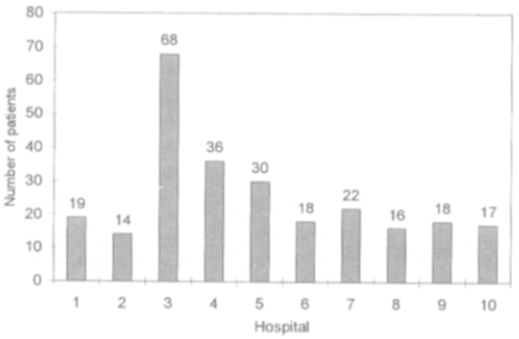

Fig. 2. Total number of admissions per Hospital.

and vomiting, diziiness or fainting, surgical complications and pain [3–5]. This is supported by our study (Fig. 4). Delayed recovery has decreased significantly since the introduction of propofol but still occurs, presumably due to patient variability, the use of other drugs, as well as junior surgical and anaesthetic expertise. It has been suggested that a factor contributing to unexpected admissions may be the involvement of less experienced junior anaesthetists, but this was not found in our study.

Decreased incidence of dizziness is associated with the use of metoclopramide, the mechanism of which is unknown [8]. An additional advantage of metoclopramide is its effect of reducing gastric fluid volume and hence decreasing the risk associated with vomiting and aspiration [11]. Of patients admitted, Kong et al quoted an incidence of just over 11% due to nausea and vomiting [5]. This is comparable to our regional results of 13.5%. (Fig. 4). It has been found that a significant proportion of patients who are admitted with nausea and vomiting and required admission had an opiate. This overnight admission rate was four times greater than those who did not receive any opiate [9].

The use of non-steroidal anti-inflammatory drugs (NSAID's) results in a reduction of nausea and vomiting, probably due to decrease in pain levels and decreased opiate use. Many of our patients are given ondansetron prophylactically and yet the incidence of nausea and vomiting is unchanged. Alon et al. [10]

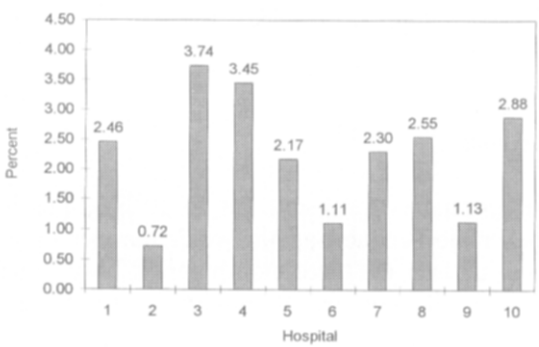

Fig. 3. Percentage unexpected admissions per Hospital.

Table 2
Reasons for admissions, including percentages

A	Pain	11.63%
B	Post-op nausea and vomiting	13.57%
C	Delayed recovery	14.34%
D	Surgical complications	17.83%
E	Unsuitable case/Extensive surgery	13.95%
F	Anaesthetic complications	3.10%
G	Medical complications	11.24%
H	Social reasons	10.85%
I	Other	3.49%

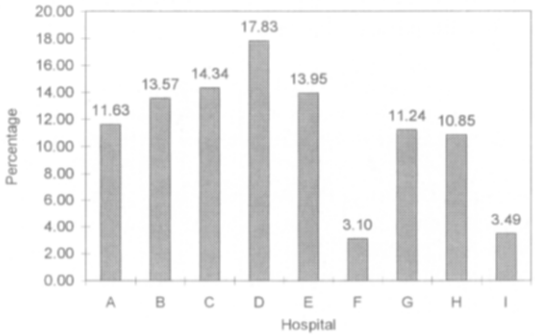

Fig. 4. Percentage admissions per Category (see Table 2 for explanation of categories).

found that the incidence of postoperative vomiting was significantly less after prophylactic ondansetron then after prophylactic metoclopramide or droperidol [10]. Their results also showed that the incidence of emesis, but not nausea, was significantly decreased in the ondansetron group compared to the other two commonly used anti-emetics. This has been supported by a number of other studies.

In our study surgical complications make up the single most important reason for admission and pure anaesthetic complications the least. This is exactly opposite to the reasons for admission reported by Johnson and Jarrett in 1990, but is supported by other studies [4,5,7]. In 1991 the data of Thompson et al. [7] showed that surgical complications were the single most common reason for admission, as in the present study, although our incidence was significantly less. Thompson et al. did include pain as a surgical complication but even when this was removed and included as an anaesthetic complication the result was still significantly higher than ours. Presumably this reflects improvements in anaesthetic care and the increased use of regional blocks, although there are many other factors that may have affected this result.

Pain is a significant factor contributing to inpatient admission. Many clinical papers give support to the effectiveness of pre-emptive analgesia [12,13]. However, recent work comparing analgesic interventions before and after surgical stimuli have shown equivocal results. Local anaesthetics blocks appear to exert a true pre-emptive effect which may be augmented by regional block [13]. The use of NSAID's reduce the need for opiates, particularly if started prior to the onset of surgical stimuli [14]. Most of our day surgical units use NSAID drugs and give bupivicaine during the surgical procedure. The exact incidence of the simultaneous use of these two drugs in the region is not known at present.

Pre-existing medical conditions have previously been found to place patients at increased risk of poorer intra-operative and post-operative outcome [6]. This relationship was found even when the medical condition was thought to be under control [6,15].

Occasionally patients will need to be admitted post-operatively for medical reasons which had not been disclosed by the patient pre-operatively, for fear of cancellation of surgery. This occurred with one patient in our study and this factor will be unavoidable until every patient is assessed pre-operatively.

In summary, this large multi-centre study shows that minor morbidity will always lead to unexpected admissions to inpatient wards. The admission rate does not appear to have changed over the last few years in spite of improvements in techniques and technology. One possible factor contributing to this is that patients who were previously not considered medically fit for day-case surgery are now being subjected to day case operations because the technology of surgery and anaesthesia has improved. This may effectively cancel out any advantages that the new technology may be providing. Surgical complications and unexpectedly extensive surgery continue to be a significant cause of admissions. Continued research aimed at identifying the optimum anaesthetic technique to decrease the incidence of delayed recovery, as well as the optimum pain control methods used in each surgical procedures must continue. The use of local analgesia should be encouraged. Long-acting opiates should be avoided. Propofol and afentanil are probably the anaesthetics of choice. The optimum anti-emetic prophylaxis will need to be further researched and assessed.

Acknowledgements

Our thanks go to all the day surgery staff at the relevant hospitals who provided the information for this study, and to our secretaries Anne Andrews and Lorraine Cusworth for their tireless efforts in liasing between the hospitals and without whom this study would not have been completed.

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Recent expansion of free standing day procedure centres in Australia

Lindsay Roberts

National Day Surgery Committee, Suite 1, 2A Mona Road, Darling Point, 2027 NSW, Australia

The first modern sophisticated free standing day surgery centre was built in Dandenong, Victoria in 1982 and this was followed soon after by the Campbelltown Day surgery Centre, Sydney, which is one of the very few free standing day surgery centres in a public hospital (it is a separate building close to and linked by an enclosed passageway to the main hospital building). There was only slow development of other day surgery centers during the remainder of the 1980s.

Over the past five years, however, there has been a marked increase in the number of free standing day surgery/endoscopy/medical centres. In January 1993 there were 83 free standing day procedure centres registered with the Commonwealth Department of health, however by January 1996 these had increased to 139. The various types of day procedure centres are listed in Table 1 and it is interesting to note, in particular, the significant increase in general and eye day surgery centres.

Many private hospitals, but fewer public hospitals, have developed specific day surgery units, only a small number being dedicated free functioning units/centres. Recently, however, an increasing number of hospitals have built dedicated free functioning day surgery units/centres e.g. The Adventist Hospital, Sydney (Private), The Mater Hospital, Sydney (Private), The Children's Hospital, Westmead (Public), and Liverpool Hospital, Sydney (Public). The efficiency and cost savings of day surgery are best achieved in these dedicated units.

Table 1
Freestanding day procedures centres in Australia

Population 18 million	Jan 93	Jan 96
Day Surgery Centres	36	67
Endoscopy Centres	23	29
Day Plastic Surgery	10	7
Day Eye Surgery	3	18
Day ENT Surgery	—	1
Day Medical Centres	11	17
In Vitro Fertilization	2	3
Oncology	1	1
Cardiac Clinic	1	1
Sleep Disorders	1	2
Sports Medicine	1	1
Rehabilitation	1	—
Dental	—	1
Medical/Diagnostic	4	8
Total	83	139

Table 2
Free standing day procedure centres in Australia – 1996

Population 18 000 000	
N.S.W.	75
Victoria	22
Queensland	16
South Australia	10
Western Australia	10
A.C.T.	5
Tasmania	1
	139

Initially, most of the day procedure centres were located in the eastern States however in recent years they have expanded into all States. The distribution of these centres, on a State basis, is indicated in Table 2.

In the future, as more major procedures are carried out as day surgery, the concept of hotel style extended recovery units together with the expansion of community home nursing services will need to be addressed. One such hotel style, extended recovery unit (10 beds) has been developed at Surgicentre, Perth, 1995.

All interested organisations and Government should seriously consider the development of these recovery units at both free standing and hospital based day surgery centres to stimulate the expansion of day surgery to reach its maximum potential and improve the quality of care for day surgery patients.

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Ambulatory Surgery

Meeting report

Report on Ambulatory Anaesthesia Symposium, Sydney, Australia

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Health budget restraints and improvements in technology are driving the trend to the ambulatory care of patients who need surgery. With this interest, there was an extraordinary high number of delegates who attended the Ambulatory Anaesthesia Symposium on the Economics and Quality in Ambulatory Anaesthesia, Convention Centre, Darling Harbour, Sydney, Australia. The conference was jointly organized by the Society for Ambulatory Anesthesia, Australian and New Zealand College of Anaesthetists, and Australian Society of Anaesthetists. It was a satellite symposium of the World Congress being held in Sydney, April 14–19, 1996.

The topic of the early morning section was on 'Pushing the Limits in Ambulatory Anesthesia'. The panelists were Ms. Robyn Johnston, Clinical Nurse, Manager, Day Surgery Unit, Queen Elizabeth Hospital, Adelaide, Australia; Dr. John Youngberg, Tulane University Center, USA; Dr. Surinder Kallar, Medical College of Virginia, USA and Dr. John Zelcer, St. Vincent's Hospital, Melbourne.

Dr. John A. Youngberg indicated that there were no absolute exclusions for outpatient surgery, whether a patient was acceptable depended mainly on the severity of pre-existing disease. In 1985 in the US, approximately 35% of elective procedures were performed on an outpatient basis whereas in 1993, this percentage increased to approximately 60%. By the year 2000, this is expected to increase to 75%.

Dr. Surinder K. Kallar said that procedures which could last up to 6–8 h, procedures that require blood transfusions, procedures such as vaginal hysterectomy, knee and shoulder arthroscopic procedures, laparoscopic cholecystectomies, laparoscopic herniorrhaphy, thyroidectomy, mastectomy, and tonsillectomy could be performed on an outpatient basis. These changes are due to (a) improvement in anaesthetic drugs and techniques, (b) advances in surgical equipment and techniques, and (c) changes in insurance reimbursement policies.

In the panel on Continuous Quality Improvement, the speakers were Dr. Frances Chung, University of Toronto, Toronto, Canada; Dr. Mark Hitchcock of Frenchay Hospital, Bristol, England and Dr. Glenda Rudkin, University of Adelaide, Adelaide, Australia.

Dr. Frances Chung discussed continuous quality improvement, North American experience. "Although complications in ambulatory surgery are relatively rare", she said, "it is important to have an ongoing quality improvement program in each ambulatory surgery facility". At the Toronto Hospital, Western Division, 82% of patients were discharged 2 h and 95.6% were discharged 3 h after surgery. Persistent symptoms such as pain, nausea/vomiting, and dizziness delaying discharge occurred in 4.4% of patients. Patient satisfaction with ambulatory anaesthesia was very high, 98.9%. Postoperative symptoms were part of the reasons given the patient for dissatisfaction with anaesthesia. Inadequate anaesthesia and lack of communication in the monitored anaesthesia care (local anaesthesia with sedation) patients accounted for 42% of patients.

Dr. Glenda Rudkin of the University of Adelaide reported on the extensive experience in Australia of Day Surgery Outcome Studies. The unanticipated hospital admissions varied from 0.1%–2.4%. Readmission rates varied from 0.7%–0.86% depending on the type of surgical procedures. When clinical performance was measured, it resulted in improvement. However, more bench-mark studies are necessary to achieve improved outcome in day surgery facilities. Dr. Mark Hitchcock indicated that cost-effective, qualitative care was a more powerful tool to assure quality in the day case surgery of the future.

In the afternoon panel on Factors Affecting Recovery and Discharge, the speakers were Dr. Sujit Pandit, University of Michigan; Dr. Lance Lichtor, University of Chicago; Dr. Michael Mulroy, Virginia Mason Medical Center and Dr. Johan Raeder, Ullevaal University of Norway.

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Dr. Sujit Pandit discussed the Use of Premedication in Outpatient Surgery: Reduction of Anxiety, Prophylaxis Against Acid Aspiration, Postoperative Nausea/vomiting, Postoperative Pain. Patients scheduled for outpatient surgery were anxious. The non-pharmacological methods used to reduce anxiety were effective and were preferred, however, these methods were not always logistically possible. As a result, short-acting anti-anxiety agents like midazolam, diazepam, or temazepam were appropriate to use when needed. Small doses of these agents did not delay recovery. Routine prophylaxis against acid aspiration or against postoperative nausea were not cost-effective and were not recommended, however, they were cost-effective in high risk patients. Postoperative pain and nausea remained important causes of delayed recovery. Non-steroidal anti-inflammatory agents given before the operation often reduced the requirement for postoperative narcotic analgesics, especially in children and after certain types of surgery.

Dr. Lance Lichtor presented a lecture on 'Factors Affecting Recovery: General Anaesthesia'. He indicated that selection of drugs for general anaesthesia played a great role in determining how long patients stayed in the Post-Anaesthesia Unit after surgery, and for some patients whether or not they could be discharged home. Many considerations were involved in the choice among anesthetic methods: general anaesthesia, block, or a block with sedation. Certainly, some procedures were possible only with a general anaesthetic. For others the preference of patients, surgeons, or anaesthesiologists might determine selection. Cost may be a factor: the cost of sedation was usually less than the cost of a general anesthetic. Time to recovery might also influence the choice of anaesthetic method: the incidence of unexpected admissions, and postoperative nausea and vomiting might be higher and recovery stays might be longer after general anaesthesia compared to local anaesthesia and sedation.

Dr. Michael Mulroy stated that regional anaesthetic techniques offered significant advantages for the outpatient in providing rapid recovery, shorter discharge times, less nausea and vomiting, and excellent postoperative analgesia. They should be used more often in outpatients, not only for the improved analgesia, but also for the ultimate cost-effectiveness of improved outcome.

According to Dr. Johan Raeder, Ullevaal University Hospital of Norway, the more important aspects of surgical and anaesthetic after-effects delaying the recovery process were somnolence, pain, emesis and surgical complications.

Dr. Paul White was the Moderator on the panel 'Controversies in Economics and Quality in Ambulatory Anaesthesia'. The panelists were: Dr. John Wardess of Royal North Shore Hospital, Sydney; Dr. Richard Kemp of Hartford Surgical Centre, Connecticut Meir Hospital; Dr. Jean Millar of Oxford University; Dr. Robert Jedeikin of Israel Beth Hospital. The discussion was both interesting and lively and many interesting topics were debated.

In summary, the symposium was highly successful. There was a lot of exchange of ideas between participants from the different countries during the question period. This first successful satellite international symposium paved the way for similar future symposiums at the World Congress.

Frances Chung
MD, FRCPC
The Toronto Hospital
Ontario
Canada