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Editorial

After-care: the changing look of recovery care

James H. Nicoll, in 1909, related his experience with 8988 outpatient surgical procedures (included, in addition to the usual childhood operations, were cleft-lip and palate repair, elevation of depressed birth fracture of the skull, pyloromyotomy, debridement of mastoid empyema) performed at the Glasgow Royal Hospital for Sick Children. His pioneering report to the British Medical Association included commentary on after-care. "That sucklings and young infants should remain with their mothers after operation... Even when the child is 'bottle-fed' separation from the mother is harmful... (for this reason). For seven years I have had a small house near the Glasgow Children's Hospital for the accommodation of young infants and their mothers. The mothers are catered for, and themselves nurse their infants. My experience of the cases so treated has been such as to make me confident... that no children's hospital can be considered complete which has not, in the hospital itself or hard by, accommodation for a certain number of nursing mothers whose infants require operation."

In the United States (USA), by the year 2005, it is predicted 82% of all surgeries will be performed as ambulatory surgical procedures, and of that number 24% will be managed in office settings. We are beginning to see and will continue to see patients with significant health problems; longer and more invasive surgical procedures testing the outer limits of acceptability. To meet the post-procedure needs of these two groupings as well as patients with inadequate social back-up, a number of innovative and extended after-care options are becoming more available. Rebecca Twersky, Society for Ambulatory Anesthesia (SAMBA) past-president, sees after-care as bridging "the gap between traditional inpatient length of stay and extended postsurgical recovery care in the outpatient settings." The modern evolution of extended after-care includes 23 h recovery, hospital hotels, home health care, and freestanding recovery centers.

1. Twenty three hour recovery

Over the past 20 years, in an attempt to provide after-care yet maintain outpatient status, hospitals in the USA have consolidated underutilized beds and developed 23 h guest services with limited or no nursing care; a family member or friend remaining with the patient. At the Methodist Medical Center of Illinois (Peoria, IL, USA) where I was medical director of the department of ambulatory surgery, we developed an in-hospital 12 room facility in 1978, referring to it as a hospital hotel. It was available for patients who did not require skilled medical/nursing care, had no one to provide home care, or resided a distance from readily available healthcare. During the same time frame hospitals also created 'observation beds' for patients who might need some degree of nursing/medical care for less than 24 h. Routine nursing care was provided; charges, although not always reimbursed, were often based upon an hourly rate.

2 Hospital hotels

Started in the mid-1980s, in close proximity to a hospital, hotel-like facilities might be devoted entirely to after-care or an existing hotel might provide designated rooms at lower cost, improved ambiance and comfort. Medical/nursing services might or might not be offered.

3. Home health care

Following a major procedure (i.e. vaginal hysterectomy) performed as the first case of the morning, the patient would be observed in the regular postanesthesia care unit until late afternoon at which time the patient would return home in an ambulance; a nurse would be in attendance or a nurse would visit the patient at home to provide necessary care.

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4. Freestanding recovery centers

The most recent approach to providing extended care for patients who need pain management, nursing care or physician consultation, are recovery centers. Recovery centers are usually part of a freestanding ambulatory surgical center (FASC). In spite of the support of patients, physicians, healthcare plans and the business community, regulatory constraints have limited the growth of recovery centers, particularly those seeking to provide 24–72 h of after-care; opposition is mainly from hospital associations. Currently more than 10% of 2500 FASC's in the USA have extended recovery care; that percentage will continue to increase for those centers providing after-care have reported a 6.5% increase in surgical volume and a high level of consumer satisfaction.

There is no doubt that more complex procedures will continue to shift to the ambulatory setting. Innovative approaches to postoperative care will provide a means for this transition to take place. Innovation is encouraged, but there is a need for outcome studies that assess safety, quality, and cost.

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Nursing care for ambulatory day surgery: the concept and organization of nursing care

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Abstract

Background: the Day Surgery Unit at the University Hospital in Uppsala provides ambulatory care for people requirering Ear Nose and Throat surgery, hand and minor plastic surgery, as well as for children and adults needing dental treatment. *Aim*: the Day Surgery Unit has as it's goal to provide an effective form of surgery with a high level of quality care, both pre and post operative on an ambulatory basis. To attain this goal, nursing care has as it s aim to provide high quality care through knowledge and good nursing, thereby creating trust, security and well being between patients and staff. All this together puts the patient in the center and gives individual nursing care. In this project we also wanted to evaluate patients satisfaction with the nursing care. *Methods*: the nursing care is organized according to four principles: patient information, primary nursing, nursing documentation and quality assurance. The patients receive information on repeated occasions, both written and oral. Written infonnation is first given to the patient by the co-ordinating nurse when the time for surgery is set up. A nurse and an assistant nurse from the care team work together with each individual patient.These nurses are primarily responsible for the patient from the first visit one week before surgery until the day after surgery. The nurses document in the patients joumal according to a Swedish system called VIPS. At the first contact a health status is taken and nursing care goals are set up with the patient. After the follow up telephone call with the patient on the day after surgery, are all the interview results with regards to post surgery and nursing care documented. The quality of nursing care is continually evaluated according to the model for quality assurance, DySSSy. Evaluation of the nursing care has been made in a patient survey in which 100 adults between the ages of 30–69 years were given questionnaires. Of these, 68 were returned and one was not responded to. *Result*: we found that the day surgery clinic provides a more effective form of care with a high quality of service. There is a shorter length of stay for the patients and the overall quality of care is maintained through an active program of information and a system of continuity of care. *Conclusions*: we have written pre and post operative information for each diagnosis. A survey is being conducted to evaluate the patients response to the post operative infonnation provided. Documentation undergoes continual evaluation and development. The DySSSy projects have included, patient integrity and safety in giving hand-over reports to the operating personel; evaluation of post operative information and pain management and nutrition for patients undergoing tonsillectomy and uvulopharyngopalatiplasty.

Keywords: Day surgery; Principles of nursing care

1. The organization of nursing care

The staff are organized in teams of two that include one nurse and one nursing assistant who are responsible for a small number of patients during their care period. The nurse is in charge and responsible for nursing care records according to VIPS. The idea is that the patient only be met by his/her care team during the care period. There is relief for breaks, etc., though one of the care team is always on the ward and the relief only performs nursing of an emergency-related nature. In cases where the patient must remain on the ward after 16:30 h, the care team of the evening shift take over.

Abbreviations: ENT, ear, nose and throat; Care period, the time beginning with the preoperative visit to the postoperative telephone call; VIPS, well-being, integrity, prevention and safety (documentation system for nursing records); DySSSy, dynamic standard setting system (quality assurance system); UPPP, uvulopalatopharyngoplasty; TE, tonsillectomy.

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Rounds are completely done away with, and the respective surgeons come up after the operation to 'discharge' the patient when it is time for this. Morning and afternoon reports are no longer necessary. This has been made possible through the organization of the care teams and well-developed documentation procedures. The only oral reporting across care team boundaries is given to relief at the care team members' breaks or at the end of the shift to the evening care team.

1.1. Staffing

The day surgery ward is staffed by nine persons, divided among the following categories:

Head nurse	one
Nurses	three (one of whom is assistant head nurse)
Nursing assistants	four (one working 75% and one with 85% duty)
Ward secretary	one

The working schedule is based on three 40-h work weeks, semi-inconvenient working hours: 07:00–20:00 h, divided into two shifts, 07:00–16:30 and 11:00–20:00 h (on Fridays the ward closes at 16:30 h).

The ward is open weekdays Monday–Friday, closed holidays, and at present closes 5 weeks during the summer for staff vacations.

Temporary absences are covered by the day surgery ward's own staff, through rescheduling or overtime since we have no access to other relief personnel.

2. The concept of nursing care

In the work concerning the concept of care, we have identified the following four key areas of nursing care in ambulatory day surgery:

Information	Pre- and postoperative, given both orally and in printed form. Also over the telephone the day before the operation.
Documentation	Entered in the nurse's records according to VIPS.
Care	Individually designed continuity. Follow-up postoperative telephone call; pain follow-up.
Quality assurance	According to DySSSy.

2.1. Information

Information begins when the operation is first planned. At this time, the patient is given an information booklet aimed at one of the following:

- adults under general/local anesthesia;
- children under general anesthesia; and
- less complicated operations with local anesthesia

This information also includes the date of the operation and the date and time of a preoperative visit. The names of the care team are also entered into this small folder when the oral information is given approximately 1 week before the planned operation date at the preoperative visit to the day surgery ward. Children and their parents are given a special session, in which a group of one theatre nurse and one anesthesiology nurse (anesthesiologist) are also present. On this occasion, the child is shown the equipment to be used by the anesthesiologist and allowed to play with it. The purpose of this is to reduce the impact of the child's hospital stay and alleviate any fear the child or parents may feel before the operation.

Hand and plastic surgery patients and patients afraid of hospitals (mainly children) undergoing dental and oral surgery also come for a preoperative visit a week before surgery. At this visit, it is also ensured that the written information, concerning not eating before the operation, etc., has been understood correctly. The nurse or nursing assistant also uses the preoperative telephone call made the evening before the operation to remind the patient of the most important points in the information. The patient is given the opportunity to ask questions that may have arisen since their last visit/contact. This is also an occasion for patients who have not attended a preoperative visit to ask questions. Any information of a medical character is given by the responsible physician or the operating surgeon.

The patient may also, if desired, meet a doctor at the preoperative visit. If the operation is to be performed under general anesthesia, the patient may also meet the anesthesiologist to receive information and preoperative assessment at the same visit.

2.2. Documentation

The documentation of patient nursing care of the care team is entered in the nurse's records at the Uppsala University Hospital. As of autumn 1994, the day surgery ward uses the VIPS system for this purpose.

Two of the ward's nurses are trained instructors in VIPS documentation. Other staff on the ward have attended internal lectures on VIPS, and the instructors are available for individual assistance if necessary. New legislation concerning patient documentation and difficulty in applying the documentation system previously used to ambulatory day surgery, lie behind the introduction of the VIPS documentation model. It was also our intention that the handling of paper be kept to

a minimum. Documentation in outpatient care is currently being developed in cooperation with other hospitals' outpatient units. In order to further simplify documentation, a number of nursing care plans, regarding pre- and postoperative information and nursing observations, have been put together for the most common patient groups. A file on search words for day surgery activities that may be used in VIPS has been developed. The VIPS file is even useful when introducing new staff to the ward.

2.3. Individual nursing care

An individual care plan is drawn up for every patient. Patients and their next-of-kin participate in the planning and have the opportunity to express their wishes regarding special nursing care at the preoperative visit to the day surgery ward.

2.4. Follow-up

Patients receive a postoperative telephone call from the responsible care team the day after surgery or at another time (e.g. following the weekend when the ward is closed) agreed upon with the patient. Patients may call the ward if necessary. Patients thus have the chance to ask questions or be given additional advice.

In some cases, we call hand and plastic surgery patients and paediatric patients who are afraid of the hospital if there is something special to discuss from the day of the operation.

2.5. Quality assurance

The aim of the day surgery ward is to integrate quality assurance as a natural part of daily work. Everyone on the ward should be familiar with the basics of quality assurance and take part in quality assurance study groups. Even the doctors should participate in this work, since it should extend across professional boundaries. Everyone must participate and become involved in the process in order for us to continue to further develop our activities.

Educational material on quality assurance is available in the department, and the opportunity exists for staff members to consult our DySSSy course instructors when necessary. An updated file on quality assurance is kept, and is accessible at the department.

In 1994, in an attempt to measure the quality of the nursing care and preoperative information, a questionnaire was sent to adult patients who had received ambulatory day surgery.

In 1995, a study group on quality in postoperative printed information was initiated and questionnaires were sent out. A pain follow-up clinic for patients who had undergone UPPP and TE was also set up. These projects are being completed and results compiled in August–September 1998.

The survey addressed to paediatric patients and their parents was completed in 1995.

The ENT Department has meetings once a month for those who have taken the quality assurance course. Five of the ten day surgery ward staff have taken the course.

The group provides regular reports on quality work to the other staff members at our ward staff meetings.

Once a year, this work is also presented to the entire ENT department.

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Growth potential of ambulatory surgery in The Netherlands

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Abstract

Objective: to determine the growth potential of ambulatory surgery in the Netherlands. *Setting*: St. Antonius Hospital, Nieuwegein and SIG Health Care Information, Utrecht. *Design*: descriptive. *Methods*: numbers of admissions in the period 1984–1995 were obtained from Dutch bases of the National Hospital Institution (NZi). From SIG Health Care Information numbers were obtained with regard to seven specified interventions in the years 1991–1995, i.e. breast tumour excision, inguinal hernia repair, varicose vein operation, laparoscopic sterilisation, knee arthroscopy, cataract operation and tonsillectomy. The potential increase if any of the number of interventions in day care was determined by placing the hospitals in order of decreasing proportions of day care, and subsequently applying the proportions of the 5th and 10th hospitals, respectively, to the whole group. *Results*: the number of day care admissions rose from 172 000 (9.9% of all admissions) to 649 000 (29.1%). Of all interventions studied, the percentage carried out in day care increased; the percentages varied greatly within hospitals as well as from one hospital to another. In 1995, the mean number of the seven interventions in day surgery was 115 000 (57% of all 201 000 interventions). The shift from interventions during hospitalisation to day care would be 42 000 and 51 000 (21 and 25%, respectively, of 201 000), respectively; operations performed in day care would then amount to 166 000 (83% of the total number of interventions) and 157 000 (78%). *Conclusion*: of the interventions studied, the proportion carried out in day care increased to 57%. In view of the interhospital differences, a considerable increase of day care is possible in the near future.

Keywords: Ambulatory surgery; Growth potential; The Netherlands

1. Introduction

Various interpretations of day-care exist: it may be defined as an office procedure, e.g. the removal of a sebaceous cyst, or a hospital stay of less than 24 h for any given intervention. In The Netherlands the National Advisory Board on Intramural Health Care Planning and Building formulated the following definition: day-care is hospital care during several hours, which is generally available and necessary, for a diagnostic procedure or treatment by a medical specialist [1]. Ambulatory surgery is the hospital care which a patient receives, who undergoes a surgical procedure and is admitted to and discharged from the hospital on the same day. It is not just the procedure itself.

The history of ambulatory surgery in The Netherlands started in 1973 with the introduction of children's tonsillectomies at the Maria Hospital in Haarlem. The first daycenter was established at 'De Weezenlanden' Hospital in Zwolle in 1975. Since then the majority of Dutch hospitals have followed.

The objective of this study is to assess the quantitative development of ambulatory surgery in The Netherlands using national databases. In addition, further growth potential is calculated in two scenarios based on seven commonly performed operations in Dutch hospitals.

2. Methods

The number of all clinical and day-care admissions in the period 1984–1995 in The Netherlands were obtained from the database of the National Institute for Health Care Management (NZi). The average hospital stay per year was calculated for both day-care and clinical admissions and for clinical admissions only.

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After 1990 data became available for specific procedures performed either as ambulatory surgery or as an inpatient surgical procedure. These data were obtained from SIG Health Care Information in Utrecht for the period 1991–1995. Seven specific operation were selected including breast tumour excision, inguinal hernia repair, varicose vein surgery, laparoscopic sterilisation, knee arthroscopy, cataract surgery and tonsillectomy. In the case of inguinal hernia repair and tonsillectomy, patients aged ≤ 15 years were classified in a distinct group from those > 15 years old. Subsequently, the fraction of these seven interventions which were performed as ambulatory surgery procedures were calculated for each year for all 130 Dutch hospitals.

Only for the year 1995 were similar fractions calculated for each hospital separately. For privacy reasons these individualised data were not attributable to the hospitals. In this way it was possible to study the differences between the proportions of ambulatory surgery for each of the seven procedures within one hospital and to compare it with other hospitals.

Finally, the growth potential of ambulatory surgery of the seven interventions was calculated using two scenarios. The proportions of day surgery exhibited by the hospitals ranked fifth (scenario 1) and tenth (scenario 2) in decreasing order of proportion of ambulatory surgery, were assumed to be attainable for all of the hospitals in The Netherlands. The growth potential for every intervention was determined by calculating how many interventions would be performed in ambu-

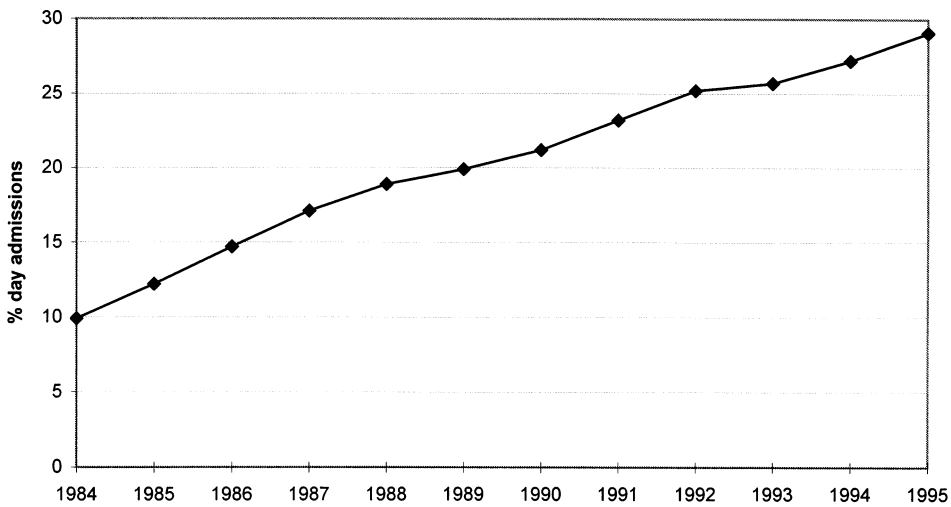

Fig. 1. Percentage day care of all admissions in the years 1984–1995 (source: National Institute for Health Care Management).

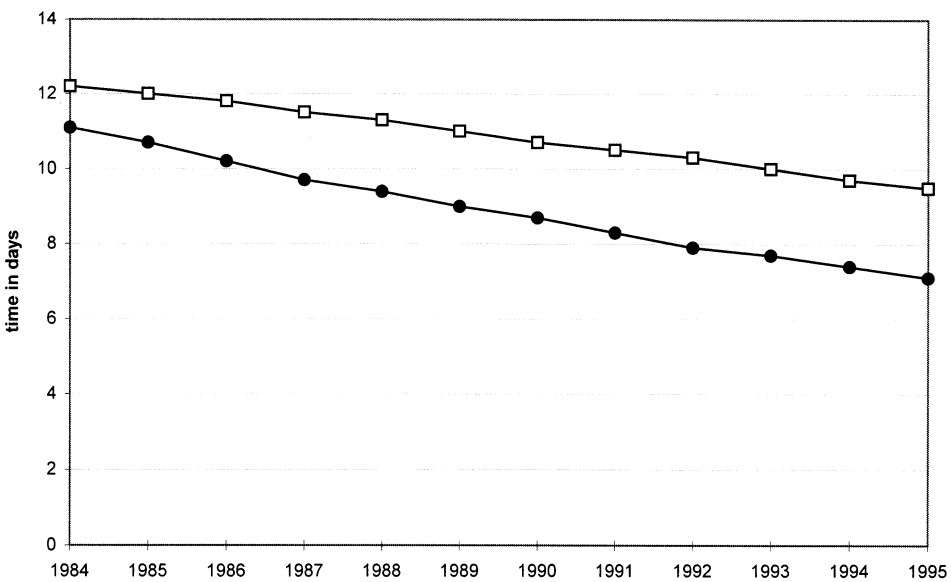

Fig. 2. Average hospital stay in days in the period 1984–1995: inpatient admissions (□); inpatient admissions and day care (●) (source: SIG Health Care Information).

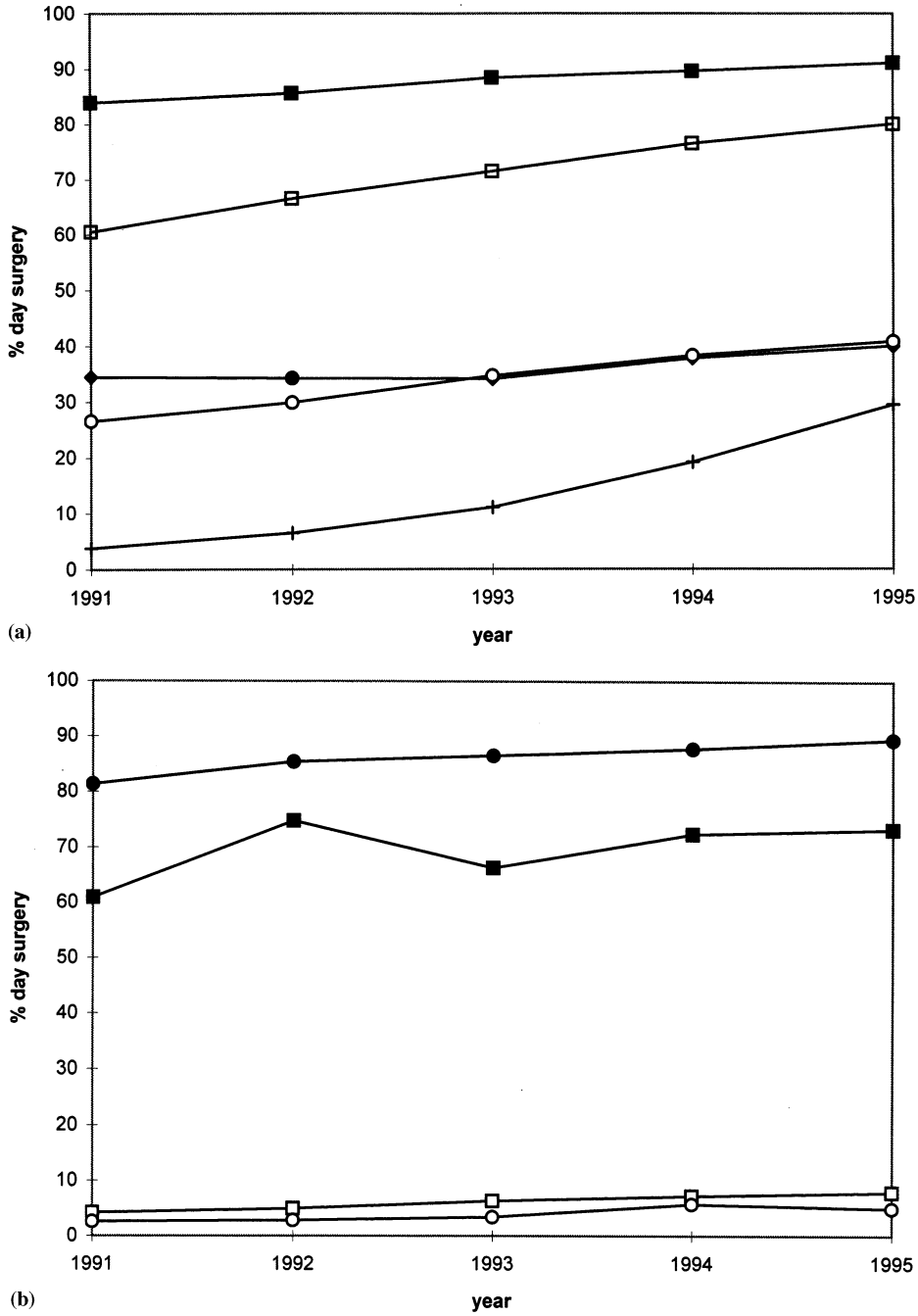

Fig. 3. Percentage day surgery of all interventions regarding seven interventions in the period 1991–1995: (a) breast tumour excision (●), varicose vein surgery (○), laparoscopic sterilisation (■), knee arthroscopy (□) and cataract surgery (+); (b) inguinal hernia repair upon patients ≤ 15 (■) and > 15 years old (□), tonsillectomy upon patients ≤ 15 (●) and > 15 years old (○) (source: SIG Health Care Information).

latory surgery if all hospitals achieved the percentage found in scenarios 1 or 2.

3. Results

The total number of admissions in The Netherlands increased by 27.4% from 1.75 million in 1984 to 2.23 million in 1995. The number of day-care admissions increased from 172 000 (9.9% of all admissions = clinical + day care) to 649 000 (29.1%) (Fig. 1).

In the same period the hospital stay of in inpatient hospital admissions decreased from 12.2 to 9.5 days. The decrease is even more if the hospital stay of all cases is considered (Fig. 2).

All seven investigated interventions showed an increase in the proportion of day cases from 1991 to 1995 (Fig. 3). There is a large variation in the proportions of ambulatory surgery for each of the seven selected operations among the hospitals (Table 1). Even within one hospital the percentage of each procedure in ambula-

Table 1
Median and range of percentages day surgery (per hospital) of all hospitals in The Netherlands in 1995 (classified for the seven interventions)[a]

Intervention	Median (range)
Breast tumour excision	38 (2–88)
Inguinal hernia repair:	
Patients ≤15 years old	77 (20–100)
Patients >15 years old	4 (0–100)[b]
Varicose vein surgery	29 (1–93)
Laparoscopic sterilisation	94 (11–100)
Knee arthroscopy	89 (12–100)
Cataract surgery	27 (0–86)
Tonsillectomy:	
Patients ≤15 years old	91 (11–98)
Patients >15 years old	2 (1–88)

[a] Source: SIG Health Care Information.
[b] In one hospital only two patients >15 years old underwent inguinal hernia repair in 1995 (both in day surgery). Without this hospital the range would be 0–59%.

Table 2
Number of interventions performed in day surgery (% day surgery of all interventions)

Intervention	Absolute number (%)		
	In 1995[a]	Scenario 1[b]	Scenario 2[c]
Breast tumour excision	4695 (40)	9362 (80)	8425 (72)
Inguinal hernia repair:			
Patients ≤15 years old	4200 (73)	5341 (93)	5169 (90)
Patients >15 years old	1612 (9)	8151 (46)	5848 (33)
Varicose vein surgery	3594 (43)	7453 (89)	7285 (87)
Laparoscopic sterilisation	13 597 (91)	14 783 (99)	14 633 (98)
Knee arthroscopy	11 883 (83)	14 356 (100)	14 069 (98)
Cataract surgery	16 865 (32)	40 951 (77)	36 164 (68)
Tonsillectomy:			
Patients ≤15 years old	58 215 (89)	63 800 (97)	63 800 (97)
Patients >15 years old	510 (6)	2017 (22)	1467 (16)
Total	115 171 (57)	166 214 (83)	156 860 (78)

[a] Source: SIG Health Care Information.
[b] In scenario 1 the percentage day surgery in all hospitals is equal to the percentage which the hospital ranked fifth, when arranging all hospitals in decreasing order of proportion of day surgery, exhibited in 1995.
[c] In scenario 2 the percentage day surgery in all hospitals is equal to the percentage which the hospital ranked tenth, when arranging all hospitals in decreasing order of proportion of day surgery, exhibited in 1995.

tory surgery may vary more than expected. A particular hospital can score a high percentage of ambulatory surgery in one procedure, but low in another. None of the hospitals had highly ranking day care proportions for all seven interventions.

In 1995, 115 000 (57%) of the seven investigated interventions were performed in ambulatory surgery. Scenario 1 suggests a potential increase to 166 000 interventions (83%) and scenario 2 to 157 000 (78%) (Table 2).

4. Discussion

In 1984 the Health Insurance Funds Council advocated the substitution of inpatient care by day care, which would lead to a more efficient use of available resources [2]. The percentage of day care has risen from approximately 10–29% since that time. This increase can be considered as a consequence of surgical, anaesthetic and financial factors. Surgical factors included the recent introduction of minimally invasive techniques, such as endoscopic surgery and phaco-emulsification (technique for cataract treatment) [3,4]. New, short-acting anaesthetics, such as propofol, result in a swift recovery. One of the major stimulating financial factors was the increase in the hospital's re-imbursement for a day-care admission. This tariff grew from 57 euros in 1983 to 91 euros in 1987 and has stabilised at 170 euros since 1988. This is still low compared to the tariff for an inpatient admission. It is not clear how the savings made, e.g. by the reduction of evening, night and weekend shifts of nurses, counterbalance the investment and running costs. The eventual financial consequences of ambulatory surgery for hospitals remain controversial [5–12]. It is obvious that insurance companies consider ambulatory surgery to be more attractive, which they reflect by sponsoring initiatives to increase the proportion of ambulatory surgery in certain areas [5–8,10,12].

There are striking differences between the proportions of ambulatory surgery performed in different hospitals. In addition, within any given hospital, a great variation exists between the individual interventions. Acceptance and local habits may play a part in this situation. The application of day care is highly dependent on the attitude and interest of managers, doctors and nurses. The presence of an adequate infrastructure for ambulatory surgery is mandatory.

The percentage of day care cases rose approximately 2% per year during the last 12 years. This is equal to approximately 45 000 interventions a year. Based on the given scenarios of the seven investigated interventions, one can still calculate a substantial growth by substitution only.

Whether a further increase of ambulatory surgery is desirable should ultimately be determined by further studies concerning the quality of care and patients' satisfaction. Although the additional load on general practitioners and district-nurses appears small to us, this will also need further investigation. The quality of care remains the most important objective, whether it is given as an inpatient or a day case.

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Caring for the carer: an audit of the day surgery service for carers within the Wessex region of England

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Abstract

The provision of the best possible service to the lay-carer by day surgery units is essential with the expansion of this type of surgery. The carers' preparation, ease with which they can fulfil their role and duration they were required for, was audited in nine day case units. Often journey time exceeded 30 min and parking was a problem in most units (20% overall). No written instructions, inadequate medication directions and lack of contact number was found in 10.5, 8.6 and 9%, respectively. In some specialities there was a failure to communicate the amount of care required: especially noted was dental surgery and varicose vein surgery. © 2000 Elsevier Science B.V. All rights reserved.

Keywords: Day case unit; Carer; Post-operative problems

1. Introduction

Most published surveys of day surgery services concerns the quality of the service the patient receives [1–4]. Few have focused on what may be the weakest link in the chain, namely the carer or home-nurse. The British Association of Day Surgery (BADS) survey (1996) [5] has estimated there would be a marked increase in the number of day surgery procedures occurring by the year 2000. The most important reason given for this was purchaser demand. The formation of Primary Care Groups in the UK will probably call for even more emphasis on day surgery, as there are obvious significant financial and logistic advantages over inpatient treatment. The service will call upon the good will of the general public to undertake the lay-carer role. The reciprocal service the lay-carer provides for the NHS cannot be overstated.

To successfully advance day surgery into the next millennium it is imperative to ensure the lay-carer is given the very best service possible. Adequate provision of facilities for the carer at the day surgery unit (DSU), essential information and support once they have left the units with the patients must be ensured.

A previous audit from the authors' own unit (unpublished), has revealed inadequacies in these areas for the lay carer. The results revealed several problem areas that were not expected. The role of the carer and provision of services has now been reaudited. The unique co-operation of day surgical units within the Wessex region of Southern England has enabled the audit to be extended to include eight other hospitals.

2. Objectives

To identify inadequacies in day surgery facilities and information for the lay-carer. To assess the duration of care required for various commonly performed surgical procedures, and identify any problems.

3. Audit standards

Carers should experience no difficulties with performing their role, escorting the patients home and understanding the nature of surgery, or prescribed medications.

They should be aware of the length of time they are likely to be needed.

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Table 1
Location of each unit participating in the audit

Basingstoke	Poole
Bournemouth	Swindon
Winchester	Salisbury
Dorchester	Southampton
Isle of Wight	

4. Setting

Nine DSUs in Wessex.

5. Methods

In June/July 1998 the DSUs issued questionnaires to 50 consecutive escorts/carers of patients who had received a general anaesthetic for their day surgery. The carers were asked to complete the form when their role as the carer was completed, postage-paid envelopes were provided. The questionnaire is shown in Appendix A.

A database was created and the anonymity of the respondents was preserved. The contributing units are listed in Table 1. The units have been subsequently coded so their individual identities are withheld.

6. Results

There were 200 questionnaires returned from the nine DSUs, resulting in an overall response rate of 44%. There was a wide variation in observed response rate between the units (22–68%). The mean journey time was 26.4 min (SD 19 min). In several units some patients had much longer journey times (Fig. 1). Problems with parking were experienced by 20% of all respondents (Fig. 2). This was usually due to a shortage of spaces near the drop-off/collection points although several commented they were opposed to paying parking charges.

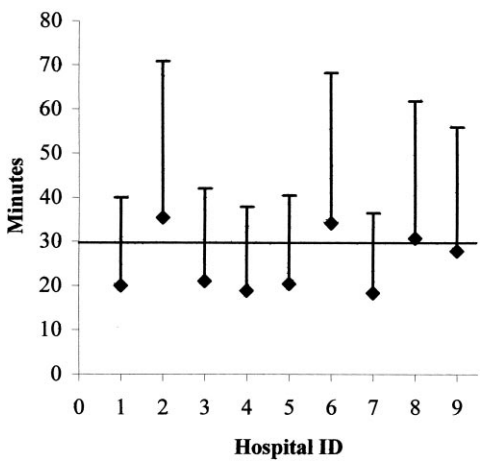

Fig. 1. Mean journey times (+1 SD).

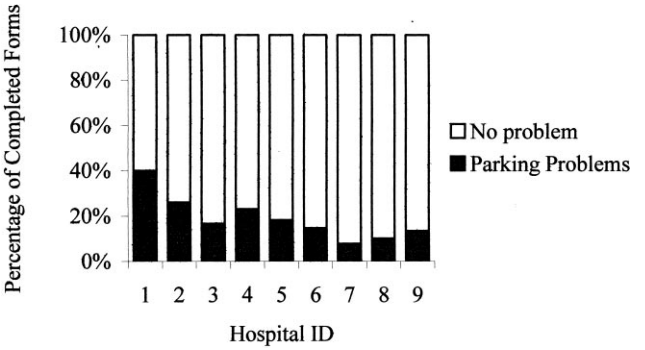

Fig. 2. Problems experienced with parking in each unit.

In most cases a partner or parent was the carer (partner 56%, parent 31%, other relative 11%), only rarely was a friend called upon (2%). The range of specialities covered in this audit is illustrated in Fig. 3.

Twenty-one carers (10.5%) did not receive written instructions; of the 179 (89.5%) who did, 2.5% of these found they were not helpful. Seventeen carers (8.6%) commented on inadequate directions related to medications. This was often related to not being informed about potential side effects.

Eighteen (9%) carers stated they did not receive a contact number for use in emergencies. Almost 60% of patients did not receive a follow-up telephone call from the DSU (Fig. 4). When a call was made it was well received, only seven carers commented that it was not particularly helpful. Comments included that they were quite happy, but it was reassuring to receive a telephone call. Some carers, who did not receive a telephone call, stated they would prefer to have been contacted.

In 85% of cases the duration of care was less than or the same as expected by the carer. Thus, 15% of carers felt the amount of care was more than they had antici-

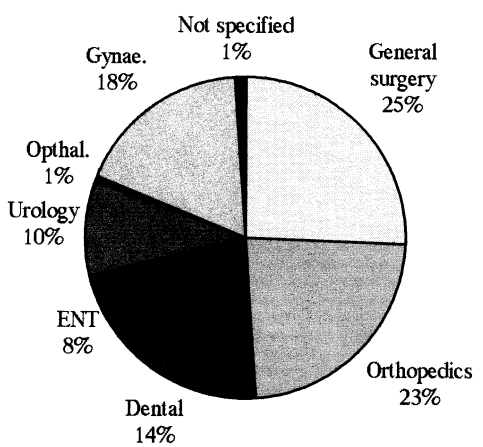

Fig. 3. Breakdown of group by surgical speciality.

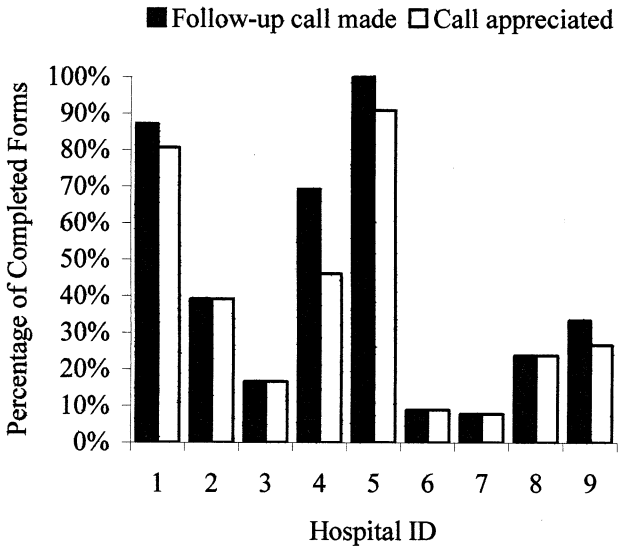

Fig. 4. Follow-up telephone calls from the day case units.

pated or been warned to expect. Closer examination of individual specialities revealed there were particular problems in urology, general and oral surgery. In urology no particular procedure was identifiable as associated with unexpected levels of care required by the carer. The three most frequently performed general surgery procedures were breast lump biopsy, inguinal hernia repair and varicose vein surgery (Fig. 5). The mean duration of care required for breast lump biopsy was 2 days (SD = 1.5 days) and no carer was required for longer than they had expected ($n = 10$). Varicose vein surgery required a similar duration of care (2 days, SD = 2.4 days), but 25% of carers felt more care was required than they had expected ($n = 14$). Hernia repair required more care than expected in 11% of cases, mean duration of care 2 days (SD = 1, $n = 10$).

Following oral surgery, 30% of carers stated more care was required than they had anticipated ($n = 27$), despite a shorter mean duration of care (1 day, SD = 1).

7. Discussion

Fortunately many patients prefer the convenience of day surgery to inpatient care, as it reduces time spent away from home. The success of day surgery relies on a willingness of carers to take on a role traditionally performed by fully trained healthcare professionals. They appear to fulfil this role effectively and evidence suggests there is little increase in workload of primary care teams as a result of increases seen in day surgery [6].

A competent carer is essential should unforeseen complications occur shortly after surgery, but also as there are cognitive failings following general anaesthesia for at least 24 h [7]. Malster et al. [8] called for more attention on carers in subsequent studies. They made the important observation that a significant proportion of carers took unpaid leave from work (36% of those employed). They considered this a hidden cost of day surgery. Unfortunately the response rate from carers in their study was very low.

Our response rate (44%) compares with Buttery et al (41%) [1], is better than Malster et al. (18%) [8], but less well with Woodhouse et al. (64%) and Linden and Engberg (87%) [6,9]. Only that of Malsters' group concerned carers directly. It is not possible to confirm each of the nine units distributed all 50 forms; however, it must be assumed they did so.

Unfortunately there is no guarantee that the person escorting the patient to and from the day surgery unit

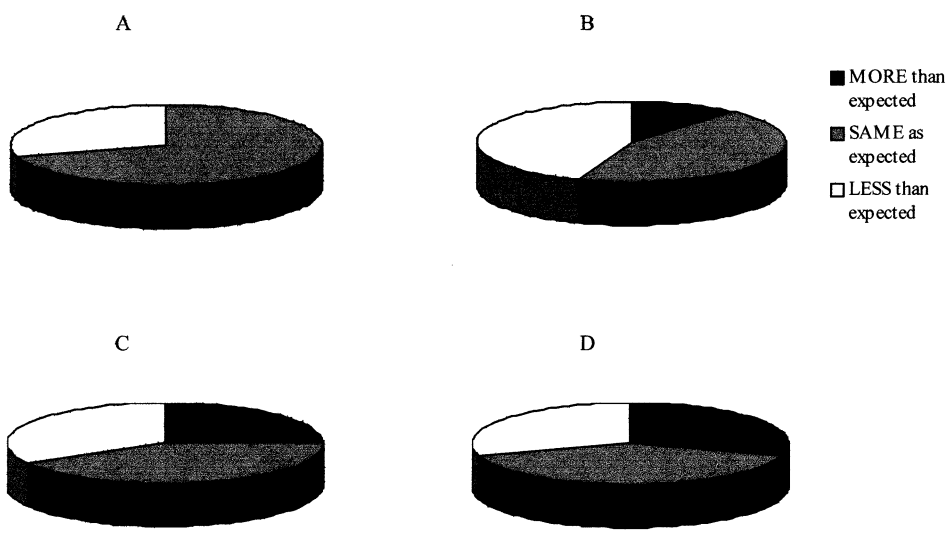

Fig. 5. The amount of care actually required for specific procedures, compared with what the carers had expected to give: (A) breast lump biopsy; (B) inguinal herniorraphy; (C) varicose vein surgery; and (D) dental extractions.

will be the carer of the patient, so it is imperative to provide clear concise written instructions which can be given to the final carer.

Journey times have been found to be excessive for some units, and those with perceived problems have been contacted with these findings for closer assessment. The average journey time of 26 min is slightly longer than Malster et al. found (23 min) [8]. Most journey times therefore conform to the Royal College of Surgeons suggestion that 30 min should be the maximum time before the recovering patient is settled in his or her bed at home [10]. The two units with markedly raised times (units 2 and 6), are in busy cities which have more traffic than the authors own unit (unit 1). Several journeys over 1 h were made, which must be considered too long.

A common cause for complaint in most units (19.5%) was difficulty related to parking, despite provision of dedicated spaces. Adverse comments were also made concerning opposition to paying car parking charges, several pointing out they are providing a service for the NHS. In the authors' own unit difficulty arises due to hospital staff and non-day surgery visitors occupying dedicated day surgery drop-off/collection spaces. Strict reinforcement is required to guarantee these spaces are available, such as wheel clamping. These grievances the carers have expressed should not be dismissed lightly, indeed the author's local general practitioners will refer patients to a particular hospital if patients and carers can park there with ease.

Several carers denied receiving written instructions or emergency contact telephone numbers. The units involved are insistent such information is provided for all patients. If the carer is not the escort one cannot guarantee such information is passed on. Little can be done here except identify when this is likely to occur and highlight the importance of the information given to the ultimate carer. They may not consider the arrangement of ringing their general practitioner as providing them with an emergency number to call. In addition the carer could be encouraged to attend the day surgery units' pre-assessment clinics. The reality of this is that there are staff shortages, and it is still difficult in the authors' unit to ensure all the patients are seen preoperatively, let alone ensure all the carers are contacted. The shortfall in communicating information is not uncommon, Woodhouse et al. found only 85% of their patients surveyed postoperatively knew of the existence of a telephone help-line [6]. They do not explain steps taken to ensure the patient knew about it. Preoperative contact with carers is an area requiring attention in the future.

Only three of the nine DSUs have policies in place to contact patients by telephone after their surgery. This rate reflects the national rate of about 30% [5]. The provision of a telephone call had no correlation with how long the carer was required for. In the authors' own unit, despite having this policy in place 15% did not receive a call. This actually compares well with the experience of Jackson et al. [4], where 33% could not be contacted by telephone on the day following surgery, and Hawkshaw and co-workers and others [2,4,8] (20%) [2]. Over half of the failed contacts did not answer the telephone. It is a matter for discussion whether the patient with no access to a telephone should be precluded from day surgery. Access to a telephone has been sited as a criterion for surgery [3]. In the authors' unit procedures taking place on a Friday, would not be followed-up until the Monday. These patients may well have recovered and even be back at work by that time. Whenever the patients were telephoned the calls were almost always appreciated. Indeed some respondents who did not receive such calls have expressed in their replies to the questionnaire that they would have appreciated a call and would have found it very reassuring. It has been suggested that placing a telephone call may contribute to minimising the impact of day surgery on the primary care team [4]. It would appear to us that it's maximum value is as an audit tool. It would be interesting to assess the impact on primary care contacts across the Wessex region as there is clearly enormous variation between the units' policies regarding telephone follow-up.

It was seen that 85% of carers estimated the duration they would be required to care for was less than or the same as they had anticipated. The notable exception was in the case of dental surgery where the problem was widespread. There are several possible explanations. These patients are usually young adults and it may be that they are more likely to want to be ambulant and return to a more hectic pace of life, earlier, than older patients, and the nature of surgery does not allow this to be the case. The extraction of wisdom teeth can produce significant discomfort for several days after their removal and emphasis on taking regular medication should be made. Based on childhood experience of exodontia, there may be a preconception from the carer, (and the patient), that third molar extraction would be quick, with a minimal amount of trauma.

Problems noted by previous authors include inadequate explanation of the procedure [8], and a very high incidence of muscle pains (40%) and sore throat (46%) following dental extraction in the DSU [4]. This was significantly higher than for any other procedure analysed and was attributed to the use of suxamethonium. This experience could have played a role in our results. The problem we discovered for these carers (and patients), needs addressing and auditing in depth to try to identify the source of the problem, and thus to improve postoperative management.

The provision of preoperative information is further justified, as there is a positive correlation between post-

operative pain and preoperative anxiety [11]. Patients provided with information preoperatively about pain, were found to have a greater tolerance for pain [12]. Patients' preoperative anxiety can be reduced with education or a preoperative telephone call.

Varicose vein surgery is well accepted and promoted as an ideal DSU procedure [13]. The results presented here suggest significant improvements could be made in the postoperative management of this condition.

8. Summary

To enhance and extend the service of day surgery attention must be made to the practicalities of the service including allowing carers to park their cars.

We must ensure good communication with the carer, who may not be the escort. The carer must be encouraged to accompany the patient to pre-assessment if they are not attending on the day of surgery. Improved information sheets may well serve the patient's carer better if we include the answers to commonly asked questions on the forms.

Further research is required to optimise the perioperative management for patients undergoing varicose vein surgery and dental surgery. Greater care must be taken to explain the implications of these procedures to both the patient and their carer.

Acknowledgements

The authors wish to thank the staff of the participating units for distributing and collecting the audit forms.

Appendix A. Audit for carers of day surgery patients

We are constantly trying to improve our service to patients undergoing surgery as a Day Case and for the people caring for these patients. Please delete YES or NO as appropriate.

1.	In which hospital did the operation take place?	
2.	How long did your journey take from the hospital to the patient's home (h/min)?	
3.	What was the operation?	
4.	Are you the patient's PARENT/PARTNER/RELATIVE/FRIEND (please circle)?	
5.	Did you find parking a problem at the hospital? (If YES please specify problem)	YES/NO
6.	Were you happy about instructions for medications?	YES/NO
7.	If you were unhappy, why? Please comment.	
8.	Did you receive *written* instructions about caring for your relative/friend?	YES/NO
9.	Were these instructions satisfactory/clear?	YES/NO
10.	If not, Why?	
11.	Were you given a contact telephone number in case of emergency?	YES/NO
12.	Did you have a follow-up telephone call from the Day Case Unit?	YES/NO
13.	Was this helpful? Please comment.	YES/NO
14.	How long did it take for the patient to recover enough to manage on their own without your care?	
15.	Was the amount of help that the patient needed as you expected (please circle)?	
MORE THAN EXPECTED	SAME AS EXPECTED	LESS THAN EXPECTED

ANY OTHER COMMENTS, PLEASE WRITE ON THE BACK OF THIS FORM

Thank you for your help. Please post this back to the day case unit at your hospital.

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Psychological preparation for patients undergoing day surgery

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Abstract

Surgical and anaesthetic intervention associated with day surgery over the last 10 years has greatly improved although the position of psychological preparation has remained virtually unchanged [Ridgeway V, Mathews A. Brit J Clin Psychol 1982;21(4):271–80; Salmon P. Clin Psychol Rev 1992;12(7):681–704; Jarrett PEM. Surgery 1997;15(4):94–6]. Information provision, an essential component of anxiety management, has recently been highlighted as a considerable problem for day surgery patients [Mitchell MJ. Ambul Surg 1999a;7(2):65–73; Mitchell MJ. Ambul Surg 1999b;7(2):75–100]. Contemporary evidence has suggested that the ability to cope with a stressful event can be improved if the preparatory information is matched with the individual's coping style, i.e. provision is made for patients with a desire for maximum levels of information (vigilant coper) and for patients with a desire for minimal levels of information (avoidant coper) [Krohne HW, Slangen K, Kleemann PP. Psychol Health 1996;11(3):315–30]. A convenience sample of 120 patients undergoing non life-threatening, gynaecological laparoscopic day surgery was contacted prior to surgery and randomly assigned into two groups. Group I received an extended information booklet, group II a simple booklet and all received a coping style questionnaire. Immediately prior to surgery patients with a desire for maximum levels of information (vigilant copers) who had received the simple information were more anxious than the vigilant copers who had received the extended information (0.013, $P \leq 5\%$). Irrespective of coping style, participants who received the simple information contacted their general practitioner more than participants who had received the extended information (0.008, $P \leq 1\%$). Incorporation of the results into day surgery nursing practices are discussed and a new, pioneering anxiety management plan providing explicit guidance is outlined.

Keywords: Levels of information provision; Anxiety; Control; Self-efficacy; Formalised anxiety management

1. Introduction

A number of comprehensive studies in the United Kingdom concerning day surgery have established that information provision is a considerable challenge [1–3]. International support for this has appeared in a recent review of the literature regarding patients' experiences of day surgery as information provision was also a challenge in Europe, America and Australia [4,5]. Day surgery patients also remain very anxious prior to surgery further complicating matters as an anxious patient will not retain information even when adequately provided [6–9]. These issues are central to the quality of day surgery from the patient's perspective and thereby required further investigation if good progress is to be maintained within the service.

Recent studies have suggested that not all patients require the same amount of information, i.e. some require more while others less [10–12]. In support of this notion, studies within the field of dental surgery have established that when a match between the required level of information and the actual information provided is achieved, patients are more satisfied [13–15]. This approach towards information provision concords with one of the prominent psychological theories on coping referred to as vigilant and avoidant coping, i.e. vigilant copers should receive copious amounts of information whereas avoidant copers very little [16]. Increasing the amount of control (real or perceived) available to patients and helping to engender feelings of self-efficacy (self appraisals of ability to cope) have also led to more positive outcomes following surgery [17,18]. The utility of these theories within the day surgery arena is relatively unknown (Table 1). A quasi-experimental research study was therefore designed to dis-

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cover their usefulness within day surgery, i.e. vigilant and avoidant coping, control and self-efficacy. The aim was to construct an effective information provision plan to improve patient satisfaction and aid anxiety reduction. The hypothesis was: when an individual's coping style, i.e. vigilant and avoidant coping, is paired with the appropriate level of information an adult day surgery patient will (a) be more satisfied with the level of information provided; and (b) experience less anxiety.

2. Study design

Gynaecological patients undergoing day case laparoscopic surgery and general anaesthesia were chosen as their throughput was high and the surgical procedure was an intermediate one. Two booklets were designed and constructed for use, one with extended information and one simple information (Table 2). When provisionally constructed the booklets were sent to the day surgery unit together with the relevant questionnaires (anxiety, locus of control, self-efficacy and coping style) for medical and nursing staff approval. Following some minor alterations the study was approved by the hospital staff prior to ethical approval.

The patients employed within the study had to be restricted in order to introduce some controls. A strict criteria was adhered to, i.e. adult gynaecological patients undergoing day surgery and general anaesthesia, no day surgery within the last 12 months, non life-threatening laparoscopic surgery, aged 18 years upwards, double-blind study, English speaking participants, no chronic health problems.

All participants were contacted prior to surgery to gain initial consent then randomly allocated into one of two groups. One group received the extended booklet while the second group received the simple booklet. The information was sent by first class post the day after initial contact and included a covering letter with the researcher's name, address and contact telephone number, the questionnaire pack (anxiety, locus of control, self-efficacy and coping style), information booklet and consent form. Approximately 48 h prior to surgery the participants were requested to sign the consent form, read the information booklet, complete the questionnaires and bring the completed consent form and questionnaire pack with them on the day of surgery. The day surgery staff were completely unaware of which information booklet had been received by whom.

On the day of surgery a convenient date and time was arranged with the patient in which to conduct the final postoperative telephone interview. Also the primary nurse within the day surgery unit completed a short patient adjustment to surgery questionnaire, i.e. number of questions asked, anxiety level, satisfaction with information received etc. Approximately 2–4 days after surgery the final interview was conducted by telephone and primarily concerned satisfaction with information provided (Table 3).

Table 1
Innate traits

Vigilant coping style	Individuals who wish to receive copious amounts of information prior to an unpleasant medical procedure
Avoidant coping style	Individuals who wish to receive small amounts of information and more relaxation advice prior to an unpleasant medical procedure
Self-efficacy	Confidence in ones' ability to behave in such a way as to produce a desirable outcome
Internal locus of control	Individuals who strongly believe they have the ability to shape their own destiny
External locus of control	Individuals who strongly believe that their destiny is influenced more by luck, fate and powerful others, i.e. doctors, nurse, employer etc

Table 2
Overview of information booklets sent via post 7–10 days prior to surgery

	Extended laparoscopy booklet	Simple laparoscopy booklet
Design	Empowering	Instructional
Definition of procedure	Yes	Very brief
Explanation of types of surgery	Yes	No
Procedural, behavioural and sensory information	Yes	Very brief
Number of diagrams	3	None
Cognitive coping strategies	Throughout	Very brief
Information regarding recovery at home	Informative explanations	Brief and containing 'do's and don'ts'
Number of pages	5	3

3. Results

A total of 120 adult day surgery patients were interviewed over a 7 month period from September 1997 through to March 1998. Not all 120 subjects were able to complete the study. Following initial consent 11 patients had their operations cancelled, two did not attend on the day of surgery, one was admitted to hospital as an in-patient prior to surgery, following initial consent two subsequently refused to take part, one did not complete one of the questionnaires correctly, one patient had to have her operation cancelled on the day of surgery, nine did not bring the question-

Table 3
Overview of quasi-experimental design

	Group I	Group II
7–10 days pre-operatively (researcher)	Initial telephone contact; initial consent; inclusion criteria checked	Initial telephone contact; initial consent; inclusion criteria checked
Approximately 48 h pre-operatively (self-rating)	Health locus of control; self-efficacy; anxiety inventory; coping style; extended information	Health locus of control; self-efficacy; anxiety inventory; coping style; simple information
Day of surgery (nurse-rating)	Adjustment to surgery questionnaire	Adjustment to surgery questionnaire
2–4 days post-operatively (researcher)	Telephone satisfaction questionnaire	Telephone satisfaction questionnaire

naire pack with them on the day of their surgery, one complained to her consultant surgeon about the study following initial consent and was therefore automatically withdrawn and five were unable to complete due to researcher ill-health. The final number of subjects who completed all aspects of the study was 87 (Fig. 1).

Firstly, an increase in age beyond the mean was negatively correlated with ratings of self-efficacy (0.02, $P \leq 5\%$), negatively correlated with the ability of the information provided on the day of surgery to reduce anxiety (0.007, $P \leq 1\%$) and negatively correlated with the nurses' ratings of patient adjustment to surgery (0.035, $P \leq 5\%$). This may suggest that successful coping with day surgery may decrease with age as the more mature patient had reduced feelings of self-efficacy, the information provided on the day had little ability to help reduce anxiety which consequently led to lower ratings of adjustment to surgery.

Using the Statistical Package for Social Sciences (SPSS) an independent t-test analysis was performed. It was discovered that patients with a desire for copious levels of information (vigilant copers) who only received the simple information were more anxious than the vigilant copers who received the extended information as rated by the nurses immediately prior to surgery (0.013, $P \leq 5\%$). Patients with a desire for copious levels of information (vigilant copers) who only received the simple information were more anxious concerning their general anaesthetic than the vigilant copers who received the extended information (0.029, $P \leq 5\%$). Also patients with a desire for copious levels of information (vigilant copers) who received the extended information were less anxious while waiting for surgery to commence on the day than the vigilant copers who received the simple information (0.058, $P \leq 5\%$).

Almost every patient (99%) required written information, 92% verbal information and the majority wanted this information between 1 and 3 weeks prior to surgery. A total of 74.6% patients required information concerning their operation a minimum of 1 week prior to surgery (Fig. 2). Vigilant copers required their information on average 3–4 weeks (mean) in advance whereas avoidant copers 1 week (mean) in advance. A noteworthy point here is that not one patient stated they required the information just on the day of surgery.

The aspect of day surgery patients found to be most fearful was the general anaesthetic (54%), waiting in the day surgery unit (44%) and the possible pain and discomfort afterwards (32%) (Fig. 3). However, 63% of patients expressed being fearful of more than just one aspect. Anxiety was reduced most by being near to and speaking with the nurse (72%), the anaesthetist (48%) and the surgeon (48%) (Fig. 4). Anxiety was reduced for 76.4% of patients by two or more aspects. The nurses' ratings of patient anxiety were negatively correlated to nurses' ratings of adjustment to surgery (0.0001, $P \leq 1\%$). The more anxious patients were seen not to adjust as well to day surgery and only 28.7% had a good adjustment to surgery (Fig. 5).

When examining aspects of control, vigilant copers rated themselves as experiencing little control over events in comparison to avoidant copers (0.045, $P \leq 5\%$). This supports the top three characteristics of a vigilant coper, i.e. recalling negative events, self-pity and the search for copious levels of information, as opposed to the top characteristic of an avoidant coper which is to minimalise all threats [19]. Concerning self-efficacy (feelings of being able to cope) avoidant copers experienced a higher level than the vigilant copers (0.026, $P \leq 1\%$). Patients who desired copious levels of information therefore experienced lower self-

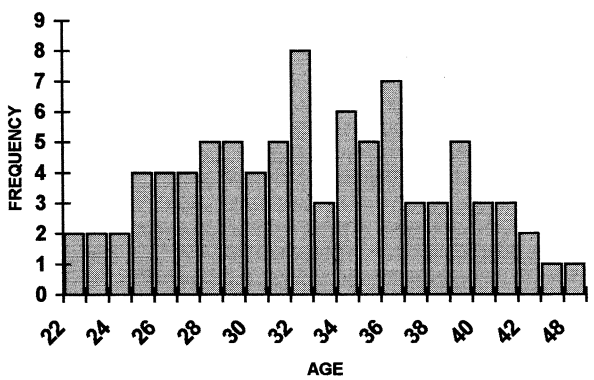

Fig. 1. Age and frequency of subjects.

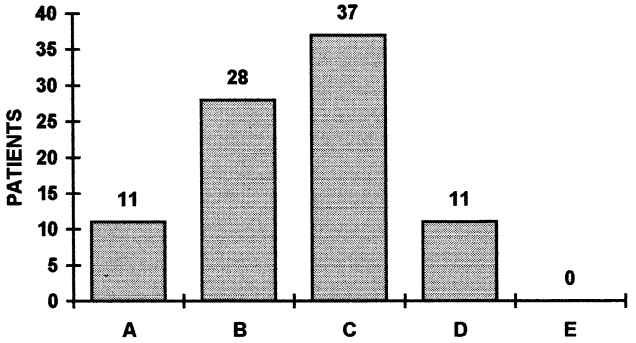

Fig. 2. Ideally, when would you have preferred to receive information regarding your surgery?

efficacy appraisals prior to surgery irrespective of the information booklet received, i.e. vigilant copers did not feel they could cope well with day surgery. Avoidant copers had more positive self-efficacy appraisals when in receipt of the simple information than the vigilant copers with the simple information (0.041, $P \leq 1\%$). Patients who desired lower levels of information and received lower levels, experienced higher appraisals of self-efficacy, i.e. had more positive feelings of being able to cope well.

Following discharge contact with community services was 18% (day surgery unit 7%, general practitioner 10%, district nurse/practice nurse 1%) (Fig. 6). Contact with the general practitioner was less in patients who were in receipt of the extended information booklet irrespective of their coping style (0.008, $P \leq 1\%$). Irrespective of coping style, contact with the general practitioner was reduced when patients had more information at their disposal. A desire for higher levels of information was also positively correlated to contact with the day surgery unit following discharge (0.0029, $P \leq 5\%$).

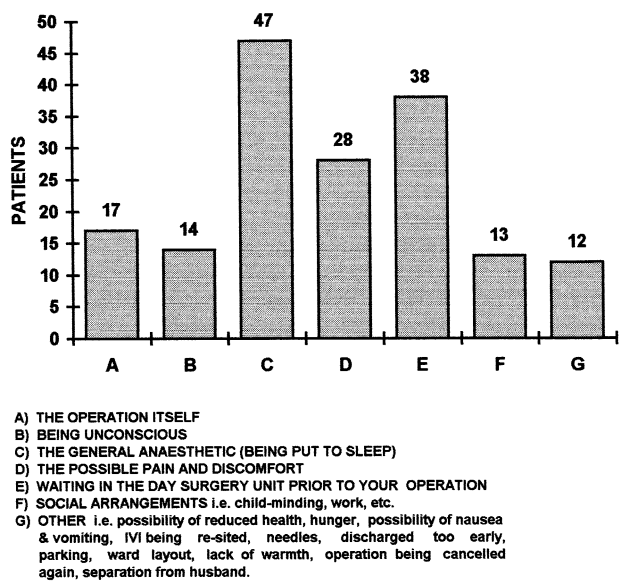

Fig. 3. What aspects of day surgery increased your anxiety?

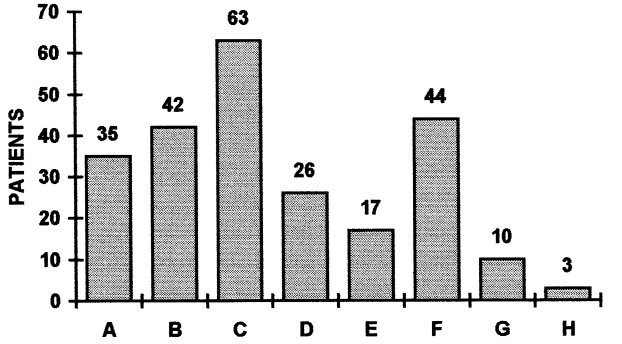

Fig. 4. What aspects of day surgery helped to reduce your anxiety?

4. Discussion

The hypothesis stating that when an individual's coping style, i.e. vigilant and avoidant coping, is paired with the appropriate level of information an adult day surgery patient will (a) be more satisfied with the level of information provided was rejected although only partially; and (b) experience less anxiety was upheld. These aspects and other issues relating to age, information provision, anxiety management, control, self-effi-

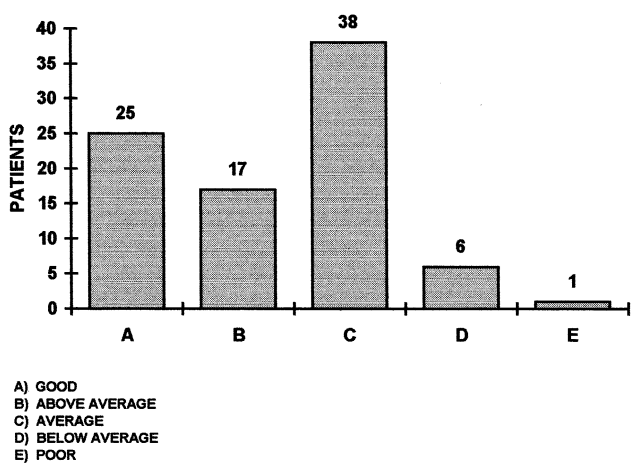

Fig. 5. Overall, how would you rate your patient's adjustment to her surgery today?

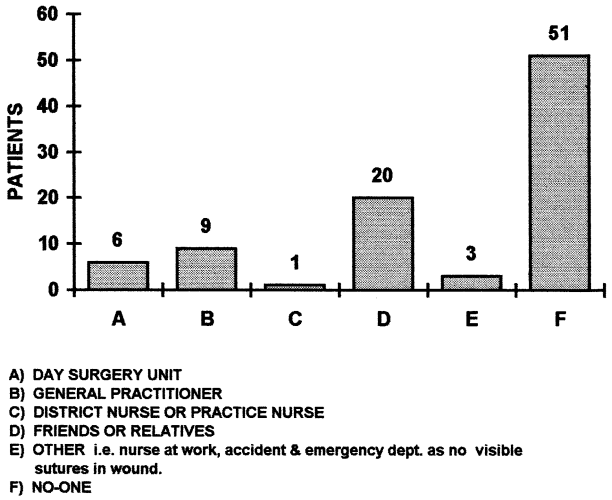

Fig. 6. Since your operation, have you contacted any of the following people for help or advice?

cacy and discharge information encompass the central findings and will be discussed in more detail.

4.1. Mature patients

A number of correlation's emanating from both nursing staff appraisal and self-appraisal related to age. The more mature participants (32–48 years) experienced reduced feelings of coping well, were helped little by the information on the day and were viewed by the nurses as adjusting poorly to their surgery. Their more mature years may indicate a possible increase in social obligations, i.e. a greater number of dependants or social commitments etc. Further support for this comes from a study by Donoghue et al. [20] in which 29% of female day surgery patients required help from one or more younger person. If this is indeed the case, day surgery, which currently requires no overnight stay in United Kingdom, may generate negative feelings of coping because the patient will be back at home that same evening. If the patient is aware that returning home too quickly to a domestic situation in which young children, for example, are depending upon them, it may result in a lack of time for personal rest and recuperation.

4.2. Information provision

Satisfaction with information and an information provision/coping style match was not identified at a significant level although there was a trend towards a significant level of satisfaction irrespective of coping style when in receipt of the extended information. A noteworthy feature of the subjects' coping styles were their fairly even spread, i.e. approximately four equal quarters (Fig. 7). This aspect of the data alone may be a strong indication of the need for differing levels of information provision within day surgery. For example, if an information booklet provided within a day surgery unit had a simple explanation of the care and treatment then, based on the figures from this research study, 54% of patients would not be satisfied with the booklet, i.e. vigilant copers (28%) and fluctuating copers (26%) (Fig. 7).

The vast majority of patients preferred their pre-operative educational material to contain both written (98.9%) and verbal (92.2%) information. Of the patients who preferred written information 43.6% wanted diagrams, posters or charts to aid the explanation. This information was required 1 week prior to surgery for 42.5% of subjects and at 2–3 weeks for 32.1% (Fig. 2). A total of 74.6% participants required both written and verbal information concerning their operation a minimum of 1 week prior to surgery. When examining coping styles and preference for receipt of information vigilant copers required the information on average 3–4 weeks (mean) in advance and the avoidant copers 1 week (mean) in advance. Crucially, not one participant stated they preferred the information a few hours prior to surgery (Fig. 2).

4.3. Anxiety

The hypothesis stating that when an individual's coping style, i.e. vigilant and avoidant coping, is paired with the appropriate level of information an adult day surgery patient will (b) experience less anxiety was verified for three main reasons. Firstly, patients with vigilant coping styles who received the extended information were less anxious than the vigilant copers who received the simple information, as rated by the nursing staff immediately prior to surgery. The nurses clearly viewed vigilant copers who received less information than they required as more anxious. The nurses were blind to the type of information each patient had received although they firmly rated vigilant copers who received the simple information as more anxious. Sec-

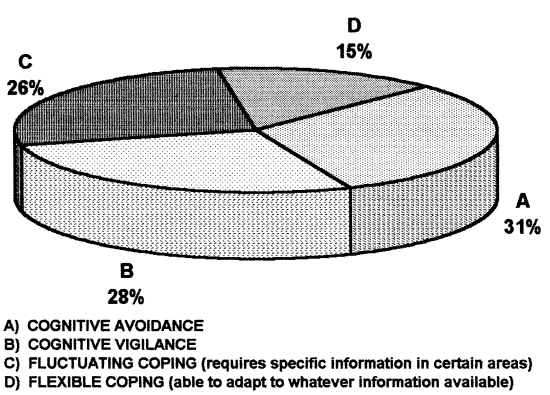

Fig. 7. Subjects' coping styles.

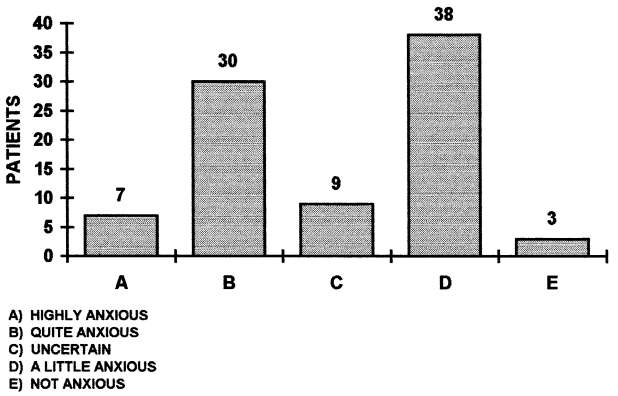

Fig. 8. How anxious would you rate your patient prior to her operation today?

ondly, vigilant copers who received the simple information stated they were more anxious concerning their general anaesthetic than vigilant copers who received the extended information. Finally, vigilant copers who received the extended information stated they were less anxious while waiting on the day for surgery to commence than vigilant copers who received the simple information. The vigilant participants when only in possession of the simple information clearly rated themselves as more fearful of general anaesthesia and waiting on the day for their surgery to commence. This, together with the nurses' equivalent ratings, comprehensibly endorses the need for differing levels of information provision within day surgery as some patients truly required a greater level of information to help manage their anxiety more effectively.

Only 28.7% of the patients were viewed by the nurses to have a good adjustment to day surgery (Fig. 5). A certain level of consistency was demonstrated within the nurses' ratings as the more anxious patient was seen to adjust less well to surgery and good adjustment to surgery was linked with the ability of the information to reduce anxiety. The nurses rated the vast majority of the patients as anxious on the day of surgery (97%) although this ranged from 'highly anxious' through to 'a little anxious', i.e. 34% were 'quite anxious', 38% were 'a little anxious' etc. (Fig. 8). The aspect of day surgery which generated the greatest level of anxiety was the general anaesthetic followed by the wait in the day of surgery unit (Fig. 3). Moreover, 63% of the participants stated they were anxious about more than one aspect of day surgery.

The aspect which helped to reduce anxiety the most for 72% of patients was the nurse speaking with and being close to the patient (Fig. 4). The information the nurses provide and their words of assurance are of considerable benefit. This is corroborated by 93% of participants gaining information on the day of surgery from the nurse and the nurses' actual presence being the most helpful in aiding anxiety reduction. This helps to establish that while the physical presence of the nurse is extremely helpful the verbal provision of information by way of cognitive coping strategies is also of great benefit, i.e. telling the patient about the highly trained doctors and nurses, modern sophisticated equipment, fast and effective drugs, countless measures to ensure ample safety etc. [21]. These aspects can be both implicit and explicit as good professional conduct and an efficient well run day surgery unit will display implicit features of assurance (Fareed, 1996). Another aspect of implicit assurance is the ward surroundings which helped to reduce anxiety for 51% of the patients (Fig. 4).

4.4. Control

Vigilant copers significantly rated themselves as experiencing little control in comparison to avoidant copers believing that their destiny was more dependent upon fate, luck and powerful others. Krohne [19] states that the top three characteristics of a high vigilant coper are recalling negative events, self pity and the search for copious information. These are clearly not the traits of a person who feels in control, more akin to a person who experiences more external control appraisals. It would appear that vigilant copers require copious levels of information but place negative interpretations on all events, findings which are echoed by Miller et al. [22]. Providing copious levels of information, an appearance of control and emphasising the quality of the professional care may ultimately be the best approach to the pre-operative management of a vigilant coper.

4.5. Self-efficacy

Avoidant copers significantly rated themselves as experiencing a greater degree of self-efficacy prior to surgery than the vigilant copers, irrespective of the level of information received. From this it could be deemed that avoidant copers expected a small level of information and were happy about coping whereas vigilant copers expected a small level of information but were unhappy at the prospect of coping. As only 16% of subjects received information from their consultant and 25% from the day surgery unit, undoubtedly some vigilant copers must have received less information than they required resulting in their lower self-efficacy appraisals.

This is supported by the second point where avoidant copers who received the simple information had significantly higher self-efficacy appraisals than vigilant copers who also received the simple information. No such differences were revealed in the data when vigilant and avoidant copers both received the extended level of information indicating that being in receipt of the extended information influenced self-efficacy appraisals in

some way for vigilant copers. In view of this it may be necessary to provide vigilant copers with a greater level of support regarding their ability to cope well with day surgery especially when also in receipt of a lower level of information than they require.

4.6. Discharge information

Information provision had a number of significant effects on the patients' experience following discharge. As previously stated, the first part of the hypothesis was only partially correct, i.e. when an individual's coping style is paired with the appropriate level of information an adult day surgery patient will (a) be more satisfied with the level of information provided was rejected, although not completely. This resulted from an overall trend towards greater satisfaction when in receipt of the extended information irrespective of coping style. Plus, participants who were in receipt of the extended information significantly contacted their general practitioner less compared with participants who received the simple information (46 received the extended information and 41 the simple information). The main reasons for visiting the general practitioner following day surgery are to obtain medical certificates, help with pain management, advice on wound care and information [23–26].

Every participant stated that they had read the information sent to them in the post and 93% stated that they had read all of the information. Contact with the general practitioner was less when in receipt of the extended information and 59% of avoidant copers received the extended information. If it is to be assumed from this study that extended information provision for some people causes greater anxiety, i.e. for the avoidant coper, but extended information recipients visited their general practitioner less, some avoidant copers may have had to read more of the information within the extended booklet in the post-operative phase than they had originally intended. This would have removed the need to contact the general practitioner for extra information. Only 7% of the participants stated they did not read all the information booklet although this was not significantly related to an avoidant coping style. The avoidant copers who received the extended booklet may have censored the information initially and read 'all' the information 'they' required but not necessarily 'all' the booklet. It is not unreasonable to conclude that the avoidant copers extracted from the booklet the immediate information they required comfortable in the knowledge that should they require more, it was at their disposal. This may have hidden the avoidant copers' true level of satisfaction with the information received, i.e. avoidant copers who had too much information only read what they wanted and were therefore satisfied. Avoidant copers will simply self-select any information provided in order to evade potentially threatening aspects then state (correctly for them) that they were not made any more anxious and the information was satisfactory. Indeed, it was observed by Salmon [27] that when patients were obliged to listen to pre-operative information, anxiety actually increased. The work of Salmon may therefore support this notion as the participants in his study were a captive in-patient audience and inevitably some participants would have been avoidant copers.

Conversely, if it is also to be assumed from the evidence here that the lack of extended information provision for some patients caused greater anxiety, i.e. vigilant copers, some patients may have agreed to take part in the study simply because they were eager for more written information. Although only anecdotal evidence from the researcher's initial contact, many participants were very willing to take part in the study once it was revealed that information regarding their operation was to be sent via the post. These participants may well have been vigilant copers in pursuit of more information as in the pre-operative phase only 16% of participants stated they had received written information prior to surgery from their consultant and 25% written information from the day surgery unit. For the vigilant copers who only received the simple information (42%) no self censorship would have been necessary only the frustration and anxiety associated with searching for more information.

4.7. Proposed nursing intervention

An information provision/coping style match, a semblance of control and positive feelings of being able to cope well with surgery have a great deal to offer to the quality of psychological care within day surgery. A more formalised approach may also lead to improved adjustment to day surgery as only 28.7% were rated with a good adjustment by the nurses (Fig. 5). It may lead to a lower level of dependency upon the community healthcare services in the days following discharge (Fig. 6).

A number of modifications, will be necessary to the psychological management of day surgery patients in order to accommodate these innovative changes. Firstly, and most importantly, alongside the essential medical pre-assessment the patient must be able to decide which level of information they require. Time consuming questionnaires may not be required for this decision, merely an overview of the information available or the 'information pathways' available. A chart can be displayed on the wall within the clinical area highlighting these information pathways, i.e. Pathway 1, avoidant coper; Pathway 2, fluctuating coper (some patients required simple information plus a specific area of information therefore a middle pathway may sometimes be required); and Pathway 3, vigilant coper (Table 4).

Table 4
Proposed information pathway chart

	Information pathways		
	One (avoidant coper)	Two (fluctuating coper)	Three (vigilant coper)
1–3 Weeks prior to surgery (minimum)	Simple information concerning treatment, care and recovery; emphasis on relaxation; semblance of control; specific information enquiry	Simple/specific concerning treatment, care and recovery; semblance of control; positive self-efficacy encouragement; specific information enquiry	Extended information detailing treatment, care and recovery; emphasise quality of care and treatment; semblance of control; encourage positive self-efficacy appraisals
Day of surgery	Simple behavioural and procedural information; emphasis on relaxation; semblance of control; specific information enquiry; cognitive coping strategies	Simple/specific behavioural, sensory and procedural information; semblance of control; positive self-efficacy encouragement; specific information enquiry; cognitive coping strategies	Extended information detailing behavioural procedural and sensory information; emphasise quality of care and treatment; semblance of control; encourage positive self-efficacy appraisals; cognitive coping strategies
Intervention following discharge	Simple information; brief problem-solving procedures; specific information enquiry; telephone helpline number; nurse initiated telephone call	Simple/specific information; brief problem-solving procedures; telephone helpline number; nurse initiated telephone call	Extended information; detailed problem-solving procedures; telephone helpline number; nurse initiated telephone call

Table 5
Multi-disciplinary notes

TABLE 5
MULTI-DISCIPLINARY NOTES

ANXIETY MANAGEMENT IN DAY SURGERY

MULTI-DISCIPLINARY NOTES

NAME : ..... **ADDRESS :** .....

CONSULTANT : ..... **TELEPHONE NO :** .....

SURGERY : ..... **DATE OF SURGERY :** ..... A.M. [ ] P.M. [ ]
TICK APPROPRIATE BOX

OUT-PATIENTS DEPARTMENT [ ]
PRE-OPERATIVE CLINIC [ ]
POSTAL CONTACT [ ]

WRITTEN INFORMATION
ONE (SIMPLE INFORMATION) [ ]
TWO (SIMPLE / EXTENDED INFORMATION) [ ]
THREE (EXTENDED INFORMATION) [ ]

VERBAL AND WRITTEN INFORMATION
(IF APPLICABLE TO COPING STYLE)
PROCEDURAL INFORMATION e.g. what happens next [ ]
BEHAVIOURAL INFORMATION e.g. what to do next [ ]
SENSORY INFORMATION e.g. possible pain and discomfort [ ]
COGNITIVE COPING STRATEGIES e.g. modern equipment, etc.. [ ]
RELAXATION INFORMATION e.g. structured programme [ ]
MODELLING e.g. visit, take home video or audio-tape [ ]

NOTES.....
.....
.....NURSE :
DATE :

PRE-OPERATIVE TELEPHONE CONTACT (24 - 48 hrs pre-op.) [ ]
NOTES.....
.....
.....NURSE :
DATE :

DAY OF SURGERY

INFORMATION PATHWAY IDENTIFICATION TAG/ MARKING [ ]

VERBAL INFORMATION
(IF APPLICABLE TO COPING STYLE)
PROCEDURAL INFORMATION e.g. what happens next [ ]
BEHAVIOURAL INFORMATION e.g. what to do next [ ]
SENSORY INFORMATION e.g. possible pain and discomfort [ ]
COGNITIVE COPING STRATEGIES e.g. cognitive re-framing [ ]

NOTES.....
.....
.....
.....NURSE :
DATE :

POST-OPERATIVE TELEPHONE CONTACT (24 - 48 hrs post-op.) [ ]
NOTES.....
.....
.....
.....NURSE :
DATE :

This type of visual display will elicit an instant answer as most patients are aware of their coping style [9]. A simple traffic light colouring system could be utilised on the day of surgery, i.e. red-stop-very brief information as patient is an avoidant coper; amber-proceed with caution-simple and specific information as patient may be a fluctuating coper; green-go-give detailed information as patient a vigilant coper. This system could take the form of an inexpensive, appropriately coloured wrist tag or marker for the back of the hand. The whole process would only take a matter of minutes to execute, would benefit the patient enormously and save a considerable amount of time explaining unwanted or unnecessary information to highly anxious patients.

All this information together with written and verbal material could be discussed with the patient either in the pre-assessment clinic or by telephone 1–3 weeks prior to surgery. Once an information provision/coping style match has been established it can act as a guide alongside the standard methods of preparation, i.e. procedural, behavioural and sensory information [28]. Furthermore, 29% of the patients in the study required a video presentation explaining their care and treatment, 23% required a visit to the unit for a look around and 11% wanted an audio-tape presentation of their care and treatment (Fig. 9). The video and audio-tape presentation would have to be offered for viewing both within a programmed visit and as a take home package as not all the patients who wanted a video-tape required a visit. Finally, the patients may need to be contacted by telephone 24–48 h prior to surgery to check their attendance, reiterate any final instructions and answer any questions as this is a positive start to the nurse/patient relationship [29]. Nurse initiated telephone contact in the early post-operative period may reduce the need to contact the general practitioner. This whole system could be co-ordinated on a simple anxiety management care plan and documented on brief multidisciplinary notes which could state any special points or specific arrangements (Table 5).

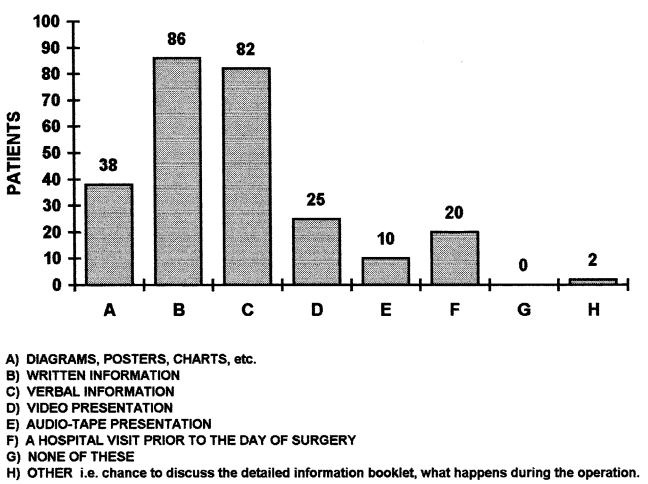

Fig. 9. What method of receiving information would you most prefer prior to your operation?

5. Conclusion

Good anxiety management and information provision are considerable challenges to current day surgery practices. Contemporary evidence suggests that offering differing levels of information, 1–3 weeks prior to surgery together with a semblance of control and the encouragement to cope well may be the way forward. If differing levels of information are readily available and these plans are adopted within day surgery, minimal disruption could be achieved. This system is quick and simple to execute, the patients will be more satisfied with the information and less anxious, time will be saved by not having to explain unwanted information, contact with the general practitioner will be reduced and it is based on contemporary research evidence.

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Primary inguinal hernia repair utilizing the mesh 'plug' technique

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Abstract

'Tension-free' mesh repairs, as popularised by Lichtenstein, are being used increasingly in the management of primary inguinal hernia. Introduced more recently, the mesh 'plug' technique may enhance further the benefits of such repairs. Twenty six males attending for unilateral, primary, inguinal hernia repair were randomised to have either a Lichtenstein 'patch' repair or to undergo a mesh 'plug' repair. Ease of technique and operating time were recorded. Patients were given a visual analogue pain-scoring sheet and were asked to record the number of analgesic tablets taken each post-operative day. Patients were reviewed in clinic at 1 and 6 weeks post-operatively, when they were asked their time to return to 'normal' activity and time to return to work. Any post-operative complications were noted. The tension-free mesh 'plug' repair requires minimal tissue dissection, no herniotomy and is technically straightforward. Patients experienced less post-operative discomfort and returned to 'normality' more quickly. The results suggest that the mesh 'plug' technique has advantages over the Lichtenstein 'patch' repair. A larger trial of this technique should now be undertaken to confirm the results of our pilot study and to assess long term recurrence rates.

Keywords: Inguinal hernia repair; Mesh plug; Lichtenstein repair

1. Introduction

Inguinal hernia repair remains one of the most commonly performed operations worldwide. In the USA, more than 700 000 operations are performed for primary groin hernias and over 50 000 for recurrent hernias each year [1]. In the UK, over 80 000 groin hernia operations are carried out each year [2,3]. Over the past decade, the mostly tension-free mesh 'patch' repair, popularised by Lichtenstein, has attracted many converts. It is said to promote a greater degree of patient comfort with a low recurrence rate approaching that of the 'gold standard' Shouldice repair [4]. Within a similar timeframe, there has been also a significant move towards Day Case surgery, with its perceived advantages of a patient's preference for an early return to the home environment, a reduced waiting list time and improved cost efficiencies [5].

Despite these 'advances', there remains still a significant dissatisfaction amongst patients undergoing inguinal hernia repair [6]. It still holds true that what is required is an operation of technical simplicity that has few complications, causes minimal discomfort and disability and has a low recurrence rate. Even with modern repair techniques and in a Day Surgery setting, it is recorded that some (15–40)% of patients have procedure-related complications or require post-operative reassurance from their general practitioners (or the hospital team) or overall, are disappointed or dissatisfied with their procedural outcome [6]. Most often, their main concern is a prolonged period of post-operative discomfort, with resultant time off work or an inability to return to their normal activities.

At present the mesh 'plug' technique for inguinal hernia repair is less well known in the UK. We thought it appropriate to assess this method of inguinal hernia repair within a randomised, controlled pilot trial, against the currently employed Lichtenstein 'patch' repair.

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2. Patients and methods

Twenty six male patients attending for unilateral, primary, inguinal hernia repair, who fulfilled the criteria for Day Surgery as laid down in the guidelines issued by the Royal College of Surgeons of England were studied [7,8]. Patients with recurrent inguinal hernia, those on warfarin, as well as those unable to complete the post-operative pain assessment sheet, were excluded from the study. Informed, written consent was obtained from each patient following a full explanation of the trial. The study was approved by the local Ethics Committee.

Patients were randomised to one of two groups; Group A — the new mesh 'plug' repair (PerFix® Plug, Bard Ltd, UK; Fig. 1), or Group B — the currently employed Lichtenstein 'patch' repair. The study was carried out in the Day Surgery Unit of the Middlesex Hospital, London.

The PerFix® Plug was used. Its fluted outside layer, combined with its internal configuration of (eight) mesh petals, maintains its overall shape and prevents it collapsing in on itself. The fluted design (in extra-large, large, medium and small sizes) allows the plug to fit easily different shapes of defect, with the opened petal-end facing outwards from within the deep inguinal ring or beneath the transversalis fascia.

All patients were operated upon by either one consultant or two senior registrars and anaesthetised by one of two anaesthetists (a consultant or a senior registrar). Prior to operation, the purpose of the trial was explained to the patient and informed consent obtained. Patients were provided with a standard visual analogue pain-scoring sheet for post-operative use and were instructed as to its use.

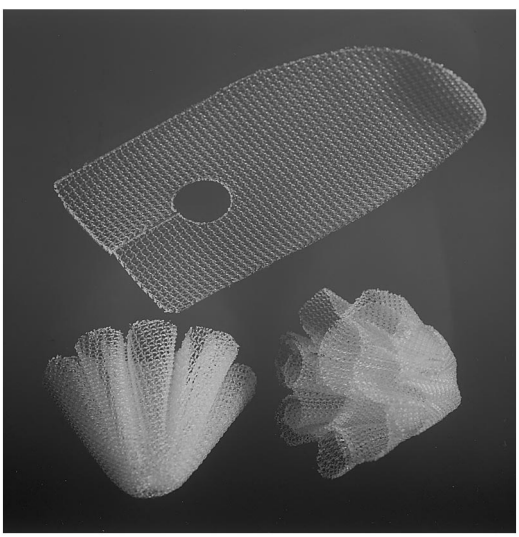

Fig. 1. The PerFix® plug (Bard Ltd.) and onlay patch for inguinal hernia repair.

Patients received a standard general anaesthetic, without pre-medication. Immediate post-operative analgesia was with a single 100 mg diclofenac suppository given per-operatively (with separate pre-operative consent). All patients received a single dose of antibiotic intravenously at induction of anaesthesia (1.5 g cefuroxime).

For those patients entered into Group A (the mesh 'plug' repair), the operation was performed as described by Rutkow and Robbins [1]. The inguinal canal was opened in standard fashion keeping tissue dissection to a minimum. For an indirect hernia, the cremaster muscle was split longitudinally. The indirect sac was dissected free, to well inside the deep inguinal ring and then reduced en masse. Herniotomy was not undertaken routinely. A PerFix plug was inserted, tapered end first, through the deep inguinal ring and positioned beneath the crura of the muscle fibers. The PerFix plug was next secured to the crura of the deep inguinal ring with two or three interrupted, absorbable sutures. With a direct hernia, the sac was dissected free and the base of the sac circumscribed to create an opening into the pre-peritoneal plane where the plug was sited following invagination of the sac and its contents. The plug was then inserted tapered-end first through the transversalis defect and secured to the edges of the defect using three or four interrupted, absorbable sutures. The 'velcro-like' reaction of the PerFix plug to the surrounding tissues helps to hold the plug in position.

We opted to add an onlay patch of mesh as practised by Rutkow and Robbins, although this is not considered an integral part of the mesh 'plug' technique. This patch was simply laid in position covering the transversalis fascia and not sutured. The on-lay patch is included within the package in which the PerFix plug comes.

For those patients entered into Group B (the Lichtenstein 'patch' repair), the hernia sac was dissected free. In the event of an indirect hernia, the sac was transfixed at its base with an absorbable suture and excised. In the event of a direct hernia, the sac was pushed back 'en masse' and the transversalis fascia plicated with an absorbable suture. In both situations a piece of prolene mesh was cut to size and placed over the transversalis fascia, around the cord structures and sutured into place with a 2/0 prolene stitch.

In all patients, the wound layers were closed with absorbable sutures. Bupivacaine (20 mls, 0.5% without adrenaline) was used along the wound edges and to block the ilio-inguinal nerve.

Patients were provided with a three-day supply of analgesic tablets (Co-proxamol) and instructions on whom to contact in the event of a complication or concern. Patients were reviewed in the outpatients' clinic at 1 week and 6 weeks.

Table 1
Results of the mesh 'plug' repair compared with the Lichtenstein 'patch' repair

	Operating time (mins)	Ease of operation*	Return to work (days)	Return to normality (days)	Pain score**	Analgesia (no. of tablets)
Lichtenstein mean (+/−SD)	38 (7)	4.6 (2.1)	29 (18)	35 (12)	3.9 (1.8)	19 (10)
Mesh plug mean (+/−SD)	29 (6)	2.7 (0.9)	22 (13)	25 (11)	2.1 (1.5)	13 (9)
P value	0.01	0.02	0.4	0.04	0.01	0.15

* Score out of ten (zero being the easiest and ten the most difficult — by visual analogue scale).
** Score out of ten (zero being no pain and ten the worst pain experienced ever).

3. Analysis of data and statistics

In this study we compared the mesh 'plug' technique with the 'Lichtenstein' repair with respect to the following outcome measures:

1. The time taken to complete the repair (from initial skin incision to skin closure)
2. Per-operative comments made by the surgeon as to the technical ease of the operation
3. Initial post-operative comments made by the patients as to how they felt prior to them leaving the Day Surgery Unit
4. Pain scores and analgesic requirements during the first 7 post-operative days
5. Complications of surgery, e.g. haematoma formation, wound infection, etc. were recorded during the first 6 weeks following the procedure
6. At the second outpatient visit (at 6 weeks), a record was made of the time taken to return to 'normal' activities and/or work
7. A record as to whether the hospital staff or a general practitioner had been contacted

Statistical analysis was carried out using a two-tailed, unpaired, Student's *t*-test (non-parametric). Differences were considered significant if the *P* value was less than 0.05.

4. Results

Twenty six males with primary inguinal hernia were randomised to have either the standard Lichtenstein 'patch' repair or the PerFix® 'plug' repair (13 in each group) over a 6-month period. The mean age was similar in the two groups: for Group A, it was 52 years (range: 24–79 years) and for Group B, it was 44 years (range: 18–64 years). There were 15 patients with an indirect inguinal hernia and eleven patients with a direct inguinal hemia (confirmed at operation). The two types of hernias were approximately equally distributed between the two groups. There were 14 patients with a right inguinal hernia and 12 with a left inguinal hernia, with approximately equal distribution between the two groups.

The results are summarised in Table 1. There were significant differences in the operating time, technical ease of the operation, time to return to 'normal' activities and overall pain scores. Although patients who had the PerFix® 'plug' repair felt better earlier, we were not able to show a significant difference in the time taken to return to work. Unfortunately, no record was made as to whether patients were employed or 'self-employed'. The pain scores were significantly higher in the Lichtenstein patch group ($P = 0.01$), whereas the mean analgesic requirement was lower in the PerFix® 'plug' group, although the difference did not reach statistical significance.

All patients were discharged home from the Day Case Unit on the same day (except one from the Lichtenstein 'patch' group, who stayed overnight because of post-operative vomiting). When asked in the recovery room, prior to discharge, as to how they felt, all patients except one in the Lichtenstein 'patch' group (who required the admission overnight), either felt well with no pain or had minor discomfort only. One other patient from the Lichtenstein 'patch' group presented at the 1-week follow-up visit with a wound haematoma requiring evacuation under general anaesthesia. Two patients (one from each group) had seromas requiring no specific intervention. There were no wound infections noted in either group and no early recurrences were seen in either group at the 6 week follow-up visit. One patient from the Lichtenstein 'patch' group contacted his General Practitioner to obtain a further prescription for analgesia, while one patient from the mesh 'plug' group made an enquiry as to when to return to work.

5. Discussion

Bassini performed the first inguinal hernia repair in 1884 [9,10]. Using his technique, the recurrence rate remained at approximately 10% for many years and post-operative pain was often quite severe.

Surgeons at the Shouldice Hernia Clinic in Toronto, Canada, achieved very low recurrence rates with what

is currently the 'gold standard' technique (0.8% at 5 years in 78 000 cases) [11]. However, recurrence rates should perhaps not be considered the only criterion for comparison between different hernia repair techniques. The Shouldice technique is far from simple and, as with the Bassini repair, suffers from the problem of suture line tension and the approximation of normally unopposed tissues. The more extensive tissue dissection and the manner of repair required, may cause more post-operative pain and hence, a slower post-operative recovery. These aspects of the technique limit its popularity, despite the low recurrence rates, and often lead to 'short cut' variants in the method of repair.

The surgical profession has not accepted widely the new laparoscopic methods of mesh repair, with its use at present, limited to laparoscopic enthusiasts. In a prospective comparison, open tension-free 'plug' hernia repair was found to be superior to laparoscopic repair [12]. The laparoscopic repair is technically more difficult, has a lengthy 'learning curve' and is associated with more complications. In addition, the laparoscopic technique is costly and is driven by sponsoring industry rather than support from prospective, randomised, controlled studies [13]. Similarly, pre-peritoneal mesh repairs have not gained widespread acceptance.

The Lichtenstein repair is simpler technically than the Shouldice repair and in part, addresses the problem of suture line tension, while achieving a low recurrence rate — approaching that of the 'gold standard' Shouldice repair [4]. The use of a mesh 'plug' to repair a primary inguinal hernia is said to offer further advantages over the standard Lichtenstein repair. In fact, Lichtenstein and co-workers were the first to use the mesh 'plug' technique for hernia repair in 1974. They recommended the use of the plug for the repair of both femoral and recurrent inguinal hernias. In a large series of 1402 of recurrent inguinal hernias, followed-up for more than three years, they reported an impressively low recurrence rate of 1.6% [14–16].

The mesh 'plug' technique of primary inguinal hernia repair is completely tension-free, with the sphincter-like action of the internal ring and the 'flap-like' valve action of the inguinal canal being preserved. Dissection is kept to a minimum, and with no tissue-to-tissue approximation, post-operative discomfort is reduced hence speeding up the return to 'normal' activity. In the mesh 'plug' technique, the repair of an indirect inguinal hernia necessitates that the dissection is carried high up the internal ring in order to accommodate the plug.

Rutkow and Robbins are notable and strong advocates of the mesh 'plug' technique. Originally., they used a hand-rolled hernia plug, then developed a preformed mesh plug. In a preliminary report they compared their mesh 'plug' repair with a conventional sutured repair and concluded that minimal dissection and 'no tension' led to greater patient comfort, more rapid rehabilitation, a low recurrence and minimal complications [17]. In a follow up report, they quoted a recurrence rate of 1% for primary inguinal hernias and 2% for recurrent inguinal hernias at 5 years [18,19].

In our small pilot study we compared the mesh 'plug' technique with the Lichtenstein repair. Our results suggest that the mesh 'plug' technique offers advantages over the Lichtenstein repair. The mesh 'plug' repair necessitates minimal dissection and is technically straightforward. Patients seemed to experience less post-operative discomfort and returned to 'normality' more quickly. We highlight therefore, the need for a larger trial of this technique, which should be undertaken to confirm the results of our pilot study and to assess further long term recurrence rate.

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Volatile induction and maintenance (VIMA) versus total intravenous anaesthesia (TIVA) for minor gynaecological procedures

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Abstract

We compared the techniques of volatile induction and maintenance (VIMA) and total intravenous anaesthesia (TIVA) in various aspects. Patients undergoing spontaneous respiration-general anaesthesia were randomised into two groups; Group P received iv fentanyl 1 μg/kg and propofol 2 mg/kg for induction followed by propofol 10 mg/min as required. Group S received vital capacity induction with sevoflurane and were maintained on 66% N_2O in O_2 with sevoflurane 2%. Induction times, complications and recovery times were recorded. Visual analogue scores for pain and satisfaction were assessed. The two groups did not differ significantly in emergence times or VAS scores for pain and satisfaction but more complications like apnoea and injection pain were encountered during TIVA compared to VIMA. Our results suggest that both techniques are comparable in efficacy for providing anaesthesia in minor gynaecological surgery with swift induction, good recovery and minimal postoperative complications.

Keywords: VIMA; TIVA; Dilation and curettage; Propofol; Sevoflurane

1. Introduction

Sevoflurane has been suggested to be the long awaited, ideal inhalational anaesthetic for its properties of being pleasant smelling, relatively non-irritating to the airways and its low blood-gas solubility which allows rapid induction and recovery from anaesthesia [1].Clinicians have taken advantage of these attributes to adopt it for volatile induction and maintenance (VIMA), especially in the day surgery setting, since it has a potential to allow 'fast-tracking' of patients [2].

A contrasting but also popular technique for day surgery is total intravenous anaesthesia (TIVA) with propofol which boasts rapid induction and recovery [3].

Although previous studies have compared sevoflurane and propofol for day surgery anaesthesia, this has mainly involved the induction phase [1]or maintenance with muscle relaxants [4]. We undertook to study the efficacy of these techniques on spontaneously breathing patients for short duration surgery such as dilatation and currettage. Also, it was intended that diclofenac suppositories be used for pain relief, so that we could assess the acceptability of suppository use in our population, the incidence of side-effects and whether it provided appropriate pain relief for these cases.

2. Methods

After obtaining institutional ethics board approval and informed consent, 80 ASA I & II patients scheduled for dilation and curettage of the uterus with hysteroscopy were enrolled. Exclusion criteria included patients with clinically significant cardiovascular, pulmonary, hepatic, renal, neurologic, psychiatric or metabolic diseases. Those who had general anaesthesia 7 days prior to the study were also excluded. Patients were randomly assigned to either of the two treatment groups: group P received IV fentayl 1 μg/kg and propo-

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fol 2 mg/kg for induction followed by propofol 10 mg/min as required. Group S received vital capacity induction with sevoflurane and were maintained on 66% N_2O in O_2 with sevoflurane 2% as the set-point for maintenance.

Consistent with our day surgery procedure, no premedication was used. In the operating room, routine monitors were applied and a 20G Venflon peripheral IV cannula was secured on the dorsum of the hand.

Group P patients were induced with IV fentayl 1 μg/kg given 2 min prior to a pre-calculated induction dose of propofol premixed with 20 mg of lignocaine 1% which was administered over 30 s. At the loss of eyelash reflex, the patient was positioned in the lithotomy position and surgery commenced. Intravenous propofol boluses of 10 mg were administered every minute as required to maintain anaesthetic depth as judged by clinical signs and hemodynamic responses to surgical stimuli. A 50% O_2/air mixture was given by face mask.

Group S patients were induced with a vital capacity breath of 8% sevoflurane from a primed circle circuit with 8% sevoflurane in a 66% nitrous oxide/oxygen mixture. Anaesthetic concentration at the Y piece was confirmed by a capnometer. Prior to induction the patients were trained in the technique of vital capacity breaths and care was taken to avoid hyperventilation. At the loss of eye reflex, the patient was positioned, diclofenac suppositories 100 mg were inserted and surgery commenced. Maintenance in this group proceeded with an end-tidal sevoflurane value of 2% as the set point.

When surgery was concluded, either sevoflurane was turned off or no further boluses of propofol were administered. The patients were then transferred to the post anaesthetic care unit (PACU) where further monitoring continued. Rescue medication was given as necessary by way of iv fentanyl for pain or iv maxolon for nausea or vomiting.

Intraoperatively, the induction time as denoted by loss of eyelash reflex was determined from time of commencement of propofol injection or mask inhalation. An independent but unblinded observer recorded complications encountered like pain on injection, breath holding, hiccups or movement. Apnoea was defined as loss of spontaneous respiration for more than 30 s and hypoxaemia as a pulse oximetry reading of less than 90%. Duration of surgery was recorded from time of cleansing to removal of speculum. In the recovery, time to opening eyes on demand (checked at 15 s intervals from termination of anaesthetic) was recorded.

Likewise, time to recall name and address was determined by an independent observer. The patient was also asked to assess the degree of pain and satisfaction based on a visual analogue scale of 0–100 after regaining consciousness for 1 h. Other side effects like awareness intraoperatively, nausea and vomiting were ascertained. Any complications encountered during emergence were recorded by the independent observer.

Table 1

	Group I	Group II
Number (n)	39	41
Induction time (s)	39.2 ± 7.0	40.4 ± 13.1
Surgery time (s)	389 ± 150	415 ± 174
Apnea	54%*	7.8%
Injection pain	18%*	0%
Hypoxaemia	2.5%	2.4%

3. Results

The two study groups were comparable with respect to age, weight, ASA status and duration of surgery (refer to Table 1). There was a significantly higher incidence of apnoea ($P < 0.01$) and injection pain ($P < 0.05$) in the propofol group. In the sevoflurane group, two patients had movements during induction and one patient developed a cough with copious secretions. In the propofol group, two patients had movements after induction and one patient had laryngospasm. In each group one patient developed hypoxaemia. Overall, there were no cases of intraoperative awareness.

Emergence times from discontinuation of the anaesthetic to eye opening, recalling name and address were similar in both groups. (refer to Table 2). Likewise, the VAS scores for pain and patient satisfaction were similar in both groups. Although there was a higher incidence of nausea noted in the sevoflurane group, this was not statistically significant. There was a patient preference towards TIVA instead of VIMA for a repeat anaesthetic.

None of the patients in group S objected to the use of diclofenac suppositories and no immediate complications like hypersensitivity arose from it.

Table 2

	Group I	Group II
Time to eye opening (s)	307.6 ± 116.2	400.4 ± 140.3
Time to recall name (s)	334.6 ± 111.1	415.9 ± 143.7
Time to recall address (s)	345.6 ± 115.1	427.4 ± 145.5
Pain score	36.64	44.17
Satisfaction score	88.33 ± 19.3	87.07 ± 17.4
Nausea (%)	0	2.5
Awareness (%)	0	0
Agreeable to same anaesthetic (%)	100	92

4. Discussion

Sevoflurane induction was swift and in a single vital capacity breath produced onset of anaesthesia within 40 s which is comparable to that previously reported by Yurino [5].

Our results demonstrated a smooth induction with good tolerability of sevoflurane even at such high concentrations in unpremedicated patients, without the use of adjunctive drugs to obtund airway irritation or cough reflex [6]. Due to the rapid equilibration between inspired and alveolar anaesthetic concentrations, surgical depth was reached sufficiently to allow patient positioning, cleansing and surgical commencement in rapid succession without ill effects on the patient.

The TIVA technique also induced patients quickly but was fraught with more complications during induction especially apnoea. This could have arisen from the administration of an analgesic dose of intravenous fentanyl, given prior to induction, for two reasons. Firstly, as pain on propofol injection is well documented [7,8], it should help to alleviate this. Secondly, since propofol has poor analgesic properties [9], fentanyl provides intraoperative analgesia . Fentanyl's inclusion helps provide balanced anaesthesia.

Even so, there was difficulty in controlling the depth of anaesthesia with the TIVA technique which resulted in apnoea after induction and then at the critical moment of surgical stimulation, movement and laryngospasm from light anaesthesia. Indeed, awareness is a great concern with the TIVA technique. Midazolam has been recommended to reduce the rate of intraoperative awareness significantly without influencing recovery profiles or discharge times from the day care unit [10].

In our study, the patients that moved and experienced larygospasm denied intraoperative awareness. This could be due to the low level of noxious stimulus from the procedure, avoidance of muscle relaxants and the use of propofol at an average rate of 150 μg/kg/min. However, it is unnerving for the clinician when having to overcome these problems, to administer a large bolus of propofol quickly, resulting in apnoea and thus be drawn into a vicious cycle.

The VAS pain scores at 1 h was comparable between the two groups despite short-acting intravenous fentayl being used in the propofol group in contrast to diclofenac suppositories, which have a long onset time, being used in the sevoflurane group. This may be explained by the procedure being most 'painful' at the time of dilatation of the cervix with little post-operative after effects and pain scores taken only at 1 h post-surgery. It is postulated that diclofenac suppositories have an added advantage of a sustained and comfortable recovery for the patients without the adverse effects of opioids [11]. However, the relative bioavailability of suppositories is low at 55% [12] and recent studies have shown that there may be a reluctance for rectal drug administration [13]. Our patients were not averse to this when told its purpose for analgesia but it still remains essential for the anaesthetist to inform patients beforehand to avoid undue stress to the patients.

Both groups were highly satisfied with their allocated anaesthetic technique but the TIVA group was more inclined to choose a similar repeat anaesthetic which is surprising considering that 18% had injection pain. Patients in the sevoflurane group rejected a repeat anaesthetic because of the 'smell'. We speculate that our patients may have preconceived expectation of pain on injection but are unprepared for inhaling a 'smelly gas'. Anaesthetists should bear in mind that not all will agree that sevoflurane has a pleasant odour and in these patients, sevoflurane induction may not be a good option.

The incidence of nausea in both groups was low although it was marginally higher in the inhalational group. The use of nitrous oxide has long been associated with postoperative emesis [14] whereas propofol has purportedly an antiemetogenic effect. This was illustrated in a study by Tramer, Moore and McQuay which showed TIVA to be superior in preventing early post-operative nausea and vomiting, thus reducing delays in discharge. There is no difference between TIVA and use of nitrous oxide in late emesis [15]. The low incidence of PONV is unexpected as the study population were all women undergoing dilatation of the cervix, both high risk factors for PONV [16,17]. Previous studies have found the incidence of nausea and vomiting in gynaecological surgery to be 30–70% even with antiemetics [18,19].

We have found both TIVA and VIMA anaesthesia to be appropriate for dilatation and curettage of the cervix and other minor surgery akin to this, for example, cystoscopy and urethral dilatation. Although the TIVA technique was more popular, complications of injection pain and apnoea reduced its anaesthetic appeal. Moreover, the VIMA technique has an added advantage in patients with poor venous access, phobia of needle puncture or a difficult airway.

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The use of 0.25% lignocaine combined with fentanyl and mivacurium for intravenous regional anaesthesia (IVRA) of the upper limb

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Abstract

In this study, two groups of patients undergoing intravenous regional anaesthesia (IVRA) for surgery on the forearm or hand have been compared. The first group received 0.5% lignocaine while the second received 0.25% lignocaine + fentanyl 1 μg kg^{-1} and mivacurium 1 mg. A prior study comparing 0.5% lignocaine to pancuronium 0.5 mg with 0.25% lignocaine and fentanyl 1 μg kg^{-1} showed a faster onset of motor block in the 0.5% lignocaine group [1]. This study demonstrates a significantly faster onset of motor block in the mivacurium-administered group. The potential advantage of mivacurium is its non-organ dependent metabolism by plasma cholinesterase. There was no difference in the onset of the sensory block. It is well known that there is little postoperative analgesia associated with conventional Bier's block. The study found lower pain scores in the second group 45 min and 1 h post-operatively. Anaesthesia was successful in all cases and none of the patients experienced muscle weakness after tourniquet release.

Keywords: Analgesia; Fentanyl; IVRA; Lignocaine 0.25%; Mivacurium; Muscle relaxation; Toxicity

1. Introduction

Intravenous regional anaesthesia (IVRA) needs no introduction. First described by August Bier in 1908, it soon lost popularity with the advent of specific brachial plexus blocks. In 1963, Holmes repopularised the technique and to date, many modifications have been described [1–7]. Today, IVRA has remained popular owing to the fact that it may be safely administered by people with basic skill levels as well as the low incidence of side effects associated with the technique [8,9]. IVRA is often used in the ambulatory surgery setting.

In conventional Bier's block, 0.5% lignocaine is administered in a volume of 30–40 ml, equivalent to a dose of 2.5–3 mg kg^{-1} for an average-sized patient in our Asian population. The present study looks at the use of 0.25% lignocaine with fentanyl 1 μg kg^{-1} and mivacurium 1 mg in a volume of 40 ml, corresponding to 1.5–2 mg kg^{-1}. This combination confers several potential advantages namely allowing earlier tourniquet release, a lower risk of systemic toxicity should tourniquet failure occur, postoperative analgesia and profound muscle relaxation of rapid onset.

2. Methods

The Hospital Ethics Committee approved this double-blind study. Informed consent was obtained from the patients. Forty-eight unpremedicated patients, ASA physical status I or II, presenting for elective or emergency surgery of the forearm or hand, were randomly allocated to two groups. In group one, the patients were administered 30 ml of 0.5% lignocaine while the patients in group two were given 40 ml of lignocaine 0.25% combined with 1 μg kg^{-1} of fentanyl and 1 mg of mivacurium.

Following the insertion of a 22-gauge intravenous cannula in the non-operative limb, a 22-gauge intravenous cannula was placed as distally as possible on the dorsum of the hand of the operative limb. Exsanguination of the limb was then achieved with anti-gravity

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Table 1
Distribution of surgical procedures between group one and group two[a]

Cases	Number of cases in group one	Number of cases in group two
Wound debridement, toilet and suture of hand	7	4
Removal of implants from forearm or hand	5	4
Carpal tunnel release	3	4
Excision of ganglion	2	5
Open reduction, internal fixation of finger	3	2
Release of trigger thumb/ trigger finger/tenosynovitis	2	2
Manipulation and reduction of Colles' fracture	1	1
Removal of foreign body of hand	1	0
Excision biopsy of palm cyst/finger nodule	0	2

[a] Group one = lignocaine 0.5%. Group two = lignocaine 0.25%+ fentanyl 1 μg kg^{-1} + mivacurium 1 mg.

drainage, compression of the brachial artery ± the use of an Esmarch bandage. Following this, the distal cuff of the tourniquet was inflated to 250 or 100 mmHg above systolic blood pressure, whichever was higher, after which the proximal cuff was inflated to the same pressure. This was carried out to aid exsanguination of the upper limb [8]. After confirming the absence of the radial pulse, the local anaesthetic solution was injected over 90 s by an anaesthetist not involved in the study. The distal cuff of the tourniquet was then deflated. Subsequently loss of pinprick sensation was tested in six areas; namely, the pulps of the index and little fingers, the thenar and hypothenar eminences, the first web space on the dorsum of the hand and the lateral aspect of the forearm, corresponding to the three major nerves supplying the upper limb, i.e. the median, ulnar and radial nerves. Time to loss of sensation of pain to pinprick, i.e. onset of analgesia was recorded from the time of administration of lignocaine. Onset of motor blockade was defined as weakness of finger grip, the control being the patient's unanaesthetised hand.

Intraoperative monitoring by means of electrocardiogram, non-invasive blood pressure and pulse oximetry was performed. Sedation with intravenous midazolam 1–2 mg was given as and when required.

When surgery had been completed, the tourniquet was released cyclically after a minimum of 20-min post-injection of local anaesthetic, i.e. deflated for 5 s, reinflated for 1 min, deflated another 5 s, reinflated another 1 min and subsequently permanently deflated. The patients were then asked to report if they experienced any giddiness, perioral numbness, tinnitus, diplopia, nausea or difficulty breathing.

Postoperatively for 1 h, at 15-min intervals, the patients' pain scores were monitored using a visual analogue scale (from zero to ten).

Analysis of data was performed with the Student's *t*-test and the Mann–Whitney *U*-test.

3. Results

The two groups were comparable in patient demographics, distribution of surgical procedures [Table 1], mean ischaemic time, duration of operation and time to onset of analgesia.

The onset of motor blockade was significantly faster in group two ($P < 0.005$) [Table 2]. In addition, pain scores 45 min and 1 h postoperatively were significantly lower in group two. ($P < 0.05$). [Fig. 1]

Anaesthesia was successful in all cases. Five patients in group one reported slight giddiness after the tourniquet was deflated, one of whom also had tinnitus. In group two, 11 patients experienced slight giddiness. None of the patients in group two experienced diplopia, skeletal muscle weakness or nausea after release of the tourniquet.

Table 2
Mean (SEM) age, weight, ischaemic time, duration of operation, time to onset of analgesia, lignocaine dose and time to onset of motor block[a]

	Group one ($n = 24$)	Group two ($n = 24$)	*P* value
Age (years)	32.3 (3.0)	31.0 (3.0)	NS
Weight (kg)	61.9 (2.2)	58.9 (1.5)	NS
Ischaemic time (min)	47.2 (6.0)	40.2 (3.3)	NS
Duration of operation (min)	29.4 (5.2)	22.4 (2.7)	NS
Time to onset of analgesia (min)	5.2 (0.6)	5.1 (0.6)	NS
Lignocaine dose (mg kg^{-1})	2.5 (0.5)	1.7 (0.2)	Not tested
Time to onset of motor block (min)	11.1 (1.3)	3.0 (0.3)	<0.001

[a] Values are mean (SEM) except lignocaine dose: mean (S.D.). Group one = lignocaine 0.5%, group two = lignocaine 0.25%+fentanyl 1 μg kg^{-1} + mivacurium 1 mg. NS: not significant.

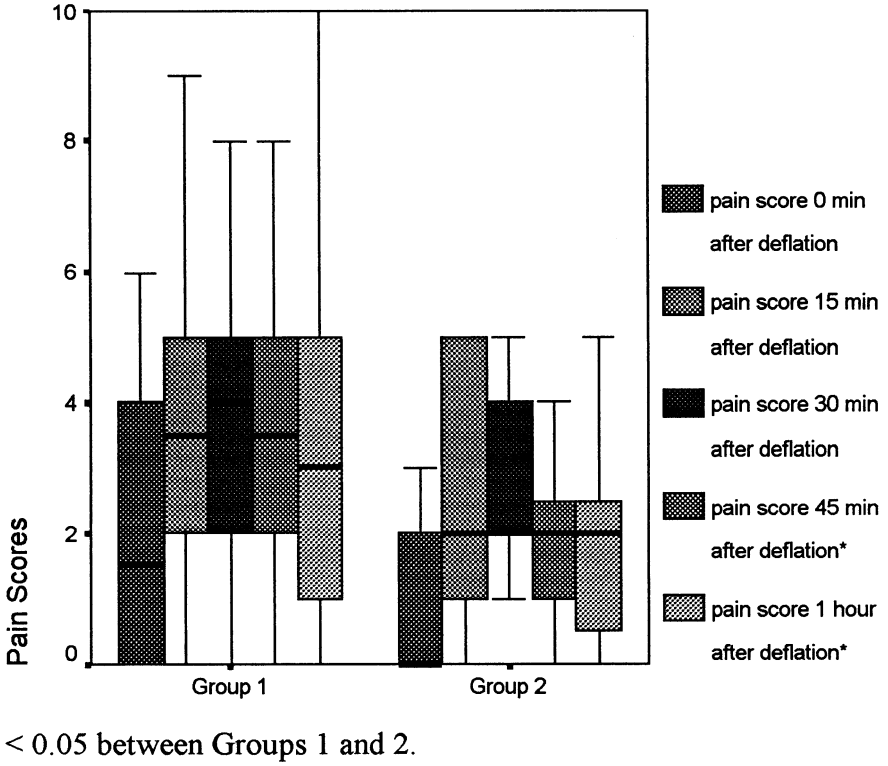

Fig. 1. Comparison of postoperative pain scores between group one (0.5% lignocaine) and group two (0.25% lignocaine + fentanyl 1 μg kg^{-1} + mivacurium 1 mg). [median ± interquartile range] * $P < 0.05$ between groups one and two.

4. Discussion

Our study demonstrates that 0.25% lignocaine combined with fentanyl 1 μg kg^{-1} and mivacurium 1 mg is a suitable alternative to 0.5% lignocaine for intravenous regional anaesthesia of the upper limb. Mivacurium, being metabolised by plasma cholinesterase, has a short duration of action. Moreover, the average dose of lignocaine in group two was 1.7 mg kg^{-1} which represents a significant reduction in the administered dose of lignocaine, thus allowing for an increased margin of safety should inadvertent systemic administration of drug occur.

Sztark et al. [1] reported a delayed onset of motor blockade with the use of pancuronium 0.5 mg added to lignocaine 0.25% combined with fentanyl 1 μg kg^{-1}. Elhakim et al. [2] found that adding 2 mg of atracurium to 0.5% lignocaine resulted in a significantly greater degree of muscle relaxation as opposed to 0.5% lignocaine alone, although there was no significant difference in the time taken to achieve motor block. Our study shows a significantly faster onset of motor blockade when 1 mg of mivacurium was added to 0.25% lignocaine with fentanyl 1 μg kg^{-1} with no effect on the onset of analgesia. A possible explanation is that vasodilatation as a result of histamine release from mivacurium enhances delivery of the drugs to their site of action. Indeed, the majority of patients in group two developed transient extreme erythema of the operative limb upon administration of the drug combination. Muscle relaxants in IVRA have been postulated to interfere with muscle spindle activity resulting in loss of muscle tone and reduction of central input because they are the sensory end organ of skeletal muscle. This may then facilitate the manipulation and reduction of bone fractures or dislocations, potentially useful in the emergency room. McGlone et al. [10] found that closed reduction of wrist fractures was facilitated and quality of analgesia improved with the addition of 2 mg of atracurium to the Bier's block. It is important to be aware of the risk of anaphylaxis or anaphylactoid reactions when administering mivacurium.

Evidence for the existence of peripheral opioid receptors is not lacking [11]. Gissen et al. [12] postulated that high concentrations of fentanyl may exert a weak local-anaesthetic type action on peripheral nerves. It is unlikely that fentanyl exerts a significant peripheral analgesic or local anaesthetic action when administered in this concentration to the tourniquet-isolated limb because there was no difference in the onset of analgesia between the two groups.

In contrast to Sztark's [1] finding of a lack of improvement in postoperative analgesia in the group of patients given fentanyl 1 μg kg^{-1} with 0.25% lignocaine and pancuronium 0.5 mg, we have found significantly lower pain scores at 45 min and 1 h postoperatively.

This may be attributable to the central analgesic effects of fentanyl upon tourniquet release.

As was in common with the findings of several authors, [4,13] 11 patients in group two, as opposed to five patients in group one, experienced slight giddiness after tourniquet release which subsided within 10 min. None of the patients developed any other symptoms of local anaesthetic toxicity except for a single patient in group one who also had tinnitus. No one experienced any nausea or vomiting. Plasma concentrations of local anaesthetic have been found to be higher in patients given a fentanyl/prilocaine combination versus prilocaine alone [4]. This was attributed to the vasodilator effect of fentanyl resulting in a more rapid washout of local anaesthetic from the limb following cuff deflation. In any case, the total dose of lignocaine used in group two was similar to that used to treat cardiac arrhythmias.

To summarise, we feel that the combination of 0.25% lignocaine with fentanyl 1 $\mu g\,kg^{-1}$ and mivacurium 1 mg for IVRA may be a useful substitute for 0.5% lignocaine for minor surgery of the forearm or hand as well as to facilitate the manipulation and reduction of fractures in the emergency room setting. However, we reiterate that the presence of personnel trained in airway management and resuscitation is necessary when employing this technique because of the inherent risks of administration of a muscle relaxant, however small the dose.

Acknowledgements

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Abstracts

Intravenous regional anaesthesia: evaluation of four different additives to lidocaine

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Cir May Amb 1998;3(3):174–178

Introduction: Intravenous regional anaesthesia is a simple technique that may be useful in patients scheduled to undergo ambulatory hand and forearm surgery. The aim of this study was to evaluate differences in onset of the block and analgesia after releasing the tourniquet between an opioid, nonsteroidal anti-inflammatory drugs and another local anaesthetic. *Patients and Methods*: One hundred and twenty patients (ASA I or II) scheduled for forearm surgery were randomly assigned to one of the four following groups: group I, 30 ml lidocaine 0.75% + 5 ml saline; group II, 30 ml lidocaine 0.75% + 5 ml bupivacaine 0.25%; group III, 30 ml lidocaine 0.75% + ketorolac 30 mg + 4 ml saline; group IV, 30 ml lidocaine 0.75% + fentanyl 100 μg + 3 ml saline. After application of routine monitoring, a double tourniquet was positioned on the upper operative arm. Onset was determined by the appearance of paresthesias, while the sensory block was evaluated by the disappearance of temperature sensation. Furthermore, the time to complete motor blockade of the fingers was assessed. After releasing the tourniquet, the reappearance of muscle activity and temperature sensation as well as the appearance of spontaneous pain were assessed. *Results*: There were no differences among groups in demographic variables, distribution of surgical procedures, length of surgery, or tourniquet times. After releasing the tourniquet, the occurrence of spontaneous pain was slowest in the ketorolac group (group III) and faster in group IV. There were no significant differences between groups in other clinical variables. *Conclusion*: The addition of 30 mg ketorolac to local anaesthetic resulted in a significant longer pain-free period after releasing the tourniquet. The addition of an opioid to local anaesthetic did not provide a faster onset of the block or a longer pain-free period after releasing the tourniquet.

Outpatient oftalmological surgery at the Hospital General de Baza between 1995 and 1997

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Cir May Amb 1998;3(3):179–184

The good results of outpatient surgery have had an important impact on our service. We conducted the following descriptive study of 684 operations of outpatient surgery carried out at the Unit of Ophthalmology from April 1995 to May 1997. Of all our operations, 73.27% were done on an outpatient basis in 1995, 91.35% in 1996 and 94.51% in 1997. Of the operations, 96.78% were carried out under local anaesthesia and the remaining 3.22% under general anaesthesia. The mean length of stay was 0.19 days. One out of 10 patients remained in hospital because of complications or social reasons, the length of stay in this group being 2.0 days. Today, in our service, outpatient surgery represents 94% of operations; mainly under local anaesthesia, the cataract being the dominant surgery, of which 9.2% do not leave the hospital on the day of surgery. For this, the global length of hospital stay of our patients is less than 1 day.

Laringeal microsurgery as an outpatient procedure

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Cir May Amb 1998;3(3): 185–186

We believe that ambulatory anaesthesiology in endolaryngeal microsurgery is a sure technique when correctly performed. We studied 61 patients operated on at our hospital with this technique, excluding big tumours in which we anticipated respiratory problems. No problem was found and only 3% were hospitalised for problems in extubation. No patient was readmitted to hospital in the following days because of problems.

First year experience in a day surgery unit in a medical care centre under public ownership

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Cir May Amb 1998;3(3): 187–194

The practice of ambulatory surgery means a substantial change in the attitude of surgeons. This change means its implementation in many countries has not been easy. Between September 1995 and June 1996, 620 consecutive patients (35% women) of median age 47 years were treated with major ambulatory surgery procedures. The distribution for the different specialities was: general surgery, 45.2%; orthopaedic surgery, 21.6%; urology, 16.4%; otorhinolaryngology, 8.9%; ophthalmology, 4.4%; and vascular surgery, 3.5%. Data were stored on a personal computer and analysed with the Stat View 4.4 program. Most operations were performed for: hernia, 148 cases; removal of metal, 55 cases; subcutaneous tumour, 45 cases; laryngeal lesion, 39 cases; pilonidal disease, 36 cases; hydrocoele, 36 cases; cataract, 27 cases; varicose vein, 22 cases; and arthroscopy, 19 cases. With a mean surgical time of 40 min, the most common procedures were: hernioplasty, 91 cases; herniorrhaphy, 76 cases; excision of tumours, 71 cases; surgical metal extraction, 54 cases; hydrocoele repair, 40 cases; laryngeal microsurgery, 39 cases. Local anaesthesia was done in

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37.5% of patients, spinal in 30%, general in 18.5%, retrobulbar in 4.5%, epidural in 4% and others in 5.5%. Hospital admission was necessary in 5% of patients and readmission in 1.4%. Twelve percent of patients developed some minor complications: urinary retention, 17 cases; wound infection, 11 cases; vomiting, 11 cases; and inadequate pain control, 8 cases. The satisfactory results show that the Day Surgery Unit provides a high quality treatment despite little experience.

Design and structure of ambulatory surgical units

C Sánchez-Cabezudo Díaz-Guerra, JL Porrero Carro

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The arrival of ambulatory surgery to the National Health System constitutes a new way of surgical attention, in which the main beneficiary is the user, and requires the organisation of spaces and the creation of new areas of care. The objectives of this modality of surgical care are to improve the diagnostic and therapeutic processes as well as to reduce the cost. For creating an Ambulatory Surgical Unit, we have to make exhaustive and good planning, analysing the following: the population around and its request, the need of staff and instruments, and the architectural structure we are going to build. Also, we have to design the different areas of the unit, their physical characteristics and functions: Consultation Area, Reception Room, Waiting Room, Wardrobe Room, Pre-anaesthetic Area, Surgical Area, Post-anaesthetic Recuperation I Area, Post-anaesthetic Recuperation II Area.

Considerations over the off-work period after inguinal herniorraphy

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The time of work cessation after an inguinal herniorraphy does not have any influence in the failure rate of a given technique. In the decision of returning to work, several clinical factors have been traditionally considered, such as the type of hernia or the degree of physical activity required by the job. Nowadays, it is considered that a period between 2 and 4 weeks off work is adequate for most patients. With the purpose of evaluating the opinions concerning this matter, we have conducted a nationwide audit with 187 participating surgeons and 201 general practitioners. Both groups conclude that a 4-week off-work period is adequate in an ideal patient. Nevertheless, the physical degree of laboural activity, the presence of bilateral hernia, the use of a prosthetic mesh, and the will of the patient in reducing this period have influence in the advice of more than 50% of the physicians of both groups. As none of the factors quoted have influence on the failure rate of a herniorraphy, the authors suggest that more thorough information could be useful for both surgeons and general practitioners.

Ambulatory surgery of PTFE (gore-tex) vascular prosthesis for hemodialisys

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In order to analyse the results obtained in prosthetic vascular access for dialysis, performed in an ambulatory surgical setting, all the operations done between January 1992 and April 1995 were retrospectively revised. Two hundred and seventy-six prosthetic vascular accesses with polytetrafluoroethylene grafts were performed. Two hundred and forty-six out of the 276 operations were done as outpatient cases, so that the substitution index was 89%. The kinds of accesses were as follows: 184 (74.8%) upper arm grafts; 28 (11.3%) loop forearm grafts; 27 (10.9%) straight forearm grafts; 7 (2.8%) brachiojugular grafts; and 1 (0.4%) femoro-femoral graft. All operations were performed under local anaesthesia without pharmacological pre-medication. There were no postoperative deaths. Early complications were as follows: postoperative bleeding controlled spontaneously with local pressure, 2 (0.8%); early peri-prosthetic infection, 2 (0.8%); early thrombosis successfully treated with rescue surgery within the first 48 h, also in an ambulatory setting, 3 (1.2%). Three patients needed hospital admission (1.2%), one due to threatening arrhythmia and two because of severe hyperglycaemia and ketoacidosis in diabetic patients. There was no increase in morbidity when the patients travelled for long distances from the hospital to their home immediately after the operation. After considering these results, we can state that prosthetic vascular access can be performed in all patients under local anaesthesia and in an ambulatory surgical setting without an increase in morbidity.

Indications of long-term central venous catheter. A 290-case experience

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Cir May Amb 1998;3(3): 207–211

Introduction: We assessed the outcome of long-term central venous catheters used in cancer patients from October 1988 to June 95. *Patients and Methods*: Two hundred and ninety catheters were inserted in 275 cancer patients. In 178 cases, a reservoir was also implanted. In this series, 161 patients were males and 114 females with age ranging between 18 and 84 years. The most frequently used approach was percutaneous puncture of the left subclavian vein. *Results*: The mean operative time was 43 min for catheter with reservoir vs. 34 min for Hickman® catheters. The overall morbidity rate was 9.7%, with 7.3% for the catheter with reservoir group and 13.9% for the Hickman® group. *Conclusions*: Long-term central venous catheters with reservoir were associated with a lower morbidity compared with Hickman® catheters. On the other hand, catheters without reservoir allow the administration of larger volumes of fluids and highly concentrated substances especially, if it remains in place less than 6 months.

Gynaecological outpatient unit. Our experience

P Deulofeu, LL Casanova, A Avecilla, P Sánchez, J Codina, L Díaz, C Utrera

Cir May Amb 1998;3(3): 212–217

After our first year of satisfactory experience in this kind of surgery, we have been following the same orientation for 2.5 years. We have extended the indications, increased our surgical activity, starting a program of 'afternoon surgery', reduced hospitalisation and avoided waiting lists.