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J. of Ambulatory Surgery 10 (2004) 173

Ambulatory Surgery

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Obituary

Dr. Caterina Ramon

Dr. Caterina Ramon, Anaesthetist-in-Chief, Hospital de Manacor, Mallorca, Spain, died from lung cancer on 6 April 2003. She was a pioneer of ambulatory anaesthesia in Spain. She developed the first Ambulatory Surgery Unit in Hospital de Viladecans (Barcelona) in 1991 and became a very respected member of the Spanish Association Of Major Ambulatory Surgery (ASECMA) and member of the Editorial Board of the Ambulatory Surgery Journal. As from 1996 she started and developed the anaesthetic service of the new Hospital de Manacor in Mallorca and since January 2002 has served as the Managing Director of this Hospital. During her lifetime she made contributions to all the International meetings of the International Association for Ambulatory Surgery (IAAS) and was one of the principal movers in all the ways of assessing and promoting the quality of ambulatory anaesthesia care at a national and international level.

Her life was characterised by a deep understanding of her speciality and a kind of friendship that all her colleagues and friends will miss forever.

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Danish association of day surgery

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The Danish Association was founded in 1997 by a group of professionals from Vejle Hospital after having had several visits from Paul Jarret from the IAAS. Vejle Hospital had been active in day surgery for several years and was now rearranging the day surgery unit in order to improve in efficiency and in patient service. Since the beginning of international day surgery congresses, Denmark bad been very well represented with many delegates to each congress—latest in London 1997, where the British secretary of health in her speech wondered if there were any doctors left in Denmark at the time for the congress. Therefore Paul Jarret suggested a Danish national association to be formed and with some support from the hospital management the Vejle group to up the challenge.

Now after 6 years the situation is the following.

- The association has about 400 personal and 15 company members. The members are doctors from all specialties involved in day surgery, nurses, managers, secretaries, and representatives from instrument and drug companies.
- There is one yearly day meeting in the springtime with about 300 delegates at every meeting and one half-day meeting in the autumn in connection to the general assembly. The association performs a yearly survey of the percentages of day surgery procedures in the country and in the health regions (counties) in regard to the IAAS basket of day surgery procedures.
- The association has been represented by the president in national groups counselling the ministry regarding DRG pricing of day surgery procedures and in national surveys of day surgery activity and organisation. We have a web site (http://www.dsdk.dk) that is frequently updated and having links to other day surgery sites. A newsletter is sent to the members four times a year.
- Denmark has been well represented at the IAAS congresses and we have been members of the IAAS since 1998 and there taken part in the IAAS general assemblies.

Also contributions to the congress programs have been frequent even by invitation by the congress committees. The congress in 2011 is planned to take place in Denmark.

Some examples of the activity in DK:

Year	2001 (%)	2002 (%)
Total	73.1	73.9
Cataract	94.5	94.2
Varicose veins	64.1	72.4
Inguinal hernia	67.1	69.2
Haemorrhoids	73	764
Qpen breast: biopsy	56.2	54.7
Transur. Bladder	27.4	26.2
Carpal tunnel	73.3	71.3
Bunion	72.4	72.9
Remov. Implant	76.8	77.9
Knee arthrosco.	90.4	91
Arthr. Meniscus	89.8	90.1
Lap. Chol.	13.1	14.1
Male sterilisat.	99.6	99.6
Female sterilisat.	92.2	91.80/0
Termin Pregnan	97.0	97 3
Tonsillectomv	32.1	33.20/0
Adenoidectornv	60.6	1.2
Colonoscopy w/	90 3	90.5
Total	227.968	211.795

And some example of the differences between the percentages in different health regions (counties):

	Best (%)	Worst (%)
Carpal tunnel	97.9	48.1
Cataract	100	51
Varicose vein	96.2	27.8
In uina1 hernia	94.6	45.5
Knee arthrosk.	100	67.3
Lap. Chol.	71.7	0

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Table (*Continued*)

	Best (%)	Worst (%)
Female ster.	100	55.0
Tonsillectomy	96.6	65.3
Tonsillectomy +	78.2	0

It may be concluded that Denmark is in front in western Europe regarding the percentage of day surgery procedures. However there is still a potential for improvement primarily by reaching the same level in all counties but also by moving against day surgery for more in-patient procedures.

ELSEVIER

J. of Ambulatory Surgery 10 (2004) 177

Ambulatory Surgery

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Present status and future for ambulatory surgery in Norway

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Norway, a country with approximately 4.4 mill inhabitants is a rural country with 50 government owned hospitals. Fifty-five percent (43–65%) of all elective surgery are performed on an ambulatory basis. The procedures varies from eye surgery (cataract) to laparascopic supravaginal hysterectomies, splenectomies, laparoscopic funduplication and cruciate ligament repair. Thus almost all types of surgical procedures are represented in ambulatory surgery in Norway. As about half of the population is living widespread in the country, long distances and time-consuming transport from the hospital back home somewhat limits the increase in numbers of procedures that can safely be performed on an ambulatory unit. To overcome this problem hotels with an affiliation to hospitals are being built, which hopefully will further stimulate to day case surgery.

In January 2002 the ownership of the hospital was changed from the counties till the government, which divided Norway into four health regions. The region is responsible for all hospitals in this particular region and it was focused on cost effective praxis and evaluation of why all hospitals performed almost the same surgical procedures. This focus lead to an "competition" between hospitals regarding, as for example, costs per procedure, waiting list, etc. based on the knowledge that expensive hospitals could be closed down or certain functions could be mowed to other hospitals. This has stimulated ambulatory surgery and as a result waiting lists are reduced.

The government has by law said that private hospitals shall be included in the public health system and the patients has been given the opportunity to choose which hospital they want to use. As this now is implemented, 26 private clinics are applying for hospital status and thus be included in the health system. All these potentially new hospitals only want a limited number of beds, implicating that these new hospitals will focus on ambulatory surgery.

Private specialist practitioners, also may be included in the public health plans, performing surgery in an office-based setting. This may further increase ambulatory surgery. As a part of the public system they must by the end of 2003 report their amount of surgery to the central registration unit in Norway, thus almost the total amount of ambulatory surgery will be reported and correct figures can be calculated.

Last but not the least, changes in financing for surgery has been made. The amount per procedure is increased from 55 to 60% of the DRG value by 0101–2003. This stimulates further to ambulatory surgery. Recently a government appointed committee evaluating the total financing system of health care in Norway has finished its work. This report indicates that a even higher percentage of the DRG value than today will follow the patient, which means that a high production is necessary to finance the hospitals. This may further increase the interest in ambulatory surgery. Health care workers are interested in ambulatory surgery. It is focused in all hospitals and the Norwegian Association of Ambulatory Surgery is growing regarding members, and participants in our yearly Winter meeting in Oslo. A Newsletter is distributed regularly to all members and hospitals, and a web site (http://www.nordaf.no) is established.

Ambulatory surgery will increase in Norway in the years to come, but as the procedures done in an ambulatory setting are increasingly complicated we also have to focus on the quality of patient care after discharge from hospital to their homes or "hospital–hotels".

However, in Norway there is a concern with the increased inclusion of ASA III patients, major surgical procedures and cancer for ambulatory surgery, that the economic pressure towards growth in this area may not always be in the interest of quality for the patients.

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Ambulatory surgery in Portugal
The 2003 APCA report

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Day surgery has began in Portugal around the 90 decade of last century. Although publishing some documents and guidelines [1], the Portuguese Government had never define clear health policies in order to develop day surgery programmes. On the contrary, all the legislation and financing regulations published were restrictive and non-competitive from the ambulatory surgery point of view. In fact, different Governments from the last 6 years agreed on the important clinic, economical and social advantageous of day surgery on the Portuguese National Health Service (NHS). However, we observed a stagnant evolution of day surgery in Portugal, growing up from 5.5 to 7.2% of all non-emergent surgery from 1999 to 2001, respectively. Our 2001 National Survey on Ambulatory surgery [2], showed that 20,870 major surgeries were performed on a day surgery basis, on a total of 290,597 non-emergent surgeries. This figure represented an increase of 1.7% when we compare with the first National Survey done in 1999 (Table 1) [3].

Although the majority of the public hospitals have insignificant day surgery programmes, there are few hospitals where this regimen represents more than 30% of all non-emergent surgery [4].

Going back to some data published by De Lathouwer and Poullier in 1998 [5], we noticed that for a 18 basket procedures selected as the most significant for ambulatory surgery, Portugal had a rate of 9.9% (7,693 in a total of 77,394 surgeries), far beyond all other countries involved in the study. However, when we compare these numbers with the results of our 2001 National Survey, we realise that there was a great increase in day surgery in Portugal on that period of time: we found a rate of 15.7% in 2001 for the same 18 basket procedures (14,530 in a total of 92,585 surgeries; Table 2).

The major difficulties for a massive development of day surgery in Portugal are:

1. A restrictive non-competitive legislation and financing of day surgery. Portugal has a health finance system based on the Diagnosis Related Groups (DRG). Nevertheless, there are two different tables for financing the same procedure: one for inpatients and the other for outpatients (Table 3).
2. Lack of incentives for all: public hospitals, health professionals and even patients.
3. Shortage of interest and knowledge amongst all (politicians, managers, health professionals).

Bearing in mind these difficulties but being aware of the great advantages of day surgery that we all recognise, APCA undertook the enormous task to raise awareness of and interest in, the importance of ambulatory surgery among all healthcare partners.

The recent meetings of APCA with members of the Portuguese Health Ministry makes us believe that there will be profound changes in the NHS, namely at the financing system. We aim to achieve an unique DRG list of procedures financing equally in- and out-patient procedures, making a non-restrictive and competitive system between both regimens. We do hope that in the next future we will be able to develop day surgery.

1. Increasing the quantity of patients operated (improving efficiency, increasing accessibility, reducing waiting surgical lists).
2. Increasing quality, with the inclusion on day surgery programmes the universal clinical indicators.
3. Promoting education and raising the interest among health professionals.
4. Promoting clinical research to improve health clinical care in our hospitals.

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Table 1
Results from the First and Second National Survey on Ambulatory surgery

	1999		2001		Difference 2001–1999
	N	Percentage	*N*	Percentage	Percentage
Total performed surgery	376913		391701		3.92
Total non-emergent surgery	269755		290597		7.73
Total ambulatory surgery	14837	5.5	20870	7.2	40.7

Table 2
Results of 18 groups of interventions eligible as ambulatory surgery (results from the Second National Survey in Portugal, 2001)

Surgical procedure	Performed as outpatient (*N*)	Total surgery performed (*N*)	Percentage
Knee arthroscopy	47	3546	1.3
Extraction of teeth	166	936	17.7
Cataract surgery	5671	19180	29.6
Hernia repair	1961	20982	9.3
Dilatation and curettage uterus	524	4571	11.5
Vein ligation	754	8669	8.7
Tonsillectomy	230	5435	4.2
Adenoidectomy	428	2988	14.3
Myringotomy	229	2689	8.5
Laparoscopic sterilisation	321	2448	13.1
Squint surgery	152	1594	9.5
Submucous resection (ENT)	22	1792	1.2
Excision of breast lump	606	2201	27.5
Anal procedures	307	2244	13.7
Circumcision	966	3227	29.9
Dupuytren	209	1133	18.4
Carpal tunnel decompression	1485	4848	30.6
Orchidopexy-varicocoele	295	1638	18.0
Implanted devices	157	2464	6.4
Total	14530	92585	15.7

Table 3
The finance of six different type of surgery (based on the DRG system, prices for 2003)

Surgical procedure	DRG for inpatient (IN) (€)	DRG for outpatient (AS) (€)	Difference between AS and IN (%)
Cataract surgery	1730.65	855.63	49.4
Hernia repair	1512.94	876.64	57.9
Vein ligation	1793.45	951.38	53.0
Laparoscopic sterilisation	1732.60	1121.15	64.7
Circumcision	763.47	468.79	61.4
Carpal tunnel	1187.38	836.66	70.5

In the interest of patients and the Portuguese society, we hope to develop high-quality day surgery programmes and follow the good examples of North America, Australia and other members of the European Community.

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ELSEVIER

J. of Ambulatory Surgery 10 (2004) 181

Ambulatory Surgery

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Ambulatory surgery in Spain

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In Spain, ambulatory surgery (AS) is called major ambulatory surgery to emphasise that the focus is on procedures previously or still conducted in an in-patient setting with overnight stay, and that endoscopies and minor surgical excisions are excluded (these procedures were traditionally performed as office procedures). According to the guidelines on major ambulatory surgery produced by the Spanish Health Ministry in 1993, major ambulatory surgery is surgery performed under general, regional, sedation or local anaesthesia requiring neither intensive postoperative care nor overnight stay, the patients being discharged from the facility a few hours after the procedure.

Spanish background:

- Type of system: national health service (organized in 17 autonomous regions).
- Funding: 95% general taxation, 5% social security.
- Provision of services: hospitals, speciality doctors, and GPs.

Evolution of the health care in Spain:

- From centralized to decentralized structure.
- From public management to "private-like" management.
- From retrospective payment system to prospective payment system (DRGs).
- Accreditation systems of health institutions.

Day surgery was initiated in Spain in the early 1990s. Since then there has been a steady increase in day surgery activity with an average substitution index (number of day: case patients treated expressed as a percentage of the number of elective inpatients and day cases combined) of 35%. Some procedures such as cataract surgery have the highest indices; in contrast, only 20% of unilateral hernia repair are performed as day cases.

Because of the decentralizing structure of the Spanish health system there is not complete information at central government level about fundamental and simple data on AS. According to 2000 data from INSALUD, which grouped 7 out the 17 autonomous regions and almost 40% of the population) the day surgery rate is continuously growing (although the impetus has diminished in the recent years) meanwhile the elective inpatient procedures have slightly decreased showing a limited evidence for substitution.

The most common way of providing ambulatory surgery in Spanish hospitals is to integrate the ambulatory patients among the other surgical patients of the different specialities. It is apparent that only 15% of hospitals with AS programmes have an autonomous day unit with dedicated operating theatres, recovery and reception areas. Forty-four percent sharing part of the resources with the general hospital. Forty-one percent integrate the ambulatory patients among the other surgical patients.

The pattern of hospital funding has been an impediment to a wider development of AS. The introduction in the late 1990s of changes in the financial mechanisms of hospitals has also favoured the trend towards more day case surgery.

- AS is a generalized practice in Spain. There is still great potential for an increase in day surgery in Spain at present with great variability among geographical areas, just as there is in the professional's different attitudes.
- AS for many processes should be considered as first choice surgery and cease to be an alternative.
- The future of AS in Spain must concentrate on quality, improved efficiency, research and education programmes.

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Swiss Society of ambulatory surgery

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The Swiss Society of ambulatory surgery (SSAS) was founded by Prof. Marc-Claude Marti, who unfortunately passed away suddenly on 26 September 2001. This was a great loss for us and the society had some difficulties in re-organizing itself. Since this time the new board of directors consists of:

President	PD Dr. Bruno Roche
Vice President	Dr. Eduard Eicher
Secretary	Dr. Henri Vuilleumier
Treasurer	Mrs. Christine Robin

The SSAS consists of 196 members.

We organized one conference last year in June 2002 in conjunction with the Union of the Swiss Surgical Society. The society has strived to develop and encourage widespread application of ambulatory surgery in Switzerland. However, as in many other countries, we are currently facing political roadblocks.

The Swiss government has proposed new legislations that will make it unfavourable for doctors to perform ambulatory surgery. As a society, we find these proposals to be unrealistic difficult to put into practice. These proposals are unfair for both doctors and patients.

If passed, the new legislation will impose regulations based on time in hospital and post operative care. It categorizes surgical admissions as follows:

1. Ambulatory surgery:
   - Discharge before midnight same day.
   - No time spent in post-operative recovery room.
   - No follow-up visit the next day.
2. Semi or half hospitalisation:
   - Discharge within 24 h.
3. Hospitalisation:
   - More than 24 h of hospital stay.

Based on current health insurance policies, ambulatory surgery is also unfavourable for both the surgeons and the patients.

1. Financial re-imbursement for surgeons is more advantageous if patients are hospitalised for 24 h or more.
2. If ambulatory surgery is performed, the patients are obligated to pay 10% of the total fee as opposed to full coverage by the health insurance for a normal hospitalisation.

Because of these financial incentives, hospitalisation is often chosen over ambulatory surgery, leading to the slow acceptance and development of ambulatory surgery in our country.

Currently, we have prepared a list of all existing ambulatory surgery clinics nation-wide, which have been accepted and accredited for re-imbursement by all insurance companies in Switzerland.

Our goal for the future is to try to modify the current re-imbursement situation and to fight against the newly proposed legislations by the government. Hopefully this will create a greater acceptance by the surgeons and patients for ambulatory surgery. With greater use of ambulatory techniques, the newly trained surgeons will see the benefits of less hospitalisation and make ambulatory surgery a commonly accepted practice in Switzerland.

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Oxycodone and ketobemidone for oral premedication

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Abstract

In a prospective, randomised and double-blinded study the preoperative sedative effect and the postoperative use of analgesics were compared in 90 patients undergoing inguinal hernia repair under general anaesthesia, premedicated orally with ketobemidone 10 mg, sustained-release oxycodone 10 mg or placebo. All patients had a local infiltration with bupivacaine after wound closure. Oral paracetamol 1 g × 4 and dextropropoyphene 100 mg × 4 were given postoperatively and iv ketobemidone was added if the pain score was >3 on a visual analogue scale from 0 to 10. Oxycodone, ketobemidone and placebo had a similar sedative effect before surgery. The use of ketobemidone after surgery was reduced by 40% in the oxycodone group compared to placebo ($P < 0.05$). No reduction was noted in the ketobemidone group. Conclusion: Sustained-release oxycodone—but not ketobemidone—for oral premedication reduced the postoperative use of opioids after surgery.

Keywords: Oral premedication; Ketobemidone; Oxycodone; Postoperative analgesia; Inguinal hernia repair

1. Introduction

The guidelines for preoperative fasting have changed and oral intake of fluids 2–3 h before induction of anaesthesia is now common practice. Consequently it has become possible and common to avoid injections and instead use oral pre-medication. Various drugs have been recommended. In ambulatory surgery benzodiazepines [1], but also opioids and non steroid anti-inflammatory drugs (NSAID) have been used for premedication [2–4]. Benzodiazepines have good anxiolytic effect but in addition they cause amnesia, which is less favourable in day surgery, and they are without any analgesic effect. An advantage of opioids and NSAIDs is, of course their potential to reduce the opioid consumption during and after surgery [3–5]. The anxiolytic effect of opioids is low in the dose range normally used for premedication. However, when the patient and anaesthesiologist meet before the day of surgery in a relaxed and informative atmosphere, this has in itself a good anxiolytic effect [6].

The aim of the present study was to compare the effect of ketobemidone and sustained-release oxycodone, two opioids with different duration of action, for oral premedication with special reference to the preoperative sedative effect and the possible influence on postoperative need for analgesic drugs.

2. Methods

Ninety adult patients (ASA I-II) scheduled for open, primary inguinal hernia repair were studied with regional ethical committee approval. Informed consent was obtained when the patients and the anaesthesiologist met a few days before surgery. Patients between 20 and 80 years of age without a history of allergic reactions or side effects with paracetamol and opioid-containing oral analgesics were included. Depending on the patients own preference and their age, about 50% of the patients were scheduled by the surgeons for day surgery and the rest were planned to stay over night.

After stratification for age into three groups, 20–39, 40–59 and 60–79 years of age the patients were randomised to receive either ketobemidone, sustained-release oxycodone or placebo as oral premedication. The patients, the staff giving the premedication and those evaluating the patients before and after surgery were blinded.

Approximately 2 h before surgery each patient was administered tablets of paracetamol 1 g and either ketobemidone

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(Ketogan Novum®, Pharmacia) 10 mg or sustained-release oxycodone (OxyContine®, Mundipharma AB) 10 mg or placebo. These doses were chosen following recommendations and routines at other centres.

When the patients arrived in the operating theatre, they were asked if they felt any effect of their premedication and to evaluate it according to a visual analogue scale (VAS) from 0 = no effect at all to 10 = very tired, almost sleeping. The anaesthesia staff also scored the effect of premedication using a similar scale (VAS 0 = no sedation and 10 = sleepy or sleeping). Patients who complained of anxiety or appeared so to the staff received propofol (Propofol® Abbott) 10–30 mg during preparation, before induction of anaesthesia. The respiratory rate at arrival to the operating room (OR) was noted and a rate (breaths/minute) below 10 was classified as respiratory depression. The patients were asked about nausea. Anaesthesia was standardised according to the hospital routine. Propofol (1.5–2 mg/kg) was used for induction and sevoflurane (Sevorane®, Abbot) with addition of fentanyl (Fentanyl®, B. Braun) (0.05–0.1 mg) or alfentanil (Rapifen®, Janssen-Cilag) (0.2–1 mg) for maintenance. A laryngeal mask was used and the patients were on spontaneous ventilation. Standard intraoperative monitoring including ECG, pulse oximetry, capnography and sevoflurane concentration was used. After closure of the surgical wound all patients received a local infiltration with 20 ml of 0.5% bupivacaine (Marcain®, AstraZeneca). Ketobemidone iv, 1–3 mg, was given if the patient was in pain at awakening.

At the postoperative ward, according to our routine, the patients received paracetamol (Alvedon®, AstraZeneca) 1 g and dextropropoxyphene (Dexofen®, AstraZeneca) 100 mg every 6 h starting 4–6 h after surgery. The patients were informed to report pain using a visual analogue scale from 0 = no pain to 10 = most severe pain. Pain score was evaluated every second hour and when the patients reported pain Ketobemidone 1–2 mg was given iv if VAS was more than 3 and repeated until the score was 3 or below. Pain at rest, sedation and nausea were noted in the protocol at 2 and 4 h and for patients staying over night also at 8 h after surgery. The consumption of analgesics was recorded.

After discharge from hospital paracetamol was continued 1 g × 4 and combined with dextropropoxyphene 100 mg × 4 or tramadol (Tradolan®, Nordic Drugs) 50 mg × 4 or codeine (Citodon®, AstraZeneca) 60 mg × 4. The first and second day after surgery the patients were contacted by phone and VAS score for pain at rest and mobilisation was recorded and they were also inquired about nausea.

3. Statistics

The primary variable was total opioid consumption (ketobemidone) after surgery. We considered a difference of 5 mg ketobemidone (mean value) between the groups was clinically interesting. To detect such a difference with 80% power 16 patients in each group was considered to be sufficient.

Analysis of variance was used for parametric variables and x^2 test for non parametric variables, with P values < 0.05 considered statistically significant.

4. Results

Out of 90 patients enrolled in the study four were women. Stratfication for age resulted in 18 patients in the youngest group (20–39 years of age) and 36 patients in each of the other groups (40–59 and 60–79 years respectively). One patient was excluded due to a change in surgical technique to a laparoscopic operation. Twenty nine patients received ketobemidone, 30 sustained-release oxycodone and 30 placebo. The proportions of patients undergoing day surgery and staying over night were similar in the three groups (Table 1). The groups were comparable with respect to age, weight, duration of surgery and distribution of gender and there was no difference in the time interval between premedication and the evaluation at the arrival in the OR (Table 1).

The VAS scores for sedation at the arrival in the OR are given in Fig. 1. There was no difference between the groups. The subjective evaluation by the patient and the evaluation by the anaesthesia staff were almost identical. There was no difference in the number of patients given propofol for sedation (Table 1). No patient had respiratory depression. Three patients reported nausea, two after ketobemidone and one after placebo. Anaesthetic management, including the number of patients without opioids during anaesthesia and the proportion of patients having fenanyl and alfentanil respectively, was similar in the groups (Table 1).

The VAS score for pain (mean ± S.D.) at 2, 4 and 8 h is shown in Fig. 2 and did not differ between the groups. Mean pain score was < 4 in all groups at 2, 4 and 8 h after surgery. The VAS score for tiredness (mean ± S.D.) and the number of patients with nausea are given in Table 2. There was no difference between the groups.

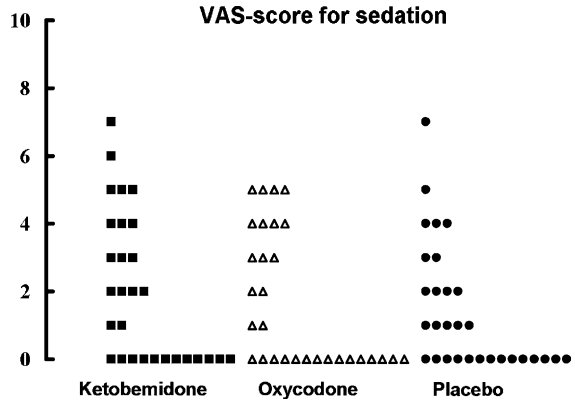

Fig. 1. Distribution within the groups of VAS-scores for sedation given by the patients at the arrival in the operating theatre.

Table 1
Demografic data, time from premedication to evaluation, duration of surgery and opioids used during anaesthesia (mean values ± S.D.) and the number of patients having propofol at the arrival in OR in the three groups

	Ketobemidone	Oxycodone	Placebo
Number of patients, M/F	28/1	29/1	28/2
Day surgery/Patients staying over night	16/13	16/14	14/16
Age years	58.4 ± 16.1	57.3 ± 14.2	53.5 ± 15.2
Weight kg	79.1 ± 10.1	78.3 ± 9.1	77.1 ± 11.9
Time from premed. to evaluation, min	106.4 ± 50.6	102.3 ± 4.6	113.2 ± 56.2
Duration of surgery min	40.3 ± 15.4	42.1 ± 12.5	40.8 ± 14.0
Anaesthesia			
Number of patients having:			
Fentanyl 0.05–01 mg	6	6	8
Alfentanil 0.5–1 mg	20	20	19
No opioid	3	4	2
Number of patients given 10–30 mg of propofol for sedation	4	4	2

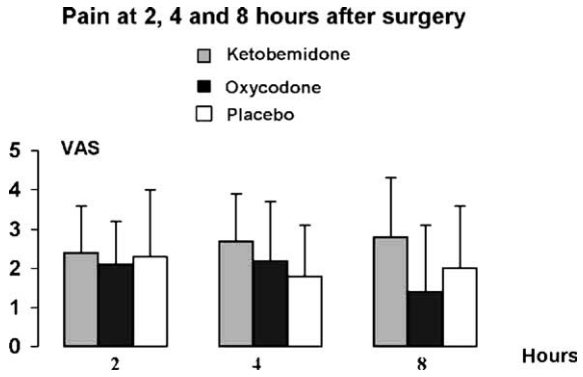

Fig. 2. Pain scores (mean ± S.D.) in the groups 2, 4, and 8 h after surgery.

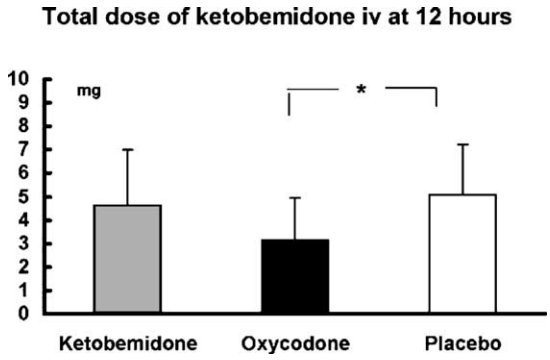

Fig. 3. The dose of iv ketobemidone (mean ± S.D.) used in the three groups during the first 12 h in order to keep pain score below 4. (* $P < 0.05$).

The total dose of iv ketobemidone including the dose given after awakening in the OR and during the first 12 h postoperatively is shown in Fig. 3. Only the dose given in the oxycodone group, 3 mg, differed from placebo, 5 mg ($P = 0.049$).

Eighty-one patients were interviewed during the first and second postoperative day. All had paracetamol plus dextropropoxyphene (68 patients) or tramadol (8 patients) or paracetamol combined with codein (5 patients). Most of the patients reported no or little pain and the mean scores both at rest and mobilization were low in all groups (Table 3). However, 13% of the patients had moderate or severe pain (pain score more than 3) at rest and 34% at mobilization 24 h after surgery and the corresponding numbers were 9 and 30% respectively on the second post-operative day. No differences

Table 2
VAS score (mean ± S.D.) for tiredness and the number of patients with nausea at 2, 4, and 8 h after surgery

	Ketobemidone	Oxycodone	Placebo
Number of pat evaluated at 2 h	27	28	30
Tiredness, VAS	2.6 ± 1.9	1.6 ± 1.9	2.5 ± 2.8
Patients with nausea	2	3	3
Number of pat evaluated at 4 h	27	26	29
Tiredness, VAS	2.9 ± 2.3	1.5 ± 2.6	1.8 ± 1.9
Patients with nausea	1	1	1
Number of pat evaluated at 8 h	11	14	14
Tiredness, VAS	3.2 ± 2.2	1.0 ± 3.4	2.1 ± 2.3
Patients with nausea	2	0	1

Table 3
VAS score (mean ± S.D.) for pain at rest and mobilization and the number of patients with nausea on the first and second day after surgery

	Ketobemidone	OxyContin	Placebo
First day after surgery			
Number of patients interviewed	27	29	29
Pain at rest VAS	2.7 ± 2.3	1.7 ± 1.6	2.0 ± 2.1
Pain at mobilisation VAS	3.7 ± 2.4	2.7 ± 1.5	2.0 ± 2.3
Nausea number of patients	0	0	2
Second day after surgery			
Number of patients interviewed	24	29	28
Pain at rest VAS	1.7 ± 1.0	1.5 ± 1.3	1.5 ± 1.5
Pain at mobilisation VAS	3.1 ± 1.5	2.6 ± 1.7	2.2 ± 2.1
Nausea number of patients	0	1	0

were noted regarding pain at rest, pain at mobilization, tiredness and nausea between the three groups (Table 3).

5. Discussion

Optimal treatment of perioperative pain is important for many reasons. It is of value in itself for humanitarian reasons. Inadequate treatment of acute pain may also develop into a situation of long lasting pain. In the current study a postoperative regimen with infiltration of local anaesthetics—effective mainly during the first hours after surgery—combined with scheduled paracetamol and dextropropoxyphene provided satisfactory pain control in most patients. In some patients in our study, however, this regimen was not sufficient and an opioid was added. In day surgery patients are often discharged only a few of hours after surgery and if prolonged pain is anticipated an analgesic regimen with a prolonged effect is favourable.

Premedication with analgesics has been recommended in order to facilitate pain control in the postoperative period [3–5]. In the current study we compared ketobemidone (duration 4–6 h) and sustained-release oxycodone (10–12 h effect) as premedication. The main result was an ability of sustained-release oxycodone to reduce the need for additional opioid in the early postoperative period, which supports the recommendation. A reduction of the amount of ketobemidone used in the oxycodone group by about 40% compared to placebo was found. A similar effect was, however, not observed in the ketobemidone group. Most probably the explanation for this difference was that the effect of ketobemidone had worn off during the period when local anaesthesia was effective. However, oxycodone with a slow release during 10–12 h had a lasting effect [7]. Oral morphine for premedication, which has a similar duration as ketobemidone, was studied by Beer et al. in patients undergoing face surgery under local anaesthesia [5]. They reported an improved pain management after surgery with morphine compared to placebo. The discrepancy may be explained by the different local anaesthetics used and different timing. Beer used lidocaine and it was applied before surgery, while we used bupivacaine with a reported duration of 5–6 h [8] and applied it at the end of surgery.

The lack of sedative effect after sustained-release oxycodone as well as ketobemidone compared to placebo at the arrival in OR was somewhat unexpected but in accordance with Beers findings after oral morphine for premedication. In our study 41 patients scored 0 (VAS) for sedation and the mean score was very low in all groups. Most patients, however, were satisfied. In well-informed patients subjected especially to minor surgery there is seldom a need for sedative premedication [5]. In the study of Beer a majority (61%) of patients interviewed regarding their preference with regard to sedative or analgesic properties of the premedication, preferred pain reduction to sedation. In the present study, those ten patients who complained of or showed signs of anxiety at arrival in OR 10–30 mg of iv propofol had a very good effect. A high patient satisfaction has been reported with iv propofol for anxiolysis [9].

A possible effect of premedication on the time for discharge from hospital in day surgery was discussed by Barnung [10]. Postoperative tiredness and nausea are symptoms that—in addition to pain—may delay discharge in day surgery. Thus it was interesting to notice that—despite a long lasting analgesic effect—these symptoms were not more frequent in the oxycodone group compared to placebo. We did not, however, address the specific question of readiness for discharge in our study.

In a descriptive study of postoperative pain the first week after open inguinal hernia repair performed under local anaesthesia, 25% of the patients reported moderate–severe pain at rest and 66% had pain at coughing and mobilization on the first postoperative day [11]. The numbers were still high, 20 and 45% respectively, on the second postoperative day. The percentages of patients reporting moderate–severe pain when interviewed the first and second day after surgery in the current study were lower. There are probably several factors involved, which may explain the differences. All patients in the study by Callesen were operated under local anaesthesia and were discharged within a few hours after surgery while in our study surgery was performed under general anaesthesia and the patient stayed in hospital for 4–6 h or over night (50%) with a strict regimen for pain control during hospital stay. Different medication after discharge, tenoxicam+paracetamol in the study by Callesen and dextropropoxyphene+paracetamol in our study, might also have contributed to differences in pain scores the first 2 days after surgery. Furthermore, somewhat different scales for scoring the severity of pain were used in the two studies and make a direct comparison difficult.

6. Conclusion

Sustained-release Oxycodone and Ketobemidone has been compared for oral premedication. Their sedative effect before surgery did not differ from a placebo group. Oxycodone—but not ketobemidone—reduced the need for opioids in the early postoperative period. This lasting analgesic effect is an advantage especially in ambulatory surgery when the patients are discharged early.

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Varicocoele surgery as day surgery—a regional hospital experience

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Abstract

From July 1994 to February 2001, 60 patients underwent varicocoele surgery in the Day Surgery Centre, Department of Surgery, Kwong Wah Hospital, Hong Kong SAR, PRC. The mean age of these patients was 25.9 years (ranged 9–66). Their symptoms included pain/discomfort (41.7%), mass/swelling (36.7%), infertility (8.3%) and cosmetic reasons (1.7%). In seven patients the indication was not clearly defined. 31 (51.7%) varicocoele operations were laparoscopically performed, 26 (43.3%) by an open method and in four patients (6.7%) the method was not mentioned. The median operative time was 34 min. We successfully reduced or abolished the symptoms of varicocoele in 68.7% of patients whose indication was pain or discomfort and restored fertility in 80% of patients whose indication was infertility. There was only one unplanned hospital admission. There were no anaesthetic or post-operative complications. Varicocoele surgery performed on a day surgery basis is feasible, with a high operative success rate and potential cost reduction.

Keywords: Day surgery; Varicocoele; Laparoscopic varicocoele surgery

1. Introduction

Varicocoele is a state of varicosity and tortuosity of the spermatic veins presumably due to absent or incompetent venous valves. Varicocoeles typically develop during adolescence and according to Western data, they have been found in about 15% of the general male population. Among men examined for infertility the incidence is as high as 40% [1]. It is considered to be the most common treatable cause of male infertility. It is also one of the manifestations of renal cell neoplasm because of renal vein tumour thrombus causing persistent dilatation of the pampiniform plexus irrespective of postural changes [2].

In Hong Kong, pain and dragging sensation in the scrotum are the main symptoms for specialist referral and treatment, in contrast to infertility in Western countries.

The classical operation for varicocoele is ligation of the testicular veins in various sites including scrotal, infra-inguinal, inguinal [3], and retro-peritoneal [4]. Patients are hospitalised for a few days and may require 1–2 weeks' post-operative convalescence in uncomplicated patients [1]. With the development of videolaparoscopy and technically sophisticated laparoscopic instruments, laparoscopic abdominal surgery has become an alternative, with decreased morbidity and costs [1]. Laparoscopic varicocoelectomy was first introduced by Aaberg in 1991 [5], and it has been shown in several studies to be a safe and effective method [5–8].

To further reduce cost, surgery performed on an outpatient or day surgery basis has been evaluated widely. Most studies show that this is an attractive way to treat varicocoele, with good results and a substantial reduction of costs [1,9,10]. In this report, we present our experience of varicocoele surgery in a day surgery centre in a regional hospital of Hong Kong.

2. Methods

Sixty consecutive patients in the period between July 1994 and February 2001 were recruited. Data was collected prospectively and results were analysed. Mean age was 25.9 years (9–66). The indications for surgery were pain/discomfort in 25 (41.7%) patients, mass/swelling in 22 (36.7%) patients, infertility in five (8.3%) patients and cosmetic reasons in one (1.7%) patient; in seven patients the indication was not clearly defined (Fig. 1).

Diagnosis was confirmed clinically. Patients then attended the Day Surgery Centre for pre-operative assessment for fitness for operation. This included a pre-operative

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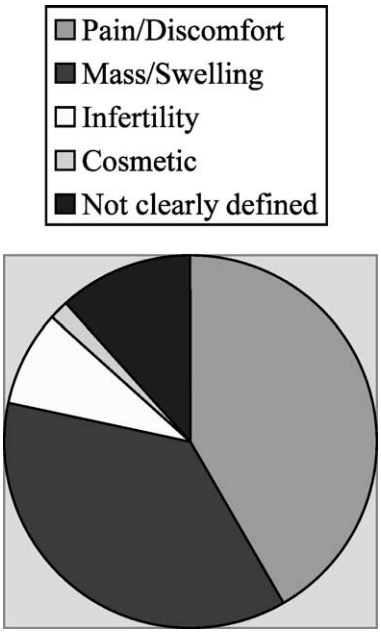

Fig. 1. Indications for surgery.

questionnaire, measurement of body weight, blood pressure and pulse, and urinalysis. In patients over 40 years a renal function test, haemoglobin measurement, ECG and chest X-ray were required. An appointment for surgery, pre-operative instructions and a patient information pamphlet were given to the patients. The contra-indications to day surgery are shown in Table 1.

On the day of operation, the surgeon and anaesthetist reassessed the patient. All of the day surgery cases were scheduled in the morning. Open varicocoele surgery was performed by retroperitoneal approach. Laparoscopic surgery was performed by the method as described by Tang et al. [2].

Patients were kept under close observation after the operation and subsequent discharge was allowed only when they had been assessed by the surgeon and anaesthetist. Advice on wound care and subsequent follow-up were given to patients prior to discharge.

Table 1
Contra-indications to day surgery in Day Surgery Centre, Department of Surgery, Kwong Wah Hospital, Hong Kong SAR, PRC

(A) Medical	Unfit (not ASAI or II)
	Obese: body mass index > 35
(B) Patient	Specific problems, e.g. recurrent hernia
	Size of pathology, e.g. large scrotal hernia
	Operation over 1 h
(C) Social	Live in more than 1 h drive from day surgery unit
	No competent relatives or friends to
	Accompany or drive patient home after operation
	Look after him or her at home for 24–48 h
	At home with no assess to
	Telephone
	Indoor toilet/bathroom
	Lift—if the patient lives in an upper floor flat

Post-operative analgesia was given according to a standard regime designed for all patients in the Day Surgery Centre [11]. Before incision, patients were given a dose of diclofenac as a suppository. Local anaesthetic infiltration was used in addition to general anaesthetic techniques. Acute pain control was carried out during the patient's stay in the Day Surgery Centre. Upon discharge, they were given diclofenac suppositories (0.5 mg/kg) for 2 days together with non-opoid oral analgesics for 1 week.

A telephone hotline was available to patients upon discharge so that they could contact nurse specialists or surgeons if necessary. Advice was given over the hotline, but if the problem could not be solved or if they were not satisfied, they were advised to attend the Accident and Emergency Department immediately.

Telephone interviews with patients were conducted about 24 h after the surgery. Nursing staff of the Day Surgery Centre used a standardised questionnaire to enquire about the degree of wound pain, the amount of analgesia required and the level of pain control. They were also asked about the wound condition and any post-operative complication experienced. Advice was also given at the same time if necessary.

3. Results

Sixty patients with 63 varicocoeles were recruited. The varicocoele was left sided in 45 (75.0%) patients, right-sided in one (1.7%) patient, and bilateral in three (5.0%) patients. The location was not mentioned in 11 (18.3%) patients.

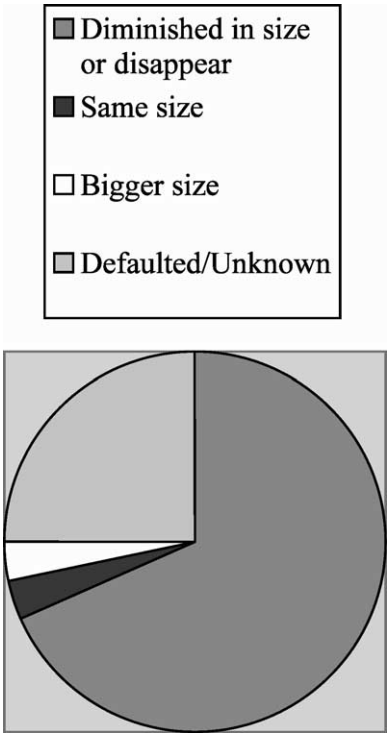

Fig. 2. Post-operative size of varicocoeles.

Operative time ranged from 19 to 65 min (median 34 min). Thirty-one (51.7%) operations were performed laparoscopically and 26 (43.3%) were performed by an open method. There was no conversion in the laparoscopic surgery group.

Only one patient was admitted after surgery due to lower limb weakness and he was discharged 1 day after admission and the symptoms completely subsided. No other anaesthetic or post-operative complications were reported.

Fifteen patients defaulted follow-up. The results were unknown. The median follow-up period was 190 days. The varicocoele decreased in size or completely disappeared in 41 (68.3%) patients, remained static in two (3.3%) patients and increased in size in two (3.3%) patients (Fig. 2). The discomfort decreased or disappeared in 41 (68.3%) patients and persisted in four (6.7%) patients. Four out of five (80%) patients operated for infertility successfully conceived.

4. Discussion

Day surgery is defined by the Canadian Hospital Association as 'Hospital based services in which scheduled elective surgical, diagnostic and/or therapeutic procedures are provided to patients who are admitted and discharged the same day through organised programmes with defined pre-operative and post-operative procedures.' It is a common practice in Western countries being increasingly used in most surgical specialties. Day surgery reduces the cost of hospitalisation [9]. Day surgery in Hong Kong is still in its infancy and under development. In the atmosphere of escalating financial stress on the public health system in Hong Kong, day surgery is a feasible option in reducing costs. In one study performed in the USA, the average cost of ambulatory varicocoele surgery was only 25% that of an equivalent inpatient procedure, with a mean cost of US$372 (HK$2976) and US$1536 (HK$12 288) per person, respectively [9].

Our experience shows that laparoscopic or open varicocoele surgery can also be performed as a day surgery procedure in Hong Kong. The median operative time was 34 min. Our operative time seems to be better when compared with other similar studies because we have included 26 open varicocoele procedures. In one study performed in the USA, the average operative time was 82.3 min for laparoscopic varicocoele surgery and 35.6 min for open varicocoele surgery [12]. In another study of outpatient laparoscopic varicocoele surgery the mean operation time was 51 min [1].

We had only one unplanned hospital admission. The success rate was nearly 70% in reducing symptoms of varicocoele and four out of five (80%) patients operated for infertility successfully conceived. Close post-operative observation and information concerning post-operative management and possible complications are mandatory as shown in our protocol.

There were two major drawbacks in our study. First, this study was a retrospective study and the result of open versus laparoscopic technique and the result of day surgery versus conventional in-patient treatment were not comparable. Second, we did not perform financial evaluation, although the experience in other countries shows that it is a cost effective procedure [1,9]. Further studies may help us to evaluate clearly the cost saving aspect of ambulatory varicocoele surgery in Hong Kong.

In conclusion, varicocoele surgery performed as day surgery basis is feasible, with a high operative success rate and potential cost reduction.

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Major ambulatory surgery and breast pathology

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Abstract

Aim: To present our accumulated experience of 614 cases of breast pathology undergoing major ambulatory surgery (MAS). *Materials and methods:* Over a period of 8 years, 1407 patients underwent surgery for breast pathologies, of whom 614 participated in the ambulatory circuit of a type-II General Hospital MAS Unit. These consisted of 362 breast nodules, 226 non-palpable lesions, and 26 other pathologies. Also presented are 20 cases of selective sentinel lymph node biopsy done on an ambulatory basis. The anaesthesia type used was local anaesthesia plus sedation. The substitution rate (SR) and the rate of unexpected admissions are analysed. *Results:* During the study period the breast nodule substitution rate went from 69 to 100%, that of non-palpable lesions from 5 to 100% and that of other pathologies from 29 to 90%. For selective sentinel lymph node biopsies it was 100%. The overall rate of unexpected admission was 1%, with no re-admissions recorded. *Conclusions:* MAS is an ideal method for dealing with the most benign breast pathologies. The opportunities offered by selective sentinel lymph node biopsy in malignant pathology are discussed.

Keywords: Ambulatory surgery; Breast nodule; Sentinel lymph node

1. Introduction

Various alternative systems to conventional hospitalisation have been introduced in Spain in recent years. Of note in the field of surgery is the creation and development of major ambulatory surgery (MAS) units, which, to greater or lesser extents, are linked to traditional hospitals. Both in the countries around us and in the different regions of Spain this development has been irregular due to differences in the organisation of health systems, types of financing and the idiosyncrasies of medical units. Whereas payment for medical treatment favours the development of MAS, as has occurred in the USA, the driving force behind MAS in Europe has been the increase in waiting lists for the most common surgical procedures and the need to improve the efficiency of the health systems [1–3].

Breast conditions, particularly those of a malignant nature, have not been widely included in MAS programmes, despite being very common and meeting the usual criteria for selection [4–7]. However, there has recently been a series of events that augur a significant increase in the breast pathology substitution rate (SR). These include the implementation of screening programmes, the acceptance of conservative surgery and selective sentinel lymph node biopsy in the treatment of breast cancer, the increasing awareness of the population of the benefits of the ambulatory regimen, the creation of specific breast pathology units and the strong support given to MAS by the government [8,9].

The MAS Unit at our hospital opened at the same time as the main hospital, in 1994. Many breast conditions were included in the MAS programme of this unit in view of their high incidence, their social repercussions and the meeting of the established criteria for selection [10]. This paper presents our experience accumulated over an 8-year period.

2. Materials and methods

The MAS Unit at the "Morales Meseguer" University Hospital is type-II or second level, i.e. it has its own stage 2

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recovery ward (day ward) with 16 beds, which is independent of the conventional hospital wards, but shares the rest of the facilities of the general surgery block, such as operating theatre and, when necessary, the stages recovery unit. It is open from 7 a.m. to 10 p.m., although since June 1999 and during special periods—in which operations are performed in an afternoon/evening session—an infirmary night shift has been included, which has led to the day ward remaining open longer.

Between January 1995 and December 2002, we performed 614 MAS operations out of a total of 1407 patients programmed for breast surgery (43.6%). Each case was assessed by surgeons and anaesthetists prior to the pre-operative studies. The criteria for exclusion from the programme were divided into the following categories: (1) *patient-related*: age >75 years, non-acceptance of or inability to understand the procedure, decompensated ASA III, ASA IV and anticoagulation treatment; (2) *environment-related*: difficulty in reaching the hospital (more than 1 h), inadequate place of residence, or no relative to take charge of the patient; (3) *surgery/anaesthesia technique-related*: presentation of bleeding complications, need for drainage, intra-operative cardiorespiratory problems and other unexpected events that also led patients to be excluded from the programme.

The patients were admitted to the Day Hospital on the morning or afternoon of the operation as applicable to undergo adequate preparation, which in some cases included antibiotic and antithrombotic prophylaxis according to our protocols. Local anaesthesia occasionally with added sedation, was used.

To locate non-palpable lesions we used a needle-harpoon (Model Ariadne's Thread by Allegiance®) guided by ultrasound or mammography. The procedure was carried out in the initial years (until 1999) by a radiologist from an officially approved centre in the evening prior to biopsy/removal, which meant that the patient had to be admitted after placement of the harpoon. From 1999 onwards it was done at our hospital by a radiologist from the breast pathology unit, who placed the harpoon on the same morning as the operation, thus making admission the previous day unnecessary and enabling the procedure to be done on an ambulatory basis.

Thirty-two selective sentinel lymph node biopsies were done, the first 20 as a single operation, with local anaesthesia and sedation to validate the technique: the following 12 were done together with excision of the tumour.

After the operation most patients were taken directly to the day ward (fast track). Occasional patients were sent first to the stage 1 recovery unit at the anaesthetists' request. They were discharged home between 6 p.m. and 10 p.m., although in the period when the operating theatre and Day Hospital times were extended, this could be delayed until 7 a.m. the following day. The drugs used as postoperative analgesics were methamizol, ketorolac or tramadol administered orally. Occasionally metoclopramide or ondansetron intravenously was used to treat nausea and prevent vomiting. All the patients were given a discharge report, a specific advice leaflet and a telephone contact number. Twenty-four hours after hospital discharge, a nurse from the Day Hospital telephoned the patients to assess their status and identify possible complications and, if necessary, gave them an appointment for the Outpatients Department 48–72 h after the operation.

3. Results

Of a total of 1407 patients programmed for breast surgery, 614 cases had the operation on an ambulatory basis (595 females and 19 males), representing an overall SR of 43.6%. The mean age of the patients was 45.7 years (range: 12–72). The conditions were 362 breast nodules, 226 non-palpable lesions, 18 gynaecomastias, 7 peri-areolar fistulas and 1 biopsy of the areola/nipple complex (Table 1). The annual SR evolution of each pathology is shown in Fig. 1. The overall SR for the non-palpable lesions was 62%, although these were not included in the MAS programme until 1999, the year in which we began harpoon placement in our hospital; in the last year they were all done on an ambulatory basis (Table 1 and Fig. 1). The overall nodule SR was 87%, with a significant increase in the annual SR from 65% in 1995 to attain 100% in 2002. The rest of the processes presented an overall SR of 44.8%, among which are peri-areolar fistulas, gynaecomastias and other surgical biopsies.

In the same period of time 569 breast cancer patients underwent surgery (284 with a modified radical mastectomy and 285 with conservative surgery techniques). No diagnosed carcinoma was included in the ambulatory programme, although since April 2002 we have been including them in a short-stay surgery programme, based on self-care of the drainage system, with the patients discharged between the first and third postoperative days fitted with a drain. In 2002, we began the selective sentinel lymph node biopsy technique in cases with tumours of less than 3 cm, taking a total of 32 biopsies. The first 20 were done on an ambulatory basis, with local anaesthesia and sedation, since they were programmed as an initial surgical intervention, and these were systematically followed by axillary lymphadenectomy a week later to correlate the anatomico-pathological findings and validate the technique. In this phase only two cases, in which the sentinel lymph node revealed metastatic involvement, showed axillary involvement (100% correlation). After validating the technique we performed another 12 sentinel lymph node biopsies in the same operation as the breast surgery and found one more case of metastatic involvement, which required a subsequent axillary lymphadenectomy; these 12 cases were included in the short-stay circuit and were discharged in 24–48 h.

Only six patients (1%) required unexpected hospital admission and were considered MAS failures. The causes were haemorrhage/haematoma in five cases and orthostatic

Table 1
Operations performed

Year	NPL			Nodule			Other[a]		
	MAS	S/A	SR (%)	MAS	S/A	SR (%)	MAS	S/A	SR (%)
1995	0	12		37	17	69	0	0	
1996	0	37		40	4	91	0	3	
1997	0	38		35	4	90	0	4	
1998	0	26		47	13	78	0	6	
1999	1	19	5	55	8	87	2	5	29
2000	115	2	98	54	7	89	2	5	29
2001	50	2	96	46	3	94	4	7	36
2002	60	0	100	48	0	100	18	2	90
Total	226	136	67	362	56	87	26	32	44.8

NPL: non-palpable lesion; MAS: major ambulatory surgery; S/A: surgery with admission; SR: substitution rate (expressed as a percentage).
[a] Sentinel lymph node biopsies are not included.

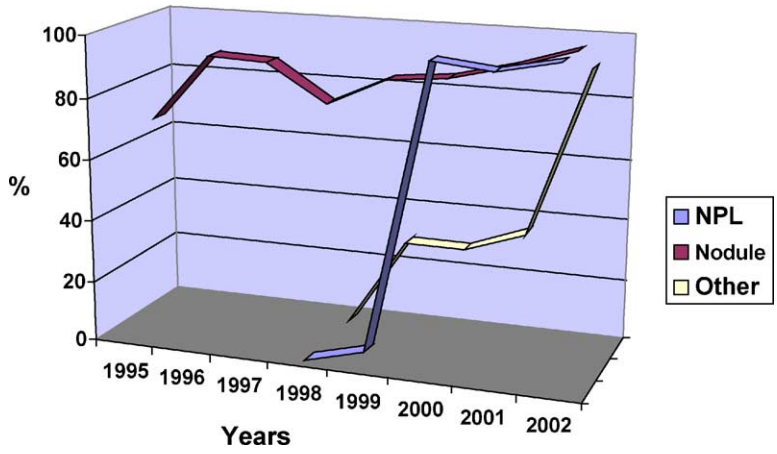

Fig. 1. Evolution of the annual substitution rate for each pathology. NPL: non-palpable lesion.

hypotension and maintained vagal crisis in one patient. No re-admissions were recorded, and postoperative complications, which were mild, were treated on an ambulatory basis (seromas, haematomas, surgical wound infections).

4. Discussion

MAS is a very efficient procedure for resolving the most common pathologies in general surgery as well as maintaining and even increasing perceived quality [2,10,11]. The ideal type of unit for developing MAS depends on the structure of the hospital, the expected volume of patients and the re-engineering capacity of the services. Four types of units have been described, according to how independent they are of the traditional systems of surgical attention [12,13]. Our unit was created at the same time as the rest of the hospital structure in 1994 and is type-II, a choice made for the flexibility of the surgery programmes.

The surgery processes selected for the ambulatory regimen were included following the previously established criteria [4–6]. From the beginning we contemplated the most common breast pathologies, although initially only breast nodule excision was done in MAS, with a 69% SR. From the second year onwards, almost all nodules were treated on an ambulatory basis, which reflects the greater confidence in the method by both doctors and patients.

The non-palpable lesions were removed surgically once they had been located by ultrasound- or mammography-guided needle-harpoon. These patients came from a radiological screening programme for early detection of cancer. It was included as an MAS procedure [8,14] although it could not be included in our MAS programme until late 1999, when we acquired the necessary technology and trained our own expert radiologist in the technique. This made it unnecessary for prior admission after location of the lesion in another (officially approved) centres in the case of patients living at a distance. In the last year of the study, all radiosurgical biopsies were done on an ambulatory basis. In breast unit this technique is indicated in grade 3 non-palpable mammography lesions from radiological screening and grade 4 and 5 lesions without cytological confirmation according to the BI-RADS classification of the American College of Radiology [15]. When ultrasound is able to locate the lesion (nodule or defined area) it is used to place the harpoon; in cases which cannot be visualized by ultrasound, location is

done by mammography (fundamentally, grouped microcalcifications with no defined nodule). Some authors advocate stereotactic biopsy using mammography for non-palpable lesions [16], but this technique is unavailable to us and we have no experience in it. However, following the criterion of other centres we agree that harpoon-guided biopsy is the method of choice for non-palpable lesions that have no clear diagnosis by previous FNA or thick-needle biopsy, because it has a low mortality rate and high diagnostic yield, it can be done on an ambulatory basis and above all, it offers the possibility of excising the lesion and constituting a definitive treatment [17].

In recent years, with our increased experience and confidence in MAS, we have performed other ambulatory procedures for breast pathologies, such as alterations in the areola/nipple complex (seven peri-areolar fistulas and one surgical biopsy after suspicion of Paget's disease of the nipple) and 18 gynaecomastias. These procedures were done under local anaesthesia and sedation, and all the patients were discharged on the day of the operation. The possible need for drainage did not exclude them from the programme, as the patients had a drainage system fitted that was low-vacuum and easy to manage, although they did require periodic outpatient follow-ups until the drains were removed.

Only six patients needed unexpected hospital admission (1%), basically due to bleeding problems of the wound (evident or bleeding haematoma) that did not require re-operation, and they were discharged 24–48 h later. One patient required admission for a vagal reaction with a sensation of maintained instability, which disappeared in few hours, and was discharged the following day. The low admission rate contrasts with that observed in other centres [9] and is probably related to the widespread use of local anaesthesia together with careful haemostasis and the added possibility of night-time hours recovery in the day ward for cases undergoing surgery in the afternoon/evening.

Surgery for cancer has been performed with success in some centres [18–21] but for the moment we have excluded it from our MAS programme, basically due to the frequent use of total mastectomy, the patients' lack of confidence and the inherent inconvenience of drainage. We do have it included in the early discharge programme, a regimen that we consider ideal for this type of surgery after instructing patients in the management of the drains and following them up regularly (every 3 days) on an outpatient basis until removal.

The concept of sentinel lymph node biopsy applied to breast cancer was introduced in 1994 on the basis that a biopsy of a particular axillary lymph node in patients with early breast cancer, especially those with a risk of lymph node metastasis (T 1b-c), was a safe alternative to axillary lymphadenectomy in women with negative lymph nodes [22]. This technique has been incorporated into our MAS programme and opens up enormous possibilities for the ambulatory treatment of breast cancer, as it avoids a great deal of axillary lymphadenectomy, which is the main cause of these patients being admitted [9]. To validate the technique, we first of all programmed it as a single operation done on an ambulatory basis, performing complete oncological surgery (conservative surgery and axillary lymphadenectomy) with hospital admission a week later. Subsequently we performed a sentinel lymph node biopsy together with breast resection, which forms part of the early discharge programme, and performed axillary rescue surgery in the positive cases a week later. In 2003, these patients have come to be included in the MAS programme.

In any case, oncological breast treatment in an ambulatory regimen requires careful planning and should include detailed pre-operative information for patients and relatives, ranging from the aims and benefits of MAS to the safety of the procedure, foreseeable incidents and management in the home of wounds and drains. A telephone number should always be given for enquiries.

5. Conclusion

MAS is an ideal system for treating the majority of benign breast surgery pathologies, as it combines rationalisation of costs with quality care. As for oncological surgery, we currently prefer a short-stay whilst encouraging an early discharge with drainage. However, the implementation of sentinel lymph node biopsy opens up the possibility of referring surgical treatment of malignant breast processes to the ambulatory regimen.

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Short communication

Intravesical analgesia for ambulatory urologic procedures: a histopathological study

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Abstract

Background and objective: Local anesthetics and morphine have been reported to be useful for painful diagnostic procedures in the bladder. Tramadol has the potential for use as an intravesical analgesic. However, intravesical use of tramadol has not been described widely. *Methods:* This study was approved by the Animal Ethical Committee of Akdeniz University and performed with standard guidelines for care and use of laboratory animals. In this study we tested the histopathological effects of intravesical tramadol versus saline in 20 adult rats. The control group received intravesically 1 ml saline. Tramadol 50 mg (1 ml) was administered intravesically in the other group. Two hours later, all animals were sacrificed and their bladders were excised. Tissue samples were evaluated macroscopically and microscopically. The data were analyzed with χ^2 and Fisher's χ^2 tests. *Results:* In all the specimens in the control group epithelial edema was seen. This finding may be explained by insertion of intravesical catheter and tissue trauma. Haemorrhagic necrosis of epithelium was observed in four cases only in the tramadol group. This finding demonstrated severe epithelial destruction. However, there was no statistically significant difference when compared with the control group. *Conclusion:* The technique of topical tramadol anesthesia may be very simple, useful and safe for bladder biopsies and cautery in many cases. However, the number of cases examined in this preliminary study after bladder instillation of tramadol was small. For this reason, the results obtained in this study regarding the histopathological effects of tramadol on the bladder, should be further investigated.

Keywords: Intravesical analgesia; Tramadol

1. Introduction

The past few years mark an ever increasing interest in intravesical analgesia in urological practice. The topical anesthesia of bladder may be an alternative to traditional methods of spinal, epidural or general anesthesia [1].

Tramadol is a safe and effective analgesic in patients of all ages who suffer from moderate to moderately severe chronic pain. Given intravenously, the most common adverse effects with tramadol are dizziness, nausea and constipation but these occur at rates similar to or usually less than other opioid analgesics. In addition, tramadol-treated patients experience less dyspepsia, physical dependence, withdrawal, tolerance and abuse [2].

In this study, we evaluated the histopathological effects of intravesical tramadol versus saline.

2. Methods

This study was approved by the Animal Ethical Committee of Akdeniz University and performed with standard guidelines for care and use of laboratory animals. In the current study 20 adult female Albino rats, weighing 230–250 g were used. At the beginning of study rats were randomly divided into two groups. In all animals an intravesical catheter was inserted (Balton 3F-181009) and 1 ml saline or study drug were administered intravesically. The first group (control group, $n = 10$) received only saline. Tramadol

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2 mg (Contramal) was administered intravesically in Group 2 ($n = 10$). All animals were sacrificed 2 h later, corresponding to the expected clinical duration of intravesical drug exposure. The bladders were excised.

The vesical mucosal injury was evaluated macroscopically. For light microscopy, tissue samples were fixed in 10% formaldehyde, embedded in paraffin and cut at a thickness of 4 μm. The sections were stained with haematoxylin-eosin, periodic acid-Schiff reagent (PAS) and unna stain for mast cells. Microscopically in each group, epithelial desquamation, epithelial and subepithelial edema, congestion, lenfoid folliculi, vascular proliferation, eosynophyl and mast cell infiltration, squamous metaplasy, inflammatory infiltrations and haemorrhagic necrosis of epithelium was observed and evaluated.

The data were analyzed with χ^2 and Fisher's χ^2 tests. A P value less then 0.05 was considered to be statistically significant.

3. Results

The cystectomy specimens were macroscopically evaluated. No morphological changes were observed in the bladder mucosa. Microscopic findings of all specimens are presented in Table 1.

3.1. Control group (Group 1)

Mast cell infiltration, lenfoid folliculi, and eosynophyl infiltration were seen each in one specimen and, inflammatory infiltration in three specimens. However, epithelial desquamation, epithelial and subepithelial edema, squamous metaplasy, congestion, vascular proliferation and haemorrhagic necrosis of epithelium were seen in the control group.

3.2. Tramadol group (Group 2)

Epithelial desquamation in six specimens, epithelial edema in four and subepithelial edema in eight, congestion in seven, vascular proliferation in four, eosynophyl infiltration in five inflammatory and mast cell infiltration in three and lenfoids in two specimens, were seen in animals from Group 2. In addition, haemorrhagic necrosis of epithelium was determined in four of the specimens in the tramadol group (Fig. 1). However, squamous metaplasy was not observed in this group.

Table 1
The histopathological findings in saline and tramadol groups

Histopathological findings	Saline group ($n = 10$)	Tramadol group ($n = 10$)
Epithelial desquamation	–	6
Epithelial edema	–	4
Subepithelial edema	–	8
Congestion	–	7
Lenfoid folliculi	1	2
Vascular proliferation	–	4
Mast cell infiltration	1	3
Eosynophyl infiltration	1	5
Squamous metaplasy	–	–
Inflammatory infiltration	3	3
Hemorrhagic necrosis of epithelium	–	4*

* $P > 0.05$, $P = 0.87$.

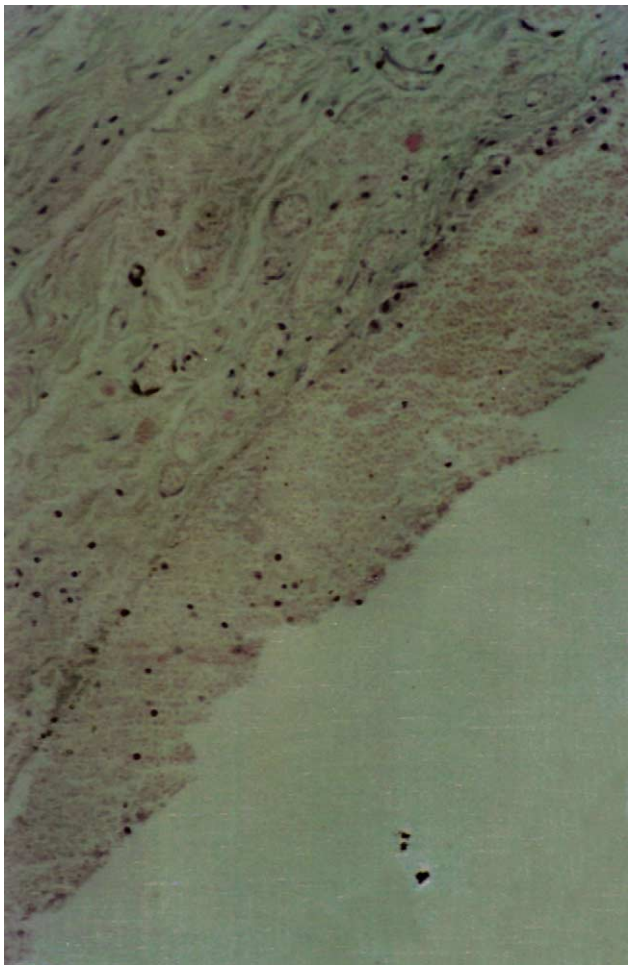

Fig. 1. Microscopic events in the tramadol group.

3.3. Statistical comparisons of all parameters for the two groups

All histopathologic findings were statistically compared between study groups. There were no statistical significant differences about lenfoid folliculi, vascular proliferation, mast cell infiltration, squamous metaplasy and inflammatory infiltrations between study groups. Squamous metaplasy was not seen in the tramadol group.

The hemorrhagic necrosis of epithelium was observed in four cases (40%) of the tramadol group. This finding demonstrated a severe epithelial destruction, but without statistical significant difference when compared with the control group ($P = 0.87$).

4. Discussion

Intravesical analgesia and anesthesia for minor procedures of the bladder have been described in recent years. The intravesical use of lignocaine and bupivacaine have been evaluated for analgesia, complications, adverse reactions, patient acceptance and costs [1,3–5]. The use of intravesical morphine has been described for analgesia in a few clinical studies [6,7]. Intravesical morphine provided effective analgesia for postoperative pain after bladder surgery and after ureterovesical reimplantation in children. Plasma morphine levels were determined by high pressure liquid chromatography and they were not detectable.

Tramadol is a central analgesic with low affinity for opioid receptors and therefore presumably another mechanism of analgesic action. Neurotransmitter release and uptake experiments were used to characterize the effects of tramadol on the central noradrenergic and dopaminergic systems [8]. Tramadol analgesia was only partially mediated by a μ opioid agonist effect. Tramadol analgesia thus results from an action on opioid receptors other the μ subtype and/or from nonopioid effects [9].

It has been suggested that opioid receptors may be present on bladder nociceptive afferents and may be activated for production of peripheral analgesia [6,7]. Intravesical instillation of tramadol may be a useful, safe, effective and affordable anaesthesia for the ambulatory care of patients requiring transurethral bladder biopsy, resection or fulguration with a potential for cost savings. However, the use of intravesical tramadol has not been described. In our experimental study, we compared the histopathological effects of tramadol versus saline on the bladder of 20 female rats. The histopathological changes observed in the tramadol group were different from the findings seen in the specimens of the control group. Particularly, the severe epithelial destruction demonstrated by haemorrhagic necrosis of epithelium was observed only in the tramadol group, in four specimens (40%). In this histopathological study, we evaluated especially hemorrhagic necrosis, because hemorrhagic necrosis demonstrates severe epithelial destruction and it is an irreversible change. Other pathologic findings were also more common in the tramadol group. However, the other findings are slight and reversible changes, and may be clinically unimportant. The occurrence of other pathologic findings was not statistically different from the control group; the lack of statistical difference may be the result of too few subjects.

The technique of topical tramadol anaesthesia may be very simple, useful and safe for bladder biopsies and cautery in many cases. The number of cases examined in this study after bladder instillation of tramadol was small. For this reason, the results obtained in this preliminary study regarding the histopathological effects of tramadol on the bladder, should be further investigated.

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Ambulatory Surgery

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Free standing units for ambulatory surgery

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Competition between hospitals and free standing units (FSU)

Since 1992 all hospitals in Germany are allowed and encouraged by government to perform surgery on an ambulatory basis. At the same time doctor's offices used for ambulatory surgery had to meet certain requirements, e.g. a separate and specially equipped operating room. These specialized doctor's offices are FSU and are called day clinics or praxis clinics in Germany.

After more than 10 years of competition between hospitals and FSU the distribution of ambulatory surgical procedures remains:

97% in FSU	All privately owned
3% in hospitals	82% public, 18% private

There are several reasons why ambulatory surgery is mainly performed in day clinics.

Reimbursement

The fees for ambulatory surgical procedures are the same in hospitals and in FSU; they are fixed by a semi-governmental agency. But theses fees are not cost covering, neither in hospitals nor in FSU. They are approximately 1/5 the prices hospitals get for inpatient treatment of the same surgical procedure.

- Therefore there are no financial incentives for hospitals to move into ambulatory surgery.

Costs

For the same type of procedure costs are higher in hospitals than in FSU [3]:

Total costs for e.g. *laparoscopic tubal 1igation* (pre-, intra-, postoperative therapy including anaesthesia, etc.):

Hospital inpatient	€ 1823	100%	46% higher than in FSU
Hospital outpatient	€ 1111	61%	11% higher than in FSU
FSU	€ 993	54%	

Despite these economic advantages government did not change politics with respect to inpatient treatment.

Emancipated physician

In FSU the surgeon is "emancipated" from any hospital system and can advice patients in a free way. Some characteristics of self-employed physicians are:

- personal responsibility and liability for the duration of the treatment;
- no head-of-department ("Chefarzt" system, no subordinate physician; and
- cooperation with other free lancers.

Emancipated patient

The modern, emancipated patient:

- is fully informed (about diagnoses, treatment schedules, etc.);
- gets informational material about specific problems;
- holds all medical records herself (e.g. surgical and histological reports); and
- judges the quality and complications by a patient questionnaire.

For many women these are strong arguments for getting surgical treatment in a FSU.

Transparent quality control

The results of surgery should be controlled not only by other physicians but also and predominantly by patients.

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The quality control system of the German Association for Ambulatory Surgery (BAO) uses such a questionnaire.

The results of 10 years experience with patient questionnaires and institutional reports confirm [1,2]:

1. Complication rates (1992–2001) monitored by patients and physicians were very low:

a	Overall complication rate	0.65%
b	Infection rate	0.36%
c	Wound infection rate	0.11%

2. Yearly institutional reports including cases with complications are helpful for quality management in the FSU as well as for information of physicians and patients.
3. Reports should be open to public (homepage, newsletter, etc.).

Progress in medicine

During the years of competition between hospitals and FSU it became clear that there are three main factors essential for success in surgery:

1. Quality of surgery measured by complication rates.
2. Total costs of procedure.
3. Patient satisfaction with pre- and postoperative care.

Progress in medicine is best achieved if the patient's problem is relieved by a fast and safe surgical procedure.

Country-wide medical services

- FSU are spread all over the country, also in rural areas.

In Germany there exists a long tradition of FSU for specialized surgery of members of the Worker's Medical Cooperative for Surgery (Berufsgenossenschaft BG). This is a governmental insurance agency for all working people. The BG insures accidents in connection with working and is represented in hospitals, but mostly in FSU. These BG–FSU are run by one or more certified surgeons.

FSU: centers of competence

FSU are now developing into interdisciplinary centers of competence.

One example are breast clinics ("Brust-Ambulanz", http://www.brust-ambulanz.info).

This is a network of FSU which specializes in the treatment of breast cancer and usually has offices (FSU) for surgery, radiology, oncology, pathology, radiotherapy, physiotherapy, psychological councelling, a documentation center (Tumorzentrum), affiliated (university) hospitals, and women's self-aid groups.

Other centers of competence are emerging, e.g. for uro-gynecology and infertility.

Legal aspects

German doctors in offices (FSU) are self-employed. Actually they have more rights than the government in our social state wants to concede:

- As free lancers they have freedom of practice.
- The Charter of Fundamental Rights of the European Union guarantees freedom to conduct a business (Article 16). This also pertains to physicians.

Unilateral disadvantages of free standing units

With regard to ambulatory surgery FSU obviously were more successful than hospitals in this competition between free enterprises and a governmental health system.

The representatives of the ruling system often regard FSU as a disadvantage for the following reasons:

- loss of governmental power by decentralization;
- loss of control of physicians;
- loss of control of prices (e.g. for pharmaceuticals);
- loss of control of markets (e.g. for hospitals);
- loss of imposing political ideologies (e.g. of the social state); and
- loss of power during elections.

But how heavy do these losses weigh in comparison to the benefits of a patient-oriented medical treatment of high quality at low costs?

The future of ambulatory surgery lies in free standing units run by experienced surgeons with quality control by patients.

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Case report

Propofol-related myoclonic seizures

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Abstract

Propofol is a popular agent for induction and maintenance of anaesthesia, as well as an excellent sedative agent widely used in ambulatory anaesthesia. Although involuntary movements due to propofol are well known, the occurrence of propofol-related seizure activity in patients with no previous history of epilepsy is less well highlighted. These seizures may occur at all stages of anaesthesia: induction, maintenance, emergence as well as early and late recovery. The cause of these seizures is as yet unknown. The occurrence of seizures with propofol may raise cautions on its use, especially in ambulatory anaesthesia.

Keywords: Propofol; Ambulatory anaesthesia; Seizure activity; Intravenous anaesthetics; Complications

1. Introduction

Propofol (2,6-diisopropylphenol) is a commonly used intravenous agent for induction and maintenance of anaesthesia [1]. It is also used for sedation in minor procedures and in the intensive care unit. Propofol has been reported to cause seizures in patients who are otherwise well [2–10]. This case report highlights the occurrence of seizures after propofol anaesthesia in a patient who presented for ambulatory surgery and discusses its implication.

2. Case report

A 49-year-old female with menorrhagia presented for hysteroscopy and dilatation as well as curettage in the ambulatory surgery unit. She had previously undergone bilateral tubal ligation and minor breast lump surgery under general anaesthesia, which she remembered to be uneventful. As her previous anaesthetic notes were not available, it was not known if she had received propofol during those procedures. She had an episode of mild depression 8 years ago when she found a lump in her breast and was treated by her general practitioner. This was resolved when the lump was proven to be benign. She had no personal or family history of epilepsy and was classified as American Society of Anesthesiologist Functional Class I. At the time of surgery, she was on no prescription or over-the-counter medication.

She received oral rofecoxib 25 mg as premedication. Anaesthesia was induced with intravenous propofol 120 mg and fentanyl 50 μg. A laryngeal mask airway was inserted and she was maintained on inhaled sevoflurane 1–2% in an O_2/N_2O mixture of 33:66% delivered via a circle system with a carbon dioxide absorber. Blood pressure, heart rate and oxygen saturation after induction were 116/67 mmHg, 64 min^{-1} and 100%, respectively, and remained stable throughout surgery. Capnograph tracing appeared normal with end-tidal carbon dioxide levels of 39–46 mmHg. The procedure took 10 min. The airway was removed when the patient regained consciousness, and she was transferred to the recovery area. At arrival, her blood pressure was 130/97 and heart rate was 76 min^{-1}. Oxygen saturation was 99%. Ten minutes after arrival in the recovery area, she developed myoclonic jerks involving the right upper and lower limbs. During these episodes, she was able to obey simple commands and seemed unperturbed by the involuntary movements. Blood pressure, heart rate and oxygen saturation were normal. Initially, the seizures occurred about 3–4 times every minute for 20 min, then became less frequent and she was fit-free after 1 h. She was immediately referred to the on-call neurologist and psychiatrist for assessment. Neurological examination did not reveal any other focal signs. She was calm and cooperative during the assessments, with relevant and coherent speech. She demonstrated

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good memory but was unable to recall the events in the recovery area. She was admitted for observation, but no further seizure activity was noted. Blood sugar level and electrolytes including calcium and magnesium were within normal limits. The neurologist consulted was of the opinion that further investigations were not necessary. She was discharged the next day. At follow-up in the gynaecology clinic 2 weeks later, she reported no other untoward incidents.

3. Discussion

The occurrence of involuntary, purposeful movement during propofol anaesthesia especially during induction is a well-known phenomenon [11,12]. Borgeat et al. [11] studied the electroencephalograms (EEG) obtained during induction of anaesthesia with propofol. They concluded that the movements were not associated with EEG abnormalities and suggested a subcortical origin for these spontaneous movements.

However, more serious seizures and seizure-like phenomena, such as generalized tonic–clonic seizures, focal motor seizures, opisthotonos and myoclonus have also been reported [13]. Kiyama and Yoshikawa [2] reported on the possible causal and temporal relationship between the occurrence of myoclonus intraoperatively during propofol infusion, which ceased when the infusion was stopped and recurred twice, each time when propofol was resumed. The Committee on Safety of Medicines in the United Kingdom [14] estimated the incidence of seizure after propofol to be 1 in 47000. In their review, Walder et al. [13] reported that in 70 patients without epilepsy, 34% of these phenomena occurred during induction, 3% during maintenance, 40% during emergence and was delayed in 23%. Forty-three percent of patients presented with generalised tonic–clonic seizures. Twenty-four patients had electroencephalograms performed; two had generalized spikes and three had general slowing. Twenty patients underwent cranial computed tomogram scans and abnormal results were reported for three of them: one had a small old cerebral infarct; one had a small bleed in the central part of the brain; and the third had radiopaque dye in the ventricles and subarachnoid space after on-table myelography. Magnetic resonance imaging of the brain was performed on four patients; one showed a small bleed. Nine patients underwent lumbar puncture and all results were normal.

It is not clear if propofol is an anti-convulsant or a pro-convulsant. The manufacturer advises caution in its use on patients with epilepsy [15]. However it has been used successfully in the management of status epilepticus [16], and there has been no conclusive clinical or electrographic evidence that propofol causes convulsions [17–21]. At low doses propofol caused activation of the electrocorticogram in patients undergoing surgery for medically intractable epilepsy [19]. At higher doses, it does not appear to trigger seizure activity in patients with epilepsy [18,20].

Propofol-related seizure activity have been reported to occur despite patients' having received benzodiazepines for anxiolysis and sedation prior to induction of anaesthesia [5]. Benzodiazepines were also ineffective for the treatment of recurrent seizures which occurred post-operatively [3,5–7,10], as were thiopentone and diphenylhydantoin [3]. Diltoer et al. [22] reported success with the use of an anticholinergic to treat choreoathetosis in a child after propofol induction.

The occurrence of seizures associated with propofol may increase due to its increasing popularity for short procedures, ambulatory anaesthesia and as a sedative agent. Its popularity stems from its favourable pharmacokinetics and pharmacodynamics [1] and ability to give a clear-headed recovery that is superior to other commonly used induction agents. It is being used increasingly outside the operating theatre. The use of airway devices such as the laryngeal mask airway, which do not require the use of neuromuscular blocking agents to gain control of the airway, may also unmask more incidences of seizures during induction and maintenance of anaesthesia. The occurrence of seizures in ambulatory patients may result in unplanned admissions as well as subjecting the patients to extensive investigations, incurring costs and causing anxiety. These phenomena have also been reported to occur a few hours to a few days after anaesthesia [23]. This is of great concern and may carry medicolegal implications where any occurrence of an excitatory episode may endanger a patient's life while carrying his usual activities and may result in disqualification of his driving licence.

On the basis of current evidence, these seizures and seizure-like phenomenon are idiosyncratic in nature and it is impossible to predict its occurrence in otherwise healthy patients. Clinicians, especially those involved in ambulatory anaesthesia, should be made aware of this complication. All cases of unexplained seizures after propofol anaesthesia should be reported as part of the routine post-marketing drug surveillance. Although propofol is generally a safe drug, it may be prudent for the careful anaesthesiologist to consider the use of alternatives such as gaseous anaesthetics in the management of ambulatory patients with epilepsy or history of seizures associated with the use of propofol.

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Day surgery: where do our efforts need to be focused? Results of a review and simulation on administrative data

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Abstract

Study objective: First, to appraise the utilisation of day surgery in an advanced Italian region. Second, to identify which surgical procedures, among those rarely performed in day surgery, can be effectively performed without ordinary hospitalisation. *Design*: Retrospective analysis of hospital discharge records related to all the 683,615 surgical interventions performed in Lombardy in 1998. Review of the last 10 years literature supporting or undermining the practicability of day surgery for the 262 procedures that, although performed at least once in day surgery, overall rarely performed in such a way. *Main results*: While as many as 1189 procedures out of 2140 (56%) were performed at least once in day surgery, the overall percentage of surgical interventions performed in this regimen was only 15.6%. The review of the literature yielded 41 procedures regarded as effectively performable in day surgery. We calculated that an absolute increment of day surgery of 20% in only these procedures would produce an increment of 5% in the overall prevalence of day surgery. *Conclusion*: Health policies aimed at reducing the length of hospitalisation after surgery can be effective even by focusing on a tiny set of procedures. Analysis of administrative data could provide useful steering hints for policy makers.

Keywords: Ambulatory surgical procedures; Day care; Health planning; Hospitalisation

1. Introduction

For many procedures, day surgery is an effective and efficient approach, offering several advantages to patient, staff, hospital and society [1–3]. The introduction of new surgical and anaesthetic techniques, the advances in medical and nursing skills, together with increased patient expectations towards healthcare assistance all contribute to a rapid enlargement of the indications and the demand for day surgery [2,4,5]. Significantly, the United Kingdom Royal College of Surgeons claimed in 1992, that 50% of all surgical procedures are practicable in such a regimen [6].

Notwithstanding, day surgery is not yet a common practice in Italy [7] or in many other developed countries [8,9]. Indeed, several factors could reduce the implementation of day surgery in practice. It has been recognised that organisational factors play a crucial role in facilitating or limiting day surgery [10,11]. Other variables have been also identified in which patients' clinical conditions [12], anaesthetist and surgeon skill [13–15], patients' preferences [3,16], quality of care outside the hospital [17] and, obviously, the specific type of procedure involved [17].

To date, the impact of the type of procedure in conditioning the use of the day surgery has been little investigated. Nevertheless, in 1997 the National Agency for Regional Health Services, part of the Italian Ministry of Health, published a list of 384 surgical procedures, classified with ICD-9-CM coding, regarded as feasible with shortened hospitalisation. Procedures were also stratified into those possible on an ambulatory basis and those requiring day surgery [7]. Since then, that list has become the reference point for most guidelines intended for local implementation.

With the aim of investigating the use of day surgery, we reviewed the administrative hospital discharge records produced in 1998 in Lombardy, one of the largest Italian regions. Procedures rarely performed in day surgery were further in-

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vestigated by reviewing evidence supporting their feasibility in day surgery.

2. Methods

All the 1998 hospital discharge records of the Lombardy region reporting a surgical procedure (coded with the ICD-9-CM classification) were studied.

Each procedure executed at least once in day surgery was classified following two criteria: the proportion performed in day surgery and its numerical relevance with respect to the whole amount of surgical interventions performed in the region during 1998. Within the first criterion we set up three classes of procedures: (1) those performed in day surgery in less than 5% of cases; (2) those performed in day surgery in 5–30% of cases; (3) those performed in day surgery in more than 30% of cases. Three classes were also derived from the second criterion: (A) procedures performed less than once every 10,000 interventions; (B) procedures performed between once every 200 interventions and once every 10,000 interventions; (C) procedures performed at least once every 200 interventions. The two cut offs applied roughly correspond to procedures carried out once every 5 days and to those carried out 10 times a day. Analysing these two classifications, nine clusters of procedures were obtained (Table 1).

We then reviewed the relevant literature of the past 10 years supporting or undermining the practicability of day surgery for procedures belonging to clusters B1, C1 and C2. This because they covered most of the interventions carried out and, consequently, an evidence based implementation of day surgery for those procedures would more efficiently increase the overall proportion of day surgery. In order to make a bibliographic search of MEDLINE feasible, we collapsed the list of candidate procedures through two distinct steps. First, we took advantage of the hierarchical structure of the ICD-9-CM classification, where the first three digits of the code refers to a group of procedures, and the fourth digit represents the single procedure in its full detail. We used the three-digit code when all its four-digit subsets were present in our list. For example, the codes 53.00 (“unilateral repair of inguinal hernia, not otherwise specified—inguinal herniorrhaphy NOS”), 53.01 (“repair of direct inguinal hernia”), 53.02 (“repair of indirect inguinal hernia”), 53.03 (“repair of direct inguinal hernia with graft or prosthesis”), 53.04 (“repair of indirect inguinal hernia with graft or prosthesis”), and 53.05 (“repair of inguinal hernia with graft or prosthesis, not otherwise specified”) were replaced by the code 53.0 (“unilateral repair of inguinal hernia”). Second, we collapsed procedures that were judged very similar from a surgical perspective. For instance, “tonsillectomy” and “adenoidectomy” were considered together, as “tonsillectomy/adenoidectomy”. For each of the obtained groups of procedures remaining in the collapsed list, relevant articles were detected by crossing the keywords “day care” or “ambulatory surgical procedures” (all sub-headings) with those identifying the specific procedure under investigation.

Whenever available, pertinent articles were retrieved. Those that were not, or written in any language other than English or Italian, had at least their English original abstract considered. Each procedure was classified according to two independent attributes: the definitive judgement about its feasibility in day surgery, summarised from the authors’ conclusions, and the quality of the studies in support of that judgement. Table 2 shows the adopted classification levels, with their definitions.

Finally, we simulated the effect on the overall proportion of procedures performed in day surgery, as it could be eventually demonstrated by any increment in the performance of procedures belonging to clusters B1, C1 and C2 (see Table 1) and whose execution with shortened hospitalisation was seemingly supported by good or satisfactory evidence (see Table 2 for definitions).

3. Results

A total of 683,615 surgical interventions made up of 2140 different procedures was performed in 1998 in Lombardy. On an average, 106,430 interventions (15.6%) were performed in day surgery, while 1189 procedures out of 2140 (56%) were performed at least once in day surgery. These 1189 procedures, corresponding to 607,424 interventions, did encompass all 384 being reported in the National Agency’s list [7] (see Section 1). Table 3 shows the distribu-

Table 1
Classification of surgical procedures according to their performance

	Proportion a procedure has been performed in DS		
	1: ≤5%	2: 5–30%	3: ≥30%
Numerical relevance of the procedure			
A: Performed less than once every 10,000 interventions	A1: Uncommon procedures, rarely performed in DS	A2: Uncommon procedures, infrequently performed in DS	A3: Uncommon procedures, repeatedly performed in DS
B: Performed between once every 200 and once every 10,000 interventions	B1: Quite common procedures, rarely performed in DS	B2: Quite common procedures, infrequently performed in DS	B3: Quite common procedures, repeatedly performed in DS
C: Performed at least once every 200 interventions	C1: Common procedures, rarely performed in DS	C2: Common procedures, infrequently performed in DS	C3: Common procedures, repeatedly performed in DS

Table 2
Classification applied to the reviewed evidence

Classification axes	Classification levels	Classification criteria
Judgement on the feasibility in DS		
	Feasibility in DS supported by the literature	Favourable results on clinical outcomes, such as safety
	Feasibility in DS seemingly supported by the literature	Favourable results, but tempered by the complexity of the procedure or evaluated with non clinical end-points (e.g., costs)
	Feasibility in DS hardly supported by the literature	The results suggest DS only in specialised centres, due to the complexity of the procedure
Quality of evidence supporting the judgement on the feasibility in DS		
	Good	Comparative studies or several concordant non comparative studies
	Satisfactory	Few concordant large scale non comparative studies
	Poor	Few concordant small scale non comparative studies
	Unsatisfactory	No studies or discordant results

Table 3
Distribution of the surgical procedures according to their relevance and performance in day surgery

	Proportion a procedure has been performed in DS		
	1: ≤5%	2: 5–30%	3: ≥30%
Numerical relevance of the procedure			
A: Performed less than once every 10,000 interventions	A1: 84	A2: 369	A3: 171
B: Performed between once every 200 and once every 10,000 interventions	B1: 230	B2: 182	B3: 113
C: Performed at least once every 200 interventions	C1: 23	C2: 9	C3: 8

tion of the 1189 procedures when classified according to the criteria described in Table 1. Globally, classes B1, C1 and C2 covered 443,448 interventions, 15,407 of which (3.5%) were performed in day surgery. After the aggregation was applied to procedures belonging to these classes (see Section 2), the original 262 procedures were grouped into 128 different categories of procedures, six in the class B1, 11 in the class C1, and 111 in the class C2.

A search for relevant publications on these procedures led us to review 348 papers written in 158 different journals. The result of this analysis is reported in Table 4. The 24 groups of procedures belonging to the first two rows and the first two columns of Table 4 (i.e. procedures appearing to be supported by the literature as feasible in day surgery) did correspond to 41 single procedures in the original list (see Appendix A). We then figured out the possible increment in the overall proportion of day surgery by simulating increased proportions of day surgery for these 41 procedures. Fig. 1 shows this relationship being approximately linear. For instance, one might calculate a 5% grow in the overall prevalence of day surgery, given an absolute increment of 20% of day surgery for those selected procedures. This would correspond to 34,000 interventions additionally performed in day surgery per year.

4. Discussion

The role of day surgery is becoming increasingly important world-wide. It potentially offers, through an adequate selection of patients and a specific organisation, health care as effective as the traditional approach, at a lower cost [18–21]. Its potential advantages extend over the shortening of the waiting list and the delivery of better care, as an increased number of beds and personnel would be shifted toward patients with more serious pathologies [11].

With the aim of studying the practice of day surgery, we reviewed the 1998 administrative database of all the hospitalisations occurred in Lombardy, a northern Italian Region inhabited by more than nine million people. Remarkably,

Table 4
Distribution of the surgical procedures according to the review of the literature

	Quality of evidence				
	Good	Satisfactory	Poor	Unsatisfactory	Total
Judgement on the feasibility in DS					
Supported	12	6	0	0	18
Seemingly supported	5	1	8	9	23
Hardly supported	0	0	1	0	1
No clue of criticism	0	0	0	86	86
Total	17	7	9	95	128

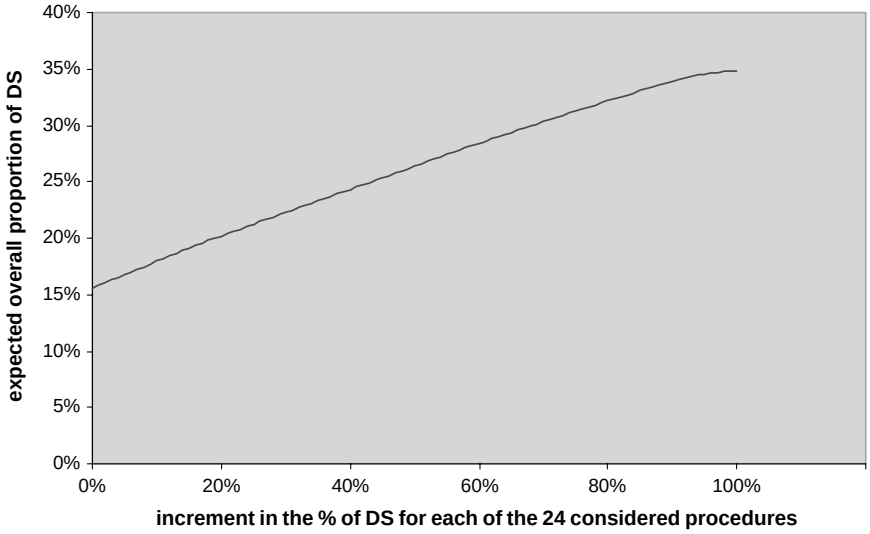

Fig. 1. Relationship between the increment in the proportion of day surgery for the 41 selected procedures and the increment in the overall proportion of day surgery.

the simple information about the hospitalisation regimen of each single procedure revealed interesting phenomena.

The first raw data that provides food for thought is the average use of day surgery (only 15.6% of all interventions were performed in day surgery). This situation, which appears inadequate when compared with other countries (e.g. 87% in Canada [22]; more than 50% in Australia [23]), might be regarded as a cultural heritage. Until 1995, Italian public hospitals were funded on a retrospective basis, so that for many years cost containment problems were largely undetected. Hence, arguments to implement less expensive alternative assistance, such as day surgery, were few and seemingly unmotivated.

We classified each procedure according to both the number of times it was performed in day surgery and its numerical relevance. By crossing the two classifications, 683,615 interventions emerged as prevalently distributed among the classes B1, C1 and C2 (Table 1), covering almost 65% of all the executed interventions. Since they also correspond to procedures rarely (B1 and C1) or quite rarely (C2) performed in day surgery, they seem particularly interesting in the attempt to increase the overall prevalence of day surgery. Because of that, we reviewed the relevant literature concerning these procedures, and we found that 32% (41 out of 128) were judged feasible in day surgery. We then calculated that an investment able to enhance the use of day surgery for these procedures could have a profound and directly proportional impact on the overall prevalence of day surgery.

Furthermore, our work showed how the analysis of administrative data could serve at least three different purposes.

First, to evaluate general and local situations. In the present analysis we found a particularly low use of day surgery in one of the most advanced Italian regions, which is likely to represent an optimistic picture for the whole country. Moreover, these data would easily allow the identification of those departments performing day surgery at a very high or very low rate.

Second, to establish priorities for investments. Only 41 procedures were found to deserve special attention. These are procedures rarely performed in day surgery in the region, although they are clearly supported in the literature as feasible without ordinary hospitalisation. It is remarkable that for as many as 67% of the reviewed groups of procedures (86 out of 128) we did not find studies on their practicability in day surgery. This could be due to at least three reasons: (1) for many procedures it is superfluous to document the day surgery feasibility, and no one undertook this task; (2) we termed each procedure as in the ICD-9-CM classification, and this could have affected the sensitivity of our search; (3) only the MEDLINE database was considered, thus some specialised journals, like “ambulatory surgery”, were excluded. However, although the procedures of interest could be more than 41, we showed how their promotion in day surgery could have a tremendous impact on the overall situation.

Third, the analysis of administrative data could be helpful in steering and monitoring the plans for enhancing the use of day surgery at a macro (geographic area), meso (hospital), and micro (department) level.

In summary, while there is wide consensus that any policy aimed at the implementation of day surgery should provide funds for both structural and organisational reforms of surgical departments, a strategy focused on the promotion of day surgery for some particular procedures could produce not only a knock-on effect on other procedures, but a direct and significant impact on the overall number of procedures performed in day surgery.

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Appendix A

List of 41 procedures whose feasibility in DS appeared to be supported by the literature.

ICD-9-CM Code	Description
13.2	Extracapsular extraction of lens by linear extraction technique
13.64	Discission of secondary membrane (after cataract)
13.65	Excision of secondary membrane (after cataract) capsulectomy
13.66	Mechanical fragmentation of secondary membrane (after cataract)
13.69	Other cataract extraction
28.0	Incision and drainage of tonsil and peritonsillar structures
28.3	Tonsillectomy with adenoidectomy
38.5	Ligation and stripping of varicose veins
38.8	Other surgical occlusion of vessels
40.5	Radical excision of other lymph nodes
49.44	Destruction of hemorrhoids by cryotherapy
49.45	Ligation of hemorrhoids
49.46	Excision of hemorrhoids
49.47	Evacuation of thrombosed hemorrhoids
49.49	Other procedures on hemorrhoids
53.0	Unilateral repair of inguinal hernia
53.1	Bilateral repair of inguinal hernia
53.2	Unilateral repair of femoral hernia
53.4	Repair of umbilical hernia
54.0	Incision of abdominal wall
54.5	Lysis of peritoneal adhesions
63.1	Excision of varicocele and hydrocele of spermatic cord
68.21	Division of endometrial synechiae
68.22	Incision or excision of congenital septum of uterus
68.29	Other excision or destruction of lesion of uterus
68.3	Subtotal abdominal hysterectomy
68.6	Radical abdominal hysterectomy
69.0	Dilation and curettage of uterus
80.1	Other arthrotomy
80.2	Arthroscopy
81.4	Other repair of joint of lower extremity
81.80	Total shoulder replacement
81.81	Partial shoulder replacement
81.82	Repair of recurrent dislocation of shoulder
81.84	Total elbow replacement
81.93	Suture of capsule or ligament of upper extremity
81.94	Suture of capsule or ligament of ankle and foot
81.95	Suture of capsule or ligament of other lower extremity
81.96	Other repair of joint
81.97	Revision of joint replacement of upper extremity
81.99	Other operations on joint structures NOS

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Pain relief following oral day case surgery: a pilot study

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Abstract

One hundred consecutive, adult patients attending for bilateral mandibular third molar removal utilising standardised surgical and day case general anaesthetic protocols were recruited into a pilot study to investigate the effectiveness of different peri-operative analgesic regimes. Patients were randomised into five study groups using various pre- or post-operative combinations of non-steroidal anti-inflammatory drugs (NSAID) and/or LA block. Pain scores were recorded pre-operatively and at 30 min intervals for 2 h after surgery, as were details of the first dose of 'escape analgesia' (codeine/paracetamol compound preparation). There was no statistically significant difference in overall pain experience between the groups, although the results suggested better pain relief was achieved in those patients who received both post-op NSAID and post-op LA. Further research is required to improve post-operative pain relief for patients undergoing third molar surgery.

Keywords: Day surgery; Post-operative pain

1. Introduction

Impaction of mandibular third molar teeth and ensuing pericoronal infection is a common disorder requiring surgical intervention. Pain, trismus and swelling are common post-operative sequelae and although their severity varies between patients significant morbidity is known to occur [1]. In particular, pain following surgical removal of third molar teeth is recognised as a major problem and whilst the majority of day units supply patients with analgesics for use at home, several studies have shown patients often experience inadequate analgesia post-operatively [2].

Whilst the surgical removal of impacted third molars has become an internationally accepted clinical pain model, there are still no agreed protocols for optimum post-operative analgesia [1–3]. Indeed, most research projects have been designed to compare different types of analgesic medication, or to contrast the efficacy of different local anaesthetic agents or their formulations in patients undergoing surgery [4].

Analgesics such as peripherally-acting non-steroidal anti-inflammatory drugs (NSAIDs), commonly ibuprofen 400 mg, or compound paracetamol 500 mg/codeine phosphate 30 mg preparations are widely prescribed following third molar surgery [1]. Likewise, many operators use local analgesic injections at the site of surgery although there remains controversy over the optimum timing of injection. Whilst some studies have shown better pain control following pre-operative local analgesia administration in patients undergoing third molar surgery under general anaesthesia, these effects do not appear to be long lasting and it remains unclear how long afferent blockade should be continued for maximum effect [5–7].

This preliminary investigation was undertaken to examine the practicality of comparing the efficacy of different peri-operative analgesic and/or local anaesthetic regimes in patients attending for day case surgical removal of impacted third molars.

2. Method

Following local ethical committee approval and informed patient consent, 100 consecutive adult patients attending the

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Oral Surgery Day Case Unit at Newcastle Dental Hospital for bilateral mandibular third molar removal under general anaesthesia were recruited into the study. All subjects were American Society of Anaesthesiologists (ASA) class I or II, and judged to be suitable for day stay following assessment at the nurse-led pre-admission clinic [8]. Patients in which NSAIDs were contra-indicated (those with gastro-intestinal disease, asthma or known to be hypersensitive) were excluded from the study.

All patients were asked to record a pre-operative visual analogue scale (VAS) pain score as a baseline, and post-operative VAS scores were determined at 30, 60, 90 and 120 min after surgery. A ruler with a 10 cm line marked 'no pain' to 'worst pain imaginable' and a moveable marker was used, and patients were asked to position the marker at a point on the line corresponding to the intensity of their pain; a 100 mm numerical scale on the other side of the ruler (not seen by the patient) allowed quantitative scores to be documented at each time point.

A 'lip numbness score' was also recorded for each patient, both pre-operatively and again at 30, 60, 90 and 120 min post-operatively, using the following scale: 0 normal lip sensation, 1 tingling, 2 partly numb or 3 complete numbness, in order to monitor the efficacy of LA administration during the study.

Patients underwent a standardised anaesthetic administered by one consultant anaesthetist (IRF), whilst surgery was carried out by two experienced surgeons (PJT and CBH) working to an agreed protocol (Table 1).

The patients were randomly allocated into five treatment groups (20 patients per group), each of which followed a different analgesic regimen (Table 2). Random permuted blocks were used, with allocation made in theatre using opaque, sealed, serially numbered envelopes. Groups 1, 2 and 3 received 75 mg of diclofenac sodium (Voltarol®) orally with bilateral inferior dental nerve LA block injections using 2% plain lignocaine (2.5 ml each side) in varying pre- or post-operative combinations. Lignocaine without a vasoconstrictor was chosen to limit the expected local analgesic effect to the immediate post-operative observation period, thus facilitating direct comparison of pre-and post-surgical LA efficacy. Groups 4 and 5 were designed to utilise only one of the analgesic techniques: post-operative LA or pre-operative diclofenac.

All patients were cared for by the day unit nurse co-ordinating their ambulatory care, and a record made of the time of use of any additional (escape) analgesia; two tablets of co-codamol (codeine phosphate 8 mg, paracetamol 500 mg per tablet) were available for this purpose.

Table 1
Standardised surgical and anaesthetic protocols

Surgical protocol	Bilateral impacted mandibular third molar teeth 'Envelope' muco-periosteal flap reflection Bone removal with burs Vertical tooth sectioning (if required) Closure with resorbable sutures
Anaesthetic protocol	Induction with Fentanyl (1 μg/kg) and Propofol (2–4 mg/kg) Muscle relaxation using Mivacurium (0.15 mg/kg) Nasal incubation with 'polar' tube (6.5 mm males, 6.0 mm females) Saline-moistened throat pack Maintenance with N_2O, O_2 + Sevoflurane (1–4%) Spontaneous respiration, using a CO_2 absorber No additional intra-operative analgesics

Table 2
Treatment groups

Group	Designation	Analgesic regimen
1	Pre V/Pre LA	Voltarol® 75 mg orally 45 min pre-op GA Bilateral I.D. Block LA (2% Plain Lignocaine) prior to surgery
2	Pre LA/Post V	GA Bilateral I.D. Block LA (2% Plain Lignocaine) prior to surgery Voltarol® 75 mg orally 45 min post-op
3	Post LA/Post V	GA Bilateral I.D. Block LA (2% Plain Lignocaine) immediately post surgery Voltarol® 75 mg orally 45 min post-op
4	Post LA	GA Bilateral I.D. Block LA (2% Plain Lignocaine) immediately post surgery
5	Pre V	Voltarol® 75 mg orally 45 min pre-op GA

3. Results

Ninety-six complete study records were available for analysis; four patients were excluded due to incomplete data recording. Sixty-seven female and 29 male patients (age range 17–38 years; mean 26.3 years) were thus recruited into the study.

The 'lip numbness scores' confirmed efficacy of LA administration. Pre-operative LA became less effective at around 60 min post-operatively, whilst post-operative LA was effective until approximately 90 min.

Fig. 1 shows that mean VAS pain scores recorded over 120 min for the five experimental groups all followed very similar patterns, whilst Table 3 summarises VAS means computed from each patient over the 30–120 min post-operative period. Comparison of means between treatments, using an analysis of covariance, indicated there was no evidence of a difference between treatment means ($P = 0.72$).

The means computed in Fig. 1 ignore when escape analgesia was taken. Fig. 2 therefore shows the means

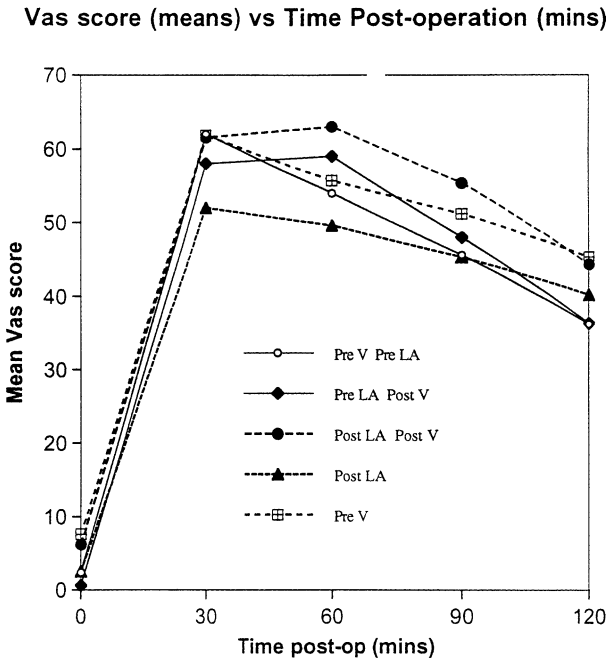

Fig. 1. Mean VAS scores vs. time post-operation (min) for treatment groups (uncorrected for use of escape analgesia).

Table 3
Mean VAS scores (30–120 min post-op)

Treatment	No. of patients	Mean VAS[a]
Pre V/Pre LA	20	50
Pre LA/Post V	20	51
Post LA/Post V	19	55
Post LA	18	47
Pre V	19	53

[a] Standard error of difference = 6.

separately, by the time escape analgesia was taken. Those taking escape analgesia at 30 min had rather higher VAS values at the 30 min post-operative period than, for example, those not taking escape before 120 min. The pattern for those taking escape at 90 min is unclear as few patients fell into this group.

Table 4 lists the proportion of patients in each experimental group requiring escape analgesia and the median time post-operatively to first use of escape analgesia; there was no significant difference between treatments (chi−squared = 1.91, $P = 0.75$).

Table 5 shows the number of patients in each group versus the time of last recorded VAS prior to use of escape analgesia.

Whilst there are no statistically significant differences between treatments, Pre V/Pre LA and Pre V patients exhibit poorer results. In particular, a high proportion (0.74) of Pre V patients required escape analgesia with a short median time to analgesic use (50 min). Indeed, 12 out of the 15 Pre V patients using escape did so within the first 30 post-operative minutes. In contrast, patients in the Post LA/Post V group exhibited the lowest proportion requiring analgesia (0.53) and the longest median time to first use escape (115 min).

Table 6 summarises mean VAS results at 24 h post-operatively (results available for only 88 patients). The number of non-responders at 24 h was not significantly different between groups ($P = 0.07$) and analysis of variance comparing the VAS scores revealed no difference between the treatment groups ($P = 0.65$).

4. Discussion

The management of post-operative pain is of considerable importance in ambulatory surgery. Recent studies have shown that 50% of patients experience pain for up to one

Table 4
Use of escape analgesia

Treatment	No. of patients	No. using escape analgesia <120 min	Proportion using escape analgesia	Median time post-op to use of escape analgesia (min)
Pre V/Pre LA	20	13	0.65	65
Pre LA/Post V	20	13	0.65	85
Post LA/Post V	19	10	0.53	115
Post LA	18	12	0.67	95
Pre V	19	14	0.74	50

Table 5
Number of patients using escape analgesia vs. time post-op

Time of last VAS before escape analgesia (min)	All treatments	Pre V/Pre LA	Pre LA/Post V	Post LA/Post V	Post LA	Pre V
0	10	2	3	1	1	3
30	30	7	4	4	6	9
60	13	3	4	4	2	0
90	11	1	2	3	3	2
120	1	0	0	0	0	1

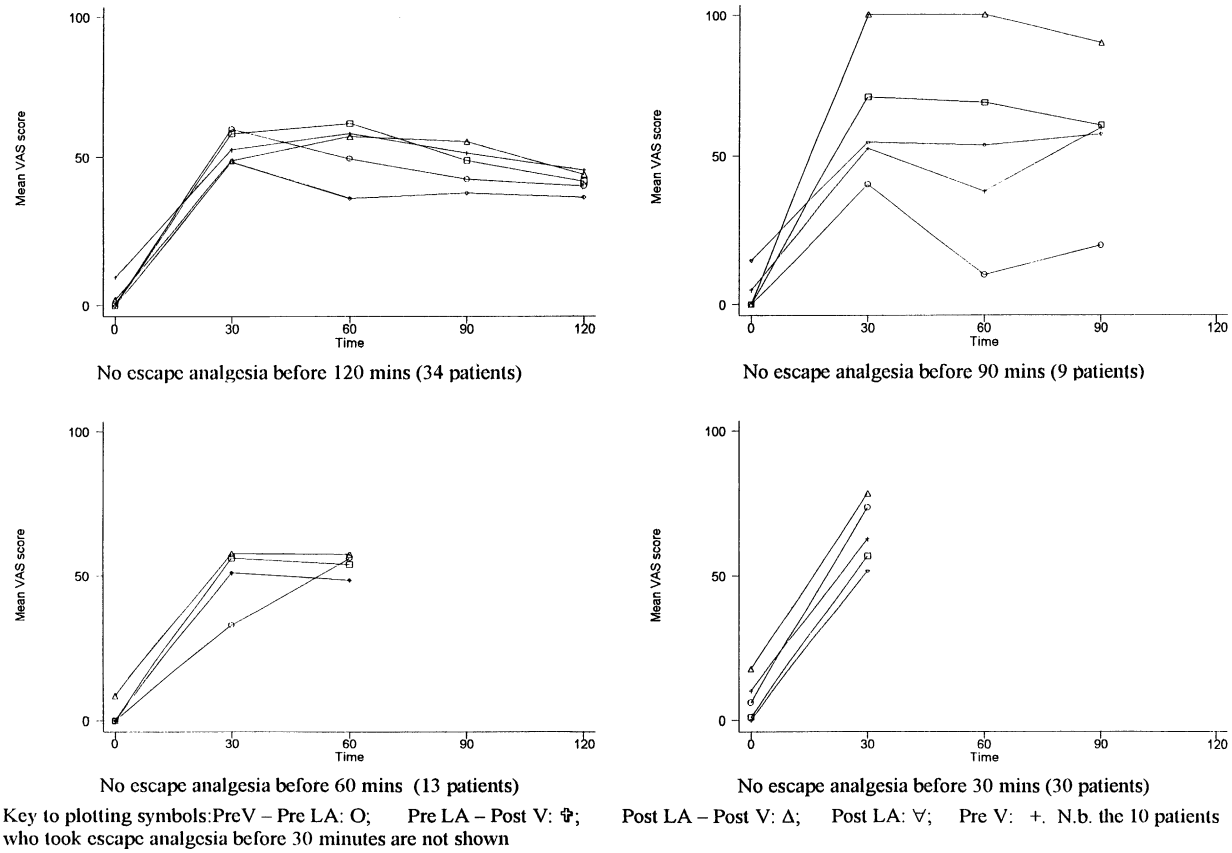

Fig. 2. Mean VAS scores vs. time post-operation (min) for treatment groups (separated by time escape analgesia was taken).

week following third molar surgery, whilst a significant deterioration in quality of life has also been demonstrated during this period [9,10]. There is clearly a need to provide improved pain control for such patients.

The purpose of this preliminary study was to investigate the efficacy of differing peri-operative analgesic regimes for day patients having bilateral mandibular third molar removal under general anaesthesia. Utilising NSAIDs and LA in different, structured combinations (Table 2) together with a codeine/paracetamol 'escape' we hoped to define an effective and practical analgesic regimen.

Daniels et al. [11] considered that the current standard of care for alleviating acute pain after third molar surgery relies principally upon NSAIDs or opioid/analgesic combination products, whilst Seymour et al. [12] recently demonstrated the efficacy of soluble aspirin compared with paracetamol post-operatively.

Table 6
Mean VAS scores (at 24 h post-op)

Treatment	No. of patients	No. of responders at 24 h	Mean 24 h VAS score
Pre V/Pre LA	20	16	46
Pre LA/Post V	20	17	40
Post LA/Post V	19	19	46
Post LA	18	18	46
Pre V	19	18	54

There are few studies in the literature which specifically investigate different analgesic and/or local anaesthetic agent combinations. Mellor et al. [13] carried out a direct comparison of pre-operative bupivacaine versus intra-venous ketorolac in third molar removal, and found no significant difference in post-operative pain scores. Campbell et al. [14] noted that the combined use of pre-emptive analgesia with bupivacaine, tenoxicam and alfentanil did not appear to reduce post-operative pain experience.

We also found little evidence for the effectiveness of pre-emptive analgesia in our study, although there was a trend (albeit statistically non-significant) for better post-operative pain relief in patients receiving analgesic medication post-operatively, particularly when this was combined with post-op LA (Table 4).

An obvious criticism of this conclusion is that the overall pain experience may not be reduced but simply that the onset of post-operative pain is delayed by the later administration of analgesics. This may be a significant problem following ambulatory surgery when patients return home before significant pain becomes apparent. In our project we deliberately chose short acting 2% plain lignocaine to facilitate the study, and it is interesting to note that those groups receiving post-operative LA did in fact demonstrate the longest times to first use of escape analgesia, although overall showed no significant difference in pain experience (Table 4).

Pain is an inherently individual and complex sensation, and difficulties arise in attempting to quantify and compare different patients' pain experiences. There is no doubt that oral day surgery patients consistently report pain and swelling as significant problems following surgery, and that better pain relief is an integral part of improving the quality of care in ambulatory surgery [15].

It may be that by combining pre-operative analgesia, post-operative LA immediately upon completion of surgery, and a further analgesic administered during the recovery period we can enhance patients' overall pain relief. Having defined our research methodology during this pilot, we are currently undertaking further studies in an attempt to elucidate the best pattern of analgesic management for oral surgery day stay patients.

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