



Editorial

Changing Times

I am sad that my Co-Editor-in-Chief of this Journal, Dr Bernard Wetchler, is retiring from this post with the publication of this edition. Bernie's achievements in the field of anaesthesia have been outstanding. Amongst a raft of prestigious appointments, he has been President of the Illinois Society of Anaesthesiologists, first President of the Society for Ambulatory Anaesthesia, President of the American Society of Anaesthesiologists and Vice President of the World Federation of Societies of Anaesthesiologists. Currently he is Clinical Professor of Anaesthesiology at the University of Illinois College of Medicine at Chicago.

As a surgeon, I have never had the privilege of working with Bernie and experiencing his expert anaesthetic techniques accompanied, I understand, by his first class sense of humour. However, I have had the privilege, since the inception of Ambulatory Surgery, of experiencing his outstanding organisational, editorial and literary skills. He has been a delight to work with and at all times a true gentleman. I will miss

his wise advice and thank him for his invaluable work over the last 9 years.

My sadness at Bernie's departure is balanced by the joy in the appointment of an able successor. The new Co-Editor-in-Chief of this journal is another talented anaesthetist, Dr Beverly Philip. Beverly is the founder and Director of the Day Surgery Unit at the Brigham and Women's Hospital in Boston and Associate Professor of Anaesthesia at Harvard University. Like Bernie, she is a Past President of the Society for Ambulatory Anaesthesia and is the current Chair of the Ambulatory Surgical Care Committee of the American Society of Anaesthesiologists. She is active in research in ambulatory anaesthesia and has published widely on the subject. Her appointment, I am sure, will aid the growth and success of Ambulatory Surgery.

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Obituary

Professor Marc-Claude Marti: 1941–2001

Marc-Claude Marti was born on the 13th September 1941 in Geneva where his father was a surgeon. However, his life really began 6 years later following encephalitis, which had erased all his earliest memories. In later years he used to say it was impossible to live quietly after such an experience.

At secondary school he was more interested in the theatre than science. This considerably worried his parents who felt he might follow a career in this rather precarious profession. In time his ideas changed and he enrolled at the University of Geneva to study medicine. On qualification he pursued a career in surgery. His endless enthusiasm towards new ideas and approaches led him to spend time at St Mark's Hospital in London studying colo-proctology. He went on to develop this speciality at the University of Geneva and was one of the early pioneers of ambulatory surgery in his outpatient unit. His world fame came from being the first to describe the posterior perineal block. He used this technique to undertake anal procedures under local anaesthetic as a day case.

In the field of colo-proctology he was the leading force in convincing all the European societies of proctology to merge and form the 'European Council of Proctology'. For more than 15 years, he was the General Secretary of this Society and in this position he used his kindness and patience to bring more than 20 societies together.

Marc-Claude was a member of the group that formed the International Association for Ambulatory Surgery (IAAS) in 1994 and was a member of its Executive Committee from then. At the time of his death he was Vice President of the Association. During his life he organised many international congresses. The last was the IAAS Congress in Geneva in April 2001 and thanks to Marc-Claude's efforts it was a great success.

But the true man is more than his actions and achievements. Marc-Claude was a kind and generous

man with a delightful even temperament and courteousness. He also enjoyed life to the full. Those who knew him well will remember this pipe smoking gourmet who was not afraid, on occasion, to wear the brightest of jackets. His humour was legendary, as was his vast repertoire of jokes which he could recount fluently in at least four languages. Despite the present circumstances, Marc-Claude would certainly have liked one of his stories told here. If perhaps not true, it is well founded: 'Si non e vero e ben trovato' as the Italians would say. An English woman was being examined for anal problems by the head of the surgical department. As he finished with the rectal examination the patient asked him:

"Sorry to bother you Professor, but could you tell me which finger you used for the examination?"

Without any surprise, he answered:

"With the second finger of course!"

"Could you please repeat it with the third finger?" the patient asked.

He did this without hesitation, but asked:

"Why do you want me to do this?"

"Just for a second opinion" she answered.

Marc-Claude Marti died on 26th September 2001 whilst on holiday in Egypt. He will be sorely missed by all who knew him.

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National Guidelines

Guidelines for the accreditation of office-based surgery facilities[☆]

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These guidelines have been prepared by the Australian Day Surgery Council to assist accrediting bodies to accredit office-based day surgery facilities. The Guidelines are intended as broad principles. Detail may be determined by the accrediting bodies. At some time in the future, health funds or other organisations may contribute to the costs of procedures performed in accredited office-based facilities.

Disclaimer

These guidelines should not be construed as dictating the facilities required to safely perform any diagnostic or surgical procedures. The ultimate judgement of how, where and when a surgical procedure may be best performed must be made by the person who accepts overall responsibility.

1. Contents

Part 1. Procedures performed under local anaesthesia alone.

Part 2. Procedures performed under local anaesthesia and sedation.

1.1. The Australian Day Surgery Council

The Australian Day Surgery Council, formerly the National Day Surgery Committee, was formed by the

[☆] With the expansion of Office based surgery in Australia, both the RACS and ANZCA consider it important that appropriate standards are defined to ensure quality control and patient safety in this area. This task has been delegated to the Australian Day Surgery Council to develop and provide guidelines for the accrediting bodies. These guidelines should be interpreted as principles only, with detail being the responsibility of the accrediting body.

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Australian Association of Surgeons and the Royal Australasian College of Surgeons which then incorporated the Faculty of Anaesthetists (now the Australian and New Zealand College of Anaesthetists) and the Australian Society of Anaesthetists. The Council also includes representatives of hospitals, private health funds and government. The Australian Day Surgery Council aims to promote day surgery of the highest possible standard.

Dr John Warden

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2. Introduction

2.1. Definition

Office-based surgery is defined as an operation(s) or procedure(s) carried out in a medical practitioner's office or outpatient department, other than as a service normally included in an attendance (consultation). it does not require or involve admission to a day surgery/procedure centre or to a hospital as an in-patient.

Although there has been no formal recognition of office-based surgery, a significant group of minor operations/procedures are carried out in practitioner's consulting rooms.

The majority of these operations/procedures are carried out under local anaesthesia or without anaesthesia. However an increasing number are being carried out under sedation, with or without local anaesthesia.

2.2. Australian Practice Standards

The above broad spectrum of minor procedural activity is subject to currently accepted Australian practice standards, including those of infection control and occupational health and safety.

2.3. Accreditation of Office-based Surgery Facilities

Accreditation of office-based surgery facilities would best be the responsibility of accrediting organisations. The Australian Day Surgery Council has prepared these Guidelines to assist such organisations in the preparation of specific accreditation criteria.

Accreditation of office-based facilities should not be compulsory. The Guidelines are not intended to apply to simple procedures under local anaesthesia or without anaesthesia such as excision or biopsy of skin lesions, suture of lacerations, removal of sutures and surgical drains, and procedures carried out with topical (surface) anaesthesia, as consulting room services.

It is not envisaged that general anaesthesia will be undertaken as office-based surgery but, if a situation arose whereby general anaesthesia were to be performed in an office-based facility, this would require adherence to standards set by the Australian and New Zealand College of Anaesthetists.

These Guidelines should be interpreted as principles only with detail being the responsibility of the accrediting body.

The following requirements should be met for a facility to be accredited:

3. Part 1

3.1. Procedures performed under local anaesthesia alone

These Guidelines should be interpreted as principles only with detail being the responsibility of the accrediting body.

The following requirement should be met for a facility to be accredited:

1. Physical facilities

- (a) A dedicated procedure room, separate from any consulting room. This room should contain:
 - Adequate lighting to allow the procedure to be performed safely.
 - Non-slip, non carpeted flooring.
 - Adequate uncluttered floor space to access and perform resuscitation should this prove necessary.
- (b) A recovery area which is not part of the general waiting room or office.
- (c) Emergency lighting for the procedure room and recovery area.
- (d) Appropriate hand-washing facilities for pre-operative hand washing or scrub.
- (e) Regular and adequate cleaning.

2. Equipment requirements

- (a) An autoclave or access to sterile instruments from a sterile supply facility.
- (b) For an open procedure, proper provision for haemostasis should be available (e.g. electro-surgical unit).
- (c) Disposable single-use items, including sterile gloves and drapes, ampoules of local anaesthetic, needles, syringes, scalpel blades, and suture material.
- (d) Resuscitation equipment including:
 - A supply of oxygen and suitable devices for the administration of oxygen to a spontaneously breathing patient.
 - A means of inflating the lungs with oxygen (eg a range of pharyngeal airways and self-inflating bag suitable for artificial ventilation).
 - Adequate suction device.
 - Appropriate drugs for treating emergencies should include midazolam or diazepam, atropine and adrenaline.
 - A range of intravenous equipment.
 - Intravenous fluids and infusion sets.
 - Intravenous cannula.

3. Approved procedures for the sterilisation of equipment and the maintenance of sterile operative fields

- (a) Wherever possible single-use disposable items of equipment should be used, including syringes, needles and ampoules for injection. Any single-use article or instrument that has penetrated the skin, mucous membrane and/or tissue must be appropriately disposed of immediately after use or at the end of the procedure.
- (b) When re-usable items of equipment are used then provision must be made for:
 - Physical cleaning: this is a process for the removal of micro-organisms and biohazardous materials from the surface of an object. Thorough physical cleaning of instru-

ments to remove blood and other debris is essential if effective disinfection or sterilisation is to occur. Such physical cleaning must always be performed prior to the disinfection/sterilisation process.

- **Disinfection:** this is the process of eliminating all micro-organisms other than bacterial spores.
- **Sterilisation:** this is a process to destroy all forms of microbial life, including bacterial spores. The most effective and reliable form of sterilisation is by steam under increased pressure (autoclaving). Australian Sterilising standards AS 4187 and Standards for Endoscopic facilities and Services. All instruments, materials and medications introduced into the body tissue must be sterile. Such instruments may be pre-sterilised single-use items, or re-useable items, which have been sterilised before use. Instruments used for internal examinations of mucous membranes (eg vaginal speculum, rigid sigmoidoscopes and flexible endoscopes) must not have the capacity to transfer harmful micro-organisms between patients. They must therefore be sterilised or disinfected.

(c) All bio-chemical equipment must comply with Australian Standards AS-3551.

(d) Sterile drapes where necessary.

4. Staff

(a) Clinical support and facility responsibilities should be provided by appropriately trained personnel. Office staff should not be seconded for this purpose.

(b) All staff involved in the performance of procedures should have blood borne virus status assessed and maintain appropriate immunisation against Hepatitis B.

(c) All staff should be familiar with procedures to be followed in the event of a needle stick injury, which should be carefully documented.

(d) All staff should be trained in basic cardiopulmonary resuscitation procedures and the checking of equipment and emergency drugs used for resuscitation purposes.

(e) All staff must be conversant with a protocol for the management of patient collapse.

5. Patient transfer

(a) An arrangement should exist with a nearby accredited hospital for the transfer of patients in the event of unexpected serious or potentially serious developments.

6. Medical records

(a) An adequate anaesthetic and surgical record must be maintained. Separate documentation of each procedure should be maintained in a logbook, including date, time, duration, personnel involved in the procedure, and any associated problems or complications.

(b) Follow up arrangements and post-operative wound care must be clearly outlined to the patient, and written confirmation when appropriate.

7. Waste disposal

(a) Disposal of contaminated waste, including

sharps, should be properly managed through an arrangement with a licensed contractor.

8. General

(a) An appropriate management structure, which has the ability to address continuous quality improvement (CQI) issues.

(b) Occupational health and safety guidelines for an operating theatre should be in place and followed. This should include fire safety and evacuation procedures.

(c) Documentation of regular staff training in cardio-pulmonary resuscitation, the use of emergency drugs, the care and maintenance of equipment.

4. Part 2

4.1. Procedures performed under local anaesthesia and sedation

Definition.

Sedation for diagnostic and surgical procedures (with or without local anaesthesia) includes the administration by any route or technique of all forms of drugs, which results in depression of the central nervous system.

All guidelines for procedures performed under local anaesthesia alone apply (See Part 1). In addition the following guidelines apply:

1. Physical facilities

(a) The complete facility should allow for:

- an admission and reception area;
- pre and post-operative patient holding areas;
- appropriate utility room;
- toilets suitable for disabled persons;
- refreshment facilities;
- vehicle access area.

2. Procedure room

(a)

- adequate size for procedure undertaken including adequate uncluttered floor space to perform resuscitation should this prove necessary;
- appropriate lighting, ventilation and suction;
- appropriate equipment for the procedure undertaken;
- an operating table or trolley which can be readily titled;
- quality of staff appropriate to the procedure undertaken.

3. Recovery room

(a)

- closely related to the procedure room with adequate lighting and adequate uncluttered floor space to perform resuscitation should this prove necessary;
- comfortable reclining seating for patients to complete recovery prior to discharge;

- patients supervised by appropriately trained nursing staff;
- ready access to resuscitation equipment, including oxygen and suction;
- patients should not leave the recovery room unaccompanied.

(b) Discharge area should include:

- wheel chair access;
- vehicle access area;
- ambulance access;

4. Drugs and equipment

(a) A supply of oxygen and suitable devices for the administration of oxygen to a spontaneously breathing patient.

(b) A means of inflating the lungs with oxygen (eg a range of pharyngeal airways and self-inflating bag suitable for artificial ventilation).

(c) Appropriate drugs for cardiopulmonary resuscitation and a range of intravenous equipment. Emergency drugs should include at least the following:

- adrenaline;
- atropine;
- dextrose 50%;
- lignocaine;
- naloxone;
- flumazenil.

(d) A pulse oximeter: continuous patient monitoring by pulse oximetry is required when intravenous sedation is used. Equipment must alarm when certain set limits are exceeded.

(e) Ready access to a defibrillator.

(f) An adequate suction device.

5. Staff

(a)

- Appropriately trained registered nurse should be present for theatre and/or recovery.
- There must be an appropriately trained assistant present during the procedure who shall monitor the level of consciousness and cardio-respiratory function of the patient and be competent in cardiopulmonary resuscitation.
- The operator may provide non-intravenous sedation and be responsible for care of the patient provided rational communication to and from the patient is continuously possible during the procedure.
- If at any time rational communication is lost, then the operator must cease the procedure and devote his/her entire attention to monitoring and treating the patient until such time as another practitioner becomes available to monitor the patient and take responsibility for any further sedation, analgesia or resuscitation.

- If intravenous sedative drugs are being administered an anaesthetist should be present.
- If loss of consciousness or loss of rational communication is sought as part of the technique, then an appropriately trained anaesthetist must be present to care exclusively for the patient.

● Techniques, which compensate for anxiety or pain by means of heavy sedation, must not be used unless an anaesthetist is present.

● The practitioner administering the sedation drugs requires sufficient basic knowledge to be able to:

understand the actions of the drug or drugs being administered;

detect and manage appropriately any complications arising from these actions. In particular doctors administering sedation must be skilled in airway management and cardiovascular resuscitation;

anticipate and manage appropriately the modification of these actions by any concurrent therapeutic regimen or disease process, which may be present.

● A written record of the dosages of drugs and the timing of their administration must be kept as part of the patient's records. Such entries should be made as near the time of administration of the drugs as possible.

● A policy and procedure manual should be available to all staff.

6. Patient assessment

(a) The patient should be assessed before the procedure. Documentation should include:

- a concise medical history and examination (should include blood pressure measurement);
- informed consent;
- any instructions for preparation and discharge procedure.

(b) If the patient has any serious medical condition or danger of airway compromise, or is a young child or is elderly, then an anaesthetist should be present to monitor the patient during the procedure.

(c) Patient assessment can be assisted by:

- a standardised anaesthesia questionnaire;
- preliminary nurse assessment;
- prior surgical referral in cases of doubt as to suitability for office based surgery.

(d) Patient information in an understandable written format must include:

- general information about the processes followed in the office based facility;
- limited solid food may be taken up to six hours prior to sedation;

- unsweetened clear fluids totalling not more than 200 ml/h may be taken up to three hours prior to sedation;
- only medications or water ordered by the anaesthetist should be taken less than three hours prior to sedation;
- an H₂-receptor antagonist should be considered for patients with an increased risk of gastric regurgitation;
- the guidelines may be modified in some patients, particularly infants and small children, on advice from the anaesthetist.

7. Selection guidelines

(a) Procedures suitable for office-based surgery include those with:

- a minimal risk of peri-operative haemorrhage;
- a minimal risk of post-operative airway compromise.
- post operative pain controllable by outpatient management techniques.
- a rapid return to normal fluid and food intake.

(b) Patient requirements for office-based surgery include:

- a willingness to have the procedure performed together with an understanding of the process and ability to follow discharge instructions;
- physical status of ASA 1 or II. Medically stable ASA III or IV patients may be accepted for office-based surgery following consultations with the anaesthetist concerned.
- In all cases, the ultimate decision as to the suitability of a patient for office based surgery is that of the surgeon and/or anaesthetist. The decision as to the type of anaesthesia must remain in the province of the anaesthetist and will be based on surgical requirements, patient considerations, the experience of the anaesthetist and the facilities in the office based surgery.

(c) Social requirements for office-based surgery include:

- a responsible person able to transport the patient home in a suitable vehicle;
- a responsible person at home for at least the first night after discharge from the facility;
- a responsible person is an adult who understands the instructions given to them and is physically

and mentally able to make the decisions for the patient's welfare when appropriate.

8. Discharge

(a)

- The patient should be discharged only after an appropriate period of recovery and observation in the procedure room or in an adjacent area that is adequately equipped and staffed.
- Discharge of the patient should be authorised by the practitioner who administered the drugs, or another suitably qualified practitioner. The patient should be discharged into the care of a responsible adult to whom written instructions should be given. These should include emergency phone numbers.
- Should the need arise the patient must be transferred to appropriate medical care.

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Australian (Commonwealth) government policy on day surgery (Ambulatory Surgery) with particular emphasis on the private sector

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Abstract

This paper examines the growth in day surgery in Australia utilising available data for the period 1991–1992 to 1998–1999. An outline of the Australian health care system is given to provide the relevant background to the day surgery environment. The growth in day surgery will then be examined with a discussion of how this growth has led to the need to reform, and the intended direction of this reform. © 2002 Elsevier Science B.V. All rights reserved.

Keywords: Medicare; MBS; Private acute care

1. Introduction

1.1. The Australian health care system

The Australian health care system has a number of unique features. Medicare, a system of universal health cover for all Australians since 1984, provides health care funding to the tune of \$A6 billion dollars per annum. This scheme is supported by others such as the Pharmaceutical Benefits Scheme (entailing funding of \$A3.8 billion per annum in the 2000–2001 financial year).

Consumers support Medicare indirectly through general taxation. Although a Medicare Levy of 1.25% is paid through taxation, this does not fund Medicare directly, but again, is paid into general revenue. High-income earners must pay an extra 1% levy if they do not have private health insurance hospital cover. Medicare supports primary and acute medical and surgical care. Primary health care visits to general practitioners or specialists are subsidised by the Commonwealth and the level of subsidy is determined in the Medicare Benefits Schedule (MBS). The MBS in-

cludes a range of medical, surgical, consultation and diagnostic procedures where the government sets the procedural fee payable by the Commonwealth. Notwithstanding this, medical practitioners can charge fees higher than the fee determined in the MBS.

Acute care has two distinctive aspects. Public acute sector health care is delivered and managed by the states and territories in Australia with joint funding and formal agreement with the Commonwealth, known as the Australian Health Care Agreements. Patients who elect to receive public acute care as admitted or non-admitted patients are not billed for any aspect of this care.

Private acute care is primarily delivered through private hospitals and day hospital facilities. Funding for this care is primarily through health insurance funds on behalf of their members who pay contributions to such funds. A minority of patient's fund their own private health care (self-funded). Medicare provides some financial subsidisation for all private patients in a private acute care setting.

Private health insurance is regulated in Australia and, as such, there are restrictions upon the levels and types of benefits that can be paid by health insurance funds on behalf of their members (the patients).

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1.2. *Private hospital insurance cover*

At September 1997 [1], 32% of the Australian population held private health insurance compared with 45.4% of Australians at 31 December 2000, an increase of 13.4% over the 3 year period. Hospital cover only relates to services provided to admitted patients on either a same day or overnight basis.

Major initiatives contributing to the increase in private health insurance for the 1999–2000 financial year were the implementation of two major Australian (Commonwealth) Government (the Government) initiatives. The first, the 30% rebate has contributed to increased numbers of Australians joining and retaining their private health insurance. This rebate has immediately improved the affordability of health insurance for members of health funds. The rebate reduces the cost of health insurance premiums by 30%, regardless of an individual's income, family structure or level of cover.

The second major initiative, Lifetime Health Cover, recognises that because health care costs increase with age, those who join at younger ages should pay less than those who join at a later age, which has the effect of encouraging younger people to join. Where this increase in younger members also brings an increase in healthier members, the risk profile of members is improved overall. This has the effect of reducing the frequency and size of premium increases, which might otherwise be needed to cover the level of fund expenditure for older, less healthy members.

1.3. *Private ancillary insurance cover*

As at 31 December 2000 [2], 40.4% of Australians held ancillary cover, compared with 31.8% at 30 September 1997, an increase of 8.6% over the 3 year period. This is a qualified increase, given that a contributor may choose to hold hospital insurance with one health fund and hold ancillary cover with another. Ancillary services, provided by such cover, include services such as dental, occupational therapy, physiotherapy, speech therapy etc, not covered by Medicare.

1.4. *Private health insurance in Australia*

From a health insurance and Australian Health Care Agreements perspective, although day surgery has only recently been recognised as a legitimate procedure, it has been around since the early 1980s. Whilst the broad concept of day surgery is self-evident, broader government objectives for the role of private health insurance have directly encouraged an increasing trend towards more sophisticated surgical procedures to be undertaken on a same day basis in both the public and private sectors, without relinquishing quality, safety and other imperative issues related to patient care and outcomes.

These Government objectives focus on maximising the effectiveness of the health system in delivering improved health for the Australian community; caring for those with chronic poor health; ensuring equity in the delivery and financing of health services; and improving the efficiency of individual health service providers as well as the industry as a whole [3].

Private health insurance also recognises the essential role of the private sector, and seeks to capitalise on the strengths of both the public and private systems in building a better health system within Australia. Private health insurance is sometimes portrayed as competing with Medicare, and sometimes as complementing Medicare. In a sense, it plays both roles because those with private health insurance are still eligible to receive care that is free at point of delivery within the public sector [4].

The Government is committed to maintaining a successful balance between public and private health care. This means retaining Medicare in its entirety, working towards a strong and viable private health system, and ensuring private insurance is a realistic option for all Australians.

Furthermore, private health insurance in Australia is based upon the principle of 'community rating' and not 'risk rating'. This principle seeks to equalise premiums for high and low risk contributors in order to meet the broad equity objectives of government, such as access to private health insurance membership or benefits.

1.5. *Day only facility benefits and banding*

In Australia, the minimum levels of day facility benefits payable by health funds are set by the Commonwealth, in consultation with the states and territories. Such levels are known as the Default Table of Benefits. The minimum benefit levels for same day treatment are based upon the level of anaesthesia and theatre time, using four banding classifications and a non-band specific classification.

- Band 1 is a definitive list of procedures with no flexibility for reclassification to another band.
- Band 2–4 are determined by anaesthetic type and theatre time.
- Non-band specific Type B list can be banded according to anaesthetic type and theatre time. In the absence of anaesthetic and theatre, a Band 1 classification is applicable.

This banding system has been in place for over 10 years and, like most things, needs to be reviewed in order to ensure it reflects the current day surgery environment and that it is acceptable to medical practitioners, hospital systems (public and private), health insurers and the consumer or patient.

The Default Table of Benefits identifies three types of categories of professional attention (i.e. attendance/treatment by a medical practitioner), namely:

Type A: professional attention normally requiring admitted overnight hospital stays.

Type B: professional attention normally requiring admitted hospital treatment, but does not include part of an overnight stay.

Type C: professional attention that normally does not require admitted hospital treatment.

Movement between these bands, i.e. from a Type B to Type A, requires certification by a medical practitioner to enable higher benefits to be paid to the hospital or day hospital facility by health insurance funds.

Overnight accommodation benefits are not payable for Type C professional attention unless overnight certification, in addition to day certification, is provided. In order for an overnight benefit to be payable to a patient in receipt of a Type C procedure requiring hospitalisation, the practitioner providing the professional attention must certify in writing that:

- (a) because of the medical condition of the patient specified in the certificate, or;
- (b) because of the special circumstances specified in the certificate.

It would be contrary to accepted medical practice to provide the professional attention to the patient unless the patient were given hospital treatment in the hospital for a period that included part of an overnight stay.

2. Advent and growth of the day hospital facility

In earlier decades in Australia, acute care whether publicly or privately funded, has required overnight stay(s) in hospital. Advances in surgery-related technology, anaesthesia and post-operative care has enabled certain procedures to be undertaken on a day only admission basis.

Prior to 1984, private health insurance benefits in Australia were not generally paid for acute procedures that did not involve an overnight stay in hospital and, if they were, it was on an ad hoc basis. Legislative and

regulatory changes since then have provided a formal structural basis for private health insurance benefits to be payable for procedures undertaken on a day only admission basis.

This has eventually led to the distinction between services provided on a day only basis. All overnight hospital facilities are able to undertake procedures on a day only basis as a service provided by the existing hospital or as a separate or integrated unit within the existing hospital structure. Patients undergoing these procedures are typically known in Australia as same day (admitted) patients.

With the allowance of private health benefits to be paid for day only procedures, there was also the development of a new type of acute facility, the free-standing day hospital facility. Free-standing day hospital facilities have become a growth area in acute care that, as outlined below, represent a small but significant provider of day only procedures in the total hospital services in Australia.

3. Results and discussion

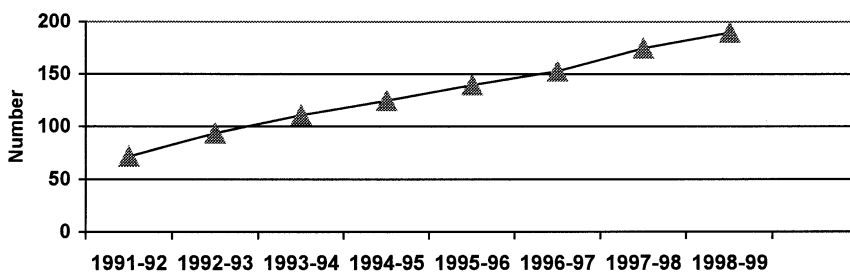
3.1. Facility and bed numbers

For the past decade, free-standing day facilities have grown not only in number, but also in the range of services available.

Table 1 shows that the number of free-standing day hospital facilities has more than doubled from 72 in 1991–1992 to 175 in 1997–1998. Data to 1 April 2001 shows around 209 free-standing day facilities exist, including five free-standing day facilities this financial year [5].

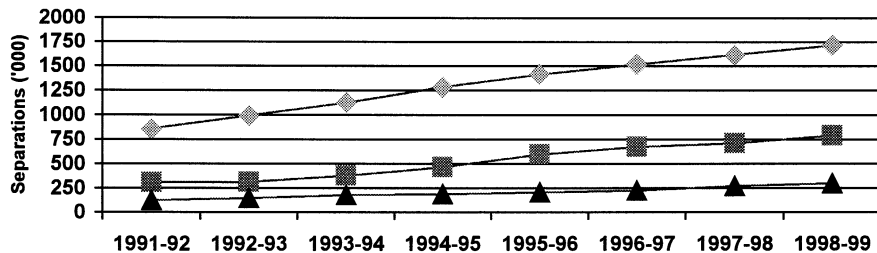
The growth in free-standing day facilities has by far outnumbered any change in private acute hospitals over the same period. Private acute hospital numbers have slightly decreased with 319 facilities in 1991–1992 and 312 in 1998–1999. The number of public overnight facilities, has remained virtually static. There are ap-

Table 1
Growth in freestanding day facilities



Source, Australian Bureau of Statistics Private Hospitals 1991–1992 to 1998–1999.

Table 2
Same day separations (publicly and privately funded and free-standing day facilities)



—◆—, public day separations; —■—, private day separations; —▲—, day hospital facility separations; Source, Australian Bureau of Statistics Private Hospitals 1991–1992 to 1998–1999 and Australian Institute of Health and Welfare Australian Hospital Statistics 1997–1998, Table 4.1.

proximately 784 public hospitals ranging in size from ten-bed hospitals to 997-bed hospitals (the largest hospital being Royal Brisbane Hospital, Queensland).

The strong growth in the number of private free-standing day hospital facilities, which has been evident over the last few years, continued during 1998–1999. Between 1997–1998 and 1998–1999, the number of facilities increased from 175 to 190 [6].

Free-standing day hospital facilities may provide general surgery, endoscopy, ophthalmic and other specialties (fertility management, plastic surgery and sleep disorders). The main distinguishing feature between a day hospital facility and a traditional hospital is that day hospital facilities do not generally provide overnight accommodation for patients. Growth of free-standing day hospital facilities has varied greatly between the states and territories because of varying state and territory legislation, set against a background of Government initiatives which have encouraged the provision of increased admitted day only stays in lieu of the traditional overnight stay.

The growth in free-standing day hospital facility numbers and status in overnight facility numbers corresponds with growth in the number of available beds. Whilst growth in free standing day facility bed numbers may appear large such bed numbers account for only 6% of available private overnight beds (1998–1999) and less than 2% of all hospital beds in Australia.

As may be observed in the discussion below, the number of available beds in Australia (public, private and free-standing) means there is the capacity for a large expansion in the volume of same day procedures as a viable substitute for overnight acute care.

3.2. Patient separations and patient days

The growth in privately owned and operated free-standing day facilities has also seen a corresponding increase in patient separations from these facilities (123 400 separations in 1991–1992 to 302 100 separations in 1998–1999; Table 2) [7].

If same day procedures undertaken within primarily private overnight facilities are included as an indicator of day procedure uptake in Australia, the proportion of same day procedures accounts for approximately 46% of patient separations in private hospital and day hospital facilities [8].

When same day procedures in public hospitals are examined, a similar level of growth is present over the same period (in the range of 29–43%). Although the proportion of these procedures is not as high as that relating to privately funded facilities, the sheer numbers of patient separations in the public sector indicates potential for expansion in same day treatments.

3.3. Patient days and length of stay

Patient separations for day procedures are equal to the total number of patient days for the same procedure [9]. Overnight stay patient days in both public and private facilities vary according to length of total admission (Table 3).

The number of same day patients treated within private overnight facilities during the period 1991–1999 has increased from 311 400 to 791 500 (61%) with a marginal increase in overnight stay patients from 4 579 900 to 5 249 200 (13%) [10].

For the period 1994–1995 to 1998–1999, anecdotal evidence shows that public facility patient days for overnight patients has decreased by around 4%. The proportion of same day separations in these facilities has increased by 7% which suggests substitution of same day separations for admissions involving an overnight stay is occurring [11].

Table 3 shows that the average length of stay related to overnight private patients in private hospitals has increased over the reference period. Yet when same day patients are included in these facility calculations, the average length of stay decreases, demonstrating that throughput has increased without a corresponding increase in what benefits would be paid by health funds.

Corresponding public overnight patient average lengths of stay have slowly decreased over the corresponding period, supported by the overall decrease in patient days. When same day patients are taken into account, the average length of stay decreases, further suggesting that the public sector has embraced day procedures as a means of increasing throughput but at a lower cost.

4. Types of free-standing day hospital facilities

Free-standing day hospital facilities have become a new factor in the delivery of private acute care in Australia. Being small in size, specialisation in services delivered has occurred. A number of areas have become the main domain of free-standing day facility services. Table 4 shows that general surgery and specialist endoscopy are clearly the main focus of most day hospital facilities [12].

Numbers of day hospital facilities providing services in each of these specialties have increased over time with the largest level of growth (around four-fold), evident in category ‘other (a)’, this being fertility management, plastic surgery and sleep disorders.

5. The future of day surgery in Australia

The historic level of increase in same day procedure use is expected to continue into the future. With advances in anaesthesia, technology and surgical techniques, many more procedures that currently require an overnight stay may be able to be undertaken on a same day basis without compromising safety or quality of care.

There are currently a number of reforms in the Australian private health industry which directly impact upon day procedures. These include the introduction of no or known ‘gap’ for hospital and medical charges for

patients in private hospitals. The medical ‘gap’ is the difference between fees charged by medical practitioners for in-hospital medical services and the combined health insurance and Medicare benefits. Day hospital facilities may receive payments through agreements with health funds or from a Government determined minimum payment arrangement. These arrangements also allow for a so-called ‘second tier’ payment system whereby hospitals demonstrating high standards of care may receive benefit levels that are higher than the minimum payment arrangement.

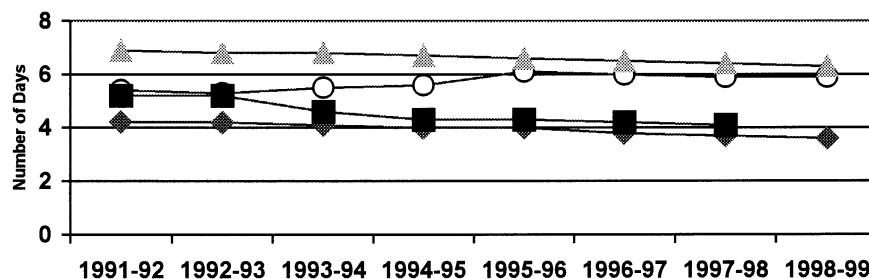
The Government is keen to broaden the scope of private health insurance to cover out of hospital care including day procedures administered in physician’s rooms, extending the application of hospital in the home services for patients and examining the feasibility of using ‘limited care accommodation’ services for step-down recovery from the acute sector. Imperative to all changes is the care of the patient in terms of pain management after a procedure, and also allowing more advanced surgery to be performed on a day only admission basis, at an overall lower cost to purchasers and consumers.

It is clear that day surgery along with early discharge-type interventions can play a prominent role in increasing the efficiency of health care delivery and patient convenience and, as such, has a very big future in front of it. As well, there is a need to complete the spectrum of acute care from day procedures through to that of overnight stays.

Given these trends over the years the Government has commenced consultation with the industry on the option of categorising day only procedures to encourage a ‘step down’ of procedures to more cost effective settings and further support the use of day facilities as efficient and safe alternatives to overnight hospital care.

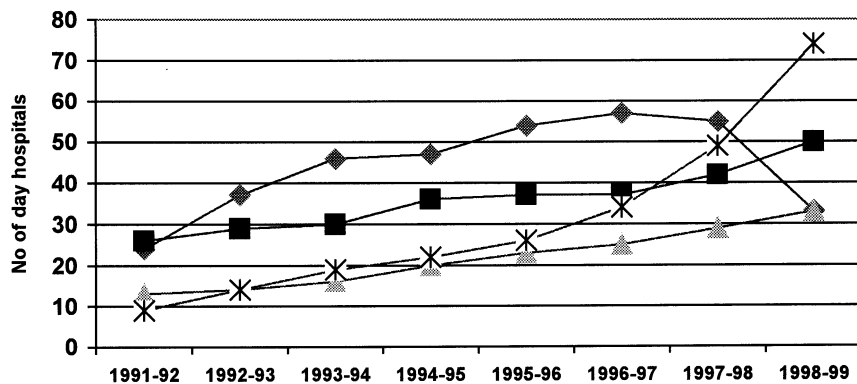
The Government believes the acknowledgement of both procedure complexity and types of facilities will allow for the expansion of day procedures, including allowances for this extension through office based

Table 3
Private and public overnight facilities average length of stay



—◆— Private, Overnight-stay patients; —○— Private, All patients (incl. same day); —▲— Public, Overnight-stay patients; —■— Public, All patients (incl. same day); Source, Australian Bureau of Statistics Private Hospitals 1991–1992 to 1998–1999 and Australian Institute of Health and Welfare Australian Hospital Statistics 1997–1998, Table 4.1.

Table 4
Types of day hospital facility growth



—◆—, General surgery; —■—, Specialist endoscopy; —▲—, Ophthalmic; *, Other (a); Source, Australian Bureau of Statistics Private Hospitals 1991–1992 to 1998–1999.

surgery and extended recovery services. The Government has developed a proposal whereby benefits are payable for day procedures according to a patient classification system and facility categorisation. The proposal brings day procedures in line with those arrangements pertaining to overnight procedures thus facilitating the potential expansion of day only procedures.

The Government is continuing considerable consultation with the industry to ensure a refined proposal before implementation.

In addition, and with the support of the Australian Day Surgery Council, the Government is currently conducting trials with a number of funds and hospitals to explore the feasibility of a health professional employed by the hospital, in the absence of the treating medical practitioner, providing overnight certification for those patients who, for medical or social reasons, are unable to return to their normal domicile following a day surgery procedure.

These arrangements require the health professional employed by the hospital to discuss his/her recommendation for continued admission to occur with the treating medical practitioner. Such arrangements avoid having to recall the medical practitioner to personally authorise the extension of the patient's length of stay, and to also enable the payment of overnight benefits to be progressed without delay. These trials are a significant departure from the traditional arrangement in Australia, whereby it is customary for medical practitioners only to provide certification.

Payment under episodic/casemix/diagnostic related groups is currently being developed further especially where funds have agreements with facilities. However, at present, the basic health insurance payment basis in Australia is calculated on a per diem rate.

6. Summary

Population growth, utilisation of private acute care and a changing population age structure all point toward a change in the overall use of acute care (whether public or private). It would appear that, if not for the rapid uptake of day procedures by facilities whether free-standing or integrated within acute hospitals, a large increase in the costs associated with acute care would occur.

As such, the time has come for further changes to be made to the controls over same day procedures and facilities providing such services. Little change has occurred in recent times and any change proposed needs to encourage substitution, cost-efficiencies and also the quality and safety of patient care.

The outline of proposed changes put forward in this paper are designed to do just that. Barriers to benefit payments for overnight care at a lower level than that delivered in a standard acute setting will be removed. Imperative to all changes is the care of the patient in terms of pain management after a procedure, and also allowing more advanced procedures to be performed on a day only admission basis, at an overall lower cost to the purchaser and the consumer.

There are six areas of service delivery critical to all forms of health care reform, and day surgery is no exception. The six areas include:

- Safety.
- Sound clinical practice.
- Acceptance by professions.
- Benefits and acceptance by patients.
- Benefits and acceptance by carers.
- Cost effectiveness of trials [13].

In summary, both sectors of acute care have greatly embraced day procedures as a means of patient treatment. Associated with advances in medical technology,

more and more of what is traditionally overnight stay treatment will eventually be undertaken more safely and effectively on a day only basis. This can be expected to lead, in many instances, to the use of multi-disciplinary approaches to assist in patient recovery following same day surgery.

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A developmental history of local anaesthesia

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Abstract

For thousands of years doctors have searched for a drug that could eliminate or at least ease the pain of surgery. Though the coca plant was well-known for more than 3000 years, it was not until the middle of the 18th century that the initial isolation of the organic base responsible for its extraordinary properties, cocaine, was accomplished. To the ophthalmologist Carl Koller goes the credit for the discovery of cocaine as a local anaesthetic. Since then, surgeons from all surgical fields adapted the newly discovered anaesthetic to all sorts of novel and complicated surgical interventions. Ambulatory surgery has benefited greatly from this development. © 2002 Elsevier Science B.V. All rights reserved.

Keywords: Cocaine; Local anaesthesia; Ambulatory surgery

1. Introduction

Throughout the centuries man has searched for an effective remedy against the pain caused by surgery. The frequent accidents and deaths brought about by anaesthetic techniques, discredited and eventually forced into retirement such ineffective methods as the soporific sponge.

Faced with this dilemma and, bearing in mind that most interventions were carried out on the extremities or on the skin, surgeons tried to alleviate pain by means of a local anaesthetic.

From the times of Arabic dominance in medicine, compression of arms and legs met with partial success. This practice gained further momentum during the Renaissance. In 1664 Severino, relying on ice and snow, was able to improve the analgesic effects of compression. Bartolino in 1667, and later on, the English surgeon John Hunter (1728–1793) and the chief surgeon Dominique Jean Larrey (1766–1842), successfully used this technique on many patients. The latter became Napoleón's surgeon in 1807. He performed amputations under extremely cold temperatures (-24°C)

However, it was not until 1848 when this practice was thoroughly revolutionized. The merit belongs to James Arnott (1797–1883) who, in 1845, made reference to the use of cold as a means of inducing insensitivity during surgical procedures [1]. In this work he introduced an apparatus of his own, which consisted of a spray filled with ice and salt. Used in the beginning to alleviate pain, Arnott defended its application with these words. "... in all superficial operations, which constitute the immense majority, cold is superior to chloroform in the circumstances of safety, ease of application or the saving of time and trouble, certainly of producing anesthesia, and lastly, in the power it possesses of preventing subsequent inflammation" [2].

In 1866, Benjamín W Richardson (1828–1896), who years before had failed with his invention called 'Voltaic Narcotism', described his 'Ether Spray'. This was predestined, because of its simplicity and cleanliness, to supplant the Arnott method [3]. The ether spray became the only local anaesthetic available until the introduction of cocaine 18 years later.

2. Cocaine

The coca-plant's stimulating effect on the organism has been well-known for more than 3000 years [4]. Some historians have suggested that the natives used

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coca as a local anesthetic in the surgical procedure of trephination. They obtained it by chewing the leaves and pouring the resulting salivates into the incision. Moreover it is known that the Inca used coca as an analgesic for muscular pain, headaches, toothaches, rheumatism, skin ulcers and gastric disorders [5].

The Spanish conquerors shied away from using coca at the beginning, thoroughly convinced that it was a part of pagan rites. However, a few years later, impressed by its value as a stimulant, they went on to encourage its cultivation. In 1580 Monardes of Seville passed on the information about its properties to the mother country. Contrary to the popularity of tobacco, which was fully accepted in Europe after the first historical trip by Christopher Columbus, coca remained unknown.

In 1750 the botanist Jussieu sent a plant specimen to Lamark who classified it with the name of erythroxyllon coca. In 1853 Mackenroder took up the chemical investigation of coca. In 1855 the German chemist Friedrich Gaedeke isolated an alkaloid from its leaves which he denominated erythroxylline. However, it was not until 1857 when Professor Wöhler of Gottingen appealed to the naturalists of the Novara expedition for a supply of dried coca leaves that a thorough investigation of coca commenced. Dr Scherzer, one of the scientific members of the expedition, managed to purchase 25 kg of coca in Lima and dispatched 15 kg of this valuable booty to Wöhler. Wöhler's assistant, Albert Niemann (1834–1861), conducted an investigation on the supplied leaves and consequently was able to purify and crystallize its organic base which he called cocaine. Even though the possible existence of other chemical components in the plant or its physiological actions were ignored, Niemann was keen enough to report the numbing effect of the newly synthesized substance.

Apparently in 1856 Samuel Percy (1816–after 1890) mentioned the possibility of using coca leaves in anaesthesia. The anthropologist Paolo Matengazza (1831–1910) who had spent many years among Indians and experimented with coca, supposedly said: "I requested to be pinched and the pain I felt was only barely perceptible." [6]. In 1862, Demarlé and Schroff confirmed the same observation and in 1868 Thomas Moreno y Maiz, surgeon of the Peruvian army, published the first study on the pharmacological action of cocaine. In this monograph he wrote: "...the sensitivity completely disappeared in the injected limb of the frog. It is therefore the peripheral sensitivity, which is affected by cocaine acetate. Furthermore, the local action of this substance is very marked. Could one utilize it as a local anaesthetic?... the future must decide" [7]. Surprisingly, he did not continue with this crucial investigation.

Years later, in 1873, Hughes Bennett [8] confirmed the anaesthetic effect of cocaine on the tongue, but it was the Russian Vassili Von Anrep (1852–1925) who in 1880, after experimenting with its effects on his own body, recommended cocaine as a local anaesthetic [9]. For inexplicable reasons, he too, like his colleague Moreno y Maiz, did not pursue his research further.

Nonetheless at practically at the same time, Collin, Fauvel and Saglia observed that the local application of cocaine in the pharynx diminished its sensitivity, while Coupard and Bordereau in 1880 confirmed the loss of ocular reflexes after instilling the conjunctiva with cocaine solutions [10]. The path for the application of cocaine as a local anesthetic was therefore blazed. All that was needed then was to take the definitive step.

3. Carl Koller

Carl Koller's discovery is intimately associated with that of the noted psychoanalyst Sigmund Freud. During the first years of the decade that brought him to fame (1880s), Freud first began reading up on and then experimenting with cocaine. He described the characteristics of the plant, its uses for religious ceremonies and the circumstances by which coca leaves came to be recognized as a medicinal substance.

Though Freud mentioned the anaesthetising effect of cocaine when applied to the mucous membranes, and hence suggested its use as a local anesthetic, his main interest was focused on its mental and physical effects. He strongly recommended its application as a stimulant, the remedy against cachexia, cure for addiction to morphine/morphinism, alcoholism, and for asthmatic and digestive problems [11].

Carl Koller was born December 3, 1857 in Schuettenhofen (Bohemia). He studied jurisprudence for a year before taking up medicine in 1876 at the University of Vienna. As a medical student he made investigations in embriology in the laboratory of Salomon Stricker (1834–1894), professor of experimental physiology and pathology. In 1882 he qualified.

As a student of ophthalmology in the laboratory of Professor Ferdinand Arlt, Koller became acutely aware of the disappointing results of ocular surgery conducted under general anesthesia. The recovery was often accompanied by postoperative vomiting that triggered an increase in ocular pressure with subsequent damage to the eye which surgeons had tried to save in the first place. These were also the times when doctors had experimented unsuccessfully with bromide, chloral hydrate, morphine and cold.

Starting from the supposition that a substance paralysing the sensitive terminations of the mucous membrane of the tongue could not greatly differ in its action on the cornea and conjunctiva, Koller made a

number of unsuccessful experiments on animals with chloral hydrate, bromide, morphine and cold. In the summer of 1884, guided by the numbing effects of cocaine, Koller instilled a solution of muriate of cocaine into the eye of a frog to test its effect. Gaertner, another assistant in Stricker's laboratory and the sole witness of Koller's discovery, described years later the historic moment in the following words: "A few grains of the substance were thereupon dissolved in a small quantity of distilled water, a large, lively frog was selected from the aquarium and held immobile in a cloth, and now a drop of the solution was trickled into one of the protuding eyes. At intervals of a few seconds the reflex of the cornea was tested by touching the eye with a needle... After about a minute came the great historic moment, I do not hesitate to designate it as such. The frog permitted his cornea to be touched and even injured without a trace of reflex action or attempt to protect himself, whereas the other eye responded with the usual reflex action to the slightest touch. The same tests were performed on a rabbit and a dog with equally good results... Now it was necessary to go one step further and to repeat the experiment upon a human being. We trickled the solution under the upraised lids of each other's eyes. Then we put a mirror before us, took a pin in hand, and tried to touch the cornea with its head. Almost simultaneously, we could joyously assure ourselves: I cannot feel a thing. With that, the discovery of local anesthesia was completed" [12].

On September 11, 1884, Koller conducted with resounding success the first operation on cataracts with the newly discovered anesthetic (cocaine) on a stricken patient. Due to his low salary and that he was not allowed to leave his duties in the hospital, on September 15, 1884 his friend Josef Brettauer, also an ophthalmologist, presented his colleague's findings during the Ophthalmological Congress held in Heidelberg, Germany. On October 17th, Koller read his report before the Medical Society of Vienna [13].

The news concerning his achievement immediately spread across Europe and the United States. Cocaine became an overnight sensation and was used with success by doctors of other specialties such as Jellinek (laryngology); Bosworth (rhinology) Otis (urology); Fraenkel (gynecology) and Halsted (general surgery).

The ophthalmologists were the first to test Koller's novel technique. The first American contribution was made by Dr C Stedman Bull, an eye surgeon who introduced the topical application of cocaine in eye surgery on October 8, 1884. In the same year Hermann

Knapp upgraded the application of cocaine in the form of a hypodermic injection into the apex of the ocular orbit in order to anesthetise the eye globe [14].

In spite of the transcendence of his discovery, Koller's Jewish origin limited his opportunities for promotion at the university where there was still considerable anti-Semitism. He found this situation unbearable and, thoroughly disappointed, emigrated to New York City in 1888. During the following years, he continued his medical practice with considerable success. He became associated in the Mt. Sinai Hospital and the first Chairman of the Department of Ophthalmology at Montefiore Hospital in the Bronx.

In 1920 he was given an award from The University of Heidelberg. In 1922 he received a medal from The American Ophthalmological Society. Eight years later The New York Academy of Medicine honored him for his contributions to medicine and in 1934 he received another honorary citation from the American Academy of Ophthalmology and Otolaryngology.

The man who made this great contribution to ophthalmology and to medicine in general, died in New York in 1944 at the age of 87.

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Suitability for day surgery of trabeculectomy and phacotrabeculectomy using 10-0 polyglactin suture

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Abstract

Objective: To evaluate the suitability of trabeculectomy or phacotrabeculectomy as a day case procedure with the objective of keeping the post-operative intraocular pressure (IOP) under control, both short-term and long-term, and post-operative complications at a low level. **Method:** A total of 27 eyes undergoing trabeculectomy with or without phacoemulsification for either primary open angle glaucoma or chronic angle closure glaucoma were chosen. All of them had surgery as day cases under sub-tenon injection. IOP check was done at baseline, day 1, month 1, month 6 and year 1 on 27 eyes. Post-operative complications directly related to aqueous drainage were noted at day 1. **Result:** Mean, mode and range of IOP at each level were analysed. Mean pre-operative IOP was 23.34 mmHg. Post-operative IOP was lowest on day 1 (mean 10.03 mm) which stabilised to mean IOP of 16.3 mmHg at year 1. At 1 year the success rate (IOP less than 21 mmHg) was 92.3% without any glaucoma medication; however, if IOP control with medication (less in number than before surgery) is taken into account the success rate was 96%. Post-operative complications were few and transient. **Conclusion:** Graded control of post-operative IOP was possible using 10-0 polyglactin suture. IOP on day 1 was not very low due to adequate suture tension and at the same time good control of IOP longterm (1 year in this study) was possible due to gradual release of suture tension by slow absorption. This is ideally suited for day surgery. © 2002 Elsevier Science B.V. All rights reserved.

Keywords: Intra-ocular pressure; Trabeculectomy; Primary open angle glaucoma; Chronic angle closure glaucoma; Hypotony; choroidal detachment; Iris prolapse

1. Introduction

Among the many filtration procedures in glaucoma surgery trabeculectomy is the commonest and safest of all [1–3]. The end point of trabeculectomy is adequate control of intraocular pressure (IOP). However the control of IOP post-operatively has not always been easy. Too little drainage would mean a rise of IOP and ultimately failure of the surgery: too much drainage would result in gross hypotony and its consequent sight-threatening complications [4–8]. Serious surgical complications are most likely in the early post-operative phase. For glaucoma surgery to be successful as day cases, these complications should be kept to a minimum. Over the years many different types and tech-

niques of sutures and scleral flaps of varied thickness, size and shape have been tried to this effect [9–11]. This study evaluates the IOP control qualitatively and quantitatively after using 10-0 polyglactin suture.

2. Objectives

This study sought to answer the following questions:

- How was the IOP controlled postoperatively in the early stages and in the late stages? Was it too high or too low?
- What was the long-term result and how many were failures?
- If the IOP control was adequate, was post-operative medication needed at all for this purpose. If so, how many medications were needed and was this number less than the number of medications needed before surgery?

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- Were there any complications directly related to the filtration?
- Were the patients suitable for day surgery?

3. Method

The standard of comparison in our study was the National Trabeculectomy Audit [12,13]. Success was defined as post-operative IOP at one year less than 21 mmHg without medication. For IOP control a minimum success of 80% was established as appropriate. In our study, visual field evaluation was not included.

3.1. Selection criteria

Patients having trabeculectomy with/without phacoemulsification for either primary open angle glaucoma or chronic angle closure glaucoma during a period from January 1999 to January 2000 were chosen. Patients with secondary glaucoma were excluded from the study. A total of 27 consecutive eyes were evalu-

ated. They were nearly equally distributed between the two sexes (male 48%, female 52%). The age range was 61–93 years with a mean of 79 years. All patients were Caucasians.

All patients were booked as elective day cases, including ASA 2 and 3 patients. Patients had the option of staying overnight in the hotel facilities if they wanted. Identical surgical technique by a single surgeon was used in all cases. The mode of anaesthesia was sub-tenon injection. For trabeculectomy a fornix-based conjunctival flap was made superiorly. A partial thickness scleral flap, square in shape and about 5 mm wide and 4 mm from limbus, was made with one side (left) attached (Fig. 1). Trabeculectomy was done using Kelly’s scleral punch. After peripheral iridectomy the scleral flap was secured using a single 10-0 polyglactin suture at the free corner. Conjunctiva was meticulously sutured and the patency of the channel was ensured through a previous paracentesis. For combined phacoemulsification all eyes had clear-cornea hinge incision, continuous curvilinear capsulorhexis under sodium hyaluronate and in-the-bag insertion of a foldable intraocular lens (Acrysof®, Alcon).

IOP check was done at baseline (pre-operative), day 1, month 1, month 6 and year 1. All patients were brought back on the first post-operative day to record IOP and post-operative complications directly related to aqueous drainage, viz. shallow/flat anterior chamber, hypotony, bleb leak, choroidal detachment, iris prolapse into drainage. The medications to control IOP pre-operatively and, where applicable, post-operatively were noted.

4. Results

Mean, mode and range of IOP at each level were analysed. Pre-operatively, the mean IOP was 23.34 mmHg (overall: with or without medication). The mean post-operative IOP was lowest on day 1 (mean being 9.8 mmHg) which stabilised to 16.3 mmHg at year 1 (see Fig. 2).

Fig. 2 shows that the final mean IOP was well below the defined upper limit of success. It is evident that the mean IOP was not too low on the first post-operative day, which was desirable.

Fig. 3 shows the early (day 1 and month 1) post-operative IOP in individual eyes. Even the eyes which did have hypotony (defined as IOP 4 mmHg or less) at day 1 recovered to a comfortable region of IOP very soon. The failures were very few (7.7%) and needed either further medication or revision surgery at a later date.

Fig. 4 compares the final IOP (at year 1) with the pre-operative one. The shift of the columns to the left (meaning fall of IOP) was indicative of the desired outcome.

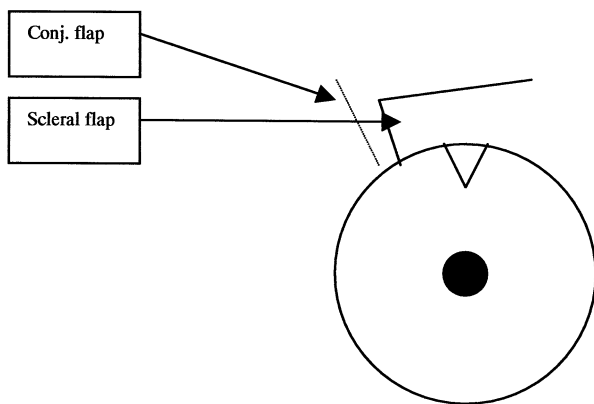


Fig. 1. Construction of scleral flap.

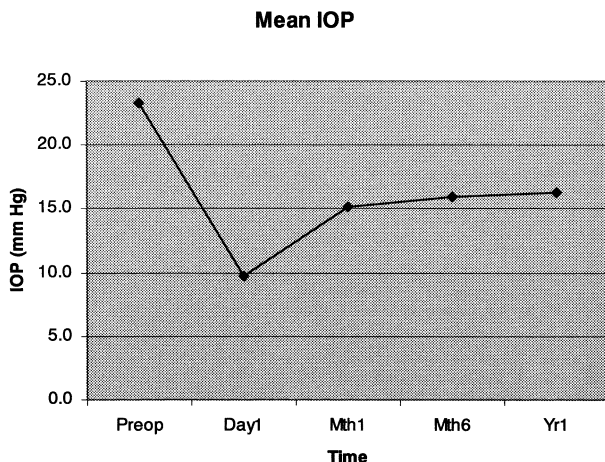


Fig. 2. Mean IOP.

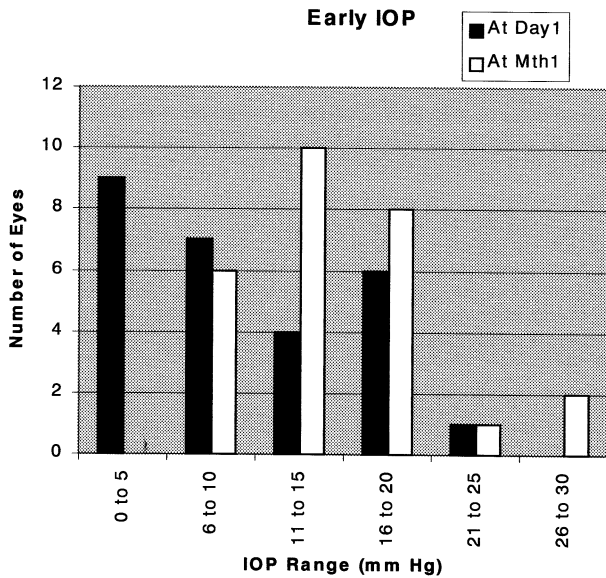


Fig. 3. Early IOP.

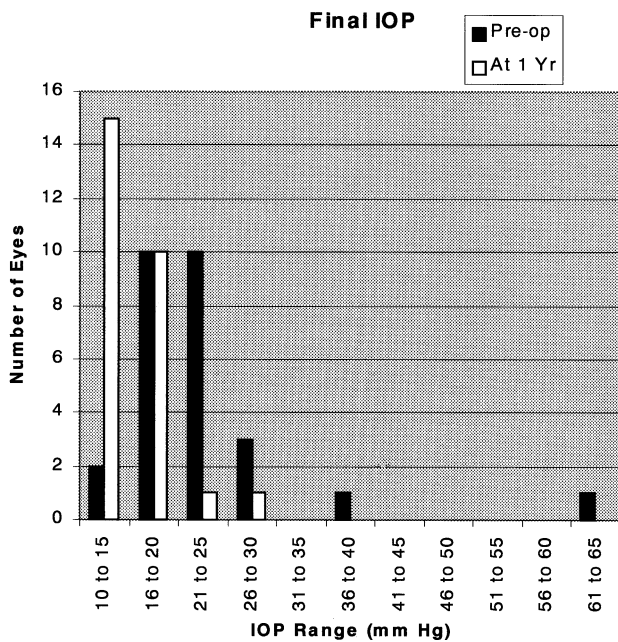


Fig. 4. Final IOP.

Fig. 5 compares the number of medications needed to control IOP pre-operatively with that needed post-operatively. The list of medications included timolol 0.5% eye drops, betaxolol 0.5% eye drops, dorzolamide 2% eye drops, latanoprost 0.005% eye drops, brimonidine 0.2% eye drops, apraclonidine 0.5% eye drops, pilocarpine 2% eye drops and pilocarpine 4% gel and acetazolamide tablets. The average number of medications used pre-operatively was 2 with a maximum of 4. At month 6, only three eyes needed medi-

cation (one in number) and at year 1 only one eye needed it (two in number).

Fig. 6 shows the post-operative complications and their relative proportions. As mentioned earlier, only those complications were considered which had direct bearing with aqueous drainage. Post-operative complications occurred in ten eyes (37% of total, i.e. 27 eyes) and were namely, bleb leak (7% of total, i.e. 27 eyes), hypotony (30%), very shallow/flat anterior chamber (15%), choroidal detachment (11%), hyphaema (30%) and iris prolapse into drainage (4%). The most relevant complication here was hypotony and relating this with Fig. 3 it can be seen that hypotony was transient.

5. Discussion

10-0 polyglactin has several advantages over its counterparts. It has higher tensile strength (as compared to, for example, nylon) which makes it possible to tighten the suture more and at the same time make it more secure. Hence chances of hypotony, flat anterior chamber and choroidal detachment become less in the early post-operative phase. The suture material incites little inflammation and leads to very little postoperative scarring. It is absorbed by hydrolysis within a month. Both these factors help maintain the drainage in the later post-operative phase minimising chances of bleb failure. Hence post-operative manipu-

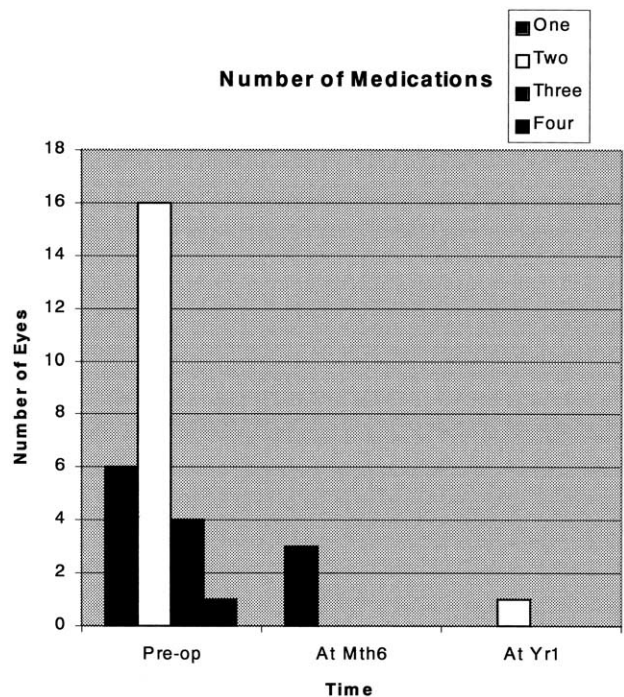


Fig. 5. Number of medications.

Complications: Day1

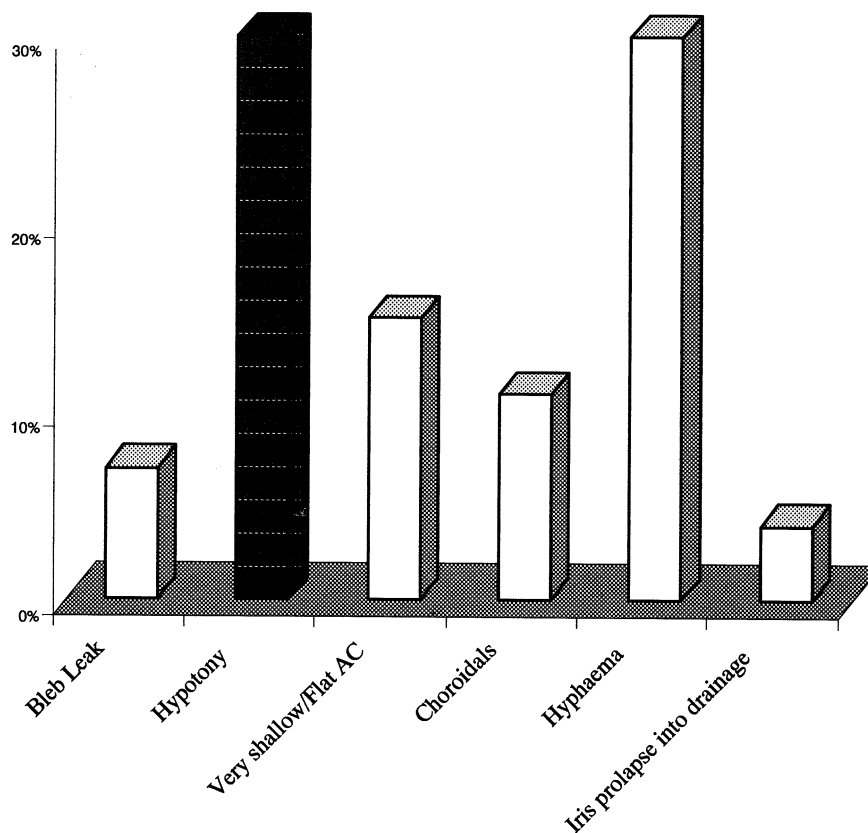


Fig. 6. Post-operative complications at day 1 (% figures show % of total 27 eyes).

lations, e.g. releasable sutures and laser suturolysis, the need for use of antimetabolites and at a later date revision surgery, all become less important. The same suture can be used economically to close the conjunctiva.

The success rate of 10-0 polyglactin in the study compares favourably with other similar studies in the following tables (Tables 1 and 2). Whenever relevant, we have included the success rates both with and without medications to control post-operative IOP. At 1 year all but two eyes had IOP less than 21 mmHg (92.3%) without any glaucoma medication; however, if IOP control with medication (less in number than pre-operative) is taken into account the success rate was 96%.

It was not our intention to study the post-operative complications of trabeculectomy as a whole, but only those directly related to the aqueous drainage. Total complications were looked at in the National Glaucoma Audit. Hence we have not cited comparisons.

Several studies [15–17] have demonstrated the advantages of sub-tenon anaesthesia over peribulbar or retrobulbar methods. In our study, all patients were operated under sub-tenon anaesthesia, which facilitated discharge on the same day and far less debility compared to general anaesthesia. This is an important factor for an elderly population where glaucoma is more prevalent. No admission and no general anaesthesia also mean more cost effectiveness for the hospital.

6. Conclusion

10-0 Polyglactin performs favourably for adequate long-term control of IOP after trabeculectomy, with fewer complications in the early post-operative period. This facilitates performing trabeculectomy or phacotrabeculectomy as a day case.

Table 1
Comparison with the national audit

	Present study	National audit: performance	National audit: recommendation
Success (R_x excluded) (%)	92.3	84	80
Success (R_x included) (%)	96	93	–

Table 2
Comparison with Vyas et al. [14]

	Present study	Vyas et al.
Mean Pre-op IOP	23.3	23
Mean IOP 1 year	16.3	14.7
Fall of IOP (%)	30	36
Success (R_x excluded) (%)	92.3	96

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Why are ambulatory surgical patients admitted to hospital? Prospective study

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Abstract

Background: Once Ambulatory Surgery (AS) has been demonstrated to be an effective alternative to hospitalisation for many surgical patients, it is necessary to establish clinical indicators to evaluate objectively the quality of care that is being given. **Hypothesis:** The unplanned admission index (UAI) is a valid and easy indicator of the management and quality of care in ambulatory surgery units. **Design:** Prospective study. **Setting:** Public regional hospital level I (less than 200 beds). **Main outcome measure:** Unplanned admission index (UAI). **Patients and methods:** Between September 1997 and October 2000, 3502 patients were operated on in our ambulatory surgery unit. The analysed surgical services were General surgery (844 patients), Orthopaedics (646 patients), Urology (499 patients), ENT (329 patients), Ophthalmology (1007 patients) and Gynaecology (177 patients). A prospective study of all the patients was made, with analysis of the following parameters: (1) global and accumulated UAI (per months and years); (2) UAI by surgical specialities; (3) UAI by causes; (4) UAI by type of operation; (5) UAI by type of anaesthesia; (6) case-mix, according to average weight of diagnostic related groups classification (DGR). **Results:** The global UAI was 4.1%. By specialities, the UAI was 10.7% in Gynaecology; 6.1% in ENT; 5.9% in General surgery; 3.4% in Orthopaedics; 2.3% in Ophthalmology and 2% in Urology. The most frequent causes of unplanned admission were haemorrhage: 15.9%; more extensive surgery than anticipated: 15.3%; postoperative pain: 12.5%; nausea and vomiting: 10.4%; and drowsiness and dizziness: 6.9%. The types of operation with the highest UAI were, gynaecological laparoscopy: 50%; hysteroscopy: 26%; haemorrhoidectomy: 25%; septoplasty: 22%; strabismus surgery: 11%; orchiopexy: 11%; hydrocelectomy: 10%; inguinal hernia repair: 8%. **Conclusions:** (1) Classification of UAI by specific causes of admission and incorrect selection of patients may detect on-line problems and allow the application of concrete solutions to reduce the UAI index. (2) In order to compare the results amongst different ambulatory surgery units, an international classification of ambulatory patients must be applied. In the same way, an objective index to evaluate the surgical complexity and the patients' morbidity should be developed. (3) The assessment of processes and results should be based on the selection of standard indicators with systematic and periodic measurement. © 2002 Elsevier Science B.V. All rights reserved.

Keywords: Ambulatory surgery units; Patients; Unplanned ambulatory surgery (UAI)

1. Introduction

Ambulatory surgery (AS) has been introduced as the ideal treatment for a large number of surgical patients. It is necessary to establish objective clinical indicators to compare the results obtained by different units and hospitals in order to improve the quality of care. The unplanned admission index (UAI) index is an objective

indicator, simple and easy to measure, that at least partly allows, the assessment of the quality of an ambulatory surgery program. A very interesting aspect of UAI as a quality indicator is the possibility to localise and point out problems that can be rapidly improved. For this reason, this indicator has been addressed as the most important in ambulatory surgery [1,2].

1.1. Aim of the study

An analysis of UAI by causes, surgical specialities and types of operations. Studied in a prospective way,

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it allows on-line detection and correction of problems and errors at preoperative evaluation, and also better postoperative management of ambulatory patients. In this way, the UAI may be reduced thus improving the use of resources and patient satisfaction.

An unsettled subject is the objective evaluation of the complexity level of our ambulatory surgery units. This complexity must include not only the technical difficulty but patients associated co-morbidity as well. Without this data, the most important quality indicators in ambulatory surgery, as the UAI or those related to the financing, will not be able to be used suitably.

2. Patients and methods

2.1. Facilities

Between September 1997 and October 2000, 3502 patients were operated in the ambulatory surgery unit. The unit can be defined as an *Integrated Mixed Ambulatory Surgery Unit*; it shares the admission area, operating rooms and postoperative anaesthesia care unit, while there is a specific area reserved for the final recovery before patients are discharged. Our hospital is defined as a level-I regional centre (less than 200 beds), which covers a population of 120,000 habitants.

Surgical procedures were classified according to ICD.9.CM (International Classification of Diseases Procedure Code) and afterwards grouped by DGR (Diagnostic Group Related) system.

2.2. Main outcome measure

The main variable studied was the UAI, which is defined as ‘*overnight stay in the hospital of patients scheduled as ambulatory surgery due to any medical, surgical or social reason*’.

2.3. Anaesthetic evaluation

All patients were given written preoperative information about ambulatory surgery. An informed consent signed by the surgeon, anaesthesiologist and the patient was necessary to be scheduled for surgery. Preoperative anaesthetic evaluation was made according to a defined protocol of selected tests. ASA-I patients (American Society of Anaesthesia) were not evaluated in the anaesthesia office, while patients ASA-II and -III were all evaluated.

Operations were performed under monitored local anaesthesia (1757 patients), regional anaesthesia (1136 patients), or general anaesthesia (609 patients).

2.4. Postoperative follow-up

Prior to discharge all patients received written instructions, a date for clinical office follow-up for 4–7 days postoperatively and a help line telephone number. Our hospital is the only public center on the island. That is why, all phone calls, emergency consultations and unplanned admissions can be adequately registered.

A telephone call was made to every patient on the 1st and 3rd postoperative days when a specific check form questionnaire was completed.

2.5. Studied variables

Data collection was fulfilled prospectively by a trained nurse and supervised by the same surgeon. Variables studied in the present work were:

- Global rate of unanticipated admission index.
- UAI rate by surgical specialities.
- Causes of admissions.
- Admissions related to the type of procedure.
- Admissions related to the type of anaesthesia.
- Average case-mix of the surgical units.

Unanticipated admissions were classified into two general groups:

- (I) Admissions due to specific complications, and
- (II) Admissions caused by incorrect selection of patients for ambulatory surgery (AS).

All admissions were documented in a predefined check form specifying the cause of admission, surgical speciality, preoperative diagnosis, type of anaesthesia, surgical operation and the name of the responsible surgeon.

2.6. Definitions

2.6.1. More extensive surgery

This item was defined as patients that had to overnight in the hospital because the indication for surgery was considered in the operation room to be non-suitable for ambulatory surgery, because an extensive dissection was required.

2.6.2. Case-mix

According to DRG classification, an estimation of average weight of all ambulatory procedures was calculated.

2.6.3. Average weight

Measurement based on the estimation of DRG relative costs in U.S.

2.6.4. Postdural puncture headache (PDPH)

Acute onset of position—related headache after spinal anaesthesia, occurring within 24 h after spinal

anaesthesia, and mainly related to the size of the needle.

2.6.5. Transient neurologic symptoms (TNS)

Acute onset of low back pain with transient radiating pain into the lower extremities, buttocks or both, occurring within 24 h after spinal anaesthesia.

3. Results

Between September 1997 and October 2000, 3502 patients were operated on in our ambulatory surgery unit. Of these, 144 had an unplanned admission (global rate: 4.1%). The UAI has diminished gradually due to increasing experience of ambulatory surgery by the surgical teams. In 1997, the UAI was 8.5% (33 of 389 patients), which diminished to 4.3% in 1998 (47 of 1103 patients), and to 2.7% in 1999 (28 of 1044 patients). UAI was 3.8% in year 2000 (37 of 977 patients) (Fig. 1).

3.1. Rate of unplanned admissions by services

Units involved in the study were ophthalmology (1007 patients), general surgery (844 patients), orthopaedics (646 patients), urology (499 patients), ENT (329 patients) and gynaecology (177 patients).

The service with the highest UAI rate was gynaecology (10.7). The second highest rate was in ENT surgery (6.1%) and this was followed by general surgery (5.9%), ophthalmology (2.3%) and urology (2%).

3.2. Classification of admissions by causes

Unplanned admissions were classified in two groups according to their causes (Table 1):

- (I) Specific complications: 109 admissions (75.7%) and,
- (II) Incorrect selection of patients for AS: 35 admissions (24.3%).

3.2.1. Specific complications

The most frequent complications were postoperative bleeding (23 cases, 15.9%), more extensive surgery than anticipated (22 cases, 15.3%), postoperative pain (18 cases, 12.5%), and drowsiness/dizziness (10 cases, 6.9%).

Twenty-three patients were admitted due to bleeding: 10 general surgery (43.4%), six ENT (26.1%), and four gynaecology (17.4%). Admissions due to more extensive surgery was most frequent in general surgery (nine cases, 41%), followed by orthopaedics and gynaecology (eight cases each, 18.1%). Postoperative pain was the third most frequent cause of admission: most patients had undergone general surgery (eight cases, 44%), and orthopaedic surgery (seven cases, 38.8%). The presence of nausea/vomiting, described as a frequent cause of admission in AS, accounted for 10.4% (15 patients) in our study. The distribution by service of this complication was ophthalmology five patients (33.3%), gynaecology four patients (26.6%) and ENT four patients (26.6%).

3.2.2. Incorrect selection of patients

The most frequent cause of inadequate selection of patients was non-detection by the surgeon that the patient lived alone (14 cases, 9.7%). Five patients showed distrust or fear of being discharged, which can be interpreted as deficient preoperative evaluation. Hospital admissions due to inadequate selection of the patients for AS have been reduced, falling from 39.3% in 1997, to 17.4% in 1998, 28% in 1999 and 8.1% in 2000. In four patients, psychiatric pathology was not registered at the preoperative evaluation. The other admission causes are shown in Table 1.

The follow up of the causes of admission during the period of the study let us adopt several measures to reduce the incidence of specific complications. All complications except admission for pain and drowsiness/dizziness were reduced as is shown in Table 2.

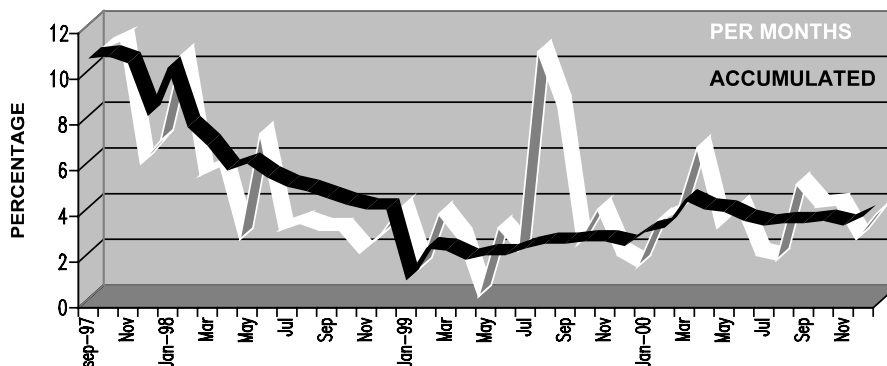


Fig. 1. UAI evolution (accumulated and per months).

Table 1
Unanticipated admissions by causes

Speciality	General surgery	Orthopaedics	ENT	Ophthalmology	Gynaecology	Urology	Total
<i>Specific complications</i>							109 (75.7%)
Haemorrhage	10	1	6	–	4	2	23 (15.9%)
More extensive surgery	9	4	2	1	4	2	22 (15.3%)
Pain	8	7	1	–	2	0	18 (12.5%)
Nausea/vomiting	–	2	4	5	4	–	15 (10.4%)
Drowsiness/dizziness	3	–	1	4	2	–	10 (6.9%)
No specified	–	–	2	–	1	2	5 (3.5%)
Postdural puncture headache	3	–	–	–	–	–	3 (2.1%)
Respiratory insufficiency	1	–	2	–	–	–	3 (2.1%)
Urinary retention	1	–	–	–	–	1	2 (1.4%)
Postoperative fever	–	–	–	–	–	2	2 (1.4%)
Iris hernia	–	–	–	2	–	–	2 (1.4%)
Bronchospasm	–	1	–	–	–	–	1 (0.7%)
Convulsions	–	1	–	–	–	–	1 (0.7%)
Increased ocular pressure	–	–	1	–	–	–	1 (0.7%)
<i>Incorrect selection</i>							35 (24.3%)
Live alone	5	3	–	5	1	1	15 (9.7%)
Live in rural area	1	–	1	2	1	–	5 (3.5%)
Psychiatric pathology	1	2	–	1	–	–	4 (2.7%)
Fear to be discharged	4	–	–	1	–	–	5 (3.5%)
Inadequate selection for ambulatory surgery	3	–	–	–	–	–	3 (2.1%)
Haemodialysis program	–	–	–	2	–	–	2 (1.4%)
Oral anticoagulation	1	–	–	–	–	–	1 (0.7%)
Total	50/844 (5.9%)	22/646 (3.4%)	20/329 (6.1%)	23/1007 (2.3%)	19/177 (10.7%)	10/499 (2%)	144 (4.1%)

3.3. Admissions related to the type of intervention

We studied the type of interventions that most frequently were responsible for hospital admissions. The type of surgery is one of the most important factors related to the unplanned admission rate. Thus, depending on which specialities are included in the ambulatory surgery programme, this index may vary importantly. In our study the distribution of procedures by surgical specialities was: ophthalmology 1007 patients (28.7%); general surgery 844 patients (24.2%); orthopaedics 646 patients (18.4%); urology 499 patients (14.2%); ENT 329 patients (9.4%) and gynaecology 177 patients (5.1%). The procedures with the highest admission rates were: gynaecologic laparoscopy 50%, hysteroscopy 26%, septoplasty 22%, haemorrhoidectomy 25%, orchidopexy 11%, hydrocelectomy 10%, inguinal hernia repair 8%, and knee arthroscopy 4.2%. The rest of the results by services are shown in Table 3.

3.4. Admissions related to the type of anaesthesia

According to the type of anaesthesia, patients were grouped into three categories:

- Local anaesthesia with monitoring (MAC): 1757 patients (50.8%)
- Regional anaesthesia: 1136 patients (31.8%)
- General anaesthesia: 609 patients (17.4%).

Table 2
Incidence of admissions causes during the study (%)

Cause of admission	1997	1998	1999	2000
Nausea/vomiting	12.1	15.9	3.6	2.3
Postoperative bleeding	9	31.8	14.3	6.9
Postoperative pain	6	11.4	10.7	23.2
More extensive surgery	0	2.3	14.3	2.3
Drowsiness/dizziness	3	11.3	3.6	4.6
Live alone	15.1	2.3	7.1	2.3
Live in rural area	0	2.3	7.1	2.3

Table 3
Unplanned admissions by the type of operation

Diagnostic/procedure	No. operations	No. admissions	% Admissions
<i>General surgery</i>			
Haemorrhoidectomy	4	16	25
Inguinal hernia	290	23	7.9
Epigastric hernia	2	26	7.7
Benign breast tumor	100	6	6
Radiocephalic A–V fistulae	56	3	5.4
Varicose vein stripping	58	3	5.2
<i>Orthopaedics</i>			
Knee arthroscopy	212	9	4.2
Hardware removal	95	2	2.1
<i>Urology</i>			
Orchiopexy	27	3	11.1
Hydrocelectomy	29	3	10.3
Circumcision	217	1	0.5
<i>ENT</i>			
Septoplasty	9	2	22
Tonsillectomy	124	8	6.5
Miringoplastia	16	1	6.3
<i>Ophthalmology</i>			
Strabismus surgery	36	4	11.1
Cataract surgery	951	18	1.9
<i>Gynaecology</i>			
Diagnostic laparoscopy	6	3	50
Hysteroscopy	26	3	26
Laparoscopic sterilization	73	5	6.8

Study by the type of anaesthesia showed that from 144 unplanned admissions, 63 (43.8%) were operated on under regional anaesthesia, 43 (29.7%) under general anaesthesia, and 36 (25%) under local anaesthesia. In two patients, the type of anaesthesia was not recorded. The most significant differences were the registration of pain in 31.7% of patients with regional anaesthesia and the presence of drowsiness (18.6%) and nausea/vomiting (13.9%) in the general anaesthesia group. The incidence of admission causes attributable to the type of anaesthesia are shown in Table 4.

3.5. Complexity of ambulatory surgery

In order to be able to compare the activity, efficiency and different quality indicators, it is necessary to estab-

Table 4
Rate of unplanned admission and causes according to the type of anaesthesia

	Type of anaesthesia (%)		
	Local-MAC	Regional	General
Rate of UAI	2	5.5	7
<i>Cause of admission</i>			
Pain	5.5	31.7	2.3
Drowsiness/dizziness	8.3	1.6	18.6
Nausea/vomiting	8.3	1.6	13.9
Bronchospasm	0	0	2.3
Respiratory insuf.	0	0	2.3
Urinary retention	0	1.6	0
Postdural puncture headache	0	1.6	0
Transient neurologic symptoms	0	1.6	0

lish quantitative and easily measurable indexes of complexity. Complexity should include not only the surgical technique, but the complexity of the patient as well. In the present work, we have only considered the case-mix on the basis of the ‘Average weight’, derived from the DGR classification. The average weight of our ambulatory surgery unit was 0.955. The distribution by services was the following: general surgery 1.465; orthopaedics 1.002; ophthalmology 0.933; gynaecology 0.8099; urology 0.786 and ENT 0.732. As it is shown in Fig. 2, we could not find any relationship between the UAI and the average weight of our patients (Fig. 3).

4. Discussion

From the different alternatives to conventional hospitalisation developed in the last decades, ambulatory surgery has been the one with the greatest growth, not only with a higher index of substitution, but also, with

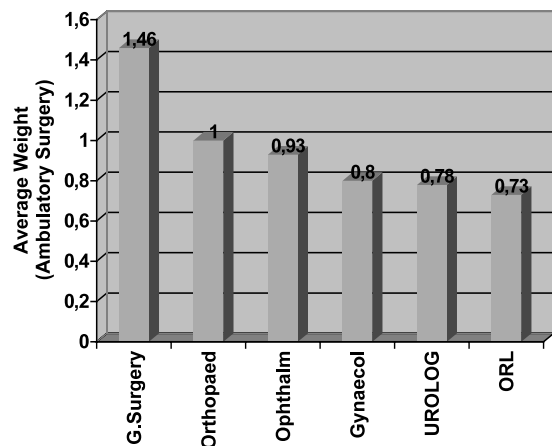


Fig. 2. Average weight of ambulatory surgery procedures by services.

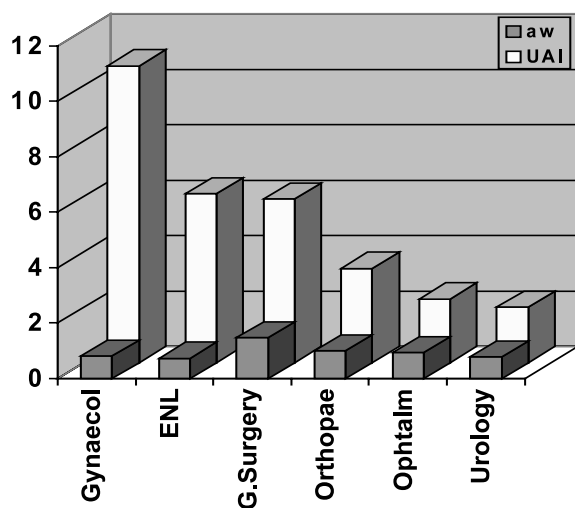


Fig. 3. Relation between the average weight and the UAI.

more complex interventions made to patients with higher biological risk [2–4]. Once developed, it is necessary to implement indicators that, when measured in a continuous and systematic form, allow the monitoring of the quality of the ambulatory surgery which we offer to our patients, as well as improving the optimisation of health care resources. The importance of these indicators is fundamental in the application of standards that allow the comparison of results between different ambulatory surgery programmes, with the ones of our own unit. Ideally, these indicators must be valid, significant, easy to measure and applicable to all units. The UAI fulfils the above requirements. However, to be able to compare the activity, efficiency and quality through these indicators, it is necessary to establish a correction factor that, quantifies the complexity of the operation, resources consumption and the complexity of the patients treated (co-morbidity, anaesthetic risk, etc.). The success of an ambulatory surgery unit depends on the application of a multidisciplinary and rational method of work in which patients and families play a fundamental role. Both of them assume, in conjunction with physicians, the control and postoperative care at home, thus in addition to improving technology, anaesthetic and surgical care, it is necessary to apply a method of exhaustive information to our patients and their ‘carers’.

The unplanned admission of a patient scheduled for ambulatory surgery must be avoided as much as possible, because it not only is an added financial burden for the Health Care System, but, also a stress factor for the patient and a disturbance for their family. The published data vary greatly ranging from below 1 to 11%, including differences between public and private centres [1,4–8]. Prospective measurement of UAI allowed us to evaluate the development of our unit, decreasing from 8.5% in 1997, to 4.3% in 1998, 2.7% in 1999 and 3.6%

in 2000, with an accumulated present global index of 4.1%.

Some recent studies have tried to identify predictive factors for anticipated admission. Amongst them, male gender, ASA-II and -III patients, duration of surgery longer than 40 min, postoperative bleeding, excessive pain, nausea and vomiting, and drowsiness and dizziness have been the most frequently described [1,5].

Different forms have been used to group the causes of admission. Chung and coworkers [5], classified the causes of admission as surgical, anaesthetic, medical or social. In order to detect and to correct operative problems, we grouped unplanned admissions in two categories:

(I) Admissions by incorrect selection of patients (24.3%).

(II) Admissions by specific complications (75.7%).

When UAI is prospectively registered and periodically reported to the involved units, it permits early detection of avoidable admissions such as social problems (e.g. patients who live alone). The study of admissions by specific complications is oriented directly to the problem, and permits a multidisciplinary approach.

4.1. Incorrect selection of the patients

Although UAI by incorrect selection of patients should be theoretically low, the reality demonstrates the contrary [1,5,9]. Incorrect selection caused 24.3% (35 cases) of our admissions. As the services have gained experience, this index has diminished from 39.3% in 1997 to 8.1% in 2000. From these 35 cases, 14 patients (9.7%) had to be admitted because they lived alone, and in addition, five patients (4.5%) were not discharged because they lived in a rural location too far away from the hospital, showing that physician’s preoperative evaluation clearly failed. In year 2000, only one patient was admitted for this reason. Special efforts must be made in this specific topic because it is probably the one that, with a simple preoperative work up, can be most easily lowered.

4.2. Specific complications

Analysis of unplanned admissions by specific complications allowed us to know which are the most frequent causes in each surgical service. Actualised data permits investigation of specific causes, pointing out avoidable problems, and allowing the development or improvement of clinical protocols for postoperative management.

4.3. Haemorrhage

Twenty-three patients were admitted because of bleeding from the operative site (16% of unplanned

admissions). This problem continues to be a stress factor for patients and surgeons. When disorders of coagulation can be reasonably ruled out, attention must be directed toward a meticulous dissection and intraoperative control of bleeding points. The fact that other published series show postoperative bleeding rates as low as 1% [5] must make us reconsider this important problem.

4.4. More extensive surgery

Twenty-two patients of 144 (15%), were admitted because the indication for surgery was considered in the operation room to be non-suitable for ambulatory surgery. The prospective measurement of this cause of admission showed a 3% rate in 1997, 2.3% in 1998, 14% in 1999, and 39.5% in 2000. The most logical explanation must be that more complex operations in patients with higher morbidity were scheduled in more recent years. This must reinforce the importance of meticulous preoperative evaluation and providing detailed information to patients and their carers [10].

4.5. Pain

Pain continues to be one of the more frequent causes of unplanned admission in ambulatory surgery, ranging from 5.3 to 12.1% [1,5,11,12] and one of the most stressful for patients. Several predictive factors of severe pain have been pointed out including body mass index, duration of anaesthesia and type of surgery [11]. As in other studies general surgery and orthopaedics were the specialties where pain was the most frequent cause of admission. In our study admission for pain was registered in 12.5% of patients. Specifically, pain has been the only increasing complication with a rate of 23.2% in year 2000. This result has made us recently review the analgesic protocol of our unit and adopt several measures:

1. Inclusion of a preemptive analgesia protocol [13].
2. Multi-modal analgesic therapy.
3. Better adjustment of analgesic doses at home according to body mass index [11].
4. Wound and ilioinguinal infiltration with bupivacaine 0.25% after interventions considered specially painful (e.g. haemorrhoidectomy, inguinal hernia repair etc.) [14].

4.6. Nausea/vomiting

Nausea and vomiting has been traditionally considered a frequent cause of unplanned admission in ambulatory surgery. Rates of admission vary from 10 to 30% [3,5,6,15,16]. Different factors have been implicated in precipitating postoperative nausea and vomiting like previous history, motion sickness, specific types of

surgery (e.g. strabismus repair, gynaecologic laparoscopy, middle ear surgery etc.), and certain anaesthetic agents like halogenated gases [17–20]. Nausea and vomiting was responsible for 10.4% of admissions in our study. Considering all the factors implicated, i.e. its high incidence, the economic and social consequences of unplanned admission, and the relatively high cost of serotonin receptor antagonists, we initiated several measures for prophylaxis and management:

1. Antiemetic prophylactic protocol with ondansetron (4 mg IV) for high-risk patients at the end of the surgical procedure [15].
2. Use of total intravenous anaesthesia in high-risk patients.
3. Reviewing the necessity to fulfil the requirements of oral tolerance for discharge in paediatric patient's [21].
4. Special care of hydration requirements [14].
5. A combined regimen of antiemetic therapy in high-risk patients because of its synergistic effects.

Implementation of these measures has led us to reduce the incidence of postoperative nausea and vomiting as a cause for admission, from 16% in 1998 to 2.3% at the end of year 2000.

4.7. UAI by the type of anaesthesia

As in other series, local anaesthesia and monitored anaesthetic care had the lowest admission rate (2%) [18,22]. We could not find differences between regional and general anaesthesia (5.5 and 7%, respectively). Drowsiness/dizziness and nausea/vomiting were much more frequent in general anaesthesia patients (18.6 and 13.9%) when compared with regional anaesthesia patients (1.6 and 1.6%). Pain was a more frequent complication after regional anaesthesia (31.7%).

4.8. Predictive factors of unplanned admission

Studies have tried to determine predictive factors of unplanned admission [1,5]. In these studies, significant factors described were ASA-II and-III status, duration of surgery more than 40 min, pain, postoperative bleeding, nausea/vomiting and spinal anaesthesia with profound sedation. General or regional anaesthesia is not considered as a predictive factor because it is mostly dependent on the type of surgery [11].

The key factor to diminish the unanticipated admission index in ambulatory surgery is to apply a multitask work force, with continuous measurement and periodic diffusion of results to the surgical services involved. Only with actualised information about the UAI index by causes and type of interventions, can we adopt measures to reduce the magnitude of this important variable.

4.9. Limitations of UAI as quality indicator

Although UAI is considered one of the most important indicators of quality in ambulatory surgery, it has several limitations. First, there is some degree of subjectivity by nurses and physicians regarding admission with certain complications such as nausea/vomiting, drowsiness/dizziness or pain. Secondly, a great variability in the tolerance of patients in the face of these complications exists. Thirdly, the outside hospital care (i.e. day hospital, domiciliary care units, etc.) could vary the rates of UAI in different units. Finally, financing of the units (public or private) could influence the rate of UAI, due to the relative ease of accessibility of beds for unplanned admissions.

4.10. Future trends

One important factor to know the capacity of our units is the evaluation of complexity. Actually, the only complexity index is the 'case-mix', which is calculated from the DRG classification. Case-mix reflects an average expenditure of resources of hospitalisation episodes by a group of patients. Thus, case-mix only comports as an indirect indicator, because it mainly represents the financial expenses of a procedure, which not always reflect exactly, either the surgical complexity or the morbidity of the patient, especially in the outpatient setting.

On the other hand, the evaluation of potentially ambulatory DRG, a common indicator frequently used by Health Care Systems including the Spanish one, can determine the degree of 'ambulatoryisation' of surgical procedures, but it does not identify potentially ambulatory DGR patients who do not fulfil the criteria to be operated on ambulatory surgery basis. Although, multiple efforts have been made to design a specific classification of ambulatory patients [23] none of them have been universally accepted and applied.

The development of a mathematical index to group the clinical complexity of the patient and the cost of the process would allow the carrying out of studies of economic profitability of the different types of units (free-standing, integrated, mixed). These studies could evaluate the real impact of ambulatory surgery units in the surgical activity of the hospitals accurately, and could also compare the activity and efficiency of the units to each other.

5. Conclusions

1. The systematic measurement of unplanned admission and its evolution in a multidisciplinary task force, allowed us to improve our results.

2. Classification of UAI by specific causes of admission and incorrect selection of patients may detect on-line problems and the application of concrete solutions to reduce the UAI index.
3. In order to compare the results between different ambulatory surgery units, it is necessary to have an international classification of ambulatory patients. In the same way, an objective index to evaluate the surgical complexity and patients' morbidity should be developed.
4. The assessment of processes and results should be based on the selection of standard indicators with systematic and periodic measurement.

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Sevoflurane requirements during ambulatory surgery: a clinical study of bispectral index and auditory evoked potential guided anaesthesia

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Abstract

The bispectral index (BIS) is processed passively from the EEG, while the auditory evoked potential (AEP) response actively tests brain activity. In the present study 60 patients undergoing elective day surgery (knee arthroscopy) were randomised to titrate sevoflurane (with O₂:N₂O, 1:2) either clinically or in combination with either a target BIS-index of 60 ± 5 (20 patients) or AEP-index of 30 ± 5 (20 patients). Induction was with propofol and fentanyl (0.1 mg). The BIS- or AEP-index did not improve either sevoflurane consumption or emergence times. In minor ambulatory anaesthesia, without muscle relaxants, neither BIS nor AEP-index guidance reduces anaesthetic consumption or emergence times. © 2002 Elsevier Science B.V. All rights reserved.

Keywords: Auditory evoked potential-index; Bispectral-index; Fentanyl; Sevoflurane; Ambulatory surgery

1. Introduction

Ambulatory anaesthesia is increasing world-wide. While a number of factors promote this rapid growth, cost-effectiveness is without doubt one of the major driving forces. The economic consequences of anaesthesia are given increasing consideration [1]. Direct drug costs are but one factor in an equation that includes residence times in both the operating theatre and post-operative care unit.

With the continual introduction of both new drugs and anaesthetic equipment, impartial comparisons must be made with established techniques to allow clinicians to make informed choices including cost. Two new monitors of the depth of anaesthesia have recently been introduced. They use the electroencephalogram (EEG) in slightly different ways to determine the anaesthetic state. Bispectral analysis (BIS) is a passive monitor, interpreting the EEG based on an algorithm which

provides a simple index to guide the clinician. The auditory evoked response (AEP) differs in that it uses an auditory stimulus to actively test the level of activity of the brain when it reacts to a signal-correlated EEG response. AEP has been suggested as one method for determining the effects of anaesthetics sensitive to the noxious effects of surgery and therefore possibly a useful technique for the determination of an adequate depth of anaesthesia during surgery [2,3].

The aim of the present study was to compare the anaesthetic consumption and emergence times for minor ambulatory surgery when sevoflurane anaesthesia is guided by BIS- or AEP-index as compared with routine clinical titration.

2. Methods

Sixty ASA I–II patients (described in Table 1) scheduled for elective knee arthroscopy were studied after approval from the hospital's ethics committee and informed consent. Premedication with cyclozine 50 mg was given orally 30 min prior to anaesthesia. Routine

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monitoring included ECG, pulseoximetry, heart rate and non-invasive systemic blood pressure.

Patients were randomised into three groups of 20 patients each. In group I ($n = 20$) sevoflurane was titrated according to routine clinical signs. In group II ($n = 20$) sevoflurane was titrated to maintain a target BIS of 60 during surgery. In group III ($n = 20$) sevoflurane was titrated to maintain a target AEP-index of 30 during surgery. Sevoflurane was combined with oxygen in nitrous oxide and given at 1 and 2 l/min, respectively, for a total fresh gas flow of 3 l/min.

In the AEP group, two AEP electrodes were placed on the forehead and one behind the ear and earphones provided an intermittent click (9 Hz, 65 dB sound pressure level) for AEP monitoring (A-Line AEP Monitor, Danmeter A/S; Odense, Denmark). Processing time for the AEP-index is 30 s for the first signal and a total update delay of 6 s. Latency and amplitude of the mid-latency AEP are weighted equally.

In the BIS group, four EEG electrodes were placed on the patient's forehead according to the manufacturer's instructions for BIS monitoring (Aspect 2000, Aspect Medical Systems; BIS algorithm 3.4, Natick, MA) and the BIS index was measured continuously.

2.1. Induction study protocol

Patients were preoxygenated ($FiO_2 = 0.7$) via a face-mask for 3 min prior to induction. All patients received the same induction with fentanyl (0.1 mg) and propofol given according to clinical need. Muscle relaxants were not used and a laryngeal mask airway was placed in all patients and connected to a circle absorber system (Q-2 system, Anmedic AB, Valentuna, Sweden). All patients received 5 ml lidocaine in the skin prior to incision and

5 ml intra-articular lidocaine (5 mg/ml) with adrenaline at the start of surgery and 10 ml lidocaine with 50 μ g fentanyl at the end of surgery.

At the end of surgery all anaesthetics were discontinued and a fresh oxygen flow of 6 l/min was given until the removal of the laryngeal mask. Emergence, calculated as the time to removal of the laryngeal mask and to when the patient could properly state his name and date of birth, were both defined from the cessation of sevoflurane.

2.2. Anaesthetic consumption determination

The sevoflurane vaporiser was filled and weighed (scale type) prior to induction. When anaesthesia was complete, the vaporiser was disconnected and reweighed. Inhaled anaesthetic consumption per minute was calculated for each patient.

2.3. Postoperative care

All patients received paracetamol 2 g and lornoxicam 8 mg orally as postoperative analgesia. Criteria for discharge were standard hospital routines: ability to drink, ambulate, void and have a VAS pain score less than 3.

2.4. Statistics

Data is presented as means and standard deviation unless otherwise stated. Differences between groups, for weights before and after anaesthesia were studied using ANOVA. $P < 0.05$ was considered statistically significant. We considered a 30% reduction in sevoflurane consumption to be clinically relevant. The number of

Table 1
Patients' characteristics and pre- and post-operative observations for the three groups studied (mean \pm S.D.)

	BIS guidance ($n = 20$)	AEP guidance ($n = 20$)	Control ($n = 20$)
Age (years)	45 \pm 14	45 \pm 12	44 \pm 11
Weight (kg)	77 \pm 19	85 \pm 15	82 \pm 12
Duration of anaesthesia (min)	15 \pm 5.0	15 \pm 5.5	17 \pm 4.8
Duration of surgery (min)	14 \pm 4.8	14 \pm 4.8	14 \pm 4.8
Diagnostic	3	2	3
Meniscus resection	7	8	11
Shaving of synovia	11	10	6
Time until removal of larynx mask (min)	2.5 \pm 0.8	2.7 \pm 1.3	2.2 \pm 0.7
Time until state date of birth and name (min)	3.2 \pm 0.9	3.1 \pm 1.3	2.6 \pm 0.7*
VAS 30'	2.0 \pm 2.5	1.8 \pm 2.8	1.4 \pm 1.6
Rescue analgesics	2	0	0
PONV	1	0	0
Time to ready for discharge (min)	56 \pm 36	44 \pm 18	43 \pm 14
Fentanyl (μ g/kg)	1.4 \pm 0.3	1.2 \pm 0.3	1.3 \pm 0.2
Sevoflurane consumption (g/min)	0.21 \pm 0.09	0.22 \pm 0.16	0.19 \pm 0.04

PONV, postoperative nausea and vomiting.

* $P < 0.05$.

patients in the brain guidance and clinical adjusted groups was based on a power analysis showing a 33% difference with a power of 90% and a 5% chance of an α -error.

3. Results

Patient's characteristics and perioperative observations are shown in Table 1. Patient groups did not differ in age or either duration or indication for surgery. Anaesthesia and surgery were uneventful in all patients and no major events were noticed in any patient. Postoperative interview revealed no awareness in any group.

None of the groups differed for either sevoflurane consumption, time to removal of laryngeal mask or time to discharge (Table 1). The time to stating date of birth was shorter for controls than the two study groups ($P < 0.05$).

4. Discussion

This is a negative study showing no major benefits from brain monitoring guidance with either BIS- or AEP-index during short ambulatory anaesthesia for knee arthroscopy.

There is a need for monitoring techniques that can objectively quantify anaesthetic depth. Such a monitor should optimally determine the depth of hypnosis independently of which drug is used and whether it is used alone or in combination with other drugs. Just as adequate anaesthesia is the balance between surgical stimulation and the combined effects of hypnosis and analgesia, so must an anaesthesia monitor be able to detect or respond to the arousal effects of noxious stimulation associated with surgery. The ideal depth of anaesthesia monitor should provide a real time description of the net effect of these factors.

Presently available BIS monitors approach these criteria. While the BIS-index does correlate with increasing sedating effects of hypnotics, it is far less discriminating for the effects of opioids, nitrous oxide or ketamine or when combinations of drugs are used [4–7]. The A-line model is a novel monitor based on the auditory evoked response. The AEP-index has not been studied previously from the perspective of optimising anaesthetic delivery. The auditory evoked response has been shown to correlate with anaesthetic effects and has been suggested to be one possible tool for determining adequate depth of anaesthesia [8].

Guidance from the BIS-index has been found to decrease anaesthetic consumption and facilitate the recovery in some studies [9–13]. Due to the high cost associated with the BIS electrodes, the cost-effectiveness

from its use has been disputed [11]. Song et al. found that BIS monitoring reduced anaesthetic consumption as well as increased speed of emergence in patients who received muscle relaxants during tubal ligation [9]. Gan et al. studied patients having propofol anaesthesia and found BIS-guidance to be associated both with decreased propofol consumption and faster overall recovery [10]. In a study by Yli-Hankala et al., BIS shortened emergence times in patients anaesthetised with propofol but not in those anaesthetised with sevoflurane. The use of BIS-monitoring lowered anaesthetic consumption for both anaesthetics [11]. Bannister et al. also found differences in the effects of using BIS-monitoring when comparing patients undergoing tonsillectomies (with muscle relaxants) with those undergoing hernia repairs (without muscle relaxants). Sevoflurane consumption was decreased in both groups using BIS, but while the average emergence time was shortened in the tonsillectomy group, no differences were found in the children undergoing inguinal hernia repair with sevoflurane and supplemental caudal block [12]. Heck et al. studied hemodynamic and other autonomic responses during intubation and found that BIS guidance lowered the incidence of autonomic response [13]. Autonomic responses intraoperatively were only very minor in the present study and did not interfere with surgery in any patient.

The present study's negative finding with no major difference regarding drug consumption, emergence time and time to discharge, is to some extent in contrast to previously published results with BIS. Comparing the result of the present study with previous studies where anaesthetic administration has also been guided by brain monitoring should, however, take into account differences in the study population and protocol. Making comparisons of results from studies involving different surgical procedures and anaesthetic protocols is always difficult. It should be kept in mind that patients in the present study received a minor dose of fentanyl at induction, local anaesthesia before the initial incision and did not receive any muscle relaxants. Even the group relying only on clinical signs had a considerable number of variables available for determination of anaesthetic depth. In addition to routine clinical signs, as defined by Evens to include heart rate, blood pressure, tearing, and sweating [14], the patients in this study were mostly breathing spontaneously and thus could give motor signs. While end-tidal anaesthetic gas concentrations were monitored online, no fixed MAC level was sought but rather the vaporiser was adjusted according to patient needs and the sevoflurane consumption throughout the procedure was the primary study end-point.

Time to discharge was the same in all three groups. The time to discharge is dependent on a number of factors and one may argue about the extent to which

intraoperative hypnotic monitoring has a causal relation to such a finding [15,16]. It is well known that pain and emesis are the two most important factors during the recovery process. All our patients had low postoperative pain scores and no patient needed rescue therapy for postoperative nausea or vomiting. Therefore, the influence from pain and emesis should have been minor and one may consider that the anaesthetic delivery regime would have had some impact.

To determine the full economic consequences of this new technology, even the cost for the special electrodes (approximately 5 Euro) and the monitoring equipment must be considered. Neither AEP- nor BIS-index guidance seems to be cost-effective in light, general anaesthesia without muscle relaxants as in this study: a finding similar to that in the BIS study by Yli-Hankala [10]. The benefits of brain monitors such as AEP or BIS may be greater during deeper anaesthesia with muscle relaxants and controlled ventilation when fewer clinical signs are available and a wider margin of safety is needed to avoid awareness as suggested by Johansen et al. [17]. It may be that the benefits of such guidance are more pronounced for intravenous anaesthesia than for inhalation anaesthesia with end-tidal gas monitoring.

Several factors may explain the shorter emergence time (ability to state name and date of birth) in the control group. A recent study demonstrated the most prominent decrease in sevoflurane consumption when first-year trainees were guided by the BIS-index [18]. Before comparing these results with the present study, it must be remembered that in the cited reference, anaesthesia cases were combined including short and long cases and those with and without muscle relaxants. Their finding is important. Brain monitors can be of value as pedagogical methods and may also influence the results of the present study in which anaesthesia was in the hands of a single anaesthesiologist with two decades of clinical experience. The control group had not only slightly faster emergence but also a tendency—which did not reach significance—of the lowest sevoflurane consumption. As there was no awareness in any group, one explanation would be that the inexperienced anaesthesiologist will feel confident to use less anaesthetic with the aide of brain monitors, while the experienced anaesthesiologist has less to gain from these monitors, at least for the type of cases studied here.

The choice of index target values can also affect the results of this and other studies. The target AEP-index of 30 was set in accordance with the manufacturer's recommendations. The BIS of 60 was taken from previous studies on day surgery patients [19]. Further studies with these devices may alter the chosen target values, particular in non-relaxed patients. As awareness is less critical in the absence of muscle relaxants, these target values may differ considerably for different anaesthetic protocols.

In summary, the new depth of anaesthesia monitors presently available, BIS and AEP, are interesting new modalities for the objective determination of depth of anaesthesia. Their effect during light general anaesthesia needs further studies in order to determine their relevant roles in clinical practice.

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Abstracts

Varicose Veins: 925 Saphenectomies and Collateral Branch Excision, as Ambulatory and Short Stay Surgery

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Introduction

The surgery of the varicose veins is the most often of the vascular surgery. It is based in avoiding future complications. With almost no variations in his technique, it is still practised essentially the same from the beginning of the 20th century. The advance and evolution of the ambulatory surgery offers an improvement for this pathology.

Materials and methods

We present the retrospective revision of the 925 varicose veins surgery with saphenous invaginated stripping and side branches in ambulatory or one-day-surgery way in 876 patients: suprainguinal and inframaleolar incisions in the stripping and Müller phlebectomy to the side branches. Intradural anaesthesia in 847, local in 73 and only seven with general.

Results

There were 0.5% postoperative headache, two deep venous thrombosis, two inguinal hematomas, 15 neuritis, eight recidives and none rehospitalization. Only three patients didn't like the ambulatory surgery.

Conclusion

Wherefore the intervention of the varices with strip-

ping and side branches is totally feasible to make it in ambulatory way with great acceptance by the patients and with low mortality.

Intercurrent Conditions in Ambulatory Surgery. Mayor Ambulatoria

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Cirugía Mayor Ambulatoria 2001; 5(3)

It is studied the concurrent pathology in the 750 patients consecutively selected and operated in ambulatory regimen and the percentage of admissions and delays at the beginning of the surgery associated with such pathology.

The sample was an average age of 53.2 years old (3–89), 55% female and 45% male. 45% were classified as ASA I, 48% as ASA II and 7% as ASA III. The most common concurrent pathologies were arterial hypertension (17.8%), drug allergy (13%), Diabetes Mellitus (7.3%), respiratory disease (7.2%), peptic disease (4.4%) and cardiac disease (3.2%). 18.4% of the patients also had antecedents of tobacco use, 4.5% of alcohol abuse and 11% of possible intubation difficulties. 47.3% were under permanent medication, 49% of them took more than two medicines and 9.5% received antiagregant drugs.

In this series of patients there were two admissions due to a wrong control of glycemia (0.2%) and 2 due to uncontrolled arterial hypertension, there were 17 surgical delays, but the total period of hospitalization did not differ in patients with or without the concurrent pathology. From our experience, a high incidence of concurrent pathology in patients ASA I, ASA II and even ASA III does not increase the morbidity nor warrant the immediate results of mayor ambulatory surgery.

Results in Proctological Surgery

Carles Olona Casas, Jordi Escuder Pérez, José M^a Coronas Riba, Vicente Vicente Guillén, Fernando Gris Yrayzoz, Francesc Feliu Vilaró, Jordi Vadillo Bargalló, Luis Luengo Rodríguez de Ledesma

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Cirugia Mayor Ambulatoria 2001; 5(3)

Full time Major Ambulatory Surgery within our General and Digestive Surgery Service began in January 1998, and proctological surgery has played an important role in the activities carried out since then.

This project hereby studies the activities carried out between January and December 1998, a period made up of 45 working days of surgery along with the other pathologies treated on an ambulatory basis by our Service. 110 proctological surgery procedures, 67 Milligan-Morgan haemorrhoidectomies on 3–4 grade haemorrhoids, 31 Gabriel fissurectomies and 12 fistulotomies were carried out in total.

Two haemorrhoidectomy patients were immediately hospitalised for postoperative haemorrhaging; three others were hospitalised for experiencing post-haemorrhoidectomy pain 24 h after the operation; and one fistulectomy patient required a more extensive exeresis than anticipated.

We can conclude that proctological pathology is treated without hospitalisation and with optimal results.

Complications in the Treatment of Acute Anorectal Abscesses

Carles Olona Casas, Jordi Escuder Pérez, José M^a Coronas Riba, Vicente Vicente Guillén, Fernando Gris Yrayzoz, Francesc Feliu Vilaró, Jordi Vadillo Bargalló, Luis Luengo Rodríguez de Ledesma

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Cirugia Mayor Ambulatoria 2001; 5(3)

Anorectal abscesses are a very common surgical emergency for which there are various treatment techniques. However, complications associated with such treatments are known, such as the recurrence of the abscess, the appearance of fistulas or anal incontinence.

Our aim is to analyse the treatment we have applied and its associated complications. In order to do this we retrospectively studied 68 patients treated for acute anorectal abscesses at our hospital during the period from June 97 to January 99. The abscesses were divided into 56 perianals, one intersphincterian, eight ischiorectals and three submucous. Thirty patients were treated with a simple incision, five presented recurrences and five fistulas. Out of eight patients treated

with a Penrose type drainage, four had postoperative fistulas. On 24 patients a skin exeresis with an associated debridement was carried out, six then presented fistulas and one recurrence. Fistulectomies were carried out on six patients for whom the fistulous tract had firstly been detected, and no postoperative complications were apparent. No patient suffered postoperative anal incontinency.

To conclude, we recommend skin exeresis and debridement as less recurrences were observed. Patients treated with primary fistulectomy did not present complications, although we believe that this technique should be reserved for cases where the tract is clearly identified and for surgeons with adequate experience in this pathology.

Our Experience in Ambulatory Laryngeal Microsurgery. Different Ventilation Techniques Employed

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Cirugia Mayor Ambulatoria 2001; 5(4)

Laryngeal microsurgery is an endoscopic method routinely employed for diagnostic and therapeutic purposes in Laryngology. This technique can be performed as day-case surgery for selected patients. Ventilation techniques range from conventional orotracheal ventilation to high frequency jet ventilation.

From June 1998 to April 1999, 81 patients underwent laryngeal microsurgery procedures with different ventilation techniques in the Major Ambulatory Surgery Unit of Valencia University General Hospital. These cases have been retrospectively reviewed.

Inferior Submucosal Turbinoplasty Using Controlled Electrofulguration Anesthesia

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Cirugia Mayor Ambulatoria 2001; 5(4)

Introduction

The most important physiological resistances to nasal air flow occur at the level of the nasal valve and Cottle's endonasal area IV. They are enlarged in cases with supplementary organic obstacles. Hypertrophic inferior turbinates are frequently observed in patients

with nasal breathing insufficiency. Hypertrophic inferior turbinates are frequently observed in patients with nasal breathing inadequacy. Numerous surgical procedures have been proposed to reduce turbinal volume, from the barely aggressive to the most radical methods. Most of them include complex technical characteristics or eventful complications, so that these procedures are rarely performed as ambulatory surgery.

Methods

One hundred and twenty seven patients who underwent inferior submucosal turbinoplasty using controlled electrofulguration were included. In 103 it was performed as a complement to septoplasty (group I), in seven as a complement to septoplasty and uvulopalatoplasty (group II) and in 17 as sole procedure (group III).

Results

Seventy one patients from group I (69% intragroup), 6 from group II (86%) and 17 from group III (100%) were discharged 6 h after surgical operation. The remaining 33 patients were discharged no longer than 24 h after the procedure. No postoperative bleeding was recorded. Postoperative pain required oral analgesia in 73 patients (67 from group I, four from group II and two from group III). One week after the operation, the most significant complaints were endonasal tightness (108 patients, 85%), mucous crusting (96 patients, 75.6%), paranasal paresthesias (47 patients, 37%) and epiphora (one patient, 0.8%).

Conclusion

Inferior submucosal turbinoplasty using controlled electrofulguration is a safe, comfortable and effective procedure to be performed on an outpatient basis.

Review of Unprogramed Hospital Admissions in a Program for Integrated Ambulatory Surgery

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Cirugía Mayor Ambulatoria 2001; 5(4)

We studied the rate and etiology of hospital admissions during the first year of operation of an integrated ambulatory surgery unit, in a newly created hospital. The period studied was from March 1998 to March 1999. A total of 1430 patients underwent surgery in an ambulatory regime, which accounted for 51.7% of ambulatory surgery, with a substitution index of 63.22%. The type of anesthesia was general in 28.4%, intradural in 19.4%, regional intravenous anesthesia or blockade of plexus and peripheral nerves in 10.2%, and retrobulbar in 41.8%. Seven point eight percent of the total, 113 patients, were admitted into hospital, as whom 27 patients were admitted due to the anesthesia (1.8%), principal etiologies were: vomiting, unbalance and dizziness when walking and urinary retention. Out of 195 patients operated for tension free hernioplasty, nine (4.6%) were admitted because of the anesthesia.



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El Control de Calidad en Cirugía Mayor Ambulatoria

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Hospital Universitario 'Virgen de la Arrixaca', Murcia
Cirugía Mayor Ambulatoria 2001; 6(1)

Objective

To evaluate the quality of the Outpatient Surgical Unit (OSU) of the University Hospital 'V. Arrixaca' during its first 3 years of operation (1997–1999), using a list of commonly used clinical indicators, mainly for the analysis of processes and results.

Patients and methods

A retrospective study of patients undergoing surgical procedures from ten different specialities, during the period 1997–1999. During this period, the Unit changed from an integrated system to an independent one. Data were processed by the Evaluation Unit of the Sub-direction for Information Systems. Indicators used were: substitution index, protocolization of admission in the S.W.L, cancelled procedures, rate of patients who required hospitalization, readmission index and complaints. To determinate the quality perceived by the user, an external agency carried out an inquiry about the degree of satisfaction and attention received. Three hundred and nineteen phone calls were made asking seven specific questions.

Results

The introduction period of the OSU was brief. The substitution index of some procedures reaches 100%, and the variety and complexity of procedures has increased progressively.

Conclusions

The introduction of the OSU has involved a signifi-

cant increase of all the surgical activity, because inpatient surgery has maintained the same volume, although inducing an improvement of its quality indicators, and therefore the system's efficiency. The quality indicators evaluated were very favourable. Finally, the quality perceived by the user was very high.

Análisis de la Casuística (Case Mix) de la Sección de Otorrinolaringología de la Unidad de Cirugía Mayor Ambulatoria

S. Sánchez Gómez, J.M^a Dueñas Parrilla, J. López Palomo, M. Shepherd González, I. Rando González, J. Miguélez Rodríguez

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Cirugía Mayor Ambulatoria 2001; 6(1)

Objective

Analysis of case mix reports gathered by the hospital's information systems and their accuracy in reflecting the activity of the Ear, Nose and Throat section of the Outpatient Surgical Unit of the Hospitales Universitarios Virgen del Rocío.

Material and methods

The study was performed as a retrospective comparison of patients who underwent ENT outpatient surgical procedures over the period of 1 year (1998). The case mix report of the DRGs was compared to the data registered by the Department of ENT of the Hospitales Universitarios Virgen del Rocío.

Results

Eight hundred and sixty one patients underwent sur-

gical treatment, 96% as ambulatory surgery. We recorded a mean stay of 1.04, outstripping the standard average stay of 2.51. A hospital stay impact of 1.320 was observed. We reached 495.96 DRG points through a DRG mix of 0.55 and a functional mix of 0.41. Clinical procedures were as widespread as 30 DRGs, and 39% were other than 060 DRG (adeno-amigdalectomy in the under 17s). Up to 1% of the patients were in a wrong in DRG grouping. Re-admissions were not properly reported.

Conclusions

DRG case mix analysis is a useful tool to be acquainted with to gather a clinical Unit's genuine activity. It also reports the efficiency in hospital management of resources. Nevertheless, this analysis must be subject to critical appraisal to solve relevant information deficiencies including the whole clinical activity. Audits of case mix reports complete the evaluation of the quality of the process.

Esfinterotomía Lateral Interna en la Fisura Anal Crónica

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Cirugía Mayor Ambulatoria 2001; 6(1)

This study gives our experience, over the last 5 years (1995–1999), in this surgical technique for the treatment of chronic anal fissure in the Outpatient Surgical Unit of the Complejo Xeral Calde of Lugo (UCA).

This is a retrospective study of a total of 72 patients, 51 (71%) of which were women and 21 (29%) were men. Average age was 39, ranging from 21 to 65. Average time of evolution of the fissure was 10.5 months (6 months–5 years)

Dolor Postoperatorio y Tratamiento Del Saco en Las Hernias Inguino-Cruales (Invaginación-Resección): Estudio Preliminar

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Cirugía Mayor Ambulatoria 2001; 6(2)

Introduction

It has been the goal of this prospective and open investigation to find out if after the surgical repair of inguinofemoral hernias, postoperative pain is influenced by the type of procedure used on the hernial sac (invagination or resection).

Patients and methods

Between July and October 1998, at the Ambulatory Surgical Unit in the General University Hospital of Valencia, 76 patients underwent surgery (67 men and nine women; MA 53.9 ± 12.5 ; limits 25–83) for inguinal or femoral hernias. The surgical technique employed for the repair of inguinal (direct, indirect and mixed) and femoral hernias was a personal variation of Lichtenstein's tension-free hernioplasty using either a plug, a mesh or a plug + mesh. Out of the total of patients operated on, 13 had bilateral hernias which were repaired during the same surgical procedure. The anaesthetic technique employed was monitored anaesthetic care (MAC) plus local anaesthesia in bilateral hernias. Postoperative pain was measured with a visual analogical scale (VAS) and depending on the dose, in mg, of magnessic metamizol taken for 6 days after the operation.

Results

Invagination of the hernial sac was performed in 66 (74.2%) cases while resection was performed in 23 (25.8%). In relation to pain, no statistical difference was found (invagination or resection) ($P > 0.05$) in the first 6 postoperative days. Only through the double variant analysis between the pain variation and the number of repairs (unilateral or bilateral hernias) performed in the same operation, was there any significant statistical difference, during the first postoperative day ($P < 0.05$). Analgesic consumption was not affected by gender or age.

Conclusion

Results lead us to the conclusion that the use of either procedure, invagination or resection, of the hernial sac does not seem to influence postoperative pain.

Fístula Anal y Cirugía Mayor Ambulatoria: Utilidad de la Ecografía Endoanal en la Selección de los Pacientes

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Cirugía Mayor Ambulatoria 2001; 6(2)

Introduction

After an adequate selection of patients most proctological surgery can be performed as a 1-day procedure. Simple anal fistula is a frequent pathology in any program of ambulatory surgery. On the contrary complicated fistula would require hospitalization. Anal endosonography has become the most helpful tool in selecting patients with anal fistula for ambulatory surgery.

Aim

To analyse the value of anal endosonography in the preoperative selection of patients with anal fistula.

Material and methods

From March 1996 to December 1999, 25 patients complaining of complex anal fistula (group I) and 25 with a simple fistula (group II) were preoperatively studied by anal ultrasonography with a B&K Medical machine with the 1850 probe and a 10 MHz transducer. Hydrogen peroxide was used to enhance the image resolution.

Results

Clinical examination had classified the patients in complex (group I) and simple fistulas (group II). After the anal ultrasound, patients were re-classified: 15 out of 25 from group I were already complex as well as five of the 25 from group II. Therefore, anal sonography changed the surgical strategy in 15 cases.

Summary

Anal endosonography may assist in the decision-making for fistula in ano. It offers a good view of the anatomy of the anal canal and the fistula track.

Therefore anal ultrasound is of great help in selecting patients with fistula for 1 day surgery.

¿Hay un Limite de Distancia Para Seleccionar los Pacientes que van a ser Operados en Régimen Ambulatorio?

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Cirugia Mayor Ambulatoria 2001; 6(2)

Since 1996, the Hospital Geral de Santo António (HGSA)-Porto, Portugal, performs, under general anaesthesia, neuromuscular biopsies in children from all over the country, as outpatients.

In this study the authors settled the question of the safety of this kind of surgery, that goes against the guidelines usually proposed for day surgery.

This prospective study included 50 ASA I, II and III children, proposed for neuromuscular biopsies in the Day Surgery Unit (DSU) of HGSA, assigned to three groups:

Group A ($n = 17$): children living less than 30 min away from the DSU

Group B ($n = 15$): children living between 30 and 60 min away from the DSU

Group C ($n = 18$): children living more than 60 min away from the DSU

All children were operated on under combined anaesthesia (general intravenous with infiltration of skin/peripheral nervous block). All the complications, such as pain, haemorrhage, nausea and vomiting were assessed. There was no statistical difference between the three groups. All the children went home the day of surgery and none of them needed to be readmitted during the 30 days following surgery.

Based on these results it seems that, for some types of surgery, like neuromuscular biopsies, distance must not be a limiting criteria for a proper day case selection.



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Postoperative pain and treatment of hernial sac in inguinofemoral hernias (invagination-resection): a preliminary study pp. 74-85

C. ZARAGOZA FERNÁNDEZ, H. Bebek Herrero, S. Castaño Conesa, L. Olavarrieta Masdeu, R. García-Aguado, M. Vivó Benlloch, C. Martínez Aparicio
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Cirugia Mayor Ambulatoria 2001;6(2)

Introduction: It has been the goal of this prospective and open investigation to find out if after the surgical repair of inguinofemoral hernias, postoperative pain is influenced by the type of procedure used on the hernial sac (invagination or resection).

Patients and methods: Between July and October 1998, at the Ambulatory Surgical Unit in the General University Hospital of Valencia, 76 patients underwent surgery (67 men and nine women; MA 53.9 ± 12.5 ; limits 25–83) for inguinal or femoral hernias. The surgical technique employed for the repair of inguinal (direct, indirect and mixed) and femoral hernias was a personal variation of Lichtenstein's tension-free hernioplasty using either a plug, a mesh or a plug + mesh. Out of the total of patients operated on, 13 had bilateral hernias which were repaired during the same surgical procedure. The anaesthetic technique employed was monitored anaesthetic care (MAC) plus local anaesthesia in bilateral hernias. Postoperative pain was measured with a visual analogical scale (VAS) and depending on the dose, in mg, of magnesian metamizol taken for 6 days after the operation.

Results: Invagination of the hernial sac was performed in 66 (74.2%) cases while resection was performed in 23 (25.8%). In relation to pain, no statistical difference was found (invagination or resection) ($P > 0.05$) in the first 6 postoperative days. Only through the double variant analysis between the pain variation and the number of repairs (unilateral or bilateral hernias) performed in the same operation, was there any significant statistical difference, during the first postoperative day ($P < 0.05$). Analgesic consumption was not affected by gender or age.

Conclusion: Results lead us to the conclusion that the use of either procedure, invagination or resection, of the hernial sac does not seem to influence postoperative pain.

Fistula-in-ano and ambulatory surgery: use of endoanal ultrasonography in selection of patients

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Cirugia Mayor Ambulatoria 2001;6(2)

Introduction: After an adequate selection of patients most proctological surgery can be performed as a one-day procedure. Simple anal fistula is a frequent pathology in any program of ambulatory surgery. On the contrary complicated fistula would require hospitalization. Anal endosonography has become the most helpful tool in selecting patients with anal fistula for ambulatory surgery.

Aim: To analyse the value of anal endosonography in the preoperative selection of patients with anal fistula.

Material and methods: From March 1996 to December 1999, 25 patients complaining of complex anal fistula (group I) and 25 with a simple fistula (group II) were preoperatively studied by anal ultrasonography with a B&K Medical machine with the 1850 probe and a 10 Mhz transducer. Hydrogen peroxide was used to enhance the image resolution.

Results: Clinical examination had classified the patients in complex (group I) and simple fistulas (group II). After the anal ultrasound, patients were reclassified: 15 out of 25 from group I were already complex as well as five of the 25 from group II. Therefore, anal sonography changed the surgical strategy in 15 cases.

Summary: Anal endosonography may assist in the decision-making for fistula in ano. It offers a good view of the anatomy of the anal canal and the fistula track.

Therefore anal ultrasound is of great help in selecting patients with fistula for one-day surgery.

Is there a distance limit when selecting patients for ambulatory surgery?

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Cirugia Mayor Ambulatoria 2001;6(2)

Since 1996, the Hospital Geral de Santo António (HGSA)-Porto, Portugal, performs, under general anaesthesia, neuromuscular biopsies in children from all over the country, as outpatients. In this study the authors settled the question of the safety of this kind of surgery, that goes against the guidelines usually proposed for day surgery.

This prospective study included 50 ASA I, II and III

children, proposed for neuromuscular biopsies in the Day Surgery Unit (DSU) of HGSA, assigned to three groups:

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Based on these results it seems that, for some types of surgery, like neuromuscular biopsies, distance must not be a limiting criteria for a proper day case selection.



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Organisation and planning of an outpatient surgical unit (OSU)

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Cirugia Mayor Ambulatoria 2001;6(3):156–161

Introduction: When creating the OSU, the objectives were: to reduce waiting lists, to make the most of human and material resources, to develop and implement innovative surgical techniques, and above all, to solve patient's pathologies with health care quality equal to or better than inpatient surgery, as well as providing an experience as satisfactory as possible. The unit has greatly helped to solve the problems of non-critical pathologies in patients who used to be admitted.

Patients and methods: The 'combined use' unit opened on 4th October, 1999. It has six beds, six reclining chairs, and monitoring and resuscitation equipment. It is open Monday to Friday from 07:30 to 21:30 h, and is staffed with two nursing shifts. Care was provided for INSALUD tracked DRG pathologies. All the surgical departments participated, with clinical, nursing care and anaesthesia protocols.

Results: As of 4th April, 2000, care has been provided for 814 patients: 457 male, 357 female; average age: 54.1 years; workload: General surgery, 190 patients, Gynaecology, 158, Orthopaedics, 153 and Ophthalmology, 109. Outpatient rate: Surgery 61%, Ophthalmology 95% cataracts; types of anaesthesia: local 45.5%, local plus sedation 29%, general 16% and spinal 6.5%. Average stay: 3 h 7 min; admissions 2%, re-admissions 0.2%, ER 0.3%. In all, 98% of the OSU patients rated their satisfaction as 'Excellent'.

Conclusion: Outpatient surgery provides an optimal solution for selected surgical pathologies, liberates hospital resources, and reduces delays on surgical waiting lists. Acceptance by the general public will be good as long as the caregivers provide enough information and

reassurance. Perceived image of the hospital, and public healthcare in general, improves with its implementation, with excellent satisfaction rates highlighting the quality and personalised care provided.

Psychological disorders in paediatric patients undergoing surgery. A comparative study: ambulatory versus inpatient surgery

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Cirugia Mayor Ambulatoria 2001;6(3):162–165

Surgical procedures in childhood produce psychological effects on patients. Hospital admission is one of the most important factors to bear in mind. In this retrospective study, we analyse the incidence of psychological disorders in 240 paediatric patients aged 1–16 years undergoing surgery between 1.1.98 and 1.12.98 in the Paediatric Surgical Department of the 'Marqués de Valdecilla' Hospital. In 101 cases, the procedure was undertaken as Ambulatory Surgery (AS), and in 139 cases as Inpatient Surgery (IS).

The most frequent disorders were those related to feeding habits, in 41 cases (19.5% MAS/80.5% IS). Increased appetite was the most common. Behavioural disorders were referred in 39 patients (36% MAS/44% IS). Sleeping disorders were present in 37 cases, especially in those patients staying at the hospital (27% MAS/73% IS). Regarding family satisfaction, it was high in both procedures, being higher for admitted patients. We believe it was due to inadequate information to parents who sometimes identify hospital admission with a high degree of security.

Our results show additional advantages for Ambulatory Surgery, specially regarding the psychological aspects, so important in paediatric patients.