

Editorial

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The present issue of *Ambulatory Surgery* marks the first entirely devoted to Spanish papers. I would like to begin by thanking the Editor-in-Chief of the Journal for this opportunity to show the readers a number of articles documenting the practice of day surgery in Spain. These papers were presented at the 3rd National Congress on Major Ambulatory Surgery that was held in Zaragoza, in October 1997 (previous Congresses took place in Barcelona in 1992 and Seville in 1995).

Ambulatory surgery is a multidisciplinary activity and, with this in mind, the Spanish Association of Major Ambulatory Surgery (ASECMA) was established in 1994, to favour multidisciplinary membership. In 1995 we joined the International Association for Ambulatory Surgery (IAAS) as a full member.

Ambulatory surgery is a distinct concept and a modern form of delivering surgical care, that takes into account both the medical and social circumstances of the patient. Thanks to new technologies, new anaesthetics and a more open-minded attitude by surgeons, the practice of day surgery has expanded all around the world. In Spain, day surgery is a form of provision of surgical care that is covered by the services delivered by the National Health System, and it is defined as follows: 'surgery performed under general, regional, or local anaesthesia or sedation requiring neither intensive postoperative care nor overnight stay, the patient being discharged from the facility a few hours after the procedure' [1]. The avoidance of using a traditional inpatient surgical bed is the key strategy of day surgery. As ambulatory surgery continues to grow, it seems more necessary to refine the discussion of what it is and what it is not. If a patient spends the night in hospital, that is not ambulatory surgery. Despite this clear statement, 'true' day surgery is sometimes confused with a simple reduction in length of stay—what is called

short-stay surgery. This controversy needs to be addressed quickly at an international level.

In recent years, the use of day surgery has increased greatly in Spain, and there have been plenty of articles in scientific journals and newspapers about the virtues and economic advantages of ambulatory surgery. At present, we have reached the stage where we should concentrate on quality rather than financial aspects. We should promote and expand day surgery as it is in the best interests of patients, clinicians and managers. But, as surgeons and anaesthetists we have the main responsibility for protecting the quality of day surgery.

The cornerstone of ambulatory surgery is that the quality should not decline when comparing it with inpatient treatment. This means adequate preparation of the patient, doing the operation properly and good postoperative control with minimal unplanned admissions, readmission rates or visits to the emergency department. To achieve these goals, all clinicians committed to day surgery must voluntarily change their habits, and the managers must support this change ensuring the availability of new or converted dedicated facilities to make the work of professionals easier and to achieve maximal output rates.

There is no doubt that ambulatory surgery must be performed by experienced surgeons and anaesthesiologists. Therefore, the attraction of the most qualified doctors remains an important feature contributing to high-quality day surgery. The increasing application of day surgery to a broader range of procedures brings new problems regarding organisation, better co-operation with other members of the team like nurses and anaesthesiologists, and new opportunities to promote the links between the day unit and primary care. All this takes time and needs a progressive development in Spain. Day surgery is the best treatment for certain patients and a scientific challenge for all implicated players. The ambulatory surgery unit could be the ideal venue for research projects and must be able to attract epidemiologists and biostatisticians who help to teach

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scientific methods and the essentials of evidence-based medicine (EBM). The practice of EBM in the day unit could help to select new procedures for day surgery of proven effectiveness which do more good than harm [2].

Another factor in gaining recognition for day care is education. The students and residents face a move in surgical teaching from the traditional ward to the ambulatory unit, where they will see more of the entire spectrum of the common surgical problems. But the day unit is not simply the place for teaching the commonest operative and anaesthetic techniques. It is the best venue for learning holistic patient care. It is imperative to direct the trainees' activities in this new surgical world and to give more support to education in day surgery.

In this Special issue, different aspects and perspec-

tives of day surgery in Spain are examined. We have a number of anaesthetists, managers, surgeons and nurses of all kinds that have contributed (with strong personal efforts) to change the traditional routine of some of our hospitals creating the right climate for day surgery. In addition these articles will serve to compare the practices of different hospitals and units. I hope this issue represents a step forward in the history of day-care in Spain.

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Ambulatory surgery in the residents' training programme

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Abstract

Ambulatory surgery incorporates more centres and more procedures every day. The consequence is that the percentage of some procedures undertaken on an ambulatory basis is so high that they almost disappear from inpatient hospitals. The resident doctors teaching programs have not been modified parallel to these changes in patient management. This study analyses this situation and proposes the inclusion of ambulatory surgery in the rotations of resident surgeons, together with suitable programs and goals. © 1998 Elsevier Science B.V. All rights reserved.

Keywords: Ambulatory surgery; Day-care surgery training; Residents' training program

1. Introduction

The teaching and practice of surgery are, or should be, compulsorily linked; each is essential for the existence of the other and changes that affect one, inevitably affect the other.

Ambulatory surgery (AS), with restricted indications at the beginning, has expanded its indications and now accounts for 50–60% of the whole of elective surgery in some countries. This was reflected in a study by the American Hospital Association in 1994 that published the percentages of the procedures carried out using AS in the US in comparison with surgery involving hospitalisation. Both the number and percentage of ambulatory surgery were increasing progressively.

In view of so many and such rapid changes, Puente Dominguez [1] says that the Association for Surgical Education, founded in 1981 and which holds annual meetings to deal with problems related with the training of surgeons, should now ask: for what type of surgery are we going to train surgeons? Will it be possible to foresee what kind of surgeons will society need in the year 2000? By changing the health aid

systems, is there a parallel change in the training programs? Is surgery teaching advancing in the same direction as the technical and structural advances in the performing surgery? The answer to most of these questions is clearly 'no'. Why?

AS is not new. It was already being used at the beginning of this century. When AS re-emerged, terminology and contents were mixed up until slowly the current AS concept started to settle down [2]. This re-emergence is due to the confluence of three circumstances: increasing service demand, appearance of waiting lists and limitation of resources.

The limited resources are competed for, probably due to a lack of understanding, by other aspects of healthcare that are inseparable from direct patient care, such as research and teaching. In the US, the public health reform is orientated towards aspects like accessibility and expenditure. Unfulfilled support has been given to the first and almost total attention has been centred on financing. In this scheme of 'managed assistance', teaching is no longer a priority because it is considered to be unprofitable and a cost-creating centre, and in this way a system is found that is well catered for from the patient-care point of view, but very neglected when it comes to teaching and research.

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2. Necessary changes on teaching programs

The most progressive AS centres pick up on this concern and suggest different methods of resolving the problem.

Stone and Doyle [3], of the Surgery Departments of Harvard and Boston, respectively, suggested drastic changes in medical training starting in the pre-clinical years and continuing during the clinical-surgical stage.

2.1. Undergraduate

Medical students should get introduced to: New economic principles of 'managed assistance'. Basic knowledge of the forces that rule efficiency in proportion to expenditure. Knowledge of cost calculation, utility margins, etc. Creation and use of algorithms and clinical paths to make the medical attention more dynamic and rational. Result evaluation and quality measurement. Mental preparation for their integration into a public health organisation.

In 1997, M. Seabrook [4] and Baskerville [5] described a teaching model for the training of medical and nursing students in the surgical practice of a day surgery unit (DSU). The program was started in January 1995 and from then onwards has been modified as a consequence of the evaluation of the results by the staff and students.

2.2. Postgraduate

For the resident surgeon, there are three reasons that justify training in an AS unit: technical education, teaching in structural and organisational aspects and management participation.

3. Technical education in DSU

In his article 'The day unit as a teaching environment', Jarre [6] asked: "What can be taught in a day surgery unit?" and points out the following aspects: The most common surgical techniques that are used in a DSU. The anaesthetic techniques employed that allow a rapid recovery with infrequent adverse effects, pain, drowsiness or sickness. The DSU is the ideal place to learn local anaesthetic techniques.

During the second Spanish Congress in AS held in Seville in 1995, the ambulatory procedures undertaken and the volume of each of them in Spain were made public [7]. Their analysis makes us demand specific training of resident surgeons in AS units, since the percentage of some procedures undertaken in

these units is so high that either they are learnt in these units or they are not learnt at all.

The technical education of the resident as regards AS procedures is not at all different from the training he has to follow for any other kind of procedure. It is a scaled training where at the beginning there is much tutorial and no responsibility but finishes with much responsibility and no tutorial [8].

4. Teaching in structural and organisational aspects

Not only technical education is important. There are also many other aspects the residents should know about, such as selection of patients and inclusion criteria, patient information, patient circuits, postoperative analgesia, guidelines for safe discharge and evaluation of results.

Residents of anaesthesiology and surgery need to know perfectly the criteria of selection and inclusion of patients in AS. Bad results are frequently related to wrong selection. They have to apply the following criteria: protocolled procedures, free acceptance of AS, adequate social habitat and ASA physical status 1, 2 and stable 3.

Preoperative and postoperative information and the circuit of patients are other aspects in which the resident should be trained, since it is very similar in most of the units, as well as the control type.

5. Management participation

Surgical training and practice are necessarily linked and are both subject to governmental and market forces. A wide-ranging revolution in the approach to teaching, especially in the US and the UK, is so-called 'managed assistance'. Surgeons' education in this aspect is fundamental, which is described by Gil Goñi [9] in his article: 'management education; a need for surgeons'. The resident doctor is not a cheap labourer but his costs are a good investment if adequate education is achieved. Unfortunately, teaching is considered cost creating. This is an error because the system will only work efficiently, when cost saving goes together with the maintenance of or an increase of the quality of the assistance. To practice surgery in a managed assistance model, it first has to be learnt. Managers should know that the quality of medicine depends upon the quality of teaching and the preparation of professionals. Surgery teachers must warn that if surgeons are not taught and prepared for efficient assistance at a competitive cost, surgical practice will be out of date and inefficient within a short period of time.

6. Resources for efficient teaching

Efficient teaching needs professionals with an open mind as preparation for this new modality of assistance, means such as a suitably prepared hospital with a defined program, adequate installations, rooms for clinical sessions and for seminars, audio-visual equipment, TV circuits in operating rooms, etc., are required.

Some models have been proposed for the training of specialists in an AS unit: Another rotation in the resident training program. On the job training during the whole resident period. Mixed: parting from a rotation, the resident surgeon continues the assistance but alternating with other activities during the rest of the training period.

Each system has its advantages and disadvantages and should above all adapt to the characteristics and goals of the particular speciality. The evaluation of the results will mark the changes that have to be introduced.

In 1992 the Valme hospital area, with the Valme University Hospital as a reference, started an AS program, mainly in Tomillar Hospital. This is a Type III unit where the selected procedures are 100% protocolised and are being integrated gradually into the surgery services.

Analysis of the surgical activity in this unit and the resolution levels of some procedures, made us think of modifying the rotation programme of residents and including an AS unit rotation into their programme.

Although the programme change has been well received and the resident doctors themselves consider that it is an important and very useful improvement, they have suggested a second rotation period in the AS unit.

7. Conclusions

At present, there are few publications about AS teaching. Although we can find programmes, projects and suggestions, it is impossible to find results. There are many questions to solve. The Spanish Commission of Anaesthesiology has already included AS in its official training programme. It is the first step. It is hoped that surgeons and other specialities will do the same in the future in Spain.

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An anesthetic data acquisition system in ambulatory surgery

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Abstract

Rapid access to and analysis of information constitutes an important element in the health care quality of an ambulatory surgical unit. We have developed a database for application to ambulatory anesthesia, based on commercially available software (Clarif File Maker Pro 3.0, allowing full compatibility between Apple Macintosh and PC systems). Three integrated bases are used (preanesthesia, anesthesia and postanesthesia), and the different fields are automatically introduced by order. The design is open and allows for subsequent modifications; reports may be presented, and direct telephone communication is facilitated, along with net-based operations. © 1998 Elsevier Science B.V. All rights reserved.

Keywords: Outpatient anesthesia; Ambulatory surgery; Data encoding; Quality assurance; Medical record systems; Data acquisition systems

1. Introduction

Ambulatory surgery in the form of ambulatory surgery centers was introduced in the late 1960s in the US, followed a decade later by freestanding ambulatory surgery centers. However, in Europe, and particularly in Spain, where health care is predominantly public, the implementation of ambulatory surgery was relatively delayed. In Spain ambulatory surgery has been based upon two main guidelines. In 1993, the Spanish Ministry of Health, via the Dirección General de Aseguramiento y Planificación Sanitaria (General Directory on Insurance and Health Care Planning) set out the organizational and functional basis for the implementation of ambulatory surgery [1]. That same year, the Academy of Medical Sciences of Catalonia and the Balearic Islands published the conclusions of their Commission for the development of protocols and recommendations for ambulatory surgery [2]. Both documents address the problems posed by data acquisition, with the definition of a minimum number of items that

needed to be recorded. In effect, the second document, in Section 1.4.6 (Information Systems) states that “in addition to the information collected by conventional means for hospitalized patients (medical records, operating room data sheets, etc.), day surgery units must record for each operation a minimum set of data to adequately document the activities, number of procedures and type of ambulatory surgery performed”. The analysis of such activities, the problems posed and rapid access to information are all major elements in health care quality assurance.

The present study develops a database that is both versatile and easy to use, and specifically addresses anesthesia in patients subjected to ambulatory surgery.

2. Material and methods

Commercial software in the form of the Clarif File Maker Pro 3.0 program for Apple Macintosh and PC based systems is used. The Mac and Windows NT 3.51 and 95 multiplatform secures the operability and 100% compatibility of both systems. As many as 50 datafiles may be opened simultaneously, with up to 2 Gb per

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file, i.e. the data storing capacity is practically unlimited. The system supports different networks (Apple Talk, IPX/SPX and TCP/IP) for data sharing among users. Files can in turn be imported and exported in DBF, SYLK and WKS1 format (WKS being limited to importation) as well as in PICT, TIFF or EPSF graphic form.

A pre-established model is used for data presentation, thus facilitating the process and improving the esthetic effects.

3. Results

Data are presented in three integrated bases (preanesthesia, anesthesia and postanesthesia), accessible from the start as folder separators. The heading common to all screens contains general data, and the different variables considered are included in Table 1.

Table 1
Database variables corresponding to preanesthesia, anesthesia and postanesthesia

General data	
7. Preanesthesia date	18. Interventions
0. Identification number	4. Birth date
1. First name	5. Medical record number
2. First family name	6. Accompanying person
3. Second family name	
<i>Preanesthesia</i>	
7. Preanesthesia date	18. Interventions
8. Address	19. Prior complications
9. Telephone number	20. Allergies
10. Speciality	21. Transfusions
11. Type of operation	22. Pregnancy/breast-feeding
12. ASA status	23. Prostheses/contact lenses
13. Age	24. Antecedents
14. Sex	25. Medication
15. Weight	26. Laboratory tests
16. Height	27. ECG
17. Systolic/diastolic blood pressure/heart rate	28. Premedication
<i>Anesthesia</i>	
29. Date of surgery	33. Activity times
30. Surgeon	34. Postponements
31. Anesthesiologist	35. Drugs
32. Technique	36. Problems
<i>Postanesthesia recovery</i>	
37. VAS on admittance	42. Destination
38. VAS on discharge	43. Observations
39. Aldrete on admittance	44. Postanesthesia recovery drugs
40. Aldrete on discharge	45. Complications
41. Duration of stay	

Table 2

Lists of options corresponding to variables 25, 32 and 36 (medication, technique and problems, respectively)

No. 25 (medication)	No. 32 (technique)	No.36 (problems)
Digitalic drugs	Local	Intubation
Diuretics	Regional	Aspiration
Blockers	Plexus	Bronchospasm
Antiarrhythmic agents	Peribulbar	Laryngeal spasm
Tranquilizers	MAC	Hypotension
Antidepressive drugs	Sedation	Hypertension
Oral hypoglycaemics	IVRA	Arrhythmia
Insulin	General	Cardiac arrest
Bronchodilators		Displ. delay
Corticoids		Pain
Hormones		Bleeding
Hypotensive drugs		Nausea/vomiting
Others		Others

In most cases the fields correspond to the variables, and have been previously defined as possessing the following formats:

(1) Text (numbers 1–3, 10 and 11): the fields corresponding to antecedents (number 24), laboratory tests (number 26) and drugs (numbers 35 and 44) are presented visually and are in turn subdivided. ‘Antecedents’ comprise of cardiological, respiratory, metabolic, renal, hepatic/digestive and neuropsychiatric. ‘Laboratory tests’ include hematocrit, hemoglobin, red cell, glucemia, urea, quick index and APTT, while under ‘drugs’ administration in either anesthesia or postanesthesia is specified; an extensive list of options is provided that covers most of the agents used (induction, anesthetic gases, analgesics or muscle relaxants). The fields in turn record the names of both the surgeon and anesthetist.

(2) :Number (numbers 5, 9, 13, 33 and 41).

(3) :Date (numbers 4, 7 and 29).

(4) :List of possible options (select) (numbers 14, 22, 23, 25, 32, 36 and 45) (see Tables 2 and 3).

In turn, the lists pertaining to ‘problems and complications’ reflect severity (rated 1–3). The field corresponding to ‘identification number’ is protected and is self-introduced with each new record. This avoids the

Table 3

Lists of options corresponding to variable 45 (complications)

Respiratory	Neurological	Others
Dysphonia	Headache	Allergic reactions
Laryngeal spasm	Agitation	Bleeding
Bronchospasm	Convulsions	Persistent pain
Aspiration	Coma	Urinary retention
Respiratory depression	Prolonged block	
	Paralysis	
	Shivering	

exclusion of records and secures chronological order. The total number of optional fields exceeds 120, and each field is automatically accessed in sequence by pressing the tab key. This order may be modified at will. On the other hand, the database design is open and allows for subsequent modifications of all fields as required. The reports may in turn be generated using different field selection criteria, in the form of lists, forms, mailing lists, etc. Direct telephone (modem) transmission and net-based operations are also possible.

4. Discussion

The existence of databases such as that described in the present study is not new, as reflected by the publications on information recording and processing [3,4]. In turn, different authors have addressed aspects such as the complications, application methods [5] and specific situations involved (e.g. obstetric anesthesia) [6].

The University General Hospital of Valencia, Spain, has 600 beds and covers the health care requirements of a population of 326000. However, it should be pointed out that this hospital is the reference center for all specialities corresponding to two geographically nearby health care areas (with 48000 and 177000 inhabitants, respectively). As a result, the total dependent population is between 400000 and 450000.

A total of 5655 operations (excluding emergency surgery) were performed under general anesthesia in the course of 1995. In this context, analysis of the different surgical specialities and interventions suggests that 25–30% of these operations could be performed on an ambulatory basis. Consequently, the introduction of a functionally autonomous ambulatory surgical unit physically pertaining to the hospital has been planned, based on criteria involving consensus among the different hospital sectors and specific functions [7].

We are of the opinion that the proposed computerized data acquisition system may be of use for a number of reasons. On one hand, the program is very intuitive and easy to use (in the line of Apple Macintosh software in general). Claris File Maker Pro 3.0 operates on Power Macintosh or Apple Macintosh computers with system 7.0 or higher, as well as on PCs under Windows NT 3.51 or 95. Requirements are a hard disk, CD-ROM and 8 MB RAM (16 Mb advisable in the case of Windows NT 3.51 based systems). A customized database design is used, left open to subsequent modifications according to needs, including the introduction of new fields and variables.

As an example, this study, in principle, includes the names of the specialists involved in each case, despite controversy over whether or not the surgeon and anesthesiologist should remain anonymous. In this context, their inclusion allows for self-evaluation, with the pro-

duction of individualized reports where required. On the other hand, the inclusion of these names could cause specialists to deliberately omit certain problems or complications, thus giving rise to inexactness. In any case, such fields may easily be protected by passwords.

The program may be integrated in PC based networks, with the sharing of files among Windows or mixed system workgroups. Data may in turn be exported to other databases or formats and subjected to processing with the most commonly used statistical packages [8].

The University General Hospital of Valencia presently possesses a data acquisition system, though limited to administrative (i.e. financial and management) activities. On the other hand, the general computerization of the service of anesthesiology has not yet been implemented in our hospital. In this sense, the Norwegian Association of Anesthesiologists has developed and distributed an application for the acquisition of both administrative and anesthesiologic information [4]. However, such alternatives limit versatility by producing dependency upon larger databases structured outside of the context of the anesthesiology unit and to which the additional desired items must be added.

The application of the system proposed in the present study would secure important gains in health care quality assurance. Analyses could be performed of the causes of cancellations [9], admissions and/or readmissions in relation to the current discharge criteria [10]. On the other hand, bypasses in patient circuits would be avoided, including specific evaluation on the part of the anesthesiologist [11,12] and the systematic collection of data [13]. This aspect is of particular interest in units of this kind, as pointed out by authors such as Enlund [14]. In this sense, the proposed system facilitates information exchange between the physician and patient or relatives, thereby contributing to the avoidance of confusion that might give rise to medical-legal problems [15]. In addition, it becomes possible to identify and re-evaluate routine medications administered over long periods of time to elderly patients suffering from chronic diseases.

Different protocols, anesthetic techniques and drugs may be evaluated for safety, patient comfort and length of stay within the unit [16]. Lubarsky et al. [17] have developed a computerized system and/or the evaluation of anesthetic costs. Their aim for the future is to select those anesthetic practices capable of securing the best possible outcome and patient satisfaction. To this effect, the acquisition of a large number of data and their corresponding computer processing is essential.

Knowledge of the variables introduced is important for the incorporation of future changes [18] to patient selection [19] methodology and data acquisition (e.g. as when investigating concrete phenomena) [20]. In this context, a major concern is that the introduction of

such systems may increase the load on already overburdened staff. Although according to some authors these systems would actually create work incentive [21], others advocate avoiding separate data collection sheets [22]. In our case, the general data and part corresponding to preanesthesia would be recorded in the consulting room prior to the intervention by the anesthesiologist in charge of informing the patient and obtaining written consent. The rest of the information would subsequently be collected from the anesthesia sheet and postanesthetic evaluation form by the specialist in charge of signing the discharge. This approach to data acquisition would secure the correct selection and interpretation of the data recorded.

Landais et al. [23] believe that the time has come to introduce working networks and new monitorization and/or ventilation systems with outputs for the automated recording of data. This would moreover allow intercommunication between operating rooms, postanesthesia recovery wards, etc. However, other authors [24] are concerned that the elimination of manual data collection procedures may actually contribute to lower levels of vigilance. The reliability of such procedures has also been questioned [25].

In conclusion, although the implementation of an anesthetic data acquisition system in ambulatory surgery represents extra work, we are of the opinion that it may secure improved health care quality by allowing for periodic activity monitorization and problem detection. This aspect is particularly important for the introduction of changes in protocol. On the other hand, such a system may stimulate an increase in the scope of data collected, with the aim of improving our capacity to deal with the challenges posed by this type of surgery.

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Ambulatory surgery and sleep disorders

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Abstract

The aim of this study was to assess the impact of ambulatory surgery on sleep quality in patients undergoing ambulatory surgery and to identify those patients who are at an increased risk of preoperative anxiety and sleep disorders. A total of 220 patients were admitted for ambulatory surgery between October 1996 and April 1997. They were asked to assess their usual sleep patterns on a questionnaire. Patients were divided into three groups: good, intermediate and bad sleep quality. Of the 220 patients, 150 (68.1%) had severe disturbances in the quality of sleep the night before surgery. Of the patients with usually bad sleep quality, 100% had disturbances the night before surgery. In conclusion, these data show that many patients undergoing ambulatory surgery, experience disturbances in the quality of sleep the night before surgery. Premedication could help the group of patients with previous abnormal sleep patterns. © 1998 Elsevier Science B.V. All rights reserved.

Keywords: Ambulatory surgery; Sleep disorders; Anxiety

1. Introduction

One of the primary goals in the ambulatory surgery setting is to provide safe and efficient care for all patients and increase patient satisfaction. With advances in surgical and anesthetic techniques, many patients previously considered inappropriate are operated on, on an ambulatory basis [1].

The anticipation of surgery and anesthesia can cause psychological stress, which is manifested by anxiety and impairment of postoperative psychomotor stress [2]. It is recognized that preoperative anxiety can have adverse effects on the course and outcome of surgery. Sleep deprivation and a disturbed night may increase the patient's emotional distress. The disturbed sleep pattern and loss of perception and control of the situation increase the patient's stress and lead to higher levels of anxiety and depression [3]. Prevention or reduction of anxiety can reduce the patient's level of fear and preoperative physiologic stress.

In general, a pleasant and comfortable admission area, a preoperative visit with a personal interview, a caring and knowledgeable staff, informative preoperative booklets, and audiovisual instructions are ways in which a calm, professional atmosphere can be created and communication with the individual patient established [4].

The aim of the present study was to evaluate the effects of ambulatory surgery on sleep quality the night before surgery and the to try to identify those patients who are at an increased risk of preoperative anxiety and sleep disorders in order to use anxiolytic drugs selectively.

2. Material and methods

Between October 1996 and April 1997, 220 consecutive patients who underwent ambulatory surgery in the Ambulatory Surgery Unit of the University Hospital of La Princesa were asked to fill out a questionnaire about their usual sleep patterns.

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Exclusion criteria were long-term therapy with psychotropic drugs, sedatives or antidepressant therapy. Data recorded in the questionnaire were: age, sex, diagnosis, usual sleep pattern (number of hours and sleep quality) and sleep quality the night before ambulatory surgery.

Patients were divided into three groups:

Group 1: good sleep quality. Patients who usually sleep more than 7 h without interruption.

Group 2: intermediate quality. Patients who usually sleep from 5 to 7 hours without interruption.

Group 3: bad sleep quality. Patients who usually sleep less than 5 h without interruption or more than 5 h with two or more interruptions.

3. Results

Of the 220 patients who were asked to participate, 158 were men and 62 women. The mean age of the patients was 41 years (range, 17–74 years). During the observation period, 160 inguinal hernias, 35 pilonidal cysts, 18 proctological procedures and seven miscellaneous cases were operated on.

The results of the questionnaire about usual sleep patterns were: Group 1: 112 patients (50.9%); Group 2: 41 patients (18.6%); and Group 3: 67 patients (30.4%). Of the 220 patients, 150 (68.1%) had severe disturbances in the quality of sleep the night before surgery (Table 1).

4. Discussion

The growth in ambulatory surgery undoubtedly represents an economic alternative in these times of ever-increasing costs in the health sector. Although ambulatory surgery will continue to expand in the future, it is critically important that it be of the highest quality. When faced with a major life event such as surgery, psychological stress which is manifested by anxiety and sleep disorders usually occurs [5–7]. Different scales, such as the Yale Preoperative Anxiety Scale

[8], can be used to assess preoperative anxiety in patients who undergo ambulatory surgery. Alterations in sleep patterns are recognized as one of the main causes of anxiety [4]. Abnormal sleep patterns are associated with disorientation, psychological disturbances and fatigue, which also contribute to the increased stress response.

Our data show that 66.8% of the patients who underwent ambulatory surgery had severe disturbances in the quality of sleep the night before surgery. All of the patients (group 3) who usually had bad sleep quality, had disturbances the night before surgery.

Relief of patient anxiety and sleep quality are important in reducing the cost of care because they minimize perioperative morbidity and allow discharge to home sooner. Detailed information and reassurance by the medical and nursing team about the type of surgery, the risks and benefits of the procedures can have a therapeutic effect and reduce anxiety and facilitate recovery [9–14]. Medical and nursing staff must be aware of these common psychological disturbances, which reduce the quality of ambulatory surgery. Further efforts are needed to improve the control of anxiety in the preoperative care of these patients.

Furthermore, it is important to identify those patients who are at increased risk of preoperative anxiety. Anxiolytic drugs can be used in selected patients to reduce preoperative anxiety and improve the quality of sleep. The recovery and discharge phase is of considerable concern in ambulatory surgery. Drug effects, which may be desirable preoperatively, can become unwanted postoperatively. Premedication that prolongs the time until discharge due to excessive sedation is undesirable. Hence, premedication guidelines must include consideration of the entire ambulatory experience and be adapted to fit the requirements of individual patients and surgical facilities [15]. Potential adverse effects include respiratory and cardiovascular depression. Patients may report dizziness or light headedness. Fortunately, in the doses used for premedication, these side effects are unlikely to be of clinical significance [16].

In conclusion, the present study shows that many patients undergoing ambulatory surgery presented severe disturbances in sleep. Premedication could help the group of patients with previous abnormal sleep patterns.

Table 1
Sleep disturbances in the night before surgery in patients undergoing ambulatory surgery

	Total		Sleep disturbances	
	<i>n</i>	%	<i>n</i>	%
Group 1	112	50.9	53	47.3
Group 2	41	18.6	30	73.1
Group 3	67	30.4	67	100
Total	220		150	68.1

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Plastic surgery in a day surgery unit: 1 year's experience

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Abstract

The study is of the different pathologies treated at the UCSI by a Plastic Surgery Unit during the course of a year. Variables such as age, sex, pathology and degree of patient satisfaction have been studied. The total number of patients treated was 678. The most common surgery was for skin tumours and hand pathology. Of those treated 96% demonstrated a high degree of satisfaction. © 1998 Elsevier Science B.V. All rights reserved.

Keywords: Plastic surgery; Ambulatory surgery

1. Introduction

Plastic, cosmetic and reconstructive surgery has been a pioneering specialisation in the field of out patient treatment. The lack of hospital beds [1] combined with an increase in the standard of living of the population (housing, communication and hygiene) and the improvement of anaesthetic and surgical techniques make it possible to appropriately treat specific pathologies in health centres. The patients must agree to be operated on without being admitted into the hospital. Their homes should meet minimal conditions in hygiene and comfort. For example, they must have a telephone, they cannot live alone and their home cannot be further away than a 60 min drive from the centre [2]. The patients arrive at the centre after consulting with a plastic surgeon recommended by a specialist or their general practitioner. At the Juan Canalejo Hospital the UCSI consists of two operating rooms, a recovery room, a resuscitation room, a waiting room for family and patients and changing rooms for patients and staff. This unit, although separate, depends on the hospital. Although the patients are released the same day, they must have a follow-up conversation by telephone 24 h later. All other follow-up and treatments are done in the doctor's office.

Our objective is to review the activity of this type of surgical unit during the course of a year.

2. Patients and methods

The medical histories of the patients operated on in the UCSI between January 1, 1996 and December 31, 1996 were reviewed. Variables such as age, sex, pathology and degree of patient satisfaction (by means of a telephone questionnaire (Table 1)) were studied.

3. Results

A total of 678 patients were operated on, 326 were men and 352 were women, with ages ranging from 5 to 93 years (average 50.24 years).

3.1. Distribution of pathologies

The most frequent pathology treated was skin tumours with a total of 341 patients. Of the patients, 206 were benign and 135 malignant, distributed in the following way: 71 cases of epidermal carcinoma, 51 cases of basal cell carcinoma and 13 cases of melanoma.

Hand surgery with 297 cases was second and included diverse pathologies such as: Dupuytren's con-

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Table 1
Questionnaire

UCSI Maternity and Children's Hospital Teresa Herrera

Dear Patient

Last year you underwent surgery at our Hospital. In order to improve patient care we would like you fill out this anonymous questionnaire regarding the treatment you were given and the impression you have of the surgery.

What treatment did you receive?

(Please underline the most appropriate answer).

1	How were you treated by the UCSI staff (doctors, nurses and support staff). BADLY	AVERAGE	WELL	VERY WELL
2	Did the doctor discuss the details of the operation with you prior to the surgery? NO	AVERAGE	WELL	VERY WELL
3	What type of memories do you have of the surgery? BAD	AVERAGE	GOOD	VERY GOOD
4	Did you experience pain at home after the surgery? NO	LITTLE	SUFFICIENT	A LOT
5	Were you happy with the treatment you received at the UCSI? YES	NO		
6	If you had to undergo the same surgery again would you prefer to be operated on the UCSI or be admitted into the hospital? UCSI	ADMITTED		
7	What did you dislike the most about your experience or what can we improve?			

Thank you very much for your co-operation.

tracture (74 cases), ganglions (52 cases), carpal tunnel syndrome (33 cases), rheumatic hand (25 cases), tendinous injuries (27 cases), tumours (19 cases). Less frequent were De Quervain's disease, nerve injuries, trigger finger, osteomyelitis, foreign bodies, loss of substance/flesh and camptodactylia. The 34 operations performed on facial pathologies were the following: 14 cases of orbito-palpebral pathology (xanthelasma, chalazions, palpebral ptosis, ectropion, orbit and zygoma fractures), 14 cases of nasal pathology (nose fractures, loss of substance/flesh, rinofimas, dento-nasal fistulas), 6 cases of auricular pathology (torn lobes, prominent ears, loss of substance/flesh). Other less frequent pathologies included scar repair (24 cases), loss of substance/flesh in the lower extremities (6 cases), gynecomastia (3 cases) and hydradenitis (2 cases).

3.2. Patient satisfaction was assessed using a questionnaire [3]

This demonstrated that contact between staff (doctors, nurses and support staff) and patients was considered good by 34% of those questioned and very good by 66%. Regarding the medical information received, 6% said they received no information, 8% found the information scarce, 80% said they were well informed and 6% believed they were very well informed. Looking back on their surgery, 10% of patients found the experience negative/bad, 18% found it average, 48% found it good and 20% found it very good. When questioned about pain at

home, 56% said they experienced no pain, 18% had little pain, 24% had some pain and 2% experienced a great deal of pain. Of the patients 96% stated they were satisfied with the treatment received. This is reflected in the fact that 90% would prefer to return to the UCSI for similar operations rather than be admitted into the hospital. Although 70% had no complaints, some patients believed that access to this unit should be made more direct in order to avoid intermediary steps and that both the waiting lists and time spent in the waiting room prior to surgery should be decreased.

4. Discussion

If patients are selected appropriately, we have found that the age range for out patient surgery can be widened without increasing the level of risk or complications.

In this review we were able to observe many pathologies, which are only a mere reflection of the fields which are covered by our speciality. This observation contrasts with other specialities where out patient surgery is limited to a very specific number of pathologies [4].

Skin and hand pathology were treated most frequently. Improvements in local and local-regional anaesthesia plus sedation techniques [5,6] decrease a patient's recovery time and allow them to be discharged in a few hours.

Although the results of the questionnaire [7] show patient satisfaction to be very high, it also demonstrates

problem areas which need to be improved such as the control of pain in the home (24% experienced some pain and 2% experienced a lot). In many cases this is due to the fact that the patients are not taking the painkillers or are doing so incorrectly. In other cases, the painkillers prescribed are insufficient. It's important to reiterate this point to the patients and evaluate the type of operation and patient characteristics when prescribing adequate painkillers. The inconvenient and tedious process undertaken by the patients before arriving at the UCSI can be avoided by maintaining closer relationships with primary care doctors and other specialists. This in turn will diminish the waiting lists and dissatisfaction of patients who have consulted various doctors without solving their problem.

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Quality assessment in ambulatory surgery in a community hospital

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Abstract

Clinical quality assessment is reviewed in 3231 patients operated on in the major ambulatory surgery (MAS) program of a 300-bed community hospital over 18 months. The substitution index was 29.96%. Unplanned admission rate was 2.9%, mainly related to anaesthetic complications. Post-operative morbidity occurred in 60 patients (1.9%); all but one being minor. Patient satisfaction was evaluated through a mail questionnaire. None of the respondents was dissatisfied with the process and 95% of them would choose MAS again. The MAS program provides safe and high quality surgical management and is widely accepted by patients. © 1998 Elsevier Science B.V. All rights reserved.

Keywords: Ambulatory surgery; Clinical quality assessment; Patient satisfaction

1. Introduction

Main scientific and health care organizations promote quality assessment in major ambulatory surgery (MAS) facilities [1,2]. Quality assessment provides information to determine if the objectives are accomplished and to improve the results. A database including information related to structure, process and clinical outcome should be made to allow periodical analysis of data.

Cost-effectiveness in healthcare management policies has been the most important factor explaining MAS development and has contributed to increase the number of day surgery units (DSU). However, the main purpose of health professionals must be the preservation of excellence in clinical healthcare. In that sense, clinical outcome evaluation is essential in quality assessment. Several indicators have been described to assess clinical quality.

The aim of this paper is to evaluate the clinical quality of the activity of the DSU in a general community hospital.

2. Patients and methods

Our 300-bed general community hospital has had a DSU since June 1994. Data required for the study were prospectively collected for all patients operated on the DSU from June 1994 until June 1996. The substitution indices were calculated and expressed as the percentage of procedures performed in the DSU in relation to all or specific procedures carried out in the hospital. The clinical quality indicators systematically reviewed were:

Unplanned admissions: patients not suitable to be discharged from the DSU the day of surgery.

Readmission's after discharge: patients admitted to the hospital after being discharged from the DSU with a diagnosis or cause related to the MAS.

Need of medical care after MAS: number of patients who visited their family doctor or the emergency department because of problems related to the MAS.

Post-operative morbidity: short term postoperative morbidity was assessed by phone call at 24 h after surgery and by a mail questionnaire sent 2 weeks after the operation.

Patient satisfaction: patient satisfaction assessment was done by a prepaid mailed questionnaire 2 weeks after the operation. Patients were asked to express their satisfaction with the entire process (deficient,

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good, very good, excellent), their availability to be operated in the DSU again if needed and to report the degree of pain (no pain, minimum, moderate, severe) and the existence of post-operative complications.

The causes of cancellation, unplanned admissions (categorized in anesthetic, surgical, medical, administrative or social) and readmission's after discharge were analyzed. Moreover avoidability or unavoidable of them were also recorded.

3. Results

From June 1994 to December 1996, 3231 patients were operated on in the DSU. During the same period of time, 7553 major inpatient surgery procedures were performed. The overall substitution index for MAS was 29.96%. A progressive increment in the DSU activity was observed through the evaluated period: 21.7% in 1994, 26.7% in 1995 and 36.5% in 1996.

The characteristics of the patients and clinical status according the ASA criteria are shown in Table 1. Among the 970 patients aged more than 60, 127 were 80–90 years old and nine were older. The surgical specialities, the number of procedures performed and the specific substitution index for each procedure are displayed in Table 2. The overall cancellation rate was less than 1%.

During the study period mentioned above, 96 outpatients that underwent MAS were admitted the same day of surgery, resulting in an overall unplanned admission rate of 2.9%. Readmission after discharge occurred in six cases (0.3%). Unplanned admissions distributed by categories are shown in Table 3. The most frequent causes for unplanned admission were related to anaesthesia; 29 cases were considered avoidable and 21 potentially avoidable (mainly nausea and vomiting). All unplanned admissions in the surgical and medical categories were considered unavoidable, while administrative causes were all considered avoidable. Social unplanned admissions were avoidable in four cases

Table 1
Patient characteristics

Patient characteristics	n	%
Age (years)		
<20	550	17
20–60	1711	52.9
>60	974	30.1
ASA status		
I	2150	66.5
II	1008	31.2
III	69	2.13
IV	4	0.1

Table 2
Procedures performed in the DSU

Surgical speciality	Number of procedures	Substitution index*
General surgery	849	27.5
Orthopedics	888	32.7
Vascular surgery	235	31.5
Ophthalmology	485	38.9
Plastic surgery	147	74.6
Gynecology	130	10.5
Urology	247	30.5
Pediatric surgery	109	39.9
ENT	121	29.9
Anaesthesiology	8	0.2
Endoscopic surgery	12	0.3

* The substitution index is expressed in percentages.

(inadequate selection) and unavoidable in two (the patient refused discharge).

Post-operative morbidity occurred in 60 patients (1.9%) and the causes are shown in Table 4; All but one were minor complications. Only one case of non-stop bleeding needed re-operation, resulting in a major post-operative morbidity of 0.05%. Pain (49%) is the most important cause of post-operative morbidity after discharge (Table 5).

Table 3
Causes of unplanned admissions

Causes	n	%
Anaesthetic	50	1.5
Nausea and vomiting	23	23.9
Prolonged recovery from anesthesia	9	9.3
Hypotension	7	7.2
Urinary retention	6	6.2
Anaesthetic complications	2	2
Pain	2	2
Headache	1	1
Surgical	21	0.6
Bleeding	8	8.3
Surgical complications	5	5.2
Extensive surgery	5	5.2
Additional procedure	1	1
Reoperation	1	1
Urinary retention (urologic surgery, local anaesthesia)	1	1
Medical	11	0.3
Observation/treatment of a previous condition	8	8.3
Temperature	2	2
Miscellaneous	1	1
Administrative	8	0.2
Late start of operation	7	7.2
Miscellaneous	1	1
Social	6	0.2
Inadequate selection	4	4.1
Refusal to discharge	2	2

Table 4
Causes of post-operative morbidity

Post-operative morbidity	n	%
Anaesthetic	41	68.3
Nausea and vomiting	23	38.3
Hypotension	7	11.7
Urinary retention	6	10
Anaesthetic complications	2	3.3
Pain	2	3.3
Headache	1	1.7
Surgical	17	28.33
Bleeding	8	13.3
Surgical complications	5	8.3
Wound infection	1	1.7
Additional procedure	1	1.7
Reoperation	1	1.7
Urinary retention (urologic surgery, local anaesthesia)	1	1.7
Medical	2	3.3
Temperature	2	3.3

Only 16% of the patients sent back the mailed questionnaire. A total of 49% of them expressed an excellent satisfaction with the entire process; it was very good for 36% and only good for 15%, while no deficient judgement was registered. In 95% of cases the patients would choose to be operated by MAS again.

4. Discussion

Major ambulatory surgery has greatly increased in the USA in the last decades, where it accounts for nearly 60% of all surgery performed at the present time. The pace of development has been slower in Europe, but great variations between countries can be noted [4]. One of the most important factors explaining the development of MAS is the need for cost containment in health [5]. However, this cost containment must preserve the quality of medical care of the surgical patient. For that reason, several clinical quality indicators have been developed in order to ensure excellence in patient care. The establishment in each DSU of standards for each clinical quality indicator has been advised [6].

Table 5
Causes of post-operative morbidity after discharge

Post-operative morbidity after discharge	n	%
Pain	1583	49
Distress	905	28
Bleeding	485	15
Nausea	194	6
Wound infection	194	6

Despite the fact that almost one third of our patients were aged over 60, the overall post-operative morbidity was under 2% and less than 0.1% when considering only major morbidity. Good selection of patients (ASA I-II) as well as careful surgical and anaesthetic techniques may have been responsible for these results.

Our low rate of unplanned admissions is probably both related to an accurate selection of patients, based on very strict clinical and social criteria and careful administrative support. There is a wide variability in unplanned admissions in different series, ranging from 1.28% [7,8] to near 24% [9], but most of them are around 5–10% [10–13]. Furthermore, several series with lower rates usually include an important proportion of minor procedures such as oral surgery, breast biopsy or skin surgery. More studies in homogeneous populations (similar surgical procedure, age and clinical status) should be undertaken to allow comparisons in the quality provided by different DSUs.

All patients included in our study underwent major procedures. Our morbidity rates compare favorably with other series that include similar procedures from a similar setting: a hospital-integrated DSU. The reasons for unplanned admission were mainly anaesthetic and avoidable. We believe that a better but safe approach in the management of post-operative nausea and vomiting is needed [14]. Unfortunately, the organization of our DSU obliges patients not discharged by 5 p.m. to be admitted to the hospital. In fact, most of them would have been able to be discharged later in the evening, which could have avoided some hospital admissions. Our readmission rate after discharge is lower than that reported by others [9,12].

Patient satisfaction in our study should be analysed cautiously because of the poor rate of responses obtained by the mailed questionnaire. This may be a consequence of the assessment method. Indeed, a lower response rate when questionnaires are administered to all patients has been described [15]. The use of new assessment methods, such as phone calls [9,12] or sending new questionnaires to the non-responders [16], could obtain a higher response rate. Nevertheless, no complaint has been made against MAS or the DSU in our hospital.

The substitution index obtained by our DSU is reasonable for a young MAS program and similar to that described by others in our area [12]. The progressive increase over the observed period of the substitution index may be a consequence of the improved experience and confidence, based on the good clinical results and high patient satisfaction [3].

In conclusion, our MAS program has provided safe and high quality surgical treatment and is well accepted by patients. Specific interventions in the management of post-operative complications and a more accurate patient satisfaction assessment are needed in order to improve results in the future.

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Ambulatory surgery in Spain¹

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Abstract

In Spain, ambulatory surgery (AS) is a form of surgical care provision covered by the services delivered by the National Health System (NHS). In order to achieve an approximation of the organisation of AS, an anonymous questionnaire was sent to all Spanish hospitals (public and private) in 1995. AS surgery was carried out in 57% of the respondent hospitals (out of these, 62% were hospitals of the NHS). Of hospitals, 54% not performing day surgery were planning to set it up in the immediate future. The most common way of providing the service is by integrating the day patients with elective cases from the surgical department. Most of the ambulatory units are hospital-based; only one free-standing unit was identified. Lack of infrastructure was claimed as the main obstacle for initiating day surgery programmes. A wide expansion of AS in Spain needs more structural modifications of the traditional hospital organisation to allow the establishment of well designed units for the provision of high quality care. © 1998 Elsevier Science B.V. All rights reserved.

Keywords: Spain; National Health System; Structural modifications

1. Introduction

The high cost of inpatient treatment and the pressure exerted by long waiting lists has resulted in the appearance of alternatives to traditional inpatient care for a large percentage of elective surgery. Ambulatory surgery (AS) is the best alternative. It is a safe and accepted form of treatment that introduces important changes in clinician practice and how the hospital is organised. When initiating AS programmes collaborative effort between doctors and managers is necessary as well as acceptance by patients. Cultural, economic and political factors are determinant for AS development in western countries, although the best solution for one country may not be the best for another [1].

This paper is divided into three main parts: a description of the hospital system in Spain, some facts and

figures about developments in AS and a final discussion.

2. Spanish Health Care System

Spain is a parliamentary monarchy. The political organisation of the Spanish State is made up of the Central State (government and parliament), 17 regions (autonomous communities) with their respective governments and parliaments and two cities with a statute of autonomy (Ceuta and Melilla). Each of the 17 autonomous communities has one basic law (Statute of Autonomy).

The 1978 Constitution laid down Spanish citizens' rights to health protection. The General Health Act of 1986 set up the National Health System (NHS) as the instrument to bring the constitutional right into effect.

The NHS comprises all facilities and public services devoted to health and is made up by all the health services run by both State Administration and the 17 autonomous communities. The Spanish health care system has been set up as an integrated national health

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¹ The opinions reflected in this study are not necessarily those of the Spanish Ministry of Health. The data of the survey have been partially published as Ref. [8].

service which is decentralised, with local organisation in each of the 17 autonomous communities which make up the Spanish State. The general principles of the NHS are: universal coverage with free access to health care for all citizens; public financing mainly through general taxation; integration of different health service networks under NHS structure; region-based organisation of health services into health areas and basic health zones; development of a new model of primary health care, emphasising promotion and prevention activities. These principles have resulted in far-reaching change. The process is not yet complete.

Publicly funded insurance scheme coverage currently amounts to 98.5% of the population, and 80% of the total 1995 budget came from taxation.

The Spanish population is nearly 40 million; the distribution by age is slightly younger than other European countries but there is a trend towards an ageing population, low demographic growth and a significant reduction in the birth rate.

Seven of the 17 autonomous communities currently have responsibility for overall health care services within their territories, while the remaining ten (39%) have yet to complete the transition process and most health care services are still managed by the central agency The National Institute of Health (INSALUD).

Each autonomous community has drawn up a health map stipulating a series of health areas and basic health zones. Health areas are the basic structures of the health system. Each area is responsible for the management of the facilities, the benefits and health service programmes within their geographical limits [2].

The health map has its basic structure in the health area within which all primary (general practitioners and community paediatricians) and specialised (including hospitalisation, day surgery and specialist centres) care services are provided. Access to specialised care is by referral from general practitioners. Within the public sector, hospitals are organised into three distinct divisions: medical, nursing and administration, co-ordinated by a general manager, who may or may not be a physician.

The total number of hospitals in Spain in 1996 was 800 (325 public hospitals and 475 private hospitals), with 167271 beds (114296 are in the public sector and 52975 in the private sector) with a rate of 4.4 beds per 1000 population [3]. The public hospitals are much larger than the private ones and generally treat more complex surgical cases. Due to a shortage of beds in the system's own institutions, the NHS establishes contracts with other public and private hospitals to assure health care. In 1992 Spain had the highest rate of registered physicians (including retired

and unemployed) in Europe, four per 1000, but a low rate of nurses, four per 1000 [4].

In the NHS, health reforms are now attempting to move directly into decentralised systems; the purchaser/provider split; freedom of choice for patients (Andalucia); internal-external competition and more involvement of clinicians in management.

According to the OECD (Organisation for Economic Co-operation and Development) estimated data [5], the level of expenditure on health services in 1994 was 7.3% of the gross national product (GNP), of which 5.7% was public-health expenditure and 1.6% private expenditure.

3. AS definition

AS is a form of provision of surgical care that is covered by the specialised services delivered by the NHS [6]. In Spain, Ambulatory Surgery is called Major Ambulatory Surgery to emphasise that the focus is on procedures that were previously or still conducted in an inpatient setting with overnight stay, and that endoscopies and minor surgical excisions are excluded (these procedures were traditionally performed as office procedures). According to the Guidelines on Major Ambulatory Surgery produced by the Spanish Health Ministry in 1993 [7], Major Ambulatory Surgery is surgery performed under general, regional or local anaesthesia or sedation requiring neither intensive postoperative care nor overnight stay; the patients being discharged from the facility a few hours after the procedure.

The Major Ambulatory Surgery Unit is the ideal venue for providing this type of surgery and it is defined as: a multidisciplinary health care organisation that meets specific structural, administrative, technical and functional criteria to guarantee the quality and efficiency of the procedures.

An Association of Major Ambulatory Surgery was established in Spain in 1994 and two National Congresses (Sevilla in 1995 and Zaragoza in 1997) and a Symposium (Játiva 1996) have been organised.

In order to obtain an approximation of how AS was delivered in Spain, a study was undertaken in 1995 by the Health Ministry in collaboration with INSALUD and the autonomous communities [8]. An anonymous questionnaire was sent to the general managers of all hospitals (public and private) included in the Spanish Hospitals Catalogue. Special categories of hospitals (psychiatric, maternal, oncology, geriatric and other monograph hospitals) were excluded. The questions were related to the type of hospital, organisation of AS, types of facilities, reference procedures, written protocols and current obstacles to the provision of day surgery programmes.

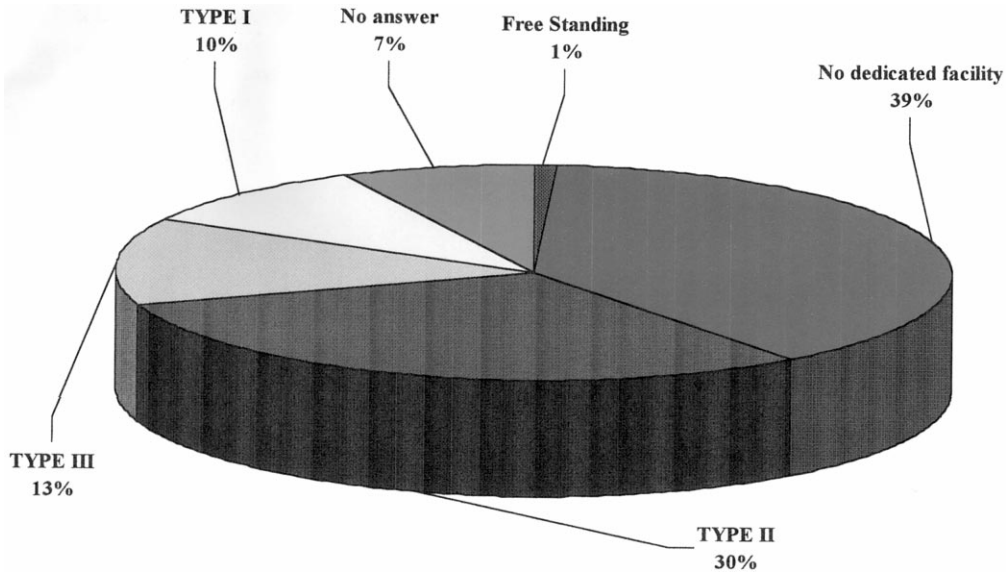


Fig. 1. Where the procedures take place.

4. Results

The questionnaire was sent to 577 hospitals and replies were received from 214 (37%). Some of the respondents did not reply to all the questions and some gave a multiple response.

4.1. Type of hospital

The answers have come from all autonomous communities: 46 hospitals in Cataluña, 26 in Andalucía, 23 in the Comunidad Valenciana, 20 in Castilla and Leon, 16 in Madrid, 12 in the País Vasco and 68 in the rest of the communities.

The majority of hospitals answering the questionnaire were from the NHS (112, 52%), followed by private hospitals (45, 21%), other public hospitals (30, 14%) and private non-profitmaking (21, 10%). Six hospitals did not answer. According to the number of beds, the most common respondent hospitals were those with 100–199 beds (64 hospitals). If only NHS hospitals are considered, the most common respondents were hospitals with 200–499 beds (39 hospitals).

4.2. Has the hospital an AS programme?

Of the responding 214 hospitals, AS was carried out in 122 (57%). Out of these 122, 76 (62%) were NHS hospitals. According to the number of beds, the most common were hospitals with 100–199 beds (38 hospitals) and 200–499 beds (36 hospitals). Out of the 92 (43%) not performing AS, 50 (54.3%) were planning to introduce AS programmes within the next year, 27 (29.3%) were not interested in day surgery and 15 (16.4%) did not respond.

4.3. AS organisation and facilities

4.3.1. How is AS organised in your hospital?

Of the 122 hospitals performing AS, AS was performed in 71 (52%) on a surgical departmental basis (urology, general surgery, orthopaedic and ophthalmology), in 31 (23%) it was a strategic plan of the hospital which provided specific resources and personnel, in 30 (22%) it was organised by doctors in some surgical specialities. In some hospitals AS was performed on a departmental basis and by groups of doctors (multiple response, $n = 136$).

4.3.2. Where do the procedures take place?

Of the 122 hospitals with AS programmes, 47 (39%) did not have a dedicated facility; 12 (10%) hospitals had a type I unit (sharing of all resources, equipment and personnel with the general resources of the hospital, although with different admission procedure); 37 (30%) hospitals had a type II unit (day unit sharing part of the resources with the general hospital) and 16 (13%) hospitals had a type III unit (dedicated ward and operating theatre with the various components of the unit autonomous from the inpatient facilities). Only one free-standing unit was identified (Fig. 1).

4.4. Reference procedures

According to the questionnaire 62890 procedures were performed as day cases in 1995. An overview of the results is given in Fig. 2. The proportion of AS for different procedures in relation to inpatient surgery for the same procedures could only be determined in those hospitals which sent complete data (ambulatory and inpatient activity, average length of stay LOS) (Table 1) [8].

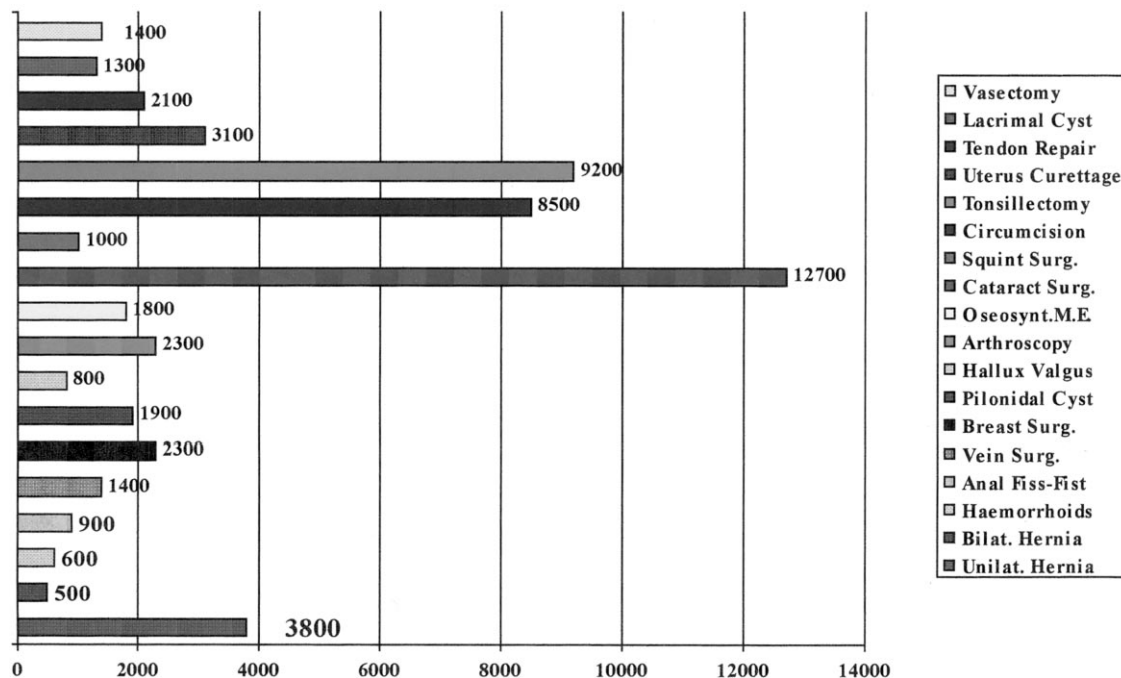


Fig. 2. Reference procedures.

4.5. Has the hospital written protocols for AS?

Out of 122 hospitals performing AS, there were 79 (65%) hospitals that had written protocols (45 for all activities and 34 in some of them) and 36 (30%) did not. Seven hospitals did not answer. The most common aspects considered were: anaesthetic assessment in hospitals (65), preoperative evaluation (61), patient selection (60), discharge instructions (59), informed consent (58), selection of procedures (54), surgical technique (43) and anaesthetic technique (40).

4.6. Obstacles to the provision of day surgery programmes

This question was answered with multiple responses ($n = 109$) that surpassed the number of hospitals not performing AS ($n = 92$). Problems with architectural layout and infrastructure were claimed by 46 (42%) hospitals. Inadequate contracts was alleged by 13 (12%) hospitals. Others mentioned conservative attitudes and practices among doctors (10, 9%), long distances from hospital (6, 5.5%), inappropriate method of delivering surgery (6, 5.5%) and other reasons (8, 7.3%). No answer was given by 20 (18%) of the hospitals.

5. AS evolution 1993–1995

To assess the evolution that took place over the period 1993–1995 we have compared the data of the 1995 survey with a similar questionnaire sent to the

hospitals during 1993 [9]. The response rate was similar (35% ($n = 212$) in 1993 and 37% ($n = 214$) in 1995) as well as those originating from the autonomous communities. The number of hospitals with AS programmes has increased from 78 (37% of 212) in 1993 to 122 (57% of 214) in 1995. The number of AS procedures has also increased considerably from 27,536 in 1993 to 62,890 in 1995.

Regarding facilities, there has been an increase in type II units (from 15 to 37) and type III units (from 12 to 16). In both surveys, the same obstacles were alleged by the hospitals for the setting up of an AS programme. It is interesting that only 9% of hospitals in 1995 considered the medical attitudes as a barrier as opposed to 19% in 1993. In 1995, 37% of the hospitals had written protocols for all the activities which compares favourably with the rate of 27% in 1993.

6. Discussion

As in most western countries the traditional hospital organisation is evolving into a more open model with AS being the best care option for 50% of all elective surgical procedures [10]. In Spain the health authorities have tried to encourage its practice and in 1993 the Spanish Health Ministry produced guidelines outlining the concepts, architectural requirements, organisation and benefits of AS [8].

The introduction of AS in our hospitals is a challenging task that has several perceived effects for the patients, managers and medical-nursing personnel: better

Table 1
Percentage of day surgery/inpatient (selected hospitals with complete data)

Year 1995	No. of hospitals	Day surgery	Inpatient	LOS (days)	% D.S.
Unilateral hernia	45	2214	8982	4.3	20
Fiss-Fist. anal	23	513	658	2.8	44
Vein surgery	32	482	2755	3.7	15
Breast surgery	60	1629	2491	3.9	40
Pilonidal cyst	43	1220	1903	3.3	39
Arthroscopy	32	1609	2404	3.8	40
Cataract surgery	54	9653	15 134	2.4	39
Circumcision	53	4733	1502	2.3	76
Tonsillectomy	53	6030	409	1.8	94
Uterus curettage	36	2507	4339	2.2	37

quality care (focused patient care, adequate information, less risk of cancellation and less psychological impact), increased productivity, reallocation of beds to acute or alternative care (in some cases by closing hospitals beds) and reducing waiting time for common surgical procedures. The establishment of well-organised AS programmes will enable both an optimal care environment for certain surgical patients and a significant impact on cutting waiting lists.

The data of the survey may be incomplete because it only comes from hospitals with AS, but it gives us baseline information on how AS is delivered and for future surveys. Perhaps, a non-anonymous and reminder questionnaire would improve the level of response. A drawback of the questionnaire is that there is no question about whether there is any clinician in charge of all day surgery.

The most common way of providing AS in Spanish hospitals is to integrate the ambulatory patients among the other surgical patients of the different specialities (the surgeon mixes some day patients with inpatient elective surgery cases). There is no clear multidisciplinary strategy for AS in Spanish hospitals which are highly dependent on the surgical department as to the extent they want AS carried out.

It was apparent that only 13% of hospitals with AS programmes had an autonomous day unit (type III) and the lack of available facilities was identified as an important obstacle to initiating AS programmes. It is advisable to provide AS in dedicated units (at least in large and medium-sized hospitals) where a variety of specialists share the facility to take advantage of the benefits of AS (proper preoperative selection, fewer cancellations and delays and low rate of unplanned admissions) and for accurate monitoring of performance. The establishment of AS requires capital expenditure to equip dedicated units (new or converted) and for education and quality assurance.

Only one free-standing unit answered the questionnaire. This independent type of unit is not frequent in

Spain, where most ambulatory units are hospital-based as in other European countries [11–13].

On dealing with the percentage of day procedures in relation to the same inpatient procedures, it appeared that tonsillectomy/adenoidectomy, circumcision, breast lump excision and cataract surgery have the highest indexes. In contrast only 20% of unilateral hernia repairs and 15% of varicose vein operations are performed as day cases. We need to increase the rate of substitution of these common procedures with the highest impact on length of stay.

Although there has been a positive evolution regarding the absolute number of hospitals and day procedures, a great deal of ambulatory procedures are still performed in a traditional hospital environment. It seems that expansion of AS has not reached the initial expectations of the Guide [7], which established a theoretical upper target of 230000 AS procedures per year. Considering that 50 (54.3%) of the surveyed hospitals were planning to introduce AS programmes immediately, there could be a significant potential for the expansion of AS in Spain.

The existence of written protocols covering all aspects of the health care process is essential to the success of day surgery. A written operational policy is needed to provide high quality surgery and to improve the overall organisation of day units.

It is also clear from this study that doctors' attitudes towards AS has improved in recent years. Voluntary adoption of AS by motivated and experienced clinicians (surgeons, anaesthesiologists and general practitioners) has been an important factor that has allowed the current development of AS in Spain. No-one considered day surgery as a method that does not match the needs of patients. This belief will contribute to an expansion and development of AS influenced by the health care demand.

Of hospitals 12% refer to the pattern of funding of hospitals as an impediment to the wide and successful

development of AS. Until the early 1990s the traditional method of financing hospitals was the retrospective budget. Since 1992 there is a trend towards adjusting funding to the real hospital costs of surgical treatment establishing prospective global budgets (Contrato-Programa). These contracts between hospitals and the Health Authorities allow the planning of activity according to predefined health objectives. The volume and percentage (the extent of substitution of day surgery for inpatients) of AS procedures is being introduced in these contracts as an incentive for encouraging AS and discouraging unnecessary hospital admissions. Nevertheless, more structural changes are necessary in the budget to enable the reallocation of resources and funds from inpatient to AS.

In conclusion, it seems that although AS activity in Spain is still limited, the potential for future growth looks promising. AS is feasible in our hospitals (mainly in NHS hospitals) and is well accepted by the patients; however, a wide expansion needs more structural modifications of the traditional hospital organisation that allow the establishment of well-designed units for the provision of high quality care. The future of AS in Spain must concentrate on quality, improved efficiency, research and education programmes.

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Analysis of complications and causes of unexpected hospitalisation in ambulatory surgery

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Abstract

Unexpected hospitalisation in ambulatory surgery is normally due to inadequate selection of patients, procedures more extensive than those originally planned or postoperative complications. In 18 months, 1000 patients from six different surgical specialities were scheduled for day surgery at a university hospital. Local anaesthesia was used in 33.4% of cases, spinal in 31.9%, general in 21.9%, intravenous in 5.7%, epidural in 3.4% and other types in 3.7%. The most frequent procedures were: hernioplasty 157, herniorrhaphy 131, subcutaneous tumour excision 117, surgical metal extraction 71, laryngeal microsurgery 66 and hydrocoele surgery 62. A total of 11.7% of patients developed some minor complications: urinary retention, wound infection, vomiting, inadequate pain control or wound haematoma. A total of 4.7 of patients needed to be hospitalised and 1.4% readmitted. The most important reasons for these admissions were nausea–vomiting, dizziness, fever, social problems and surgical difficulties. The incidence of complications and unplanned admissions were influenced by anaesthetic techniques and type of pathology but not by age of patients, sex or their ASA physical status. © 1998 Elsevier Science B.V. All rights reserved.

Keywords: Ambulatory surgery; Complications; Unplanned admissions; Failure to discharge

1. Introduction

There is a tendency in all developed countries to perform more and more ambulatory surgery [1,2]. Correct selection of patients is very important in day surgery but surgeons and anaesthesiologists are under increasing pressure to treat elderly and medically compromised day cases, applying safe and efficient standards of practice [3–5]. An excessive number of complications or unexpected hospitalisations could delay the expansion of ambulatory surgery because of the effect on patients, hospital personnel [6], number of inpatient beds and increasing costs [7].

The rate of complications and unplanned admissions following ambulatory surgery has become an important measure of outcome [3,8]. Certain factors under our control (such as psychological preparation of patients,

premedication or type of anaesthesia) could probably favourably modify this. The aim of this study was to analyze the incidence of complications and the reasons for unplanned hospital admissions and their relation to age of patients, sex, physical status, type of pathology and anaesthetic techniques chosen.

2. Patients and methods

In 18 months, 1000 patients from six different surgical specialities (Table 1), were scheduled for day surgery (66% male and 34% female). Their mean age was 47 years (range 12–85). Only 4.1% of patients lived more than 1 h drive from the day surgery unit. The most frequent pathologies are shown in Table 2. According to the classification of the American Society of Anaesthesiology, 65.2% of patients were ASA physical status 1, 31.3% ASA physical status 2 and 3.5% ASA physical status 3. After their arrival at the unit, 1.1% of ambulatory patients were cancelled for medical reasons.

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Standard premedication with 50 mg of ranitidine and 4 mg of ondansetron was used in 95% of patients, 30–60 min before entry to the operating theatre. Low molecular weight heparin (3%) or antibiotics (20%) were used according to the particular criteria of the surgeons. The anaesthesia used was local in 33.4% of cases, spinal in 31.9%, general in 21.9%, intravenous regional in 5.7%, epidural in 3.4% and others in 3.7%.

The length of stay of patients at the unit and the follow up details during the first 30 days of postoperative period were registered in a database elaborated with Stat-View 4.1 program, 1992–1994 Abacus Concepts, Berkeley, CA. Statistical comparisons of qualitative variables were made applying χ^2 test and *P* values less than 0.05 were considered to be significant.

3. Results

Hernia repair, tumour excision, surgical metal extraction and laryngeal microsurgery were the most common procedures (Table 3). The mean duration of surgery was 40 min (range 5–150 min). Intraoperative complications were recorded in 19 patients (1.9%): pain in three cases, local anaesthesia failure in two, difficulty in endotracheal intubation in three, postoperative laryngeal spasm in two, respiratory depression after extubation in one, unplanned extensive surgery in two, minor cardiovascular problems in three, anaphylactic reaction to anaesthetic medication in one, extravasation of local anaesthetic in one and one traumatic puncture in spinal anaesthesia. The mean discharge time of patients was 7 p.m. (range: 10 a.m.–10 p.m.).

No major complications were recorded, but 116 patients (11.7%) developed minor complications in the first 30 days after surgery: urinary retention 2%, wound infection 1.9%, nausea–vomiting 1.5%, inadequate pain control 1.5% (Table 4). There was no statistical influence of sex, age or ASA physical status in global morbidity, $p = 0.67/p = 0.96/p = 0.56$, nor in different complications, $p = 0.45/p = 0.67/p = 0.83$. However, we found significant differences, $p < 0.0001$, when we studied the influence of surgical procedures on the type of

Table 1
Type of surgery

Speciality	No. of patients
General surgery	463
Orthopedic surgery	230
Urology	169
ENT	89
Ophthalmology	27
Vascular surgery	22
Totals	1000

ENT: Ear–nose–throat.

Table 2
The most frequent pathologies

Pathologies	No. of patients
Abdominal wall hernia	253 (38 bilat., 8 recurrent)
Subcutaneous tumour	77
Metal removal	73
Laryngeal lesion	66
Pilonidal disease	59
Hydrocoele	59 (4 bilateral)
Anal fissure	30
Bone tumour–cyst	29
Carpal tunnel	27 (4 bilateral)
Cataract	27
Epididymal cyst	26
Meniscal pathology	24

complications. There was a higher incidence of complications in relation to the wound in tumour excision and in relation to anaesthesia in hernia repair. There were significant differences, $p = 0.005$, when studying the influence of the anaesthetic techniques employed, with a lower incidence of complications in patients operated under local anaesthesia and the highest under spinal anaesthesia. The latter is secondary to the common use of spinal anaesthesia in hernia repair procedures and the higher rate of urinary retention, 5.4%, caused by this technique.

Hospital admission was necessary in 4.7% of patients and readmission after discharge in 1.4%, without statistical differences between specialities, $p = 0.2$, (Table 5). The most frequent causes of these unexpected hospitalisations were nausea–vomiting, dizziness and fever (Table 6). These rates were not statistically influenced by age, $p = 0.08$, or ASA physical status of patients, $p = 0.94$, but there were differences when comparing procedures $p = 0.03$, and anaesthetic techniques, $p = 0.001$. Hernia repairs were responsible for most hospital admissions, 9.5%. Hospital admissions were infrequent in patients submitted to local anaesthesia, 1.8%, but

Table 3
The most frequent procedures

Procedures	No. of patients
Hernioplasty	157
Herniorrhaphy	131
Tumour excision	117
Surgical metal extraction	71
Laryngeal microsurgery	66
Hydrocoele repair	62
Pilonidal cyst marsupialisation	35
Knee arthroscopy	33
Carpal tunnel decompression	31
Hallux valgus correction	29
Internal anal sphincterotomy	29
Epididymal cyst excision	29
Cataract surgery	27

Table 4
Complications after day surgery (within 30 days)

	Number of patients	%
Mortality	0	0
Major morbidity	0	0
Minor morbidity:	116	11.7
Complications in relation with wound:	52	5.2
Wound infection	19	1.9
Wound haematoma	10	1.0
Wound dehiscence	10	1.0
Fever	6	0.6
Wound haemorrhage	5	0.5
Recurrence	2	0.2
Complications in relation with anaesthesia:	43	4.3
Urinary retention	20	2.0
Nausea–vomiting	15	1.5
Headache	6	0.6
Haemodynamic problems	1	0.1
Dizziness	1	0.1
Inadequate pain control	15	1.5
Others	6	0.6

much more common when using general anaesthesia, 8.8%.

4. Discussion

We are in agreement with Westman et al. [9] who state:—‘A safe return home is a result of well balanced anaesthesia and well performed surgery’—However, a safe return home depends on two other factors, correct selection and good preparation for postoperative discomfort. In units with great experience in ambulatory surgery the general trend is to widen the selection of patients. In spite of this, the inclusion of elderly or ASA 3 patients and complex cases has not increased the number of complications or unplanned admissions probably due to improvements in technique and technology [1,6]. Selection has continued to be adequate. Information about possible complications or postoperative discomfort and detailed instructions about pain relief after discharge are vital if patients are to tolerate the postoperative period and avoid anxiety [1,10,11]. This psychological preparation, combined with high quality nursing care at the unit ensures a safe return home.

Mortality and major complications are very uncommon in day surgery and their rates are even less frequent than in the general population [11,12], but minor complications occur with some frequency.

In the intraoperative period these minor complications, 1.9%, were related to anaesthetic technique and as treatment was undertaken immediately hospital ad-

mission was unnecessary. Only two cases of unplanned extensive surgery needed a delayed discharge time.

A wide variety of minor postoperative complications were found in this study, 11.7%. Though this rate seems too high [13], it includes some problems related to anaesthesia, such as urinary retention, nausea or dizziness for instance, which are never considered as postoperative complications in traditional surgery. The percentages of pain, nausea–vomiting or headache, considered as the most common complaints following day surgery [8], were less than 2%.

Pain control was undertaken using metamizol, a non-narcotic analgesic with a central action and a weak inhibition of prostaglandins’ synthesis. Strict written and verbal instructions were given. Patients in general were satisfied with their analgesic. According to some authors [14,15], successful pain relief could be an important factor in avoiding nausea and vomiting.

Emesis prevention with ondansetron, carried out in almost all cases, should be discussed because it is cost-effective only in high risk patients [9,16,17]. When nausea and vomiting occurred in our series hospitalisation was almost inevitable, (12 out of 15 patients). Other authors had similar findings [3,14]. In future, knowing the association of nausea and vomiting with general anaesthesia, we will try to reduce the use of ondansetron to these patients exclusively.

Headache was a complication in six out of 349 patients (1.7%) operated on under spinal or epidural anaesthesia, as low as the occurrence in other experiences with pencil point needles [18].

Catheterization was necessary for urinary retention in 20 cases and was the most frequent complication. However, the catheter was removed within 1 or 2 h in 17 patients and they were able to go home without delay. In the remainder the catheter was removed within 24 h, but necessitated hospital admission.

Our rate of unplanned admissions was 4.7%, in the middle of the range, 0.1–10% reported in literature [6–8,19]. This is an acceptable rate in the first months of any day surgery unit [20], and it has been shown that with more experience this proportion will normally fall to 1% [5]. Readmissions within 30 days following discharge were rare, 1.4%. In general, the rate is around 1% [16,19], with the exception of the report of Twersky [11], 3.1%. We attribute the low incidence to well planned patient discharge, and avoiding premature decisions. Readmission must be considered a failure of ambulatory surgery and a possible cause of medicolegal problems [1]. Several outcome studies reflect variations in the frequency of unexpected admissions among different surgical specialities [7,8,11]. In our study, general surgery patients developed more problems than the average, 6.7% as against 4.7%. This speciality, together with gynaecological surgery [8] and ophthalmology [7], has a higher risk of admission than urology or pediatric

Table 5
Incidence of unexpected hospitalisation among specialities

Speciality	Discharged patients	Admissions	Readmissions	Cancelled operations
General surgery	420 (90.7%)	31 (6.7%)	8 (1.7%)	4 (0.9%)
Orthopedic surg.	218 (94.8%)	7 (3%)	2 (0.9%)	3 (1.3%)
Urology	160 (94.7%)	4 (2.3%)	3 (1.8%)	2 (1.2%)
ENT	83 (93.3%)	5 (5.6%)	0 (0%)	1 (1.1%)
Ophthalmology	26 (96.3%)	0 (0%)	1 (3.7%)	0 (0%)
Vascular surgery	21 (95.5%)	0 (0%)	0 (0%)	1 (4.5%)
Totals	928 (92.8%)	47 (4.7%)	14 (1.4%)	11 (1.1%)

ENT: Ear–nose–throat.

Table 6
Causes of unexpected hospitalisation (admission and readmission)

Causes	Number of patients	Absolute frequency %	Relative frequency %
In relation with surgery	19	1.9	31.1
Fever	6	0.6	
Unplanned extensive surgery	5	0.5	
Wound haemorrhage	4	0.4	
Wound dehiscence	2	0.2	
Wound infection	2	0.2	
In relation with anaesthesia	29	2.9	47.6
Nausea–vomiting	12	1.2	
Dizziness	12	1	
Headache	4	0.4	
Urinary retention	3	0.3	
Social	6	0.6	9.8
Pain	2	0.2	3.3
Miscellaneous	5	0.5	8.2
Totals	61	6.1	100

surgery. Complications related to surgery are more common than complications related to anaesthesia as causes of admissions in many series [7,11] but in our series the reverse was true. 47.6% were related to anaesthesia and 31.1% were related to surgery. Specifically nausea–vomiting was the most frequent reason for inpatient admission as is mentioned in several reports [6,14], followed by dizziness, fever and social problems. Curiously, social reasons were more frequent than inadequate pain control in the present series, as opposed to what is described in the literature [6–8,19]. This is probably due to a difference in attitude of patients when they are not used to ambulatory surgery.

The univariate statistical study made about complications and the unexpected hospitalisation rate found no influence of sex, age or ASA physical status. Although Gold et al. [3] reported in 1989 a weak association of age and ASA score with admission, showing differences between their uni and multivariate logistic studies, the present opinion is that elderly or ASA 3 patients are able to withstand ambulatory surgery. Exacerbation of coexisting medical diseases is uncommon when patient selection is well done [7]. Our statistical study found a relationship between the surgical procedure and complications. There was a clear association between hernia

repair procedures and an increased likelihood of complications or hospital admissions. These operations, in general performed under spinal anaesthesia, were frequently followed by urinary retention and some minor problems with wounds. The study also showed the influence of anaesthetic techniques. Spinal anaesthesia was associated with urinary retention, and general anaesthesia caused the highest percentage of admissions, 8.8%, due to a slower recovery. Like other reports [1,3,6,7] these results induce one to think that an important reduction in the rate of unplanned admissions would be possible if there were an increase in the use of local or regional anaesthesia, because these techniques result in a low incidence of complications, a reduced recovery time, better postoperative pain control and they are well accepted by patients.

In conclusion, although complications and unplanned hospitalisations are uncommon in ambulatory surgery, it could be possible to improve the rates by modifying several customs. With good psychological preparation of patients, more frequent use of local or regional anaesthesia and carefully performed surgery in order to avoid wound complications, problems should happen very rarely or not at all.

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Lichtenstein unilateral hernia repair: results of 961 cases in a day surgery unit

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Abstract

The objective was to evaluate the short and long term results of the open tension-free mesh repair as a day case. A retrospective study of 961 elective inguinal hernia patients over a 5 year period was undertaken. The setting was a Day Surgery Unit of a District General Hospital where surgeons of different levels of skill perform the operations, according to a standardised protocol, using local anaesthesia with sedation and mesh repair. A total of 93% of the patients were discharged and sent home the same day. Morbidity was 4.4%; no mesh required removal; the overall recurrence rate was 2.2% (0.7% for primary hernias and 5.2% for recurrent hernias). The satisfaction rate with the repair was high (>95%). We conclude that the Lichtenstein repair is highly suitable for day case surgery. Standardization of the anaesthetic-hernia repair technique improves the results and the quality of care provided. © 1998 Elsevier Science B.V. All rights reserved.

Keywords: Inguinal hernia; Open tension-free repair; Ambulatory surgery; Local anaesthesia

1. Introduction

Inguinal hernia repair is the commonest operation performed on males by general surgeons [1]. More than 60% of inguinal hernias in Spain are carried out by traditional open techniques under general anaesthesia [2] and the proportion of adult patients treated as day cases was 17% in 1993 [3]. In the last few years, multiple factors (socio-economic and techniques) have contributed to change the approach to hernia repair. The introduction of the tension-free mesh repair, developed by Lichtenstein, has been a determinant, enabling a shorter convalescence period, a lower complication rate and a lower recurrence rate [4].

Since the opening of the Day Surgery Unit (DSU) at our District General Hospital (DGH), the Lichtenstein operation has been used for the treatment of inguinal hernias on a day basis. The inpatient treatment carried

out in the same hospital involved, on average, a 4.5 day hospitalisation period [5]. Inpatient hernia repair was undertaken using the Bassini technique and we changed to tension-free techniques with local anaesthesia for ambulatory patients. It is very important to test whether results with this DSU method are acceptable. We present our series of unilateral inguinal hernia repairs with short and long term follow up, operated upon by several surgeons in a DSU of a public DGH serving a rural and geographically diverse population.

2. Materials and methods

Over a 5 year period (April 1992 to April 1997) operations on a total of 1,149 patients with unilateral inguinal hernia were performed in the Day Surgery Unit (DSU) located at the El Tomillar Hospital belonging to the Valme University Hospital—a teaching District General Hospital. Of these patients, 961 (71.9%) were treated by Lichtenstein tension-free repair, and form the basis of our report.

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Inclusion criteria were: (a) patient acceptance; (b) anaesthetic risk (American Society of Anaesthesiologists) ASA I, II or III well controlled preoperatively; (c) social (housing conditions, accessible telephone, less than 1 h travel time, responsible accompanying person). Only patients with large irreducible inguino-scrotal hernias were excluded. The patients were given booklets with information on the procedure, operation date, postoperative care and contact telephone number.

The mean age was 51 years (range 16–84) with 79% of the patients being between 31 and 70 years. The mean weight was 73.7 kg (range 50–120), 895 (93%) were male and 66 (7%) women. Of the 961 hernias, 791 (82.3%) were primary and 170 (17.7%) recurrent, 497 (51.7%) were indirect, 376 (39.1%) direct and 88 (9.2%) combined (Table 1). The anaesthetic ASA risk was: in 419 (43.6%) ASA I, 459 (47.8%) ASA II and 83 (8.6%) ASA III well controlled.

All the patients attended the DSU on the morning of operation, and it was intended they be discharged 2–6 h after the procedure. In the operating room, all the patients were routinely monitored (heart rhythm, blood pressure and oxygen saturation) by a consultant anaesthetist or supervised resident.

Local anaesthesia (a 50:50 mixture of 1% mepivacaine and 0.5% bupivacaine) in combination with propofol sedation was the standard anaesthetic technique in 924 (96.1%) patients as has been described elsewhere [6,7]; spinal anaesthesia was used in 26 (2.7%) patients, general anaesthesia in 8 (0.8%), and local in 3 (0.3%) patients. In addition, the wound was irrigated with local anaesthesia (0.25% bupivacaine) prior to closure. Prophylactic antibiotic therapy was commonly used.

The operations were performed by surgeons of all degrees of skill (staff and adequately supervised residents). The tension-free patch with a mesh (Bard^R Marlex^R), as developed at the Lichtenstein Hernia Institute [4], was used in 935 (97.3%) patients and the 'plug' technique [8] in 26 (2.7%) patients with recurrent hernias. Indirect sacs (51.7%) were commonly inverted without ligation or excision. Direct sacs (39.1%) were inverted and the posterior fascia transversalis imbricated. In 88 (9.2%) cases there was a combined type of hernia. In short, the entire posterior wall of the inguinal canal is covered with an 8 × 16 cm size mesh which is sutured inferiorly to the inguinal ligament and the conjoint tendon superiorly. The mesh must overlap by 1–2 cm medially over the pubic tubercle. Only a single nonabsorbable monofilament suture is required to construct a new internal ring crossing the two tails of the split mesh around the emerging cord. [4]. Recurrent hernias were repaired in the same way as primary hernias except in cases of small defects when a 'plug' was used.

Table 1
Patients' details (n = 961)

Sex ratio (M:F)	895:66
Age (years)*	51 (16–84)
Primary hernias	791
Recurrent hernias	170
Type of hernia	
Indirect	497
Direct	376
Combined	88
Anaesthesia	
Local + sedation	924
Spinal	26
General	8
Local	3
Surgical technique	
Open tension-free patch	935
Plug	26

* Median values.

After the operation, patients stayed in the recovery room until their Aldrete scores [9] were > 9. They were then discharged to the stage 2 recovery area of the DSU. Periodic home-readiness evaluation was made with special attention to ability to walk, minimal pain or nausea, no wound bleeding, per Os fluids and voiding. Patients were always accompanied home by a responsible adult. They were provided with analgesic tablets and also instructed about postoperative problems.

Follow-up was undertaken the following day by telephone or a domiciliary visit by nurses of the DSU. The patients were given appointments for 4 weeks later and 1 year later for clinical examination. A standardised data form was used to collect information about complications, return to daily activities and recurrences. Satisfaction with care was measured by an anonymous questionnaire 2 months after surgery.

3. Results

The average operative time was 30 min. The average time in the recovery room was 26 min. A total of 893 patients (93%) left the hospital as day cases, 3 h (on average) after the conclusion of surgery (Table 2). A further 68 (7%) could not be discharged home the same day because of: inadequate preoperative selection, 15 (22%); changing patient's preference 17 (25%); long distance travel 10 (14.7%); surgical complications 11 (16.2%); anaesthetics reasons 11 (16.2%) and wound pain 4 (5.9%) (Table 3).

Table 2
Times of discharge No. (%)

Same Day (0–6 h)	893 (93%)
Short stay (1–3 days)	68 (7%)

Table 3
Unplanned admission (*n* = 68)

Inadequate selection	15
Patients' preferences	17
Long distance travel	10
Surgical complications	11
Anaesthesia reasons	11
Wound pain	4
Total	68 (7%)

There was no mortality. Overall morbidity was 4.4% (43 patients) divided into early morbidity 1.1% (occurring during the DSU stay) and late morbidity 3.3% (within 1 month after surgery) (Tables 4 and 5)

Postoperative pain: Of the patients, 86% required oral analgesia for only 3–4 days. Return to activity: 63% of our hernia patients were manual workers (mainly heavy agricultural tasks; 73% of them with salaried jobs and 27% self-employed); 5% desk workers; 24% retired; and 8% unemployed. 43% of manual workers (*n* = 605) returned to work within 30 days or less. 75% of desk workers (*n* = 48) were at work within 15 days. Satisfaction rate: 70% of questionnaires were returned 2 months after the operation, and more than 95% were highly satisfied with the results of the operation. Recurrences: The long-term follow-up was carried out by clinical examination of the inguinal region and genitalia. To date 644 patients have been checked. Thus a follow up of operated hernias of 67% was obtained with a minimum follow-up of 12 months and a maximum of 63 months. The average length of follow-up was 36.4 months, 14 recurrences were observed (2.2%). The incidence of known recurrence therefore is 2.2% if one considers only the 644 patients followed up (Table 6). Out of these 14, there were 5 recurrences (3 indirect, 1 direct and 1 combined) of primary hernias and 9 (6 following multiple repairs; 2 after one repair and 1 femoral hernia after previous inguinal repair) following operated recurrent hernias.

4. Discussion

Our results with the open tension-free mesh repair of Lichtenstein as a day case are acceptable. All surgeons in our DGH have quickly and voluntarily embraced this simple technique and accepted the three important

Table 4
Early complications (*n* = 961)

Wound bleeding	5
Wound haematoma	3
Femoral nerve block	2
Scrotum haematoma	1
Total	11 (1.1%)

Table 5
Late complications (*n* = 961)

Wound haematoma	12 (1.3%)
Persistent wound pain	7 (0.7%)
Wound seroma	4 (0.4%)
Cord haematoma	4 (0.4%)
Hydrocele	3 (0.3%)
Testicular atrophy	1 (0.1%)
Wound abscess	1 (0.1%),
Total	32 (3.3%)

common objectives: organisational (day surgery); anaesthetic (local anaesthesia) and surgical (Lichtenstein repair). This retrospective study has enabled us to know what is happening in a DGH with a DSU used by different general surgeons (staff and residents).

Before the DSU was opened (February 1992), most of the inguinal hernias in our DGH were performed using a great variety of techniques and on an inpatient basis. The trend to avoid unnecessary hospitalisation in hernia surgery has been widely supported [10]. Day surgery can now be considered as the best option for more than 90% of elective hernia repairs. With surgeons it is very difficult for all to agree upon a specific technique. However, we have concentrated on the progressive standardisation of the care process to allow us to improve the results [11] (Table 7).

The type of operation for inguinal hernia repair must not be considered in isolation. Other relevant factors include the anaesthetic technique, the attitudes of the patient and the decision on the optimal care environment (inpatient or ambulatory).

Encouraged by some studies [6,12,13] we started to use local anaesthesia with sedation as a routine method for inguinal hernia repair. Only 2.7% of hernias seen by us were not suitable for surgery under local anaesthesia. In the DSU, it is a safe alternative to general anaesthesia, well tolerated by patients, reduces fear and anxiety and allows the treatment of large hernias as day cases [7]. According to some data [14] the local sedation approach was associated with a significant reduction in the time to achieve a sitting position in the recovery room and the time for home-readiness. These shorter times affect efficiency, allowing greater patient throughput in the DSU [15]. Important complications are virtually eliminated (urinary and chest) and additionally

Table 6
Recurrence rate (*n* = 644)

Follow-up	Clinical examination
Follow-up rate	644 (67%)
Average length follow-up	36.4 months (12–63)
Overall recurrence rate	14 (2.2%)
Primary hernias	5 (0.7%)
Recurrent hernias	9 (5.2%)

Table 7
Quality indicators

Recurrence rate	2.2%
Postoperative morbidity	4.4%
Patients' satisfaction	>95%
Unplanned admissions	7%
Return to activities	<30 days

other benefits such as the testing of the repair and immediate mobilisation have been confirmed by our experience. Despite these advantages the technique has not gained widespread acceptance in Spain and is used in only 16.3% of hernia operations [2].

The introduction of the tensionless repair technique has had an important impact on surgeons' and patients' attitudes towards hernia surgery. Surgeons are more confident with this simple repair that can be applied to the majority of hernias. The use of meshes has also changed the perception of the surgery on the part of patients, having reduced the fear of postoperative pain, the change of recurrence and the length of convalescence. Our experience verifies high acceptance rates. More than 95% of patients were satisfied with the open mesh repair in the DSU.

Complications cause postoperative discomfort, increase the convalescent period [16] and can be a reason for unplanned admission. Especially in the case of ambulatory surgery, where problems occur after leaving the hospital, accurate recording and monitoring of complications within 1 month of surgery is very important. Our overall morbidity rate was 4.4%, which compares favourably with our previously reported rate of 5.9% [7]. Wound haematoma 15 (1.6%) was the most common postoperative problem, followed by persistent inguinal pain 7 (0.7%). Only one patient required drainage of a wound abscess. There was one case of testicular atrophy after the repair of a recurrent hernia. In this series no mesh needed to be removed. Control of postoperative pain has not been a problem. There was no mortality.

The majority of the patients could return home the same day. Our rate of unplanned admission could be explained considering the case-mix of hernias (primary and recurrent) and that we have had a high percentage of admission for social reasons due to long travelling distances and problems related to changes in patients' preferences after the operation. In these cases the patients are not obliged to go home the same day.

Time off work is another important criteria in order to evaluate the efficiency of hernia repair. This has not been addressed very often in clinical publications in Spain. A multicenter study in 1994 showed an average of 58 days off work for ambulatory operated inguinal hernia patients and 69 days for inpatients [17]. Our results show a trend towards earlier return to full

activities, although they are a little disappointing with respect to other studies [18]. Resumption of activity is not associated with an increase in the recurrence rate, being more related to several factors such as type of work, motivation and attitudes to recovery of the surgeons, patients and general practitioners [19,20]. As there is no scientific reason to restrict physical activity after hernia repair, the advice of surgeons and general practitioners given to the patients—encouraging activity—has a major influence on the recuperation of the patient.

In our series, the overall recurrence rate has been 2.2% (0.7% for primary and 5.2% for recurrent hernias) with an average follow-up duration of 36.4 months. This recurrence rate for a DGH with a DSU is acceptable, even taking into account possible objections to the follow-up rate. It compares favourably with multicenter figures for recurrence of 13% [2]. However, the recurrence rate following recurrent hernia repair is high, perhaps due to a late adoption of the 'plug' repair technique. In future, our aim will be to reproduce the results of specialist hernia surgeons approaching <1–2% recurrence rates [18,21,22] and to improve our follow-up rate.

An indirect measure of the process of improvement of hernia repair in our DGH, is that our current re-operation rate (percentage of operated recurrent hernias) is 7% which compares favourably with rates of 17% in 1992 [23].

We conclude that, in our DSU, an open mesh repair with local anaesthesia as a day case is the procedure of choice because of simplicity, and low complication and recurrence rates. It is well accepted by patients and surgeons. Its widespread application has had a positive impact on cost-effectiveness in our hospital, allowing greater patient turnover in the DSU operating rooms, shorter waiting times, and leading to an important improvement in the quality of care.

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Day case laparoscopic cholecystectomy

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Abstract

Since the introduction of laparoscopic cholecystectomy (LC) its indications have been growing at the same time as the surgeon's skill and improved instrumentation and anaesthesia. Nowadays in many hospitals the contraindications are those of general anaesthesia, the presence of intestinal obstruction or peritonitis, where there is a high risk of carbonic acidosis and the last months pregnancy. These are the ones that are used in our unit. We study, retrospectively, the LC done in our unit. We have studied the LC done on our unit from April 1994 to November 1997. The total number of cases was 286. Multiple surgery was performed in 3.49% cases. We found associated risk factors in 25.87%, complications in 3.49%, conversion to laparotomy in 2.45%, reoperation in 0.34%, readmission in 1.74%. We had no mortality. The mean stay was 1.61 days; 167 patients (58.39%) less than 24 h. The absence of mortality, low morbidity in high risk patients and short stay makes LC the best choice for cholecystectomy. A high percentage of LC cases may be dealt with on a day case basis. © 1998 Elsevier Science B.V. All rights reserved.

Keywords: Laparoscopic cholecystectomy; Day surgery

1. Introduction

It is accepted world wide that laparoscopic cholecystectomy (LC) is the ideal treatment for symptomatic cholelithiasis.

Cholecystectomy is one of the most common major surgical procedures in any surgical department. The use in these cases at the laparoscopic technique in a day surgery regimen offers benefits to both patients and health care institutions.

2. Patients and methods.

We have studied retrospectively the LC done in our unit from April 1994 to November 1997. The epidemiology, morbidity, length of stay and final results have

been analysed. The total number of cases was 286 (217 women and 69 men) with a mean age of 54–74 years, 206 cases were operated on in the afternoon. There were no emergency cases and all were operated on by laparoscopic surgery.

In order to reduce postoperative pain we work with a low gas pressure, perform a meticulous cleaning of the abdominal cavity and irrigate the liver dome with bupivacain. The gallbladder is taken out using an 'endobag'.

3. Results.

Multiple surgery was performed in ten cases (Table 1). We found associated risk factors in 74 patients (25.87%) (Table 2), complications in ten (3.49%) (Table 3), conversion to laparotomy in seven (2.45%), reoperation in one (0.34%), readmission in five (1.74%). There was no mortality (Table 4).

The mean stay was 1,61 days. 207 cases (72.37%) with stayed less than 36 h and 167 patients (58.39%) less than 24 h (Table 5).

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4. Discussion

Our results confirm that LC can be applied to all patients when there is no contraindication to general anaesthesia, no bowel obstruction, no peritonitis, no carbonic acidosis and the patient is not in the last months of pregnancy [1,2].

We have used LC in high-risk patients according to the criteria of many authors [3–6].

Table 1
Multiple surgery: ten cases (3.49%)

	Mean stay (days)	No. cases
Oophorectomy	1	1
Abdominal wall hernia	3	1
Groin hernia	1–6	5
Umbilical hernia	2	1
Anal fissure	1	1
ERGE. Hiatus hernia	3	1

Table 2
Risk factors: 74 cases (25.87%)

Sintron
Morbid obesity
Kidney horseshoe
Multiple laparotomy supramesocolic
Depressive syndrome
Kidney graft
Gallblader infection
Cardiac insufficiency
HTA
HTA and DMID
DMID
Lung metastases (Hipernephroma)
EPOC
Anterior cholecystostomy
Coronary insufficiency
Cholecystocolic fistula
Supra renal insufficiency
Cardiac transplant

Table 3
Complications: ten cases (3.49%)

Complication	No. cases	Stay (in days)
Wound infection	1	3
Neural pain	1	5
Bowel obstruction	1	6
<Potassium	1	17
Port bleeding	1	3
Hematoma	1	8
Abdominal pain	1	3
Liver bleeding	1	17
Biliar, leakage	1	10
Biliar, leakage	1	18
Biliar, leakage	1	10

Table 4

	Cases	%
Total	286	100
Multiple surgery	10	3.49
Risk factors	74	25.87
Complications	10	3.49
Conversion	7	2.45
Reoperation	1	0.34
Readmission	5	1.74
Mortality	0	0

Table 5
Stay in hospital: mean stay of total cases 1,61 days

	No. cases	%
< 36 h	207	72.37
< 24 h	167	58.39

We have used all techniques described to obtain a better postoperative course and reduce hospital stay [7–10]. We have not applied any preoperative selection criteria in order to determine the hours of hospital stay of the patient [11–13].

The absence of mortality, low morbidity in high-risk patients and short stay makes the LC the best choice for cholecystectomy. A high percentage of cases can be undertaken on a bay basis.

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Analgesic effect of intra-articular morphine after arthroscopic knee surgery

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Abstract

Objectives: To assess the analgesic effect of intra-articular morphine. To establish the optimal dose of morphine as well as the best volume of solution to obtain an adequate analgesic effect. **Patients and methods:** Prospective, randomized, double blind study of 120 patients undergoing elective arthroscopic meniscectomy. Patients were randomly allocated to one of the following five groups: In group A1 ($n=28$) and B1 ($n=20$) patients received 1 and 5 mg of intra-articular morphine, respectively, in both groups morphine was diluted in 20 ml of saline. Another two groups, groups A2 ($n=22$) and B2 ($n=26$) received 1 and 5 mg of intra-articular morphine, respectively, that was diluted in 40 ml of saline. Finally, the control group, group C ($n=26$), received 20 ml of saline without morphine. The intensity of the pain was evaluated by visual analog scale of 1 to 10 points at 30 min and at 1, 2, 3, 6, 12 and 24 h after arthroscopic surgery. Needs for complementary analgesia and side effects related to morphine were also recorded. **Results:** With respect to the control group there was a significant improvement in pain scores in those patients that were treated with morphine ($p<0.05$). The best morphine dose to improve pain was 5 mg. The amount of analgesic therapy required by the patients within the first 24 h after surgery was lower in groups B1 and B2. No important side effects or complications of therapy were seen in any of the groups. **Conclusions:** Intra-articular morphine is effective in the postoperative period after arthroscopic meniscectomy. This method of administration provides a safe way to control the postoperative pain after arthroscopic ambulatory surgery of knee. In our experience a morphine dose of 5 mg dissolved in 20 ml of saline constitutes the best therapeutic approach to reduce postoperative pain after arthroscopic meniscectomy.

placebo-controlled study of patients undergoing elective arthroscopic meniscectomy was undertaken.

A total of 120 patients diagnosed as having meniscus damage were included in this study. All of them were treated by arthroscopic meniscectomy and gave signed consent.

All patients received spinal anesthesia with mepivacaine diluted to 2% injected by spinal pencil point needle (20 G).

Patients were matched by age and sex and allocated at random to one of the following five groups by the use of a computer program:

Group A1—28 patients that received 1 mg of intra-articular morphine diluted in 20 ml of saline.

Group B1—20 patients that received 5 mg of intra-articular morphine diluted in 20 ml of saline.

Group A2—22 patients that received 1 mg of intra-articular morphine diluted in 40 ml of saline.

Group B2—26 patients that received 5 mg of intra-articular morphine diluted in 40 ml of saline.

Group C (control group)—24 patients that only received 20 ml of saline.

Intra-articular injection of either morphine diluted in saline or saline without morphine (control group) was administered by the arthroscopy cannula as soon as the surgical intervention ended.

Times of surgical intervention and ischaemia were similar in groups A1, A2 and B1. However they were shorter in groups B2 and C.

Both traumatologists and anesthesiologists were blind to the composition of the group in which each patient was included. In addition, all the staff members were blind to the substance that was injected in the joint. Syringes with the solutions were prepared in the Pharmacology Unit of the hospital and tagged with the name and number of each patient.

Postoperative pain was measured by medical staff members of our Unit using Visual Analog Scale (VAS) of 10 points at 30 and 60 min, and at 2, 3, 6, 12 and 24 h after surgical intervention. Data related to side effects were also registered.

In cases that VAS reached > 5 point score, analgesic non-steroidal drugs were given intravenously. In cases which remained in severe pain (VAS > 5) 60 min after administration of non-steroidal analgesic therapy an opioid drug was given intravenously.

All patients were phoned 24 h after surgery. They were asked about the global severity of pain during the 24 h after surgery. They were asked to describe the pain as mild, moderate or severe.

Statistical analysis: χ^2 -test was used to compare proportions. The mean of two groups were compared by Student *t*-test. Level of significance of 0.05

3. Results

Postoperative pain, measured by VAS, was more severe and occurred earlier in the control group (group C) (Table 1).

Patients that were treated with a morphine dose of 5 mg (groups B1 and B2) had less intense pain than those patients treated with 1 mg of morphine (groups A1 and A2) (Table 1).

The above results were also correlated with the amount of analgesic therapy that was required within the 24 h after surgery. All patients included in the placebo-control group (group C) required analgesic treatment within the first 4 h after surgery (Table 2). By contrast, analgesic postoperative therapy within the first 24 h after surgery was only required in 28.6% of group A1 and 31.8% of group A2 patients (Table 2). The analgesic therapy required by patients treated with 5 mg of intra-articular morphine was even lower. Analgesic treatment was only required in 10.0% of patients of group B1 and in 15.3% of those patients included in group B2 (Table 2).

To alleviate severe pain and reach a VAS < 5 all the patients in the placebo-control group (group C) required postoperative analgesic therapy. This was sufficient for diminishing the severity of pain in 67% of them; the remaining 33% required additional opioid therapy intravenously (Table 3). Among those patients that were treated with 1 mg of intra-articular morphine (groups A1 and A2) the requirements for postoperative opioid therapy were lower. An opioid drug was only administered in 10.7% of patients included in group A1 and in 4.5% of group A2 (Table 3). No postoperative opioid treatment was required in the patients treated with 5 mg of intra-articular morphine (Table 3).

Of the 120 patients, 14 had side effects (nausea and/or postoperative vomiting, drowsiness, retention of urine, and pruritus). We are not absolutely certain about the potential role of intra-articular morphine in the development of such side effects. Both the anesthetic technique (spinal anesthesia) and the presence of underlying disease (prostate adenoma) might have ex-

Table 1
Postoperative pain measured by Visual Analog Scale

	30 min	1 h	2 h	3 h	6 h	12 h	24 h
Group C	1.6	3.2	4.3	6.7	5.4	3.8	2.1
Group A1*	0.6	1.1	0.8	1.3	1.4	0.8	0.0
Group A2*	0.8	0.9	1.3	2.1	2.1	1.0	0.1
Group B1*	0.4	0.4	0.2	0.3	0.8	0.1	0.0
Group B2*	0.4	0.4	0.6	0.4	1.1	0.5	0.0

A1—A2: 1 mg of morphine.

B1—B2: 5 mg of morphine.

C: control group.

* $p < 0.05$.

Ambulatory ophthalmological surgical program for insulin-dependent diabetic patients

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Abstract

Objective: Insulin-dependent diabetic patients scheduled for vitrectomy, under regional anesthesia were studied during the perioperative period in the ambulatory unit, with the aim of including these patients in our ambulatory surgery program. **Materials and Methods:** The patients underwent surgery early in the morning without having breakfast or their morning insulin dose. Following a continuous infusion of glucose 10% retrobulbar anesthesia was administered and vitrectomy performed. After surgery, breakfast was given in the recovery area and was followed by the recommended insulin dose. **Results:** Three men and nine women, ASA 2-3, with the median age of 66 were observed. Blood glucose levels were shown to be between 123 and 337 mg/dl. The insulin dose was individualized for each patient. The average stay in the recovery room was 138 min. One patient was nauseous, none were readmitted. No significant recorded parameter differences were found between these patients and non diabetic patients undergoing ambulatory ophthalmological surgery. **Conclusions:** Ophthalmological surgery for insulin-dependent diabetic patients, under retrobulbar anesthesia can be performed in an ambulatory setting. © 1998 Elsevier Science B.V. All rights reserved.

Keywords: Diabetes; Ambulatory anesthesia; Vitrectomy

1. Introduction

Metabolic alterations arise in all patients as a consequence of preoperative anxiety, tracheal intubation, post-operative pain and possible nausea and vomiting. Diabetic patients under insulin treatment have associated pathologies requiring surgery [1,2] which may be performed on an ambulatory basis. These patients may have serious complications such as hypoglycemia or ketoacidosis when they are discharged after an ambulatory operation. Due to these factors, insulin-dependent diabetic patients are not usually included in ambulatory surgery programmes in most hospitals. The diabetic patients scheduled for vitrectomy, under regional anesthesia, were studied during the perioperative period in the ambulatory unit, with the aim of including these patients in our ambulatory surgery program.

2. Materials and methods

A retrospective study with 12 insulin-dependent diabetic patients, scheduled for ocular surgery, was carried out from May 1996 to May 1997. Preoperatively the patients were admitted to the Endocrinology Service to adjust their insulin dose. The patients then underwent surgery first thing in the morning without having breakfast or their morning insulin dose. Following a continuous infusion of glucose 10%, retrobulbar anesthesia was administered and vitrectomy performed. After surgery, breakfast was given in the recovery area and was followed by the recommended insulin dose. The parameters recorded in the post-operative period were: blood glucose levels in the capillary blood vessels before breakfast finger (stick); nausea, vomiting or other complications; amount of time in the recovery room and the number of unexpected hospital admissions. Discharge was undertaken following the Aldrete criteria modified because of the ambulatory surgery.

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Table 1
Results

Age	43	63	63	62	66	73	54	54	71	62	75	75
Finger-stick mg/dl	315	192	157	166	174	383	130	244	185	337	333	123
Insulin	22	—	—	14	15	24	20	20	10	24	12	10
	MXT			NPH	NPH	NPH	NPH	MXT	NPH	NPH	NPH	NPH
											4	
											ACT	
Recovery (min)	130	130	200	140	135	140	240	120	85	130	185	130

MXT: Mixtard Insulin, ACT: Actrapid Insulin, min: minutes.

Obtained values in the 12 patients.

3. Results

Three men and nine women, ASA 2-3, with a median age of 66 years were observed. All patients were given retrobulbar anesthesia and vitrectomy was performed, without any complications occurring. Blood glucose levels were shown to be between 123 and 337 mg/dl, which are considered to be normal in this type of patient. The insulin dose was individualized for each patient. The average stay in the recovery room was 138 min. One patient was nauseous. None were readmitted. (Table 1). No significant recorded parameter differences were found between these patients and non diabetic patients undergoing ambulatory ophthalmological surgery in the same unit.

4. Discussion

Diabetes mellitus is one of the most frequent endocrine illnesses found in ambulatory surgery patients. Correct perioperative management of diabetes is very important to reduce any complications [3]. Surgery for insulin-dependent diabetic patients must be scheduled as early in the morning as possible. Subsequently, there are minimum alterations in glucose levels thus allowing oral intake to begin before discharge [4]. There are three life-threatening complications in diabetic patients: ketoacidosis, hyperosmolarity and hypoglycemia. These complications are more frequent using general anesthesia. The drugs used delay oral intake and there are higher levels of nausea and vomiting.

Maintaining blood glucose levels between 120 and 200 mg/dl is the chief aim. The most physiological

method would be through a continuous infusion of insulin and glucose. However, some studies have shown better results with subcutaneous insulin [5,6].

In short procedures or in those only requiring local or regional anesthesia, administering half or two-thirds of the normal insulin dose is recommended first thing in the morning followed by a glucose infusion. After surgery the patient is allowed to eat and the rest of the morning dose is then given.

In our center we do not administer the insulin until after surgery and breakfast. The dose given is two-thirds of patient's morning dose. We have not recorded any important post-operative problems.

In conclusion, ophthalmological surgery for insulin-dependent diabetic patients, under retrobulbar anesthesia, can be performed in ambulatory units. We consider these patients could be accepted for other minor operations under peripheral regional blocks.

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