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INTRODUCTION

The popularity of ambulatory surgery (AS) is continuously increasing because of cost saving and convenience. The low rate of adverse events or complications during the intraoperative or immediate postoperative periods further justifies the rapid growth of AS [1-3]. Nevertheless, these surgical programmes should be continuously monitored in order to guarantee that high quality services are provided for the population. Clinical indicators should therefore be implemented to ensure a safe, effective and efficiency environment in our day surgery programmes.

Only a limited number of published studies discuss the utilisation of clinical indicators as an important tool to reflect the quality of services performed in day surgery units. The Australian Day Surgery Council has a lot of experience in this field, having measured indicators of their clinical practice for the last decade [4].

WHICH CLINICAL INDICATORS SHOULD BE INCLUDED?

Clinical indicators are norms, criteria, standards and other direct qualitative and quantitative measures used in determining the quality of health care. They should occur with some frequency and reflect an important aspect of quality. They also should be easy to define and to analyse.

The quality and safety of AS should be the same as that provided in overnight, acute bed hospitals and there is evidence that the standards of care are higher in AS. Establishment of a process for the assurance of high quality and safe standards of service in ambulatory surgery centres / units is essential. The identification of universally acceptable clinical indicators for quality assurance in AS is one of the most important goals of the International Association for Ambulatory Surgery (IAAS) and its materialization is one of the major achievements in ensuring those high standards of care.

The clinical indicators shown in Table 1 have been derived from the Australian and French Clinical Indicators, and they are those recommended by the IAAS for Quality Assurance in Ambulatory Surgery [5].

TABLE 1: CLINICAL INDICATORS FOR AMBULATORY SURGERY

1. Cancellation of booked procedures	1.1. Failure to attend the DSU 1.2. Cancellation after arrival at the DSU
2. Unplanned return to the operating room on the same day of the surgery	
3. Unplanned overnight admission	
4. Unplanned return of the patient to a DSU / Hospital	4.1. < 24 hours 4.2. > 24 hours and < 28 days
5. Unplanned readmission of the patient to a DSU / Hospital	5.1. < 24 hours 5.2. > 24 hours and < 28 days
6. Patient Satisfaction	

DSU = Day Surgery Unit

AMBULATORY SURGERY AS A SAFE, EFFECTIVE AND EFFICIENT ORGANISED MODEL?

The clinical, economic and social advantages associated with AS made this organisational model the field of major growth for the last 30 years in the surgical arena. This development has only been possible due to great improvements in surgical and anaesthetic techniques, with increased safety, over this period

It is now estimated that over 65% of surgery performed in North America and some European countries like United Kingdom or Denmark are done in the outpatient setting. In analysing the safety, efficacy, effectiveness, and quality of care given to these patients, physicians have turned to outcomes research and have introduced clinical indicators as important tools in the evaluation of their ambulatory surgery programmes.

A) USEFUL CLINICAL INDICATORS

I. Cancellation of booked procedures

This indicator provides evidence of the effectiveness of the booking system in day surgery facilities. There can be many causes for the cancellation of booked procedures. Because of this it is proposed that for this indicator we must discriminate between cancellation due to failure to attend for the booked procedure and cancellation after arrival at the day surgery centre. Cancellations may be due to: i) pre-existing medical condition; ii) acute medical condition; iii) organisational reasons; iv) other reason.

Cancelled elective surgical cases result in wasted operating room time and additional hospital expense. Additionally, there is staff demotivation and patient and family inconvenience, and in the case of inpatients, a prolonged hospital stay.

There is however little data in the literature describing the frequency of day surgery cancellation. Lacqua et al reviewed 1063 scheduled cases in a four-month period that resulted in 184 (17%) cancellations. There were 56 (10%) outpatient cancellations, 110 (30%) inpatient cancellations and 18 (11%) patients admitted in the morning of surgery who were cancelled [6]. The authors stressed the importance of improving operating room utilization, which could be done by; a more efficient clinical evaluation of the patient before scheduling; improved communication with patients about the proposed procedure and preoperative preparation; and avoiding premature case booking before a complete patient evaluation.

The paediatric population is even more vulnerable to having their surgery postponed because they become ill more easily. Macarthur et al reported a cancelled booked procedures rate of 10.2% [7]. One hundred and six children out of 1042 had their procedure cancelled, of which 52 cancellations were considered preventable (4.9%), due to inadequate children preparation (n=38) or to health care inefficiency (n=14). Tait et al designed a study to determine the cause and timing of case cancellation in the paediatric outpatient surgical population [8]. The authors found that the majority of the children had their surgery cancelled due to upper respiratory infections (34.6%) or other medical reasons (30.7%). However, 34.7% were cancelled to scheduling errors like surgery not needed, child had not fasted, or difficulties with transportation. Interestingly, the majority of cases, 58.3%, were cancelled prior to their scheduled surgery date, making it possible to schedule other cases instead. Although, 18.9% were cancelled on the day of surgery prior to leaving for the hospital and 22.8% were cancelled on arrival at the outpatient surgery clinic.

Many systems have been developed in order to decrease cancellations on the day of surgery. Nurse-led pre-assessment supervised by consultant anaesthetists is one of them. Rai et al, described the organised nurse-led pre-assessment based at an elective surgical centre [9], and found a much better result (5% of cancellations on the day of surgery) than the cancellation rate of about 11% in the Trust as a whole. Questionnaires and telephone screening before attendance for ambulatory surgery can be another way to reduce the cancellation rate. Basu et al reported a reduction of 2.25% in the cancellation rate for the group that received a pre-operative assessment questionnaire 2 weeks before the expected procedure [10]. Patients were asked to return the questionnaire within the 7 days, and contact the Day Surgery Unit if they needed to have their procedure rescheduled. Those who failed to return the questionnaire were contacted by telephone during business hours, giving an overall figure of 533 (94.16%) patients contacted by either method. The 33 (6.19%) patients contacted who needed rebooking for personal commitments or who were unsuitable for day care surgery had their places filled by other patients. Kleinfeldt also found that preoperative phone calls could reduce cancellations in paediatric day surgery [11]. She reported an 8% cancellation rate in patients who had been contacted by phone prior to the day of surgery in comparison with a 16.6% cancellation rate of the patients who had not.

The effectiveness and efficiency of a day surgery programme can be maximized by careful organization with appropriate selection, patient information, proper education, and the suitable preparation and assessment of patients.

The Australian Council on Healthcare Standards reported national data on this clinical indicator [4]. They found that the rate of patients who failed to arrive for surgery has decreased since 1998, from 1.38% to 0.79% in 2003. The main reasons for this cancellation rate are administrative and organisational and they account for half the referred value.

II. Unplanned return to operating room

Although not being a specific clinical indicator of ambulatory surgery it may reflect possible problems in the performance of procedures. As it is a rare event only studies with large databases can provide reliable data. The Australian Council on Healthcare Standards reported national data which showed the unplanned return to operating room rate, as stable at 0.04% for the last six years [4].

III. Unplanned overnight admission

Other than using mortality to assess the overall safety and effectiveness of an ambulatory surgery programme, morbidity related complications (anaesthetic, surgical or medical), became important outcome measures. In evaluating these factors, many researchers have focused on the rate of hospital admission and recovery room length of stay (see below) as their endpoints. Overall, the rate of unplanned overnight admission due to surgical, social or administrative, medical or anaesthesia-related complications averages 1% in most outpatient centres [12].

Gold et al conducted a case-control study of 9,616 adult patients who underwent ambulatory surgery to identify clinical and demographic risk factors for admission[13]. There were one hundred unplanned overnight admissions (1.04%). These were due mainly to pain (18.6%), bleeding (18.6%) or intractable vomiting (17.5%). These authors found some factors that were independently associated with an increased likelihood of admission: general anaesthesia (odds ratio, 5.2), postoperative emesis (odds ratio, 3.0), lower abdominal and urologic surgery (odds ratio, 2.9), time in the operating room greater than 1 hour (odds ratio, 2.7) and age (odds ratio, 2.6). Moreover they concluded that the likelihood of unplanned overnight admission is related more to the type of anaesthesia and surgical procedure rather than to the patient's clinical characteristics.

Osborne et al found a 1.34% unplanned overnight admission rate in 6000 consecutive ambulatory surgery procedures [14]. Surgery-related admissions (0.95%) exceeded those related to anaesthesia (0.13%), although pain was considered as a surgery-related admission. Moreover, perioperative complications related to surgery (1:105) were more frequent than those related to anaesthesia (1:176) and pre-existing medical problems (1:500). Greenburg et al determined an unplanned overnight admission rate of 0.85% in 15,132 consecutive ambulatory surgery patients [15]. Although admission rates by specialty had some variation, no procedure had a higher risk. Pain, cardiopulmonary and bleeding problems as well as longer procedures than anticipated accounted for 73% of the admissions. Tham et al, revealed a 1.5% unplanned overnight admission rate in 10,801 procedures performed on a day surgery basis [16]. Most of the admissions were surgically related (62.8%), followed by anaesthesia (12.2%), social (9.5%) and medical reasons (8.1%). Interestingly, these authors inferred that seventy-five percent of these admissions were potentially preventable. The majority were due to common problems like post-operative pain, surgical observation and social reasons, and the non-preventable causes were mainly due to unrelated medical problems.

Nevertheless, great differences are to be expected between studies. Margovsky found an unplanned overnight admission rate of 4.7% in 920 outpatients [17]. The surgical, anaesthetic and social reasons accounted for 58.2, 37.2 and 4.6% of the unplanned admissions, respectively. The highest rate of admission was for plastic and reconstructive surgery (12.8%) and orthopaedic surgery (7.5%). The authors proposed several reasons to explain their results; from inappropriate patient selection; underestimation of the disease process; patients unfit for day surgery; to surgery which is likely to be longer than expected, giving the idea that monitoring unplanned overnight admission rates and correcting the aetiological causes will improve day surgery practice.

More complex surgery can lead to higher unplanned overnight admission rates. One example is ambulatory laparoscopic cholecystectomy. Lau et al found an unplanned overnight admission rate of 4.5% in a retrospective analysis of 200 patients who underwent ambulatory laparoscopic cholecystectomy [18]. Uneventful recovery was attained in 185 (92.5%) patients. Nine patients were admitted overnight after operation because of nausea and vomiting (n=3), pain (n=2), urinary retention (n=2), medical observation (n=1) and patient's preference (n=1). These results compare favourably with data from other studies in which the rate ranged from 1% to 39%. Robinson et al, identified predictors of same day discharge (SDD) failure of outpatient laparoscopic cholecystectomy [19]. These authors found three factors that predicted more than 50% failure of SDD: age more than 50 years, ASA class 3 or more, and surgery start time later than 1:00 PM.

Ear, Nose and Throat (ENT) procedures can expect also higher unplanned overnight admission rates. Ganesan et al reported 29 patients (1.8%) who had to be admitted unexpectedly for an overnight stay in a total of 1642 patients who underwent ENT day surgery [20]. Twenty-four of these patients had undergone nasal surgery (representing 5.4% of all nasal procedures performed) and the cause of all these admissions was haemorrhage. Further analysis revealed 22 of these 24 nasal operations had included a septoplasty, which had an unexpected admission rate of 13.4%. Dornhoffer et al also reported higher unplanned overnight admission rates (3.9%) in a study of 657 patients who underwent group II otological procedures (i.e., tympanoplasty with or without mastoidectomy, stapedotomy, and middle ear exploration) [21]. A significantly larger percentage of children were admitted than adults (5.7% vs. 2.3%), primarily for nausea and vomiting. Three factors were significantly associated with unplanned admissions: the type of surgery (tympanomastoidectomy with ossicular reconstruction), the duration of general anaesthesia (more than 2 hours), and asthma as a coexisting condition.

In a study by Fortier et al, 1.42% of 15,172 consecutive ambulatory surgical patients had an unplanned overnight admission [22]. Surgical, medical, social and medical reasons accounted for 38.1%, 25.1%, 19.5% and 17.2% of the unanticipated admissions, respectively. ENT patients had the highest unplanned overnight admission rate (18.2%), followed by urology (4.8%) and chronic pain patients (3.9%). The predictive factors found were; male, ASA status II or III, long duration of surgery, surgery finishing after 3 PM, postoperative bleeding, excessive pain, nausea and vomiting, and excessive drowsiness or dizziness.

Unplanned overnight admissions seem to be unavoidable with the further increase of day surgery practice, along with the growing complexity of performed procedures and higher risk patients being included in these programmes. If the rate of unplanned admissions can be kept at the same level, however, this will indicate an improved quality of surgical outcome.

These are examples of isolated analysis of unplanned overnight admission rates and their causes. Nevertheless, this clinical indicator should be continuously evaluated in every day surgery programme offering an opportunity for quality improvement and further day surgery development. A good example is given by the work done over the last 5 years by the Australian Council on Healthcare Standards, collecting national systematic data on a couple of clinical indicators [4]. In its 5th edition publishing data from 1998 till 2003 there has been a decline in the unplanned overnight admission rates: from 2.46% in 1998 to 1.75% in 2003. The rates for the public sector were twice the rates for the private sector. However, the authors did not refer to the complexity of the type of surgery performed or if there were differences between both sectors on the associated pathology of the selected patients.

IV. Unplanned return and readmission rates

Another important outcome measure in the day surgery setting is the hospital return and readmission rates. It has been suggested that an acceptable readmission rate should be between 1 and 2% [23], as found by Mezei et al on 17,638 consecutive patients undergoing ambulatory surgery with a readmission rate of 1.1% [24] and a complication-related readmission rate of 0.15% (1 in 678 procedures). The complication rate was significantly higher among patients undergoing transurethral resection of bladder tumour (5.7%).

However, variations in returns or readmissions after ambulatory surgery are probably due to various factors including day surgery unit policies, specialty, age of patients and the level of primary care support available [25]. Moreover, there is a need to analyse the time when this return or readmission occurs. We can expect more acute and emergent situations in the first 24 hours after surgery and more chronic complications after that period of time. Due to this the IAAS has recommended that the analysis of this clinical indicator is divided into two situations: i) before the first 24 hours; and ii) after this period till 28 days after surgery.

In an extensive retrospective evaluation of returns or readmissions after same day surgery that included a total of 20,817 patients, Coley et al found 1,195 patients that returned to the hospital within 30 days or were admitted directly after surgery (5.7%) [26]. Of these patients, 313 (1.5%) were directly related to the original ambulatory surgery procedure. Pain was the most commonly reported reason for return, occurring in 120 (38%) patients who had an unanticipated admission or readmission. General Surgery, ENT and Urology were the specialties that had the highest rate of unanticipated admissions and readmissions accounting for 3.2%, 3.1% and 2.9% respectively.

Studying patient readmission rates can be used as a guide for quality of care. Vaghadia et al, found a 0.04% readmission rate for bleeding after 172,710 outpatient procedures [27], concluding that the majority of bleeders can be identified within 30-45 min after arrival to a post anaesthetic care unit (PACU) and that extending the postoperative observation period beyond this period to prevent return to hospital due to bleeding is not justified, if the patient is otherwise ready for discharge.

Some authors questioned the conservative selection policy in order to guarantee low readmission rates, pretending sometimes to reach them to zero. Sibbritt [28] discussed whether we should be conservative in patient selection and present lower readmission rates or we should be more flexible and include more complex surgery and more risky patients as well, improving accessibility to ambulatory surgery programmes for more of society. He concludes that it may be more beneficial to the patient population if more patients are given access to a day-only treatment. However, higher readmission rates can be taken to show a lesser quality day surgery programme.

V. Patient satisfaction

To further assess the global efficacy and quality of ambulatory surgery, there has been a movement to include patient satisfaction in outcomes research. Even though more than 85% of patients report at least one minor sequelae from their outpatient surgery, satisfaction ratings remain extremely high [29]. Good post-operative pain control, short waiting time before surgery, good pre and post-operative patient information and final outcome after surgery are among the top predictors of patient satisfaction. So, seeking the patient's opinion should be obligatory for all day surgery units, not to justify their services, but to improve and better the quality of them.

B) UNUSEFUL CLINICAL INDICATORS

There are some clinical indicators that for several reasons are not useful for monitoring daily practice..

I. Mortality and major morbidity rate

The incidence of death associated with ambulatory surgery is extremely rare [1,30]. In a study of 38,598 ambulatory surgery patients, Warner et al demonstrated a 1:11,273 risk of dying within 30 days of surgery [30]. Moreover, two of the four patients died in a traffic accident 48 hours after surgery. The other two patients died in the 7 days after surgery due to myocardial infarction (MI). Of the 31 patients who developed a major morbidity event (1:1455), 14 (45%) had a MI (1:3220), 7 (23%) had a central nervous system deficit (1:6441), 5 (16%) had a pulmonary embolism (1:9018), and 5 (16%) had respiratory failure (1:9018). 12 patients (39%) had their major adverse event 48 hours after surgery, pointing out the necessity to audit the outcome for longer than the first day after surgery. The authors also demonstrated that these major adverse events occurred less often than they would have expected in their patient population, concluding that the overall risk of major morbidity or mortality from an ambulatory surgery procedure is very low.

II. Delayed patient discharge

This indicator usually refers to an unexpected period of six hours or more from the time of leaving the operating / procedure room to the time of patient discharge from the facility. It may reflect problems in the administration of anaesthesia or sedation, the selection of patients or other aspects of management in a day procedure facility. However, there are procedures which need more time for patients to recover making it difficult to decide which patients should really be included in this indicator It may reflect in some areas that patients need to stay longer to facilitate collection by relatives, at the end of the working day.

III. Infection rate

Infection requiring antibiotics has been long accepted as a clinical indicator in acute bed hospitals but was rejected on ambulatory surgery programmes on the basis that collection of accurate and reliable data would be onerous and of doubtful accuracy.

CONCLUSION

The introduction of clinical indicators will result in better monitoring of our ambulatory surgery practice, allowing improved levels of care, in a safer, more efficacious and more effective environment.

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