

Cancellations in ambulatory day surgery: Ten years observational study

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Abstract

Background: Reasons for cancellation of booked procedures in ambulatory surgery need a detailed analysis in order to introduce corrective measures to lessen them.

Methods: Cancellations occurring the day before operation without patient replacement and procedures cancelled on the day of operation in 10 500 patients scheduled to be operated on in a multidisciplinary ambulatory surgery unit were analysed. Data were obtained from the incident register sheets and the database of the unit.

Results: A total of 424 patients were cancelled (4%). Reasons for cancellation were: acute medical conditions in 23.3% of cases, personal decision of the patient to refuse programming in 22.2%, non-attendance in 2.1%, failure to follow pre-operative guidance in 23.3% and unavailability of resources in 29%. These causes were preventable or possibly preventable in 57.1% of cases, difficult to prevent in 29% and not preventable in 13.9%.

Conclusion: More than half the cases of cancellation could be prevented. A rapid response of surgical departments to substitute patients, campaigns to increase the awareness of the population about the cost of health services and the implementation of pre-operative assessment guidelines must be considered.

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1. Introduction

The absolute need for a better use of health resources obliges the study of problems such as cancellations in elective and ambulatory surgery. The rate of cancelled procedures is not negligible in reported series and has important economic outcomes in western countries [1,2], because of operating room time waste, increase in pre-operative rework with additional associated expenditure and for its impact on patient waiting lists. Patients and their families can also be affected both economically and emotionally. Ambulatory surgery is an expanding practice worldwide in public health services, but is affected by the same problem despite proper patient selection for this type of surgery [3]. Among the various reasons leading to cancellations, inappropriate organization of

programming, incorrect pre-operative patient evaluation and outdated appointment systems must be considered and corrected. Causes related to patient attitude and mindset, have little possibility of improving without considering a publicity campaign in order to alert the population about the true costs of public health systems.

The aim of this observational study is to analyse the causes of cancellation of booked procedures in a multidisciplinary ambulatory surgery unit during 10 years, in order to allow surgeons, anaesthetists, nurses and administrators to introduce corrective measures.

2. Patients and methods

Our ambulatory surgery unit is integrated in a university general hospital with independent physical facilities. Admission area, pre- and post-operative holding area for 12 patients, registered nurse's office and nursing station, two operating

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rooms and a recovery area have a round architectural distribution. After a temporary proving period from 1995 to 1999, the unit began its normal work, reaching 1500 patients per year in 2003. A total of 10 500 patients were scheduled to be operated on in the studied period of 10 years. Patient selection was done by surgeons in according to procedures suitable for day surgery treatment in general surgery, ophthalmology, orthopaedic surgery, urology, ENT surgery, vascular surgery and plastic surgery, patient physical status related to the American Society of Anaesthesiologists (ASA) classification (ASA 1, 2 and stable 3) and social environment (availability of a responsible adult, phone access and residing within an hour travelling time from the hospital). Selection was also assessed by anaesthetists according to a detailed clinical history, physical examination and appropriate pre-operative tests. Programming of surgery was done weekly following priority criteria, waiting list status and surgical speciality. Patients were notified by phone twice, 1 week before the operation and the day before. A definitive phone call was made by nurses from the unit, to confirm the appointment, to verify the physical status of the patient and to give instructions related to the operation and the stay in the ambulatory surgery unit. After operation, patients were discharged from the unit following the Post Anaesthesia Discharge Scoring System (PADSS) developed by Chung et al. [4] in 1995. Clinical data from admission up to the 30th post-operative day were included in a database created with Stat-View 5.0.1 for Windows, 1992–1998, SAS Institute Inc. Cary, NC 27513. If a procedure was cancelled the day before operation and substituted by another patient from the list, this was not considered a cancellation. However, cancellations occurring the day before operation without patient replacement and cancellations on the day of operation were considered as cancelled procedures.

Data from the cancelled procedures were obtained from the incident register sheet of the weekly surgical booklet and the clinical database of the unit. Descriptive statistics were

used in the analysis. Different causes of cancellation were considered in the study with no-comparison.

3. Results

Out of 10 500 patients scheduled to be operated on in the day surgery unit, 424 were cancelled (4%). In 210 cases (2%) cancellations were done the day before the operation without substitution and in 214 cases (2%) on the day of operation. Cancellation rates varied from 1.9% in 1996 to 6.1% in 2002 (Fig. 1). There was a small seasonal variation: 3% for spring, 4.2% for autumn and 4.9% for winter. In summer time, no activity in the ambulatory surgery unit was scheduled. Considering only surgical specialities, treating more than 500 patients in the analysed period of time, cancellation rates varied from 2.8% in urology to 5.2 in vascular surgery (Fig. 2).

Reasons for cancellation were divided into five groups: (1) acute medical conditions: 99 cases (23.3%), (2) personal decision of patients to refuse programming: 94 cases (22.2%), (3) non-attendance: 9 cases (2.1%), (4) failure to follow pre-operative guidance: 99 cases (23.3%), and (5) unavailability of resources: 123 cases (29%). Among the reasons included in acute medical conditions, more than 50% of the cases were due to upper respiratory tract infections and the remainder were related to anxiety, fever or poorly controlled high-blood pressure. When considering the personal decision of the patients to refuse scheduling, the majority of them (80 cases) did it the day before operation, and 14 cases on the day of operation, mainly because of family, social or professional events. The main group of causes for cancellation, unavailability of resources, grouped reasons like health workers on strike, medical team unavailability, equipment repair or failure, overbooking of day surgery unit beds occupied for general emergencies and shortage of operating room time (Fig. 3).

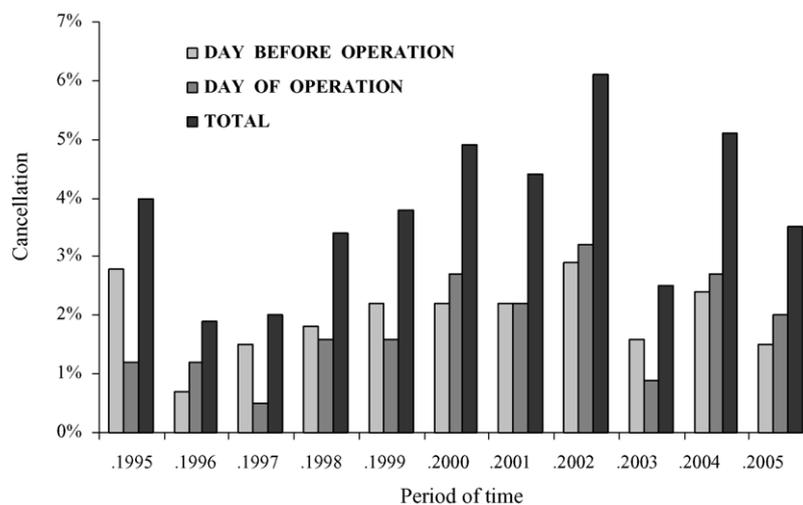


Fig. 1. Cancellation rates in the studied period of time.

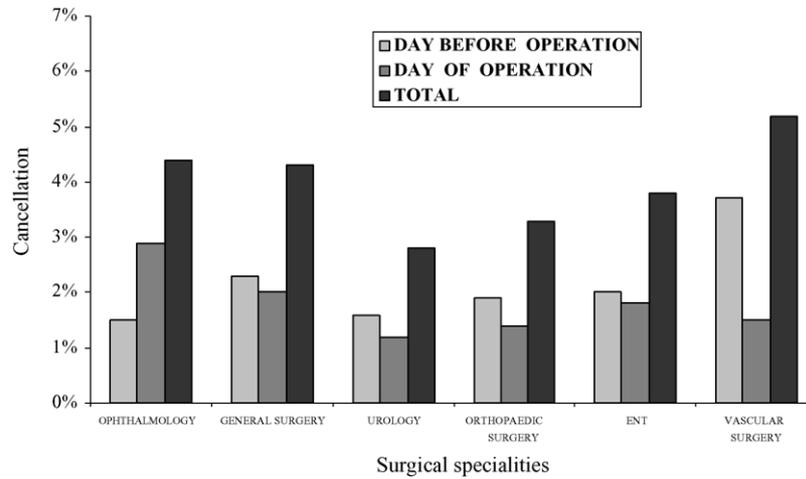


Fig. 2. Cancellation rates according surgical specialities.

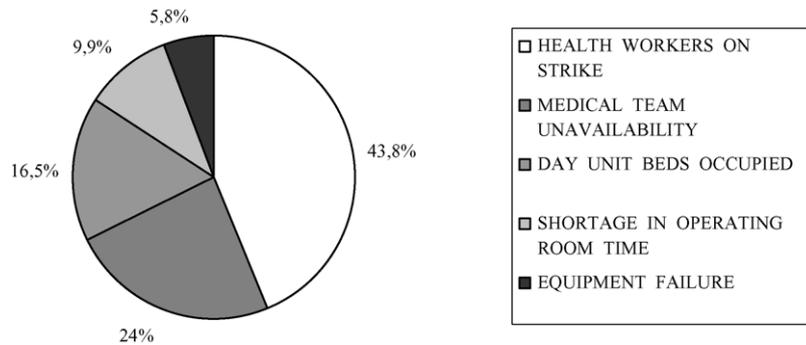


Fig. 3. Reasons for cancellation. Resource failure.

When considering surgical specialities and the reasons for cancelling in each, we found a high rate in vascular surgery (5.2%) mainly caused by coincidental strike or occupied bed places at the scheduled time. Cancellation rates above average was encountered in ophthalmology patients (4.4%), mainly due to unavailability of resources in two-thirds of the cases

and to acute medical illness in the remaining third and in general surgery patients (4.3%).

Distributing cancellation causes into the classic four groups, based on difficulty in prevention, we found that more than 57% could be preventable (acute medical conditions appearing the day before the operation, personal decision of patients the day before as well as failure to follow pre-operative guidance) or possibly preventable (private decision of patients the day of operation or non attendance). The rest of the causes were difficult to prevent (resources unavailable) or not preventable at all (acute medical conditions on the day of operation) (Table 1).

Table 1
Distribution of reasons for cancellation in ambulatory surgery depending on the possibilities of prevention

	Number of cases	%
Preventable	219	51.7
Acute medical reasons the day before operation	40	9.4
Personal decision of patients the day before operation	80	18.9
Pre-operative work-up not followed	99	23.4
Possibly preventable	23	5.4
Personal decision the day of operation	14	3.3
Non-attendance of patients	9	2.1
Preventable with difficulty (resources not available)	123	29
Non-preventable (acute medical conditions the day of operation)	59	13.9

4. Discussion

The cancellation of surgical procedures is such an important problem in health care delivery that institutions like The United Kingdom Parliament [5], The Modernisation Agency of the National Health Service [6] (NHS), or Insalud [7], Sistema Nacional de Salud (SNS) in Spain, have published their concern and recommended analysing the causes and have suggested introducing corrective measures. Reports from highly developed countries such as the USA [8,9]

and Norway [1] show cancellation rates from 10 to 17% in elective surgery. The Australian Council of Healthcare Standards and the Australian Day Surgery Council identified clinical indicators for application to day surgery centres and attached day surgery units within hospitals. In their users' manual version 3, edited in 2001 [10], four indicators were pointed out. The first was—cancellation of booked procedures—including four circumstances: (1) patients who fail to arrive, (2) cancellations due to pre-existing medical conditions, (3) cancellations due to acute medical conditions, and (4) cancellations due to administrative/organizational reasons. This interest in monitoring cancellations in day surgery is related to the surgical procedures on an ambulatory basis being affected by the same problem of cancellations as elective surgery. Some reports state rates of 10–13% [3,11], somewhat less than in elective inpatient surgery. In our hospital, the rate of cancellations in elective surgery was 6.4% in 2004, including only same day cancellations. That year, day surgery registered 5.1% of cancelled operations including both cancellations occurring the day before operation and on the day of operation. This percentage was one of the highest from 1995, the average being 4% during the period of time studied.

In outpatient surgery, higher rates of cancellation are reported in urology and dental procedures and lower rates in orthopaedic and paediatric surgery [8,9]. Our experience is quite different. Vascular surgery with 5.2% and ophthalmology with 4.4% have a higher than average cancellation rate. But we must consider the impact in these results of the coincidence of unavailable resources at scheduled dates for vascular surgery and unavailable resources and acute medical conditions when considering ophthalmology because an older age patient group is involved.

We observe, as others, that more than 50% of cancellations could be prevented [11]. It is our opinion that 57.1% of cancellations are preventable applying the correct measures, but the remaining 42.9% will be difficult to prevent because it seems unlikely to be able to avoid the occurrence of acute medical conditions in patients on the day of operation and because public administration is not likely to increase expenditure on health care delivery in the near future.

The occurrence of acute medical conditions in our patients produced 23.3% of all the cancellations. This is not surprising because surgical specialties such as ophthalmology deal with an older patient group, as mentioned. We must also consider that in winter, upper respiratory infections are frequent and interfere with day surgery programming. However, in one-third of cases, cancellation was known the day before operation but patients failed to be replaced. A more efficient response from surgical departments could allow the substitution of patients and would have avoided 9.4% of all cancellations.

The SNS [7] highlights that patient cancellations occur more frequently in hospitals with a higher rate of cancellations. This reason for cancellation is registered in 22.2% of our cases and was related to specific troubles associated with

family, workplace or personal change of mind about the decision to be operated on. As in the case of occurrence of acute medical problems, the majority of cancellations were known on the day before operation and a rapid substitution could have avoided as much as 18.9% of cancellations. In our opinion, patient cancellations would decrease even more if public oriented campaigns based on the real cost of health delivery systems and on the limits of economic resources were applied in countries like Spain where the SNS treats more than 95% of the population.

In the Theatre Programme of the NHS Modernisation Agency, piloted from August 2001 to June 2002, non-attendance of patients was the highest reason of patient cancellations in day surgery (23%) [6]. This cause of cancellation was not frequent in our day surgery unit (2.1%), probably because the way of notifying our patients of the date for operation. Patients receive two phone calls, the first from the admission department, 1 week before and the second one directly from the day surgery unit, the day before operation. Nurses use this second call to confirm attendance of patients and is extremely helpful, not only to know the physical condition of the patient, provide useful instructions for the pre-operative period about fasting, pre-operative drug consumption, time of arrival, number of relatives allowed in the recovery area and advise about concerns and fears, but certainly to begin a close relationship with patients, in order to obtain their confidence and for a more gratifying and successful outcome. Basu et al. [12] have demonstrated as well that patient questionnaires along with telephone screenings are very effective in reducing cancellation rates in day surgery.

The NHS Modernisation Agency advises the implementation of a pre-operative assessment to decrease the number of patients who do not attend [6] and this recommendation is supported by others [13–17]. The introduction of outpatient pre-operative evaluation, pre-assessment clinics, pre-clerking clinics or pre-admission evaluation centres has an important role to play in reducing cancellations not only in day surgery but in all elective surgery. All of these facilities allow a complete preparation of patients for surgery. A complete history and appropriate physical examination, followed by laboratory testing, chest radiographs and electrocardiographic evaluation related to ASA classification, gender and age of patients, a suitable selection of surgical procedures and the evaluation of patients' environment, should form the pre-operative assessment for day surgery. Furthermore, if a patient is suitable for day surgery, the preparation should include information provided by the surgeon and anaesthetist, about the surgical procedure and the pre-operative process.

At the beginning of our experience in day surgery, we reached an agreement among anaesthetists, surgeons, nurses and hospital managers, about the criteria and guidelines to follow in the selection of patients suitable for day surgery. Divergences appeared during the last years and the publication in Spain of consensus recommendations between surgical and anaesthetic associations [18], forced an agreement revision in 2003 focused princi-

pally on the selection of cost-effective pre-operative testing for different risk groups of patients and the period of their validity. With this change, we hope to avoid some 23.3% of cancellations due to failures in the pre-operative assessment and improve the cost efficiency of ambulatory surgery.

The unavailability of resources has been the most important group of reasons for cancellation in the study (29%). Heterogeneity of this group and the difficulty in introducing any improvement need a detailed analysis. Labour conflicts between health workers produced nearly half the cancellations included in the unavailable resources group. When a strike involves health workers of a surgical division, day surgery patients always suffer cancellation of their procedures due to the low priority of this type of surgery. Possibilities of changing this situation are nil because day surgery never will be considered as a so-called “priority service” during strikes. The unexpected prolongation of operating time may lead to cancellation of the last scheduled operations of the day. Although this situation is infrequent in our series (12 cases), a better relationship among surgeons, anaesthetists, nurses and managers could avoid these cancellations. Unavailability or maintenance of equipment is also infrequent (9 cases) and permits little improvement due to its nature. However, when the unavailability of resources is related to day surgery facilities being disrupted by unexpected emergencies, or medical teams are unavailable due to the interference of special programmes like organ transplantation, an important concern and debate appears. We have registered this incidence in 49 cases. With the purpose of dealing with a situation producing augmentation of current waiting lists, some ideas are being implemented in the UK, i.e.: the introduction of independent 24 h surgery units for elective procedures, diagnostic and treatment centres separated and protected from general emergency units and beds specifically ring fenced for routine operations [5]. In all cases, these plans need new resources and support and the published evidence does not show so far a clear increase of hospital efficiency. Reports from Norway [1,19] conclude that ring fenced day surgery units have 60–75% higher work efficiency than day surgery units without ring fencing, but the results at hospital level are discouraging because the positive effect observed in cost efficiency, ranging from 0.4 to 1.9%, is statistically insignificant. There is no doubt that plans to improve the availability of resources need a bigger investment in health and this is a subject for social and political debate, not for professional discussion.

In conclusion, in the current series, more than half the cases of cancellation could have been prevented. A prompt response of surgical departments involved in order to substitute patients already scheduled is encouraged. Public oriented information campaigning directed to increase population awareness about the real cost of health services and the implementation of guidelines for pre-operative evaluation of

patients must be advised to achieve these goals. All other cancellations need changes in the surgical division organization and additional funding for Public Health System hospitals.

References

- [1] Aaserud M, Trommald M, Boynton J. Elective surgery-cancellations, ring fencing and efficiency. *Tidsskr nor Laegeforen* 2001;121:2516–9.
- [2] Tait AR, Voepel-Lewis T, Munro HM, Gutstein HB, Reynolds PI. Cancellation of pediatric outpatient surgery: economic and emotional implications for patients and their families. *J Clin Anesth* 1997;9:213–9.
- [3] Pollard JB, Olson L. Early outpatient preoperative anesthesia assessment: does it help to reduce operating room cancellations? *Anesth Analg* 1999;89:502–5.
- [4] Chung F, Chan VWS, Ong D. A post anaesthetic discharge scoring system for home readiness after ambulatory surgery. *J Clin Anesth* 1995;7:500–6.
- [5] The United Kingdom Parliament Website. House of Commons Hansard Debates for February 12, 2002 (pt 4). <http://www.parliament.the-stationery-office.co.uk/> [April 20, 2004].
- [6] The NHS Modernisation Agency Website. National Good Practice on Pre-operative Assessment for Day Surgery. <http://www.modern.nhs.uk/theatreprogramme/preop/> [November 30, 2004].
- [7] The Insalud Website. Memorias y Catálogos. Programa de Calidad Atención Especializada. Memoria 1999. <http://www1.msc.es/insalud/docpub/memycat/> [April 20, 2004].
- [8] Hand R, Levin P, Stanziola A. The causes of cancelled elective surgery. *Qual Assur Util Rev* 1990;5:2–6.
- [9] Lacqua MJ, Evans JT. Cancelled elective surgery: an evaluation. *Am Surg* 1994;60:809–11.
- [10] The Royal Australasian College of Surgeons Website. Day Surgery/Endoscopy Indicators. <http://www.racs.edu.au/wedo/adsc/adsc> [May 27, 2004].
- [11] Macarthur AJ, Macarthur C, Bevan JC. Determinants of pediatric day surgery cancellation. *J Clin Epidemiol* 1995;48:485–9.
- [12] Basu S, Babajee P, Selvachandran SN, Cade D. Impact of questionnaires and telephone screening on attendance for ambulatory surgery. *Ann R Coll Surg Engl* 2001;83:329–31.
- [13] Starsnic MC, Guarnieri DM, Norris MC. Efficacy and financial benefit of an anesthesiologist-directed university preadmission evaluation center. *J Clin Anesth* 1997;9:299–305.
- [14] Jones AR, Sandison AJ, Owen WJ. The impact of pre-clerking clinics on surgical operation cancellations: a prospective audit. *Int J Clin Pract* 1997;51:294–5.
- [15] van Klei WA, Moons KG, Rutten CL, Schuurhuis A, Knape JT, Kalkman CJ, et al. The effect of outpatient preoperative evaluation of hospital inpatients on cancellation of surgery and length of hospital stay. *Anesth Analg* 2002;94:644–9.
- [16] Rai MR, Pandit JJ. Day of surgery cancellations after nurse-led pre-assessment in an elective surgical centre: the first 2 years. *Anaesthesia* 2003;58:692–9.
- [17] Aguirre-Cordova JF, Chavez-Vazquez G, Huitron-Aguilar GA, Cortes-Jimenez N. Why is surgery cancelled? Causes, implications, and bibliographic antecedents. *Gac Med Mex* 2003;139:545–51.
- [18] Alcalde Escribano J, Ruiz López P, Landa García JJ. Evaluación preoperatoria en cirugía programada. Madrid: Aran Ediciones SL; 2002.
- [19] Hagen TP, Kjekshus LE. Ring fencing of elective surgery: does it affect hospital efficiency? Oslo: Health Organisation Research Norway, HORN; 2004.