Occasional Survey

Hospital admissions from the Surgical Day Care Centre of Vancouver General Hospital 1977-1987

Peter F. Fancourt-Smith MB ChB FRCPC,
Jeffrey Hornstein MD FRCPC,
Leonard C. Jenkins BA MD CM FRCPC

The admissions to Vancouver General Hospital from its Surgical Day Care Centre were reviewed for the period 1977 to 1987. The overall mean rate of admission for the period was 0.28 per cent, for surgically-related admissions 0.22 per cent and for anaesthesia-related admissions 0.07 per cent. The principal reasons for surgery-related admissions were postoperative bleeding, complications, the need for further surgery, the requirement for prolonged postoperative care, and pain. Urology had a particularly high percentage of admissions compared with its workload, because of the diagnostic nature of much of the work. Anaesthesia-related admissions included "syncope," lack of an accompanying adult, aspiration pneumonitis and coincident acute disease. Twelve of the 14 patients admitted with syncope had surgery in the afternoon and had received less than ideal amounts of intravenous fluid. Seven of the 12 ASA physical status II patients admitted had an admission diagnosis related to the coincident disease.

Les admissions d'un jour du Centre de chirurgie de l'Hôpital Général de Vancouver ont été revues pour la période de 1977 à 1987. Le taux moyen général d'admission pour cette période était de 0,28 pour cent et de 0,22 pour cent pour les admissions chirurgicales et 0,07 pour cent pour les admissions anesthésiques. Les raisons principales pour les admissions chirurgicales étaient le saignement postopératoire ou d'autres complications, la nécessité d'une chirurgie plus extensive, la nécessité de soins

postopératoires prolongés et la douleur. L'urologie présentait un pourcentage particulièrement élevé d'admission comparative à sa charge de travail principalement à cause de la nature diagnostique de la plupart des procédures. Les admissions reliées à l'anesthésie incluent « la syncope », l'absence d'escorte adulte, la pneumonie d'aspiration et l'existence concomitante d'une maladie aiguë. Douze des 14 patients admis pour syncope ont été opérés l'après-midi et ont reçu une quantité insuffisante de liquide intraveineux. Sept des 12 patients admis ayant un état physique ASA II présentaient une maladie concomitante.

Outpatient surgical units are a well-established part of today's hospital facilities. Vancouver General Hospital (VGH) Surgical Day Care Centre (SDCC) treats over 11,500 patients per year (Figure 1), approximately 43 per cent of the total surgical caseload of the hospital. This does not include the 1,500 lithotripsy patients per year who are cared for in a separate area. This review is of the 90,234 patients treated in the geographically free-standing but functionally integrated SDCC of VGH during the first ten years of its existence. The admissions to hospital from the unit are reviewed as part of our continuing Quality of Care program. Since the numbers are relatively small in any one year it was decided to compile a ten-year summation to look for any features that might become apparent in a larger group of patients.

Key words

ANAESTHESIA: out-patient, complications.

From the Department of Anaesthesia, Faculty of Medicine, The University of British Columbia, Vancouver General Hospital, Vancouver, British Columbia.

Address correspondence to: Dr. P. Fancourt-Smith, Department of Anaesthesia, Vancouver General Hospital, 910 West 10th Avenue, Room 3200, Vancouver, B.C., V5Z 4E3.

Methods

All patients treated in the SDCC are recorded in a register at the time of discharge. The discharge records for the period September 1977 to March 1987 were reviewed and the patients admitted to the main hospital instead of being discharged home were noted. This period was chosen because the unit opened in September 1977 but the hospital audit runs from April to March. The hospital records of the admitted patients were inspected individu-

ally. The patients were grouped according to whether the reason for admission was surgical or anaesthetic. Each group was then divided into sub-groups depending on the admission diagnosis.

The patients admitted were also grouped by year. The total number of patients treated in the SDCC was taken from the unit records and the annual hospital admission rate was calculated. The overall admission rate for the ten-year period was also calculated.

The numbers of each procedure performed in the unit were estimated by taking two weeks, one in May and one in November, and recording the number of times each procedure was performed during those weeks in each of the years 1982 (when Urology joined the unit) to 1987. An average for each procedure was then taken and percentages calculated. Patients admitted for surgical reasons were grouped according to procedure and these figures compared with the frequency with which the procedures were performed.

In the case of the patients admitted for anaesthetic reasons the ASA physical status was recorded. The charts of patients admitted with the diagnosis of aspiration were reviewed carefully and were divided into those in whom there was good evidence supporting the diagnosis and those in whom the diagnosis appeared to be based on regurgitation alone with no documented evidence of respiratory sequelae. The preoperative histories of the patients admitted with the diagnosis of syncope were reviewed to look for any predisposing factors for their prolonged recovery time.

Results

The overall rate of admissions to VGH from the SDCC for the ten years 1977–1987 was 0.28 per cent. The rate varied from a high of 0.47 per cent to a low of 0.16 per cent. These are shown in relation to the annual number of patients treated in the SDCC in Figure 1. The mean rate of admissions related primarily to surgery was 0.22 per cent and that for anaesthesia-related admissions was 0.07 per cent. The annual rates for anaesthesia and surgery are shown in Figure 2. The reasons for admission are listed in Table I. Four patients required hospitalization for coincident conditions when examined in the preoperative holding area. Two were admitted without surgery: one with inadequately controlled hyperthyroidism and the other with a badly infected tooth socket following dental extraction some days earlier. The other patients needed more urgent surgery and, since both had acute airway problems, they were managed with local anaesthesia and monitored anaesthetic care followed by admission for observation and treatment.

The principal reasons for admission related to surgery were: minor bleeding which was too great to be managed

FIGURE 1 Total annual admissions per thousand cases VGH from SDCC ○—○ compared with total number of cases per year in thousands ●—●.

TABLE I Reasons for hospital admission from VGH SDCC

	No. of patients
<i>Surgery related</i>	
Bleeding	65
Complication of surgery	44
Further surgery indicated immediately	43
Surgery more extensive than planned	24
Pain	22
<i>Anaesthesia related</i>	
Syncope	14
No accompanying adult	12
Aspiration	6
Preoperative assessment	
– Admitted directly	2
– Surgery with standby	2
Cardiac arrest	2
Hypertension	2
Hypovolaemia	2
Seizures	2
Emotionally distressed in PAR	2
Nausea and vomiting	2
Pseudocholinesterase abnormality	2
Post-laryngospasm pulmonary oedema	
Dysrhythmia	1
Allergic reaction	1

TABLE II Patients admitted for surgical reasons by service 1982–1987*

	Number of admissions	Percentage
Gynaecology	39	45.3
Urology	38	44.2
Dental	2	2.3
Orthopaedics	1	1.2
Ophthalmology	1	1.2
General	3	3.5
Otolaryngology	2	2.3

*Period during which Urology working in unit.

FIGURE 2 Comparison of annual surgical and anaesthetic admissions per thousand cases.

TABLE III SDCC caseload

<i>Gynaecology</i>	
Therapeutic D. & C.	35%
Laparoscopy	13%
Diagnostic D. & C.	} 10%
Cone biopsy	
Miscellaneous	
<i>Urology</i>	
C. & P.	16%
Vasectomy	} 3%
Vaso-vasostomy	
Miscellaneous	
<i>Dental</i>	
	8%
<i>Orthopaedics</i>	
Arthroscopy	} 4%
Removal of plates etc.	
Foot	
Miscellaneous	
<i>Hand</i>	
	3%
<i>Ophthalmology</i>	
	3%
<i>General</i>	
Hernia	} 3%
Anal	
Breast biopsy	
Miscellaneous	
<i>Plastics (excluding hand)</i>	
	1%
<i>Otolaryngology</i>	
	<1%
<i>Thoracic</i>	
	<1%

at home, minor complications of the surgery performed and the discovery of major pathology undiagnosed preoperatively. The number of admissions for surgical reasons from each surgical service is listed in Table II. The frequency of performance of individual procedures is shown in Table III.

The largest single group of patients admitted for anaesthesia-related reasons were diagnosed according to

TABLE IV Patients admitted with diagnosis of suspected or confirmed aspiration 1977-1987

ASA physical status	Procedure	Initial anaesthetic technique	Area where diagnosis made
II	Circumcision	GA by mask	OR
II	Arthroscopy	GA by OTT	OR
I	D & C	GA by mask	OR
I	Laparoscopy	GA by OTT	PAR
I	Arthroscopy	GA by OTT	PAR
I	Strabismus repair	GA by OTT	PAR*

GA - General anaesthesia

OTT - Orotracheal tube

OR - Operating room

PAR - Post-anaesthetic recovery room

*Diagnosis confirmed by arterial blood gas analysis and chest radiograph.

TABLE V Anaesthesia related admissions by year and ASA class

Year	ASA I	ASA II	ASA III
1977-78	1	1	0
1978-79	9	1	0
1979-80	8	2	0
1980-81	3	4	0
1981-82	7	1	0
1982-83	1	2	0
1983-84	4	0	0
1984-85	2	0	0
1985-86	4	1	0
1986-87	5	0	1

Wetchler's term, syncope, "Symptoms of dizziness, drowsiness, weakness and hypotension singly or in combination...." Six patients were admitted with suspected aspiration (Table IV). Of these six only one case was confirmed by chest radiography and blood gas analysis. Twelve patients were admitted because when each was ready for discharge the adult responsible for accompanying them home could not be contacted. Other causes of admission occurred with a frequency of less than one in forty-five thousand. The ASA physical status of all patients admitted for anaesthesia-related reasons is shown in Table V. The one class three patient was admitted preoperatively with a diagnosis of hyperthyroidism. Table VI is a breakdown of ASA physical status II patients. In seven of the twelve patients admitted the admission diagnosis was related to the reason for classifying them ASA II.

Table VII groups patients admitted for anaesthesia-related reasons by surgical procedure. The more frequently performed procedures had admission rates appropriate to their frequency except for oral surgery which resulted in no admissions.

TABLE VI Physical Status ASA II patients admitted for anaesthesia related reasons 1977-1987

<i>Reason for ASA classification</i>	<i>Reason for admission</i>
Infected tooth socket	Unfit for anaesthesia
Upper respiratory tract infection	Elective admission
History of rheumatic fever;	Profound intraoperative
dyspnoea on exertion;	hypotension and bradycardia
palpitations; smoker	requiring CPR
History of epilepsy	Seizures in PAR
History of hypertension	Hypertension and angina in PAR
Upper respiratory tract infection	"Syncope"
Upper respiratory tract infection	Dehydration secondary to pre-admission diuretic
Abnormal ECG	Suspected aspiration unconfirmed
Smoker	Suspected aspiration unconfirmed
Asthmatic	"Syncope"
Smoker	No adult for discharge
Angina, smoker	No adult for discharge

Discussion

The purpose of outpatient facilities is to relieve the pressure on hospital beds and to make the process of surgery more convenient for the patient. One way of assessing the success of a unit is to look at the number of patients requiring admission to hospital, since this represents failure of the system to fulfill the purpose for which it was created. As Levy points out, post-anaesthetic follow-up, even using pre-stamped forms, brings a very low rate of return.¹ Admission to hospital provides an easily identifiable end-point for measuring morbidity although it is, in ambulatory surgery terms, an extreme one.

The criteria upon which the decision to discharge a patient is made obviously have a bearing on the hospitalization rate since these guidelines also form, by exclusion, the criteria for admission.² The Recovery Room Standards Package which has been developed at VGH in conjunction with the Division of Nursing includes both detailed Criteria for Independent Discharge and a checklist on all patients' Recovery Room flowsheets which is completed by the discharging nurse. Admission to the main hospital occurs when a patient does not meet the discharge criteria.

The overall admission rate for the ten-year period (90,234 patients) was 0.28 per cent. This number compares favourably with the other published series which quote values from 0.11 to 2.4 per cent.^{1,3} Free-standing units tend to have the lowest transfer rates while hospital-based units are higher by as much as a factor of ten. It has been suggested that the ease of admission in the latter is the reason for this wide variation in rates.^{4,5} While most of the reports are from US institutions, Paasuke and Davies reporting a conference on "Anaesthesia for Day-

TABLE VII Anaesthesia-related admissions by procedure 1982-1987*

	<i>Number of admissions</i>	<i>Percentage of total</i>
<i>Gynaecology</i>		
Therapeutic D & C	6	32
Laparoscopy	3	16
D & C	2	12
Cone biopsy		
<i>Urology</i>		
C & P	2	16
Miscellaneous	2	
<i>Orthopaedics</i>		
Arthroscopy	2	12
<i>Ophthalmology</i>		
Strabismus repair	2	12

*Period during which Urology working in unit.

care Patients" quote figures given by Duncan and Maltby from the Foothills Hospital, Calgary.³ Their combined surgical and anaesthesia admission rate was 1.65 per cent with an anaesthetic component of 0.54 per cent. Since there are differences in financial considerations regarding hospital admissions from day care units between Canada and the US these figures are more appropriate for comparison with our own.

Surgical admissions

The admissions related primarily to the surgery involved can be grouped under five headings (Table I). When a surgical procedure is accepted as suitable for the Day Care Unit one criterion is that it is associated with little postoperative pain. However, there will always be some patients who need more analgesia than can be administered at home and this group have to be admitted. Similarly, surgery performed in a day care unit should not normally be complicated by postoperative bleeding. The group of patients admitted for bleeding represent principally those who had slight but persistent oozing following D & C or mild degrees of haematuria after urological instrumentation; neither was a major complication but was too great to be managed at home without supervision. Cases of major bleeding have been re-operated upon in the unit and the patient transferred to the main hospital after surgery.

When the surgical admissions were grouped according to service (Table II) and compared with the caseload of that service (Table III) it became apparent that while the less busy services had appropriately small numbers of admissions the two busiest services placed different

demands on in-patient beds. Urology with only 19 per cent of the SDCC workload produced 44 per cent of the admissions while Gynaecology which utilizes 58 per cent of the unit's operating time led only to 45 per cent of the admissions. The difference was because, while both services had their share of complications such as minor bleeding or patients with pain, the urologists used the day care concept as a diagnostic facility more than the gynaecologists. Half the urological admissions were to enable treatment to be started on pathology diagnosed during cystoscopy.

Anaesthetic admissions

Six patients were admitted with a diagnosis of aspiration (Table IV). All had received general anaesthesia as had all patients who were admitted. Although we cannot produce precise figures, the majority of patients during the period of the review received general anaesthesia. The incidence of aspiration in the literature of ambulatory surgery varies considerably. Levy quotes one case in 106 hospital admissions in a population of 4495 anaesthetics.¹ Natof prospectively found one case in 32,001 patients.⁵

Kallar, in a multicentre review, reported a suspected or definite episode of aspiration in 1.7 per 10,000 procedures.⁶ Our suspected or confirmed incidence was 1 per 15,000 procedures and of the six suspected cases only one was confirmed by arterial blood gas analysis and chest x-ray. Thus our incidence of confirmed aspiration pneumonia is 1 in 90,234. All our patients were given instructions to fast from midnight prior to surgery. Also we have a standing order for patients to receive an oral antacid in the preoperative holding area. Before 1980 we used magnesium-aluminum hydroxide suspension. Since 1980 patients have received sodium citrate.

There have been two cases classified as cardiac arrest in the period under review although one may have been severe hypotension during laparoscopy. As with the major surgical complications both patients were initially stabilized in the unit's recovery room before being transferred to the Intensive Care Unit. Both patients were subsequently discharged.

The largest single group of admissions became necessary during the recovery period and is best described using Wetchler's term, syncope, "Symptoms of dizziness, drowsiness, weakness and hypotension singly or in combination...."² These are patients in whom no specific problem was diagnosed but who were too drowsy, or became dizzy or faint on standing without identifiable hypotension, and were therefore not ready for discharge. This group was reviewed carefully to see if a more definite diagnosis could be made. Although none of these patients was recorded as having postural hypotension, twelve of

the fourteen had received less than 1000 ml of fluid up to the time that an anaesthetist was asked by a Recovery Room nurse to review them. We consider this volume to be the minimum desirable for the average patient. Further, one of the two patients who had received 1000 ml had treated herself earlier in the day with a diuretic for an upper respiratory tract infection. Twelve of the 14 patients arrived in the recovery room after 13.00 hr which meant they could not be allowed as long to recover as morning patients. This will always be a problem in a unit with fixed hours of operation. In our institution, the group of patients admitted as suffering from postanaesthetic syncope were probably dehydrated and arrived in the recovery room late in the day. We have not accumulated sufficient numbers to decide if this group can be reduced by more generous fluid administration, although there was a reduction from eleven in the first four and one half years to three between 1982 and 1987.

During the period under review the ASA physical status of the majority of patients was I or II and only latterly were class III patients considered acceptable for anaesthesia. The ratio of class I to class II cannot be assessed accurately retrospectively but even with our more liberal guidelines now in use the majority of patients are still class I. The ASA class II patients admitted for anaesthetic related reasons were reviewed. In seven of the 12 patients admitted, the diagnosis was related to the reason for classifying them as ASA class II (Table VI). This is different from Natof⁷ who concluded that the rate of complications causally related to one of five pre-existing diseases was no higher than the general complication rate of patients who did not have one of the five diseases. In our study, patients with coincident disease were only reviewed in detail when admitted for non-surgery-related reasons and therefore our figures cannot be compared directly with those of Natof. Further, in both studies the numbers in this sub-group were small, and our results do not constitute an argument against accepting ASA II patients for day surgery.

This review has looked at a period of steady expansion in day care surgery (Figure 1). However, the criteria for acceptance for anaesthesia in our unit were comparatively restrictive for the whole period. Since completion of the review there has been an even greater shift to out-patient work. While the number of patients with significant coincidental disease is still small, we have liberalized our criteria. A more liberal policy may result in an increase in unplanned admissions to hospital for overnight care but we cannot say whether this is so. The overall rate for the last 12 months was 0.42 per cent. We review our day-care to hospital admissions on a regular basis as part of our departmental quality of care program. It is necessary for

any day surgical unit to carry out this kind of review to ensure that changing practices are not having adverse effects on the running of the unit. This review, however, has shown that a large day surgical unit can be run within the umbrella of a hospital but physically independent of it and place very few demands on its parent institution.

References

- 1 Levy M-L. Complications: prevention and quality assurance. *In: Out Patient Anesthesia. Anesthesiology Clinics of North America* 5:1, Mar 1987. Levy M-L, Weintraub HD (Eds.). Philadelphia: W.B. Saunders.
- 2 Wetchler BV. Post operative management, discharge and follow-up. *In: Out Patient Anesthesia. Anesthesiology Clinics of North America* 5:1, Mar 1987. Levy M-L, Weintraub HD (Eds.), Philadelphia: W.B. Saunders.
- 3 Paasuke RT, Davies JM. Anaesthesia for daycare patients: controversies and concerns. *Can Anaesth Soc J* 1986; 33: 5: 644-6.
- 4 Patterson FJ, Bechtoldt AA, Levin KJ. Ambulatory surgery in a university setting. *JAMA* 1976; 235: 266-8.
- 5 Natof HE. Complications. *In: Wetchler BV (Ed.). Anesthesia for Ambulatory Surgery.* Philadelphia: J.B. Lippincott 1985.
- 6 Kallar SK. Aspiration pneumonitis: fact or fiction? *In: Out Patient Anesthesia. Problems in Anesthesia* 2:1, January-March 1988. Wetchler BV (Ed.). Philadelphia, J.B. Lippincott.
- 7 Natof HE. Special Study 1. Alexandria VA 1987. Federated Ambulatory Surgery Association.