

## Postdischarge unplanned admission in ambulatory surgery—a prospective study

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### Abstract

**Background::** Postdischarge recovery continues at home and some patients will need admission if complications occur.

**Objective::** To analyze the postdischarge unplanned admission rate in a hospital-based ambulatory surgery unit.

**Method::** Prospective non-comparative study. Patients admitted in the first 30 days postdischarge were included.

Univariate analysis was performed to identify independent predictive factors for these admissions.

**Results::** The postdischarge unplanned admission rate was 1%. Urology, gynaecology and general surgery, patients 90 years or older and epidural anaesthesia were significant risk factors for postdischarge unplanned admission.

**Conclusion::** The postdischarge unplanned admission rate was very low.

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**Keywords:** Ambulatory surgery; Ambulatory outcome; Postdischarge admission

### 1. Introduction

A discharge protocol is essential for safe practice in the day procedure setting. It is accepted that some patients will not be fit for discharge after surgery. Postdischarge recovery will continue at home and some patients will need admission if complications occur.

Postdischarge complications cannot be reasonably predicted. The causes may either be related or not related to surgical technique or anaesthetic procedures. The bibliography reports postdischarge unplanned admission rates following ambulatory surgery between 0.85 and 2.2% [4,5,7,8] while we do not know what it is following inpatient surgery. It should be understood that once ambulatory surgery programmes overcome the implementation step it will be almost impossible to carry out research with a higher evidence level

as a control group of patients for comparison will not be available [16,17].

### 2. Objective

To analyze postdischarge unplanned admission in a hospital-based ambulatory surgery unit.

### 3. Method

In a 38-month period, a prospective non-comparative study was carried out on postdischarge unplanned admissions in a hospital-based ambulatory surgery unit.

Patients admitted in the first 30 days postdischarge from the ambulatory surgery unit between October/1998 and December/2001 were included. All patients operated on in this period were followed and consecutive unplanned admissions were documented using a specific protocol.

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At the central database system information was cross referenced between the ambulatory surgery unit programme and the emergency room admission programme. Data were collected and all coincidences of the patients' identifications numbers were derived to a designed protocol for unplanned admission. Details documented included:

- age and sex;
- ASA status;
- surgical specialty;
- type of anaesthetic;
- operation performed;
- reasons for admission;
- lapsed time before admission;
- hospital stay;
- mortality.

Modified Aldrete Test in recovery phase 1 (PACU) and Postanaesthesia Discharge Scoring System (PADSS) in recovery phase 2 (ASU) were utilized. All the patients had reached the required score before discharge.

#### 4. Definitions

- Major ambulatory surgery: procedures that need a recovery phase in the ambulatory surgery unit but no overnight stay is necessary.
- Minor ambulatory surgery: procedures that do not need a recovery phase in the ambulatory surgery unit. Patients are discharged when surgery is finished.
- Recovery phase 1: recovery time between the end of surgery and total haemodynamic and respiratory stability.
- Recovery phase 2: recovery time between the end of phase 1 and a satisfactory score in the discharge protocol (PADSS).
- Lapsed time before admission: period of time in days between discharge and postdischarge admission.
- ASA status: American Society of Anesthesiologists Physical Status Classification.

- PACU: postanesthetic care unit.
- ASU: Ambulatory surgical unit.

The postdischarge unplanned admission rate was calculated and descriptive statistics were utilized. The significant risk factors on postdischarge unplanned admission were reported as a relative risk (RR) with a 95% confidence interval.

Univariate analyses of five clinical factors (sex, age by group, ASA status, surgical specialties and type of anaesthetic) were performed to identify independent predictive factors for these admissions.

#### 5. Results

Between October 1998 and December 2001, 16,601 of 21,693 elective surgeries were performed on an ambulatory basis. There were 6209 (37%) major ambulatory and 10,392 (63%) minor ambulatory procedures. Fig. 1 shows the percentages of both major and minor ambulatory surgery by surgical specialties.

In a 38-month period, there were 63 cases of postdischarge unplanned admission being a rate of 0.37% (63/16,601). These were distributed by surgical specialty as follows: General surgery 0.59% (25/4217), Vascular surgery 0.32% (2/613), Gynaecology 0.20% (4/1965), Ophthalmology 0.17% (5/2879), ENT (ear, nose and throat) 0.33% (2/604), Orthopaedic 0.49% (8/1624), Paediatric 0.76% (2/263), Urology 0.37% (15/3960) and Plastic surgery 0% (0/476). There were no postdischarge unplanned admissions following minor ambulatory procedures and their exclusion resulted in an admission rate of 1% (63/6209). Table 1 shows this rate by surgical specialty for major ambulatory surgery. Significant differences in the unplanned admission rate in General surgery, Gynaecology and Urology were found.

Female sex was 51%. No significance difference in the unplanned admission rate by sex was found (Table 2).

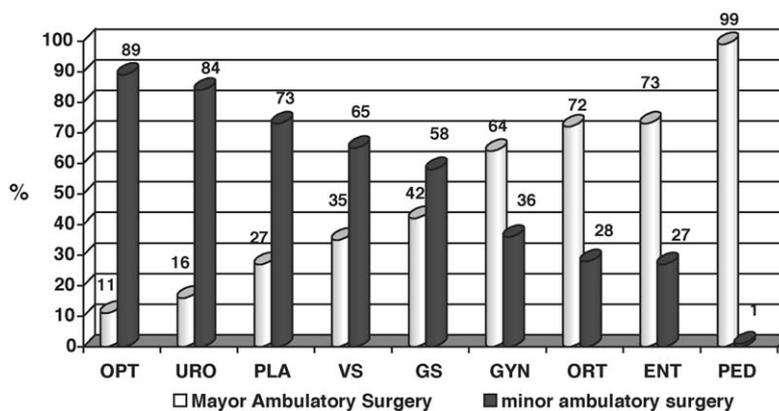


Fig. 1. Percentages of both major and minor ambulatory surgery by surgical speciality. OPT: ophthalmology; URO: urology; PLA: plastic surgery; VS: vascular surgery; GS: general surgery; GYN: gynaecology; ORT: orthopaedic; ENT: ear, nose and throat; PED: paediatric.

Table 1  
Unplanned admission rate by surgical specialties for major ambulatory surgery

Surgical specialties	Number of patients	Unplanned admission rate (%)	Relative risk (95% confidence interval)	P-value
General surgery	25/1777	1.40	1.64 (0.99–2.71)	0.058593
Vascular surgery	2/216	0.92	0.91 (0.23–3.59)	0.62
Gynaecology	4/1261	0.31	0.27 (0.10–0.73)	<0.005
Ophthalmology	5/327	1.52	1.55 (0.63–3.84)	0.23
ENT	2/444	0.45	0.43 (0.10–1.74)	0.16
Orthopaedic	8/1167	0.68	0.63 (0.30–1.32)	0.21
Paediatric	2/260	0.76	0.77 (0.19–3.15)	0.50
Urology	15/628	2.38	2.78 (1.56–4.93)	<0.0002
Plastic surgery	0/129	0	–	–
	63/6209	1		

Table 2  
Unplanned admission rate by sex

Sex	Number of patients	Unplanned admission rate	Relative risk (95% confidence interval)	P-value
Female	32/3589	0.89	0.75 (0.46–1.23)	0.25
Male	31/2620	1.18	1.33 (0.81–2.17)	0.25
	63/6209			

Table 3  
Unplanned admission rate by age group

Age group (years)	Number of patients	Unplanned admission rate	Relative risk (95% confidence interval)	P-value
0–9	1/228	0.44	0.42 (0.06–3.04)	0.32
10–19	4/198	2.02	2.06 (0.76–5.61)	0.14
20–29	3/404	0.74	0.72 (0.23–2.28)	0.40
30–39	2/401	0.49	0.47 (0.12–1.94)	0.21
40–49	6/623	0.96	0.94 (0.41–2.18)	0.89
50–59	6/838	0.71	0.67 (0.29–1.56)	0.35
60–69	17/1253	1.35	1.46 (0.84–2.59)	0.17
70–79	17/1682	1.01	0.99 (0.57–1.73)	0.90
80–89	5/545	0.91	0.90 (0.36–2.22)	0.81
90+	2/37	5.40	5.47 (1.39–21.54)	<0.007
	63/6209			

Median age was 64 years (interquartile range 25–75% = 47–74 years). Distribution rate by age group showed a significance difference in the unplanned admission rate in patients 90 years or older (Table 3).

ASA Status was: ASA I 15 cases, ASA II 36 cases and ASA III 12 cases. No significance differences in the unplanned admission rate were found (Table 4).

Type of anaesthesia showed a significance difference in the unplanned admission rate in epidural procedures (Table 5).

Operations performed by surgical specialties are showed in Table 6.

Most of the causes of unplanned admission were surgical (64%) and the more frequent were infection, bleeding and pain (Table 7).

Median lapsed time before admission was 6.5 days (interquartile range 25–75% = 2–13 days) (Fig. 2).

Median hospital stay was 3 days and the mode was 1 day. Mortality rate was 0.03%. There were two patients:

1. Woman of 76 years old with irradiated uterine cervix tumor. A biopsy of cervix was performed and then she was admitted for sepsis at 11th day postdischarge and died at 7th day post admission.

Table 4  
Unplanned admission rate by ASA status

ASA status	Number of patients	Unplanned admission rate	Relative risk (95% confidence interval)	P-value
I	15/1699	0.88	0.90 (0.51–1.59)	0.72
II	36/3612	0.99	0.96 (0.58–1.57)	0.86
III	12/898	1.33	1.54 (0.84–2.82)	0.16
	63/6209			

Table 5  
Unplanned admission rate by type of anaesthesia

Type of anaesthesia	Number of patients	Unplanned admission rate	Relative risk (95% confidence interval)	P-value
General	20/2053	0.97	0.94 (0.56–1.60)	NS
Spinal	17/1607	1.05	1.06 (0.61–1.84)	NS
Epidural	15/285	5.26	6.50 (3.68–11.46)	<0.0000001
Local + intravenous sedation	0/506	0	–	–
Brachial plexus block	1/244	0.40	0.39 (0.05–2.83)	NS
Local	10/1514	0.66	0.59 (0.30–1.15)	NS
	63/6209			

Table 6  
Postdischarge unplanned admissions by operations performed

General surgery	Six laparoscopic cholecystectomy
	Six inguinal hernioplasty
	Five haemorrhoidectomy
	Three eventroplasty
	Two umbilical hernioplasty
	One femoral hernioplasty
	One anal abscess
Urology	One anal sphincterotomy
	Six shot weaver lithotripsy (SWL)
	Four transurethral resection of bladder tumour
	Two orchidectomy
	Two hydrocelectomy
Gynae	One ureteroscopy
	One cervix biopsy
	One breast biopsy
	One mastectomy
Orthopaedic	One laparoscopic quistectomy
	Four arthrovideoscopy
	One hallux amputation
	One dupuytren disease
ENT	Two internal fixation
	Two amigdalectomy
Ophthalmology	Three cataract surgery
	One retinopexy
	One strabismus surgery
Vascular surgery	One arterio-venous fistula
	One saphenectomy
Paediatric	Two inguinal hernioplasty

2. Man of 86 years old. An inguinal hernioplasty was performed and then at 2nd day postdischarge he was admitted with an acute abdomen. He was submitted to laparoscopy and a purulent diverticular peritonitis was found. A Hartmann's procedure was performed. At 4th day postadmission he died of sepsis.

## 6. Discussion

We think that the postdischarge unplanned admission rate is a good clinical indicator for quality control in ambulatory surgery programmes, but not the only one. Other parameters such as substitution index, unplanned overnight admission

index, morbidity, mortality, patient satisfaction and cost are very important too [1–10,12,14,16].

Both major and minor ambulatory surgery rates are different in each surgical specialties. The postdischarge unplanned admission rate in minor ambulatory surgery is very low. We think that the analysis of this clinical indicator must exclude these minor procedures. This way it will allow more reliable evidence to be obtained. Comparison between the institutions, inside institutions and among the surgical specialties requires defining key demographic elements whose identification for now remains a challenge [4]. Retrospective studies are important but we believe that prospective research should be the way forward. Given the progress of evidence-based medicine, surgeons should not distance themselves from these activities, which will have a great influence on health care in this century [17].

We found that 75% of the patients were admitted 2 or more days postdischarge (Fig. 2). Most postdischarge unplanned admissions could not be avoided even with an ambulatory surgery programme with extended recovery (i.e. patient including overnight stay before discharge the following day) [8]. On the other hand, we do not now what the

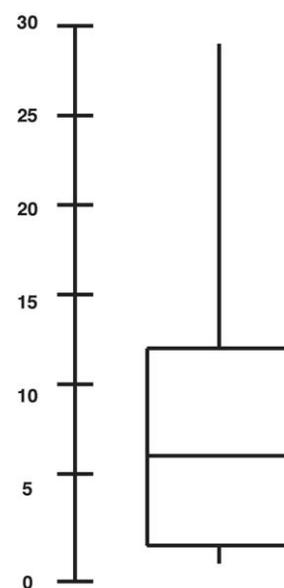


Fig. 2. Lapsed time before admission. Median 6.5 days; interquartile range 25–75%, 2–13 days; range 1–29 days.

Table 7  
Reasons for admission (N = 63/6209)

Surgical	N	Medical	N	Anaesthetic	N	Others	N
Wound bleeding	3	Acute myocardial infarctation	4	Headache	2	Fever	2
Wound haematoma	2	Pneumonia	3	Acute urinary outflow obstruction	1	Upper gastrointestinal bleeding	1
Haemarthrosis	1	Pulmonary embolism	2	Pneumothorax	1	Lower gastrointestinal bleeding	1
Renal haematoma	1	Deep venous thrombosis	2			Diverticular peritonitis	1
Anexial haematoma	1	Stroke	1				
Scrotal haematoma	1	Acute pulmonary oedema	1				
Haematuria	2	Tuberculous meningitis	1				
Anal abscess	1						
Scrotal abscess	1						
Wound infection	7						
Infection urinary tract	5						
Endophthalmitis	2						
Overcorrection poststrabismus surgery	1						
Postoperative biliary ascites	1						
Intestinal obstruction	1						
Renal colic	3						
Pain	6						
Sepsis	1						
	40 (64%)		14 (22%)		4 (6%)		5 (8%)

postdischarge unplanned admission rate is following inpatient surgery. There is a dearth of well-controlled, randomized studies comparing inpatient and ambulatory surgery.

We agree with Greenburg et al. [4] and we think that research needs to be undertaken to analyze the true predictive value of the surgical procedure on postdischarge unplanned admissions. Surgical techniques are not always comparable and other variables such as different surgical specialties and surgeons and illness status should be taken into consideration [4–7,11,13,17].

Anaesthetic induced complications have little influence on the postdischarge unplanned admission rate and our study only found a significant difference with epidural procedures. One report [15] shows spinal procedures as a significant risk factor. We consider that more research is necessary to obtain more reliable evidence.

## 7. Conclusions

1. The Postdischarge unplanned admission rate is relatively low.
2. Urology, gynaecology and general surgery and 90 years or older patients and epidural anaesthesia are significant risk factors on postdischarge unplanned admission.

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