

Surgical audit in a district general hospital: a stimulus for improving patient care

RICHARD E GLASS MS FRCS

Senior Registrar in Surgery

PAUL A THOMAS MS FRCS

Consultant Surgeon, Whipps Cross Hospital, London

Key words: SURGICAL AUDIT; IMPROVING PATIENT CARE

Summary

A computerised audit system was used to monitor clinical and administrative management of surgical patients in a District General Hospital. In one year (1985) there were 1,060 discharges from 27 beds (39.3 patients/bed/year). Operative treatment was required in 652 patients but 408 patients did not undergo surgery. Of this latter group the majority were admitted with abdominal pain (179 patients) and a final diagnosis was made in only 76 patients. The majority of patients were discharged within one week of admission, but 94 patients (8.9%) were admitted for more than three weeks. Of this group 42.5% could not be discharged because of poor home and social circumstances. The results of this study suggest that management could be improved without compromising patient care, in particular by providing adequate facilities for day care surgery and by improving social and geriatric support services. Reductions in staff or bed numbers without providing such improvements will lead to a significant reduction in patient care.

Introduction

Whether we like it or not, surgeons are now to be held responsible for the cost of their clinical activities. The surgeon has a duty to provide adequate care but must recognise that there is a limit to the finances that are available. As the cost of medical care rises, the clinician can only hope to maintain standards by improving efficiency. Before an individual surgeon can achieve this however, he must have accurate information as to his clinical activities. Only then can he identify areas of inefficiency and consider if they can be improved without compromising patient care. The aim of this study was to record the clinical and administrative activities of one surgical team in a district general hospital.

The information was to be gathered prospectively and then analysed in an attempt to identify areas of care which need improvement. The study was confined to in-patient care and was started two years after the start of the consultant's professional career at Whipps Cross Hospital.

Facilities and medical staff

Whipps Cross Hospital is one of two hospitals providing surgical care for the district of Waltham Forest in North East London. Whipps Cross Hospital, alone, provides emergency surgical care and serves a population of

approximately 259,000. The hospital has 130 general surgical beds staffed by four consultants and 33 urology beds with two consultants.

The study was conducted by one surgical team consisting of a consultant, with a responsibility for vascular surgery; a shared senior registrar, on rotation from the London Hospital; a shared senior house officer/registrar, and two pre-registration house surgeons. All post-registration staff have other duties within the district which are not included in this study.

The surgical firm looks after 27 beds split on two wards which provide two single-bedded rooms and two two-bedded rooms. Four half-day lists are available and two outpatient clinics. The firm is on take for emergencies on a 1 night on 4 rota. There are no day care facilities but minor procedures are performed under local anaesthetic in casualty theatres. Urological services are not included in this review.

The data presented in the paper is derived from one surgical team. Data obtained from monthly 'in hospital' surgical audit meetings show that the general surgical work load is equally distributed amongst the four surgical teams. Total patient numbers presented here therefore represent approximately 25% of the total number of hospital general surgical patients. There will however be some variation in the specialty interest of each of the four teams.

Methods

The study was conducted for one year. A weekly audit of all discharges or transfers was held at a meeting of surgical staff before the consultant's ward round. Information on each patient discharged in the previous week was entered on to a specially designed data card. Details of admission, investigations, treatment, complications and discharge were recorded; a final index diagnosis identified and appropriate follow-up arranged. In addition, a record was kept of all admission cancellations, whether by the hospital or by the patient, and the reason for delay in discharge if appropriate.

From the data card the details on each patient were entered into a Minstrel microcomputer by a research assistant. The computer system provides data storage as well as a facility to generate discharge letters and a summary of inpatient care on each patient. This system was developed locally and financed with a grant from the North East Thames Regional Health Authority (Sangmed Fund).

Results

There were 1,060 patients discharged from 27 beds (39.3 patients/beds per year). Of these 1,060 patients 890 (84%) were resident in the district of Waltham Forest but 170 (16%) lived outside the district. Four hundred and ninety nine patients were admitted as an emergency from casualty, 28 were transferred from other surgical or medical teams within the hospital and 533 patients were admitted for elective treatment (Table I).

When seen in outpatients all patients for elective admission were given a date of proposed entry into hospital. Despite this policy of planned admission 85 patients had to have their admission delayed as a bed was not available. However, 99 patients cancelled their booked admission to hospital requesting an alternative admission date. There was an almost constant rate of patient cancellations per month. Cancellations by the hospital were however seasonal and maximal during the months of December, January and February and lowest during the months of June, July and August (Fig. 1).

TREATMENT

Operative Six hundred and fifty two patients underwent a total of 704 operations, of which 130 were emergencies, 12 urgent (within 48 hours of admission) and 562 elective. Of those patients undergoing an elective operation, 74 had been admitted from casualty and required surgical treatment before discharge. Each operation was classified according to the BUPA scale as Major (296), Intermediate (212) and Minor (196). Although the consultant shares a responsibility for vascular surgery, the range of procedures was wide (Table II) and the majority of operations were for diseases of the colon, rectum and anus. Ninety four point seven per cent of all operations were performed by permanent members of the surgical team. Only 37 operations during the year were performed by locum medical staff.

TABLE I Admission and subsequent treatment at Whipps Cross Hospital

	Non-operative treatment n=408	Operative treatment n=652
Emergency admissions (n=499)	293	206
Elective admissions (n=533)	100	433
Internal referrals (n=28)	15	13

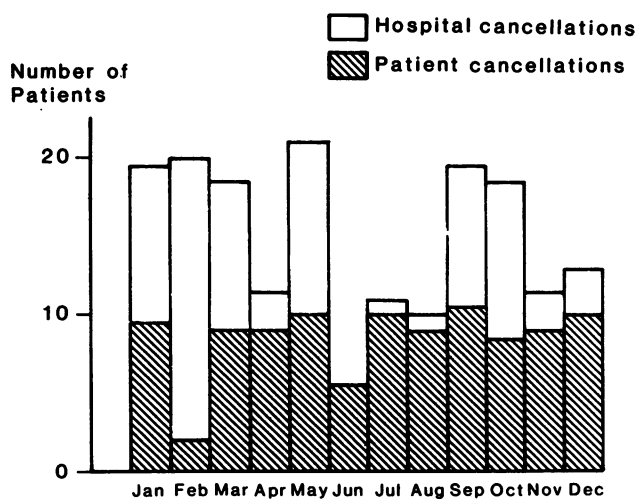


FIG. 1 Cancellations of admission to hospital by hospital and by patient.

Non-operative Four hundred and eight patients did not require an operation (Table III) and the majority (293—72%) were admitted direct from casualty. The most common reason for an admission that did not result in a surgical procedure was abdominal pain (179 patients) and on discharge a definite diagnosis was made on only 76 of these patients. As Whipps Cross Hospital does not have provision for day case procedures, a number of patients were admitted for endoscopy. Twenty two patients scheduled for elective surgery were found on admission not to require an operation. In eight patients with benign breast disease, the mass palpated in outpatients had disappeared, and 14 children with herniae or phimoses were found on admission to have minor

TABLE II Classification of 704 operations performed on 652 patients

<i>Gastrointestinal</i>	
Gastrectomy	10
Vagotomy and drainage	4
Oversew of perforated ulcer	6
Hiatus hernia repair	1
Palliative gastric/biliary bypass	4
Small bowel resection	12
Diagnostic laparotomy	22
Drainage of intra-abdominal abscess	3
Colectomy	32
Closure of colostomy	8
Appendicectomy	60
Repair of rectal prolapse	9
Pilonidal sinus excision	3
Rectal polyp excision	15
Haemorrhoids, fissure, fistula	24
<i>Biliary and pancreatic</i>	
Cholecystectomy (+/- exploration bile duct)	40
Liver, pancreatic resection	3
<i>Vascular</i>	
Arterial reconstruction	25
Aortic aneurysmectomy	13
Sympathectomy	1
Amputation	28
Varicose vein surgery	43
<i>Head and neck</i>	
Thyroidectomy, parathyroidectomy	11
Salivary gland excision	3
Tracheostomy	2
<i>Breast, hernia, external genitalia</i>	
Breast biopsy	41
Mastectomy	8
Hernia repair	76
Orchidopexy	10
Hydrocoele excision	7
Circumcision	27
<i>Integumental</i>	
Excision skin lesions	105
Pilonidal sinus	3
Drainage of cutaneous abscess	32
Ingrowing toe nail excision	16

TABLE III Details of 408 patients admitted and discharged without a surgical procedure (diagnosis on discharge)

Abdominal pain—cause unknown	103
Abdominal pain—cause identified	76
Malignant disease	38
Trauma, including burns and closed head injury	74
Gastro-intestinal bleeding	11
Assessment of peripheral vascular disease (arteriogram +/- chemical sympathectomy)	20
Varicose ulcers/cellulitis	14
Peptic ulcer/hiatus hernia for endoscopy	39
Miscellaneous	11
Decision to operate changed	
benign breast disease	8
hernia/circumcision	14

upper respiratory tract infections and were considered unsuitable for elective general anaesthetic. Infected varicose ulcers in patients with poor social circumstances are a problem in Waltham Forest, and 14 patients were admitted for a period of bed rest and intensive nursing to clean their wounds.

DEATHS (TABLE IV)

Thirty three patients died, and all within 30 days of an operation. Ten patients died after elective surgery and of this group seven were found to have disseminated cancer. All died with pneumonia after diagnostic laparotomy. Two patients died of ischaemic heart disease after an amputation for end-stage peripheral vascular disease. Both had undergone previous amputations and had severe cardiac insufficiency. One patient of 87 years died after reversal of a previous Hartman's procedure. This patient almost died after emergency colectomy for perforated diverticular disease but despite the risks, requested a second operation as she could not accept life with a colostomy.

Twenty three patients died after an emergency operation; two after laparotomy for obstructing or perforating

TABLE IV Details of 33 postoperative deaths

Diagnosis	Emergency n=23	Elective n=10
Cancer	2	7
Peripheral vascular disease/ aortic aneurysm	8	2
Perforated/bleeding peptic ulcer	6	—
Perforated colon (non-malignant)	3	—
Small bowel obstruction	3	—
Multiple injury	1	—
Reversal of Hartman's procedure	—	1

TABLE V Details of 149 postoperative complications in 652 patients undergoing 704 operations

Wound: (628 wounds)	
Infection	36
Haematoma	22
Minor dehiscence	8
Laparotomy dehiscence	2
	—
	68
Gastro-intestinal:	
Anastomotic leak	4
Enterocutaneous fistula	2
Gastro-intestinal bleed	5
Pancreatitis	2
	—
	13
Thromboembolic:	
Deep vein thrombosis	5
Pulmonary embolism	2
	—
	7
Cardiovascular/respiratory:	
Cerebrovascular accident	3
Congestive cardiac failure	9
Myocardial infarction	1
Pneumonitis	15
	—
	28
Genito-urinary	
Retention	13
Renal failure	8
Infection	12
	—
	33

inoperable cancer, eight after amputation for gangrenous legs, three after operation for diverticular disease, three after laparotomy for non-malignant obstruction and six after operation for perforated or bleeding duodenal ulcer. These six latter patients with complicated duodenal ulcer disease are of interest. All were over 73 years of age and one over 90. All but one died within five days of surgery, but their demise was associated with severe coexisting disease, including carcinomatosis, pneumonia and severe peripheral vascular disease.

POSTOPERATIVE COMPLICATIONS

Table V shows the details of 149 complications that occurred after 704 operations. A complication occurred in 68 of 628 surgically created wounds (10.8%). Infection occurred in 27 of 516 clean wounds (5.2%) and in 9 of 112 potentially contaminated wounds (8.0%). Four patients developed an anastomotic leak after colonic resection; two were diagnosed clinically by the development of a faecal fistula and two on routine radiological studies after a colorectal anastomosis. Two patients developed an enterocutaneous fistula after emergency surgery for small bowel obstruction. One patient had inoperable cancer but the other patients had no evidence of malignant disease. Both died within 30 days of operation.

All patients who underwent surgery were given subcutaneous heparin as prophylaxis against thromboembolic complication. Nevertheless, five patients developed a deep vein thrombosis, confirmed by venogram, and two a pulmonary embolism. There were however no deaths from thromboembolic complications.

INPATIENT STAY

Fig. 2 shows the length of stay as inpatient weeks. The majority of patients (91.1%) were discharged within

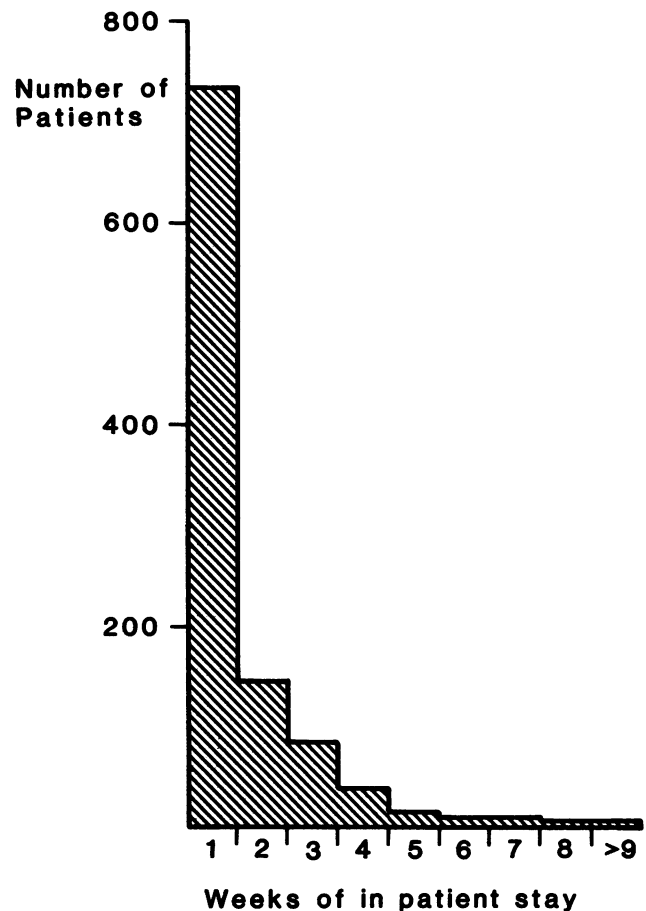


FIG. 2 Length of in-patient stay in weeks.



FIG. 3 Age distribution of patients remaining in hospital for longer than three weeks.

TABLE VI *Diagnosis and details of 94 patients admitted for more than 21 days*

		Cause of delay in discharging patient*	
		Disease or treatment (n=54)	Social circumstances (n=40)
Peripheral vascular disease (including abdo. aortic aneurysm)	27	15	12
Gall stones/pancreatitis	12	9	3
Carcinoma: stomach	5	3	2
pancreas	1	1	—
colon/rectum	15	9	6
breast	3	3	—
unknown primary	6	4	2
Diverticular disease	4	1	3
Rectal prolapse	3	—	3
Varicose ulcers	4	4	—
Appendicitis	2	1	1
Perforated peptic ulcer	1	1	—
Investigation of gastro-intestinal bleeding	4	—	3
Miscellaneous	7	3	4

*Cause of delay or discharge classified primarily due to the disease or its treatment, or to poor home or social circumstances.

three weeks and 739 patients (69.7%) within one week of admission. Ninety-four patients (8.9%) were however admitted for more than three weeks. Fig. 3 shows the age of this group of patients in decades expressed as a percentage of the total series. These patients were clearly of an elderly age group and it appears that if a patient was over 80 years and admitted to Whipps Cross, there was a one in three chance of the patient remaining in hospital for more than three weeks whatever the diagnosis. This group of patients is of obvious interest. The majority (27) had peripheral vascular disease of which 15 had an amputation. Twelve patients had biliary or pancreatic disease and 30 malignant gastro-intestinal disease. Of 94 patients admitted for more than three weeks, 11 did not undergo surgical treatment.

Table VI shows details of this group of patients and includes the reason for delay in discharge from hospital. In 54 patients the disease or its treatment was primarily responsible, but in 40 patients discharge was delayed because of inadequate home care or facilities.

Discussion

The advent of clinical budgeting has drawn attention to the need for cost-effective medical practice. Estimating clinical requirements can be difficult and is usually based on a locally collected Hospital Activities Analysis (HAA). It is recognised however that such information can be inaccurate and lead to a serious underestimate of individual clinical needs. It was with this background that we decided to monitor a year's clinical work in an attempt to provide accurate information as to our future needs and our present inefficiencies.

Collecting data for such an audit is not easy and is often delegated to junior staff whose interests may lie far from efficiency and effective patient management. We felt it essential to make the audit consultant-based by arranging a weekly meeting before the consultant's ward round. This had many benefits. The time-consuming aspects of data collection were minimised by the number of auditors and inconsistencies in coding minimised by the presence of the consultant. Results and investigations could be reviewed, especially histological reports, and appropriate decisions taken. The computer facility provided easy access to patient data but had the added advantage of producing immediate discharge summaries. Several secretaries are now familiar with this system and are pleased to be relieved of repetitive typing, freeing them to take care of patients' inquiries and appointments.

The overall results of this study were of obvious interest to individual members of the surgical team but were not dissimilar to the results published by other workers (1-3). A death/discharge rate of 39.3 patient per bed per year is equal to the proposed target of patient throughput for the North East Thames Regional Health Authority. A significant number of patients treated lived outside the district of Waltham Forest (16%). This may reflect the urban nature of the health district and its proximity to other health districts.

During the period of study, a policy of planned 'diary' admissions was maintained. However, 34.5% of all planned admissions did not get into hospital on the allotted day and this policy would therefore seem to be failing. On closer study of these cancellations, some interesting factors emerge. As a result of unavailability of beds 16.3% of patients were cancelled by the hospital. This reflected the pressure produced in a hospital where nearly half (47%) of surgical admissions were of an emergency nature. In addition, the seasonal variations in hospital cancellations reflected the need for beds for acute medical care in the winter months. This is a predictable pattern and improvements could be made by accepting that at this time of year the number of elective surgical admissions should be curtailed. In exchange for this freeing of beds for medical care, more surgical beds could perhaps be made available during the months of May, June and July.

It is disappointing to note that more patients cancelled their admission (99) than were postponed by the hospital (85). These were short notice cancellations and it is difficult to know how this can be prevented. It might be that such cancellations take pressure off the admission office by releasing much needed beds. In the winter months, such cancellations are unlikely to leave beds unfilled but is a cause for concern if bed wastage occurs in summer months.

Planning for elective surgery seems to be further complicated by the number of patients admitted as an emergency who required an elective operation before discharge (13.2%). Each week one to two patients, admitted from casualty required elective surgery, and often a major operation. This is a regular occurrence and it is necessary to allocate theatre time for these cases.

The range of surgical procedures performed was wide and surgeons in training gained adequate experience in all aspects of general surgery. Because of commitments elsewhere in the hospital and district, the total number of operations carried out by the surgical team represents only a proportion of its surgical responsibilities. If the threatened reduction in the numbers of staff at Whipps Cross Hospital occurs then, based on the results of this study, a significant fall in elective surgery will follow.

Whipps Cross Hospital is not provided with day case operating facilities, and considering the diagnosis and subsequent treatment we estimate that of 704 operations approximately 256 (36.4%) could have at least in theory been performed under a general anaesthetic as a day case. Day case surgery is however not quite so straightforward and requires an appropriate day case ward as well as an experienced surgeon and a cooperative patient with good home facilities. In Waltham Forest a high proportion of patients have inadequate home facilities and a number of immigrants a poor command of English. Under such circumstances day case surgery may not be appropriate. Despite these reservations the results of this study suggest that day case surgery might significantly reduce the pressure on acute surgical beds. One group of patients who would certainly benefit from such a facility would be those who undergo diagnostic endoscopy (37%). The use of an acute surgical bed in this way is wasteful and is likely to be increasingly so as interventional endoscopy expands.

A high proportion of patients were admitted but did not require an operation. The great majority were patients with abdominal pain (179 patients) and in only 76 was an accurate diagnosis made by the time of discharge. At Whipps Cross Hospital all patients with abdominal pain are examined in casualty where there is a computer programme available to aid diagnosis and identify those who require admission. Many patients are admitted to an observation ward and therefore do not enter an acute surgical bed. The admissions detailed here are therefore a selected group. Abdominal pain can be a difficult problem to assess even by senior doctors and the most senior may not be available to see the patient in casualty. Under such circumstances admission is the safe and correct policy but a hospital bed is needed even though the patient may be fit to be discharged the following day. From the results of this study there could be an advantage in increasing the number of available overnight observation ward beds to accommodate the 179 cases (3-4 a week) with abdominal pain not requiring surgery admitted by this surgical firm. This of course would only be a valid improvement if the cost of running such beds were less.

Deaths and complications have been detailed in order to present a complete picture, but there have been some interesting results. The fate of patients with a perforated or bleeding duodenal ulcer seems poor with only four of six patients surviving operation. This group of patients was however elderly and had coexisting disease. Two patients developed pulmonary embolism and five a deep vein thrombosis. There were however no deaths from thromboembolism, which justifies the continued prophylactic use of subcutaneous heparin in this surgical unit.

The incidence of minor wound complications is perhaps too great (10.8%) and should be reduced. As judged from other studies a wound infection rate of 5.2% for clean wounds and 8.0% for potentially contaminated wounds is probably within the accepted range. We have been aware that many of our patients remain in hospital

for too great a time and this is supported by the results of the study. Waltham Forest, like many districts in urban areas, has a high proportion of elderly patients, many of whom live alone without family support. Home circumstances, with which patients cope prior to admission, are frequently found to be lacking after a period of hospital stay. In the present study, it was found that whatever the diagnosis, any patient over the age of 80 had a one-in-three chance of remaining in hospital for more than three weeks. Of those whose stay was longer than three weeks, 42% were unable to return home because of inadequate social circumstances. This analysis of course underestimates the problem, as we have not studied in detail those patients who were admitted for less than three weeks. There is little doubt that additional patients could have been discharged earlier if alternative accommodation or improved home help were available. It is this group of patients which requires the expertise of specialised geriatric care, and there is a strong case to be made for transfer of such patients out of expensive high dependency acute surgical beds into a more suitable environment. General surgeons are not recognised as specialists in this particular field and nursing expertise on acute surgical wards is at a premium.

It was the aim of this study to record the clinical and administrative management of patients under our care. Many aspects have given cause for satisfaction but many for concern. We have established that day case facilities and endoscopic facilities must be provided before a further reduction in acute surgical beds can be accepted. The high percentage of patients cancelling their admission is disappointing and we are not sure how this can be altered. A cancellation by the hospital is a tragedy but this can perhaps only be prevented or minimised by introducing day case facilities or by allocating specific beds for elective admissions that cannot be used for emergency cases. The number of elderly patients who require prolonged admission because of poor home or social circumstances is of major concern. In this respect our findings differ from a recent geriatric study from a Belfast teaching hospital (4) in that social circumstances do appear to determine the length of stay of elderly patients in acute general surgical wards. It is accepted that bed blocking (5) is to some extent inevitable in wards that are attempting to cope with a steadily rising number of elderly patients but in a financial environment when departments may be held responsible for budget control, a request for the proper occupancy of acute surgical beds will inevitably follow. We hope that the results of this study will encourage those involved in geriatric and social services to help surgeons make more efficient use of acute surgical resources.

References

- 1 Gough MH, Kettlewell MGW, Marks CG, *et al.* Audit: an annual assessment of the work and performance of a surgical firm in a regional teaching hospital. *Br Med J* 1980;281:913-20.
- 2 Gilmore OJA, Griffiths NJ, Connolly JC *et al.* Surgical audit: comparison of the work load and results of two hospitals in the same district. *Br Med J* 1980;281:1050-2.
- 3 Quill DS, Devlin HB, Plant JA *et al.* Surgical operation rates: a twelve-year experience in Stockton-on-Tees. *Ann R Coll Surg Engl* 1983;65:248-53.
- 4 Macquire PA, Taylor IC, Stout RW. Elderly patients in acute medical wards: factors predicting length of stay in hospital *Br Med J* 1986;292:1251-3.
- 5 Coid J, Crome P. Bed blocking in Bromley. *Br Med J* 1986;292:1253-6.