

# Changes in emergency surgery between 1973 and 1982: audit of the workload of one surgical team

E PHILIP PERRY MSc FRCSEd  
Surgical Registrar

JOHN C CRISP MB BS FRCS\*  
Surgical Registrar

DAVID F L WATKIN MCh FRCS  
Consultant Surgeon

Leicester Royal Infirmary, Leicester

**Key words:** SURGICAL AUDIT; SURGICAL STAFFING; SURGERY, EMERGENCY

## Summary

*The emergency surgical workload of a consultant in general surgery has been studied by comparing two prospectively collected audits of 6-month periods 9 years apart. There have been a number of changes in the pattern and intensity of general surgical admissions (excluding trauma) with a decline in the total number per day from 14.1 to 12.4 and a reduction in the number of days on call for general surgery from 30 to 14 over the 6-month period. There was a similar fall in days on call for trauma from 60 to 23 days and a decline in total emergency surgical operations from 6.6 to 5.2 operations per night on call. These changes have mainly been produced by an increase in the number of consultants in the hospital from five to eight and specialisation with the establishment of an area urology unit. The results of this study suggest that as consultant numbers increase in a particular area there will be diminished exposure of surgical trainees to emergency cases both in quantity and in quality, and this loss of experience will prove deleterious to the trainee surgeon.*

## Introduction

Surgical audit has become popular in the quest to understand and raise the quality of patient care (1,2). Sub-specialisation within general surgery has seen growth in the development of specialties such as urology, paediatric surgery and vascular surgery, and this trend is likely to continue. Initiatives both by the Government and the profession aim to increase the numbers of consultants and to reduce the career bottleneck for surgeons in training (3,4). We have used a prospective audit over 9 years to provide some insight into the effects of these changes on the profession.

## Materials and methods

### CASES STUDIED

All emergency admissions under the care of one consultant (DFLW) were prospectively recorded during two 6-month periods 9 years apart (1 April to 30 September 1973 and 1 February to 31 July 1982). Patients admitted more than once were scored separately for each admission. The diagnosis on discharge was amended if investigations after discharge showed it to be inaccurate, so that the final diagnosis was as accurate as possible. The diagnoses reached have been grouped into six main categories:

- 1 Right iliac fossa (RIF) pain, if appendicitis was the only surgical consideration,
- 2 Other abdominal pain,
- 3 Trauma,
- 4 Retention of urine,
- 5 Readmission after recent treatment,
- 6 Others, which included vascular cases, abscesses (mainly perianal), testicular problems and individual cases of heart failure, deep venous thrombosis and diabetic ketoacidosis.

Patients operated as emergencies from the wards of other specialties were entered into the survey at the time of operation or when transferred to the surgical ward if this was sooner. Patients visited on other wards for a surgical opinion were not recorded.

### THE HOSPITAL

General surgical emergency admissions in Leicestershire were shared by the General Hospital and the Royal Infirmary where DFLW is based. The population served by the hospitals increased from 717 000 in 1973 to 805 000 in 1982. The only accident and emergency department in Leicester is at the Royal Infirmary so that all cases of general surgical trauma were sent there. General surgical admissions from all other sources including

\* Present appointment: Consultant Urological Surgeon, Watford General Hospital

Correspondence to: Mr E. P. Perry FRCSEd, Walsgrave General Hospital, Coventry CV2 2DX

general practitioners, and casualty (non-trauma) were rotated between the two hospitals, on a one in two basis. The casualty department had an observation bay of two beds in 1973 and a purpose-built observation ward of eight beds in 1982 for overnight stay of adults, for which the surgeons were not responsible, and admissions to these beds have not been included in our audit. In 1975 the University of Leicester Medical School admitted its first undergraduate students and they graduated in 1980. Therefore, in 1973 the Royal Infirmary was a district general hospital but by 1982 had completed the transition to a teaching hospital. In 1976 the Area Urology Unit was opened at the General Hospital and received all urological emergencies.

#### STAFFING

In 1973 there were five consultants at the Royal Infirmary and DFLW was on take 2 days in 6 to balance the registrar rota. By 1982 the number of consultant general surgeons had increased to eight. Thus, in the 1973 period there were 60 days when the firm was on call for trauma and 30 of these days also included all general surgical admissions. In 1982 there were 23 days on call for trauma in the 6-month period and 14 of these days also included all general surgical admissions. In both periods there were four general surgical consultants at the Leicester General Hospital. Within the area, in 1973 there was one consultant per 79 667 patients and in 1982 there was one consultant per 67 083 patients.

#### STATISTICS

Comparisons between groups were made using the  $\chi^2$  test.

#### Results

There were 604 emergency admissions during the 6-month period in 1973 which was 73% of all admissions to the firm. In the corresponding 6-month period in 1982 there were 226 emergency admissions which was 48% of all admissions. Allowing for the increase in the population served, the overall admission rate per thousand of the population per day fell from 0.024 in 1973 to 0.018 in 1982. In 1973 the emergency admissions were 228 (38%) males, 198 (33%) females and 178 (29%) children (aged 12 years or less) and in 1982 there were 93 (41%) males, 88 (39%) females and 45 (20%) children. In both years

TABLE I Details of workload and staffing structure in each period

	1973	1982
Number of days on call for trauma	60	23
Number of days on call for trauma and other general surgery	30	14
Average total number of general surgical admissions per day on call (excluding trauma)	14.1	12.4
Average number of trauma admissions per day on call	3.0	2.3
Average number of urological admissions per day on call	2.5	0.1
Total number of operations per day on call	6.6	5.2
Consultants in hospital	5	8
Medical Staff on Firm		
Houseman	0	1
Senior House Officer	1	1
Registrar	1	0.5*
Senior Registrar	0	0.5*

\* Each shared with one other consultant

the pattern of distribution by age of these admissions was similar, with peaks at ages below 20 years and greater than 65 years. During the two periods the number of elective inpatients treated was 223 in 1973 and 244 in 1982. These figures do not include patients treated by day case surgery in 1982 when such a facility was not available in 1973. The principal changes between 1973 and 1982 are summarised in Table I. The total number of general surgical admissions fell from 14.1 to 12.4 patients per day on call between 1973 and 1982 but if urology and trauma admissions are deducted then the number of such surgical admissions per day on call increased from 11.6 to 12.3 patients per day on call.

Table II summarises the final diagnoses made on all admissions for the two periods. There was an increase in the proportion of patients presenting with RIF pain in 1982, but this was mainly caused by the loss of urological admissions from the total number in 1973 which was a purely organisational change. In 1982 the proportion of patients with abdominal pain coming to operation (35%) was lower than in 1973 (49%) with a significant decrease in the RIF pain group ( $P < 0.001$ ). There was a significant fall over the 9 years in the proportion of

TABLE II Disease category for emergency admissions

Disease category	1973	1982	
RIF Pain	Pathology		
	{ appendicitis	77	22
	{ other	15	5
	{ normal	15	5
	Total	107 (18%)	32 (14%)
Other abdominal pain	No operation	54 (9%)	49 (22%)*
	Operation	45 (7%)	14 (6%)
Trauma	No operation	105 (17%)	37 (16%)
Retention of urine		180 (30%)	52 (23%)*
Readmission after recent treatment		44 (7%)	1 (0%)*
Others		27 (4%)	12 (5%)
Total		42 (7%)	29 (13%)
		604	226

The percentage of the total admissions in parentheses

\*  $P < 0.01$  for differences to 1973

emergency admissions of children from 65% of the total to 44% in 1982 ( $P < 0.009$ ) and this is principally accounted for by a fall in the number of admissions for trauma. It is interesting that eight out of 178 children admitted as emergencies in 1973 had irreducible inguinal hernias, whereas there were none in 1982 from a total of 45 children admitted.

### Discussion

We have audited the evolution of a general surgeon's workload over a period of 9 years. There have been several significant changes affecting various aspects of the clinical practice. A fall was observed in overall general surgical admission rates per thousand of the population served. This fall is partially accounted for by the diversion of urological emergencies to a specialised urological unit in the 1982 period. Secondly, specialised units such as vascular and paediatric surgery have made inroads into the emergency cases. There was also a fall in the number of trauma cases admitted per day on call, with the proportion of adults similar in both periods and the admission rate for children declining significantly. Improved casualty facilities for the overnight observation of head injuries helped to keep adult admissions unchanged and possibly the introduction of two career senior registrars in the accident and emergency department in 1981 led to better decision making in the casualty department and subsequently less referral of trauma in children.

The number of general surgical admissions per day on call, which were non-urological and non-traumatic, increased over the period of this study. This group provided the largest numbers of emergency surgical operations and, despite an increase in the total number of admissions in this group, the number of operations per day on call declined. In 1982 more patients were referred with RIF pain but significantly fewer had an emergency operation. Of those who were operated upon the percentage in whom acute appendicitis was found (70%) was similar in both time periods. It has been suggested that the incidence of acute appendicitis is decreasing (5) and our figures agree with this. The incidence of strangulated inguinal hernias in male children fell to zero in 1982. Increased paediatric surveillance in the postnatal period and advances in paediatric anaesthesia, which allow safe operative repair at an earlier age, may be responsible for this.

The proportion of all surgical admissions which were emergencies fell from 73% in 1973 to 48% in 1982. An increase in consultant numbers in the hospital from five to eight has clearly contributed to this change, and

therefore future increases in the consultant grade seem likely to continue this trend, since the number of days receiving emergency admissions will be relatively reduced. During the two periods we have studied there was a similar number of elective inpatients treated (per consultant): 223 in 1973 and 244 in 1982.

The changes we have described have important implications for surgical training. The most obvious of these is a reduction in exposure of all staff to emergency surgery. In our audit we have seen a reduction in nights on call, a reduction in total emergency admission rates per day and the loss of certain special groups of patients. Some of these changes may relate to the evolution of Leicester Royal Infirmary as it became a teaching hospital over the 9 years of the audit, but the general pattern of change in emergency general surgical experience is clear, with a diminished exposure of trainee surgeons to emergency cases both in quality and in quantity.

This loss of experience will prove deleterious to the trainee surgeon, and career training of junior surgeons is developing in conjunction with less intense on-call rotas and an intended reduction of training time. Our data clearly shows that these trends will exacerbate an already shrinking emergency surgical experience. There is a real need to provide emergency surgical experience and a redistribution of trainee surgeons to posts in district general hospitals may be necessary. Furthermore, with increased channelling of patients to specialties there is an increased need for changes in the rotations of surgical trainees to include experience in these subspecialties. Although less pressure on junior staff must be a welcome change, care is required to ensure that an adequate minimum experience is achieved in the training of career general surgeons.

### References

- 1 Glass RE, Thomas PA. Surgical audit in a district general hospital: a stimulus for improving patient care. *Ann R Coll Surg Engl* 1987;69:135-9.
- 2 Gruer R, Gordon DS, Gun AA, Ruckley CV. Audit of surgical audit. *Lancet* 1986;2:23-6.
- 3 Royal College of Surgeons of England. Report on Surgical Manpower and Career Structure. *Ann R Coll Surg Engl* 1981;63 Suppl:1-10.
- 4 Department of Health and Social Security. Joint Consultants Committee, Chairmen of Regional Health Authorities. Hospital Medical Staffing: Achieving a Balance. London: DHSS, 1986.
- 5 Department of Health and Social Security. Hospital Inpatient Report. London: HMSO, 1972.

*Received 20 January 1989*