

Theatre delay for emergency general surgical patients: a cause for concern?

Michael G Wyatt MSc FRCS

Registrar

Paul W J Houghton ChM FRCS

Senior Registrar

A John M Brodribb MS FRCS

Consultant Surgeon

Department of General Surgery, Derriford Hospital, Plymouth

Key words: General surgery, theatre delay

The delay involved in operating on emergency general surgical patients is often excessive. This problem has been examined prospectively in a district general hospital with a catchment population of 450 000. Over a 16-week period, the details of 204 consecutive general surgical emergency operations were recorded and analysed. Following essential resuscitation, the median delay in operating on emergency general surgical patients was 3 h. Eighty-eight patients had to wait in excess of 1 h, with 15% experiencing a delay of over 6 h. In only 10% of cases was a theatre required after midnight, yet 26% of all emergency general surgical operating was performed between midnight and 8 am. The majority of delays were due to a combination of factors; theatre delay was mentioned in 47% of cases, anaesthetic delay in 30% and the overrunning of routine lists in 14% of cases. Our results suggest that unnecessary theatre delay results in an unacceptable number of emergency general surgical operations occurring after midnight. It is important that routine afternoon lists do not overrun, as this contributes directly to evening theatre delay. If both theatre and anaesthetic availability could be ensured in the afternoon and early evening, the after midnight workload could be cut from 26% to 10%, and staff sleep deprivation reduced.

With the recent introduction of strict hospital budgeting programmes, less money is now available to staff and equip hospital operating theatres. This limiting of theatre resources may have reached an unacceptable level resulting in wasteful underutilisation of theatre capacity (1) and increasing the length of the general surgical elective

Present address and correspondence to: Mr M G Wyatt, Research Fellow, Vascular Studies Unit, Level 7 Research Floor, Bristol Royal Infirmary, Bristol BS2 8HW

waiting lists. More importantly, such limitations may have serious consequences in the provision of an adequate emergency surgical service.

Assuming adequate resuscitation, further delay in operating on the acutely ill general surgical patient may result in a deterioration of that patient's condition. In addition, lengthy theatre delay results in a greater proportion of the emergency operations being performed after midnight, resulting in staff fatigue and less effective patient care the following day.

It has become apparent, following discussions with surgeons from many hospitals within the UK, that there may be increasing difficulties in getting patients to theatre within a time limit felt acceptable by the operating surgeon. We considered it appropriate to examine this problem in a busy district general hospital covering a catchment population of 450 000.

Patients and methods

Over a 16-week period, each member of the junior staff was provided with proformas to record details of all the emergency general surgical operations carried out by their firm. Data collected included the patient's name, time of admission, time of theatre contact, time of 'knife to skin', operation type, the time the operation finished and the reason for any delay. Proformas were collected each week and the data collated. Operating theatre books were checked at regular intervals to ensure that all cases were reported.

'Theatre delay' was defined as any factor contributing towards a delay in operating on an emergency general surgical patient following the surgeon's decision to operate and his contacting the operating theatre. The time

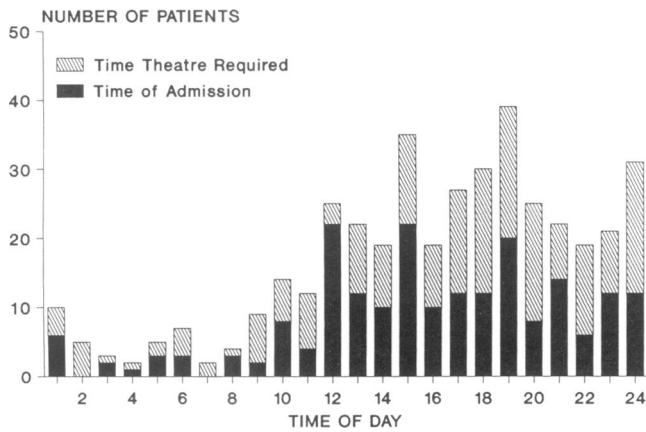


Figure 1. Time of admission and time theatre required.

delay between admission and the decision to operate was not included in the delay figures as this is an essential period for both surgical and anaesthetic assessment, observation and resuscitation prior to surgery.

Results

Details of 204 consecutive general surgical emergency operations were recorded and analysed.

The majority of general surgical emergency admissions requiring operation occurred during the 12-hour period 9am–9pm (75%), with only 9% admitted after midnight (Fig. 1).

In 58% of cases, the demand for an emergency general surgical theatre occurred in the evening (4pm–midnight), with only 21% of patients requiring an operation while the theatres were fully committed to elective operating lists (Fig. 1). Although the demand for emergency theatre usage was only 10% after midnight (6% during the working week), 26% of all emergency operations were undertaken during these hours, mostly by the junior surgeons (Fig. 2).

The median delay between the time theatre was required and the start of the operation (knife to skin) was 3 h (Fig. 3), with only 25 patients operated on within the hour (vascular emergencies and acute testicular torsion). Despite time allocated for anaesthetic assessment and resuscitation, 88% of patients had to wait in excess of 1 h for their emergency operations, with 15% experiencing a delay of over 6 h (range 6–13.5 h).

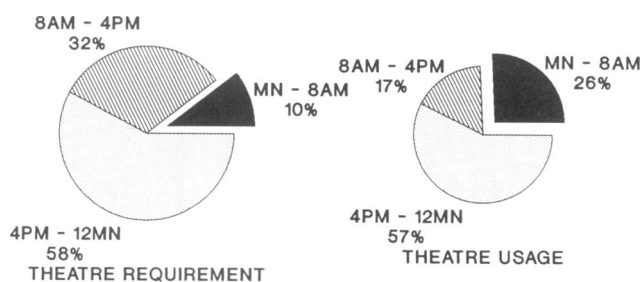


Figure 2. Theatre utilisation.

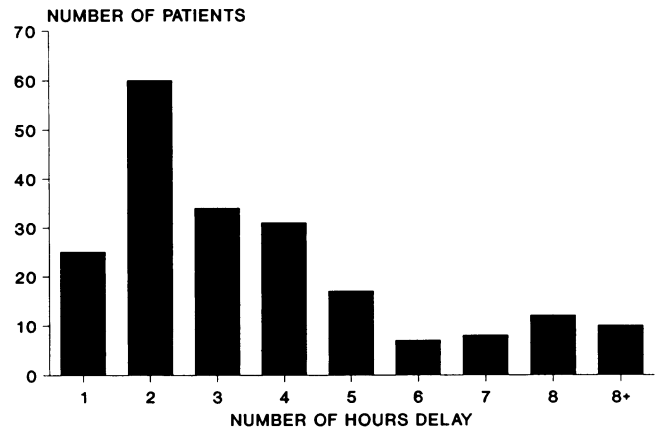


Figure 3. Theatre delay.

The time of day at which an emergency theatre was required was a major determinant of the extent of subsequent delay. For patients requiring a theatre during normal working hours, the median delay was 5 h, compared with a delay of 2–3 h for all other time periods (Table I).

Although the majority of delays were due to a combination of factors, ‘theatre delay’ was specifically mentioned in 47% of cases. This consisted primarily of theatre unavailability, due to other operative procedures (30%), but also included nurse, porter and operating department assistant (ODA) unavailability in 17% of cases.

The overrunning of afternoon lists was mentioned as causing significant delay in 14% of cases and in 10%, theatre delay was due primarily to theatre involvement with other general surgical emergencies. In only 6% of cases did other specialties contribute to any appreciable delay (plastic surgery 4% and orthopaedics 2%).

Ward delay was mentioned in 11% of cases, due to the low levels of ward nurse staffing and the disruption of ward routine involved in the preparation of emergency patients for theatre.

Anaesthetic delay was mentioned in 30% of cases, due primarily to the duty anaesthetist being involved at, or in transit from, other Plymouth hospitals (anaesthetic assessment time is not included in the delay figures).

Other minor causes of theatre delay included surgical unavailability on two occasions (routine lists) and the delay involved in waiting for results of investigations on four occasions. In only 18% of general surgical emergencies was no delay recorded.

Table I. Theatre delay dependent upon time of day

	Time theatre required		
	8am–4pm	4pm–midnight	midnight–8am
Mon–Fri Patient No.	43	98	13
Hours delay	5	3	1.5
Sat–Sun Patient No.	22	20	7
Hours delay	3	2.5	2

Discussion

In the past, inadequate attention appears to have been paid to the question of delay in getting emergency general surgical operative cases to theatre. This study has identified an average emergency theatre delay of 3 h, with 15% of patients having to wait in excess of 6 h. The reasons for these delays are multifactorial, but essentially involve operating personnel unavailability, due primarily to lack of available manpower.

In nearly one-third of emergency cases, operation was delayed due to the immediate lack of availability of an anaesthetist. This is a common problem in many health authorities operating a split site acute service. With the trend towards single site relocation of emergency surgical services, this stretching of anaesthetic availability may become less of a problem. Until such time, it is important for anaesthetic departments to maximise the availability of all their on-call staff up to and including consultant level.

The greatest demand for general surgery emergency theatre and anaesthetic facilities is from 4pm to midnight, Monday to Friday, and not during the time when elective surgery is taking place. The provision of an emergency theatre from 9am to 5pm during the working week, as recommended by CEPOD (2) would have no significant effect on the general surgical emergency problem; it would be expensive to instigate and would not provide resources where most needed. Nevertheless, a theatre available from 12 noon would prevent the 'stacking up' of daytime admissions which presently occurs in the afternoons.

This study has shown that unnecessary evening delay results in an unacceptable number of emergency operations occurring after midnight. It is increasingly realised that sleep deprivation in both surgical and anaesthetic junior staff causes a significant reduction in performance of both mental and physical skills (3,4). In the middle of the night there is increased reluctance to involve more senior members of staff and standards of care may be lower (2).

As the National Health Service becomes more consultant based (5), it will become necessary to ensure that out-of-hours emergency operating is kept to a minimum. The additional emergency workload need not be as arduous as has been suggested (6), provided that the current reductions in essential theatre staff are at least halted, if not reversed. If two extra emergency operations could be performed each weekday evening, the after midnight commitment could be cut from 26% to 10%; junior staff sleep deprivation could be reduced and the standard of patient care perhaps improved.

It is important that routine lists do not overrun, as this has a 'knock on' effect, contributing significantly to evening delay. The provision of an adequate general surgical emergency service before midnight would result in a more efficient utilisation of theatre capacity and a more cost-effective and perhaps safer emergency surgical service.

References

- 1 Dudley H. Empty theatres. Looking at part of the problem provides only part of the answer. *Br Med J* 1988;297:1490.
- 2 Buck N, Devlin HB, Lunn JN. *The Report of a Confidential Enquiry into Perioperative Deaths*. London: Nuffield Provincial Hospitals Trust and King's Fund Publishing Office, 1987.
- 3 Poulton E, Hunt G, Carpenter A, Edwards R. The performance of junior hospital doctors following reduced sleep and long hours of work. *Ergonomics* 1978;21:279-95.
- 4 Durnford S. Junior hospital doctors: tired and tested. Should the rules for pilots apply to doctors? *Br Med J* 1988;297: 931-2.
- 5 United Kingdom health departments. Joint consultants committee. Chairmen of regional health authorities. *Hospital Medical Staffing: Achieving a Balance: Plan for Action*. London: DHSS, 1987.
- 6 Royal College of Surgeons of England. Report on surgical manpower and career structure. *Ann R Coll Surg Engl* 1981;63:Suppl:1-20.

Received 12 December 1989