

Surgical audit without autopsy: tales of the unexpected

Damien A Mosquera BSc FRCS

Surgical Career Registrar

Mark D Goldman MD FRCS

Consultant Surgeon

Department of Surgery, East Birmingham Hospital

Key words: Autopsy; Audit; General surgery

To establish our current practice and the potential value of the autopsy in general surgery, a retrospective review of general surgical autopsies was performed at one district general hospital from January 1989 to August 1991. There was considerable interconsultant variation in autopsy practice with a low 25% overall autopsy rate reflecting a low autopsy request rate. There were discrepancies between the clinical and pathological cause of death in 40 (63%) cases. There were important discrepancies which may have changed management in life in 18 (28%) autopsies, 7 (39%) of which were untreated visceral perforations. Autopsy is an important part of the surgical audit and will disclose considerable unsuspected pathology. Present autopsy rates are low and need to be improved. The unexpected finding of seven untreated visceral perforations requires further study.

The increased emphasis on quality assurance in medical practice has led to a re-evaluation of the role of the autopsy. Many studies detail the importance of the autopsy in medical patients, but we have been unable to locate any reports specifically investigating its value in general surgical practice, where death may follow examination of the peritoneal contents in life.

The aims of this study were to establish our current practice with respect to autopsy and to investigate the potential value of autopsy in general surgery.

Methods

The study was performed by a retrospective review of death certificates, autopsy request forms and deceased patients' notes. It was divided into two parts:

Correspondence to: Mr D A Mosquera, Department of Surgery, East Birmingham Hospital, 45 Bordesley Green East, Birmingham B9 5ST

1 Pilot study

The pilot study examined the previous 100 deaths on one general surgical/vascular ward to determine the overall autopsy rate and that of each of the three consultants with patients on the ward. Records in the death certification office were also examined to determine the number of autopsy requests that had been refused and to record the cause of death given on the death certificate.

2 Extended study

The extended study retrieved case notes, death certificates, autopsy request forms and autopsy reports on all hospital autopsies performed on general surgical patients from January 1989 to August 1991 under the care of six general surgical consultants. It included the hospital autopsies from the pilot study. The extended study specifically examined discrepancies between the clinical diagnosis of the cause of death and the cause of death given at autopsy. Coroner's autopsies were excluded from this analysis to ensure that only deaths for which the clinicians felt they could reasonably give a cause, were scrutinised. The potential value of an autopsy was determined by assessing new information it disclosed. New information on the cause of death or associated pathology was considered significant if it might have changed the clinical management of the patient, if known, before death. This assessment was made by both authors, one of whom was unaware of the surgical team in charge of the deceased patient (MDG). An independent assessment was made initially, and then decisions on the potential value of the autopsy were discussed for each individual case. Cases in which there were technical errors in death certification or disagreement between the authors over the value of the autopsy, were not considered as cases of diagnostic error or as cases where the

Table I. Cases with a potentially valuable autopsy result

<i>Pre-autopsy cause of death</i>	<i>Autopsy cause of death</i>	<i>Possible action</i>
Pulmonary embolism	Pericarditis with large effusion	Drain effusion
Bronchopneumonia	Left ventricular failure	Diuretics
GIT bleeding not treated on basis of diagnosis of underlying cancer	Bleeding duodenal ulcer	Surgery
Normal gastroscopy	No evidence of malignancy	
Enteritis	Perforated rectum	Early surgery
Ischaemic bowel?		
Acute pancreatitis	Perforated duodenal ulcer	Early surgery
Pelvic mass?	Peritonitis 2° perforated diverticulitis	Early surgery
Multiple pulmonary emboli	Peritonitis 2° perforated gastric ulcer	Early surgery
Myocardial infarction?		
Pulmonary embolus bronchospasm?	Bronchospasm, tracheobronchitis with copious mucus	Minitrach or bronchoscopy
Mesenteric thrombosis	Peritonitis 2° perforated gallbladder	Early surgery
Jaundice-gallstones?	Liver abscess	Percutaneous drainage
Peritonitis cause? (recognised late)	Peritonitis 2° perforated duodenal ulcer	Early surgery
Pulmonary embolus	Bronchopneumonia (not recognised)	Antibiotics
Bronchopneumonia	Peritonitis 2° perforated gastric ulcer	Early surgery
Bleeding gastric ulcer		
Disseminated intravascular coagulation after radical cancer surgery	Cerebral oedema Intra-abdominal haemorrhage Vertebral metastases	Revise extent of surgery
Perforated gastric ulcer (following surgery)	Inspissated mucus occluding main bronchi	Minitrach or bronchoscopy
Cardiac arrest	Ruptured left ventricle Cardiac tamponade Recent myocardial infarction	Medical management No resuscitation
Cardiomegaly	Bleeding duodenal ulcer	Endoscopic treatment
Congestive cardiac failure		
Cholecystitis	Multiple pulmonary emboli	Heparin therapy

autopsy result would have altered management beneficially.

Results

1 Pilot study

Only two of 27 autopsy requests were refused (93% success), to give an overall autopsy rate of 25% for the previous 100 deaths. The autopsy rate varied between 16% and 29% depending on the consultant in charge. Of the 25 autopsies performed, eight Coroner's autopsies were excluded leaving 17 hospital autopsies for inclusion in the extended study.

2 Extended study

Since January 1989, 119 surgical autopsies have been performed at East Birmingham Hospital. Coroner's autopsies accounted for 55 cases (46.2%) and 64 hospital

autopsies were distributed between six consultant general surgeons. One surgeon was responsible for 29% of all autopsies, the others being distributed fairly evenly between the remaining consultants (12–18% each). The average age in 33 women patients was 77.9 years (range 43–96 years, median 77.5 years) and in 31 men 73.3 years (range 39–89 years, median 75 years).

In 40 (63%) of the hospital autopsies ($n = 64$) the cause of death disclosed at autopsy differed from the clinical diagnosis of the cause of death. In 18 (28%) of the hospital autopsies, knowledge of the cause of death, if known before death, might have altered the management of the patient (Table I). Among these cases there were seven examples of untreated visceral perforations.

Discussion

We have demonstrated low autopsy rates in our general surgical practice, which varied widely between consultants, and which were below that generally accepted as

adequate for an efficient audit of practice (1–3). What constitutes an adequate rate is, of course, controversial. The Joint Working Party of the Royal Colleges suggests a rate of 35% (1), but other studies consider anything less than a 100% autopsy rate as inadequate (2,3). This study has clearly demonstrated that the low autopsy rate reflected a low autopsy request rate on the part of clinicians, and not a high refusal rate by relatives. Comparison of the cause of death given on the death certificate with the findings at subsequent autopsy showed that the autopsy disclosed unexpected pathology in the majority of patients.

In a significant proportion of deaths (28%), we felt that the pathology revealed at autopsy might have altered the management of the patient if known before death. This is a difficult and highly subjective judgement to make. Technical errors in death certification which resulted in discrepancies between clinical and autopsy causes of death were not considered to be inaccurate for the purposes of this study. Technical errors were errors in which the diagnosis of cause of death was correct in substance but expressed incorrectly on the death certificate, eg cardiorespiratory arrest secondary to haemorrhage from a duodenal ulcer should have read haemorrhage from a duodenal ulcer. However, it could be argued that technical inaccuracies were equally important because future decisions on health care might be taken on the basis of epidemiological information compiled from inaccurate death certificates. In retrospect, it is easy to simplify what at the time may have been a difficult clinical problem. It is even more difficult to decide the potential benefits of treatment after the patient has died. To give clinicians the benefit of doubt, cases of disagreement between the authors over the value of treatment were not considered clinical errors. Possible errors or contentious diagnoses made by the pathologist were also difficult to challenge retrospectively.

Despite these reservations, in our judgement there were still a number of patients who might have benefited from different management. The autopsy request rate needs to improve not only in our own surgical practice, but probably on a national basis. The large number of discrepancies that we have demonstrated, suggest that a confident clinical diagnosis from which a cause of death can be reasonably given on the death certificate is not a substitute for autopsy. It is likely to be incorrect in nearly two-thirds of cases. Further studies with higher autopsy rates will confirm whether these findings apply to all general surgical deaths.

In 11% of deaths a perforated viscus, unsuspected clinically, was potentially treatable. This is an unexpected, but important finding, which requires further investigation, because in these deaths relatively simple surgery might have been life-saving. Increased utilisation of urgent radiological investigations may reduce this problem, but despite all our modern aids to diagnosis it may still be better to look and see, rather than to wait and see.

Our study confirms the low autopsy rates reported in other hospital studies (4–6), although a figure of 28% for potentially beneficial management changes is higher than in most. Autopsy studies now need to move forward. As a quality measure, an improvement in autopsy practice should be followed by detailed specificity and sensitivity rates for clinical diagnosis (7). The autopsy should be considered an essential component of our surgical practice. Our proficiency to plan for the future, both at the individual level and at the epidemiological level, depends on accurate death certification, which can only be achieved through higher autopsy rates.

The authors wish to thank the consultant surgeons of East Birmingham Hospital for allowing us to report on their deceased patients.

References

- 1 Joint Working Party of the Royal College of Pathologists, Royal College of Physicians of London, and the Royal College of Surgeons of England. *The Autopsy and Audit*. London: RCPATH, RCP, RCS, 1991.
- 2 Tchertkoff V. Autopsies should be performed on all cases. *JAMA* 1989;261:2197–8.
- 3 Boers M. The prospects of autopsy: 'mortui vivos docuerunt?' (Have the dead taught the living?). *Am J Med* 1989;86:322–4.
- 4 Goldman L, Sayson S, Robbins S, Cohn LH, Bettmann M, Weisberg M. The value of the autopsy in three medical eras. *N Engl J Med* 1983;308:1000–1005.
- 5 Shanks JH, McCluggage G, Anderson NH, Toner PG. Value of the necropsy in perioperative deaths. *J Clin Pathol* 1990;43:193–5.
- 6 Fernandez-Segoviano P, Lazaro A, Estaban A, Rubio JM, Iruretagoyena JR. Autopsy as quality assurance in the intensive care unit. *Crit Care Med* 1988;16:683–5.
- 7 Saracci R. Is necropsy a valid monitor of clinical diagnosis performance? *Br Med J* 1991;303:898–900.

Received 29 April 1992