

Risk management in the care of medical emergencies after referral to hospital

ABSTRACT An analysis of 40 medico-legal claims arising from the care of patients admitted as medical emergencies showed an excess of young patients (median age 45 years) but equal numbers of men and women. Twenty-nine patients died; with optimal management, 20 of these patients would have had a good chance of long-term survival. Of the 11 who survived, 3 were left with serious neurological deficits and 3 underwent intestinal resections that could have been avoided. Further analysis revealed probable defects in the organisation of care including: inadequate input from experienced clinicians; insufficient use of specialists; incorrect interpretation of radiographs and laboratory tests; and inadequate assessment of patients before discharge from hospital. It is suggested that there is an urgent need to collect and analyse data regarding adverse events in hospital medical practice in order to develop optimal organisational structures for the care of patients presenting as emergencies.

Doctors have been slow to face up to the problem of adverse events in hospital practice¹⁻³. In the UK there are few published data on medical accidents but as the number of complaints and claims increases, trusts are beginning to set up risk management teams to identify and eliminate problems^{4,5}. At present the concept is in its infancy. Whereas reports on confidential enquiries into peri-operative⁶ and maternal⁷ deaths have been published in the UK, no satisfactory methods have been proposed for identifying, recording and analysing adverse events in medical practice – nor for assessing complaints and claims made by or on behalf of patients. Medico-legal cases often take several years to resolve and it is unusual for assessors to be told the outcome of cases in which they have become involved. Data are not collected centrally and thus potentially useful information is wasted⁸.

Over the past decade I have assessed and followed the progress of more than 250 claims. In this paper I analyse the data from 40 cases that arose from emergency admissions to general medical wards. Although the sample is small and biased towards my special interest in gastroenterology, some important issues emerge. This pilot study underlines the need for a central office for the collection and analysis of similar data in order to improve medical practice and to minimise the incidence of adverse events in the NHS.

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Materials and methods

The study analysed 40 successive requests for a medical opinion made by solicitors representing either plaintiffs (36 cases) or defendants (4 cases) regarding the care of medical emergencies in hospitals during the period 1987–96. Thirty-nine cases were from England and Wales and one from Northern Ireland. The occurrence of cases was fairly evenly spread over the 10-year period.

For each case, hospital records and relevant radiographs were received together with GP notes, associated correspondence and statements of patients and relatives. Assessments were made on the written evidence. Final conclusions were reached after considering opposing opinions and usually with the help of another assessor. In cases of doubt, appropriate clinicians were asked to judge the correctness of responses to given situations without having knowledge of the consequences. Key data from analyses were stored on computer using a filemaker programme.

Results

Adverse events were recorded from: 10 large teaching hospitals (one twice) and 3 small hospitals covered by teaching hospital staff; 6 large district general hospitals (3 twice); and 17 small hospitals (with 5 or fewer physicians). The patients ranged in age from 16–77 years, with a median of 45 years (Fig 1). There were 21 men and 19 women. The patients have been divided into two groups: 18 had disease which was not primarily gastroenterological; 22 had gastrointestinal conditions. In all 40 cases there were one or more avoidable serious adverse clinical incidents (Table 1).

Outcome

Twenty-nine of the patients died of whom, with correct management, 20 would have had a good chance of long-term survival. Only 4 were judged to have a poor possibility of leaving hospital reasonably well. Of the 11 patients who survived, 3 were left with serious neurological deficits and 3 underwent intestinal resections that could have been avoided. Four patients suffered unnecessarily several months of ill-health and one had a relatively short but life-threatening illness from which he recovered completely.

Clinical situations leading to adverse outcome

Diagnoses associated with adverse outcomes are summarised in Table 2. Ten of the eighteen patients with non-gastrointestinal conditions had serious infections that

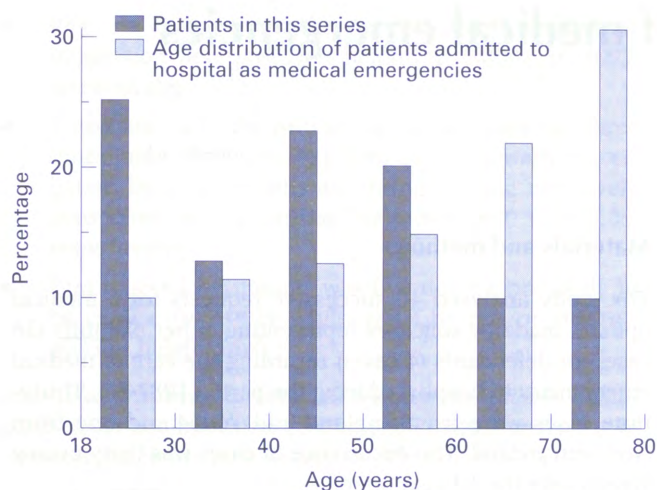


Fig 1. Age distribution of patients assessed and age distribution of patients admitted to the general medical wards of Addenbrooke's Hospital, Cambridge.

were inadequately diagnosed or treated (pneumonia 3, Legionnaire's disease 1, empyema 1, pyelonephritis 2, cellulitis and septicaemia 2, cerebral abscess 1). The other 8 patients were all incorrectly diagnosed; 3 had acute headache (sub-arachnoid haemorrhage 2, cerebral tumour 1), 2 acute breathlessness (pulmonary embolism 1, aortic stenosis 1), 1 acute chest pain (myocardial infarction), 1 epileptic fits (insulinoma) and 1 nerve compression (retroperitoneal haemorrhage).

Eleven of the twenty-two patients with abdominal disorders presented with abdominal pain; none was referred for an urgent surgical assessment. Five died without surgical intervention that would probably have saved their lives; 4 underwent delayed surgery and 2 died; 2 did not require surgery but surgical opinions would probably have led to more prompt diagnoses (including one patient who died of pancreatitis). There were 7 cases of serious errors in the management of diarrhoea and vomiting; 4 of these

Table 2. Clinical situations leading to adverse events.

General

Failed to recognise and treat serious infection (of which 8 had septicaemia or metastatic infection)	10
Error in investigating acute headache (2 subarachnoid haemorrhage; 1 cerebral tumour)	3
Error in investigating acute breathlessness (1 pulmonary embolus; 1 aortic stenosis)	2
Error in investigating epilepsy (hypoglycaemia)	1
Misreading ECG in acute chest pain	1
Delay in investigating nerve root pain	1

Gastro-enterological

Inadequate assessment of abdominal pain (of which 7 needed urgent surgical help)	11
Error in assessing diarrhoea (1 missed colitis; 1 missed diverticular abscess; 1 missed gastro-intestinal bleeding; 1 colonoscopic perforation)	4
Error in assessing vomiting (2 intestinal obstruction; 1 acute pancreatitis)	3
Failure in management of known gastro-intestinal bleeding	2
Missed diagnosis in patient with liver failure	1
Missed diagnosis of cause of ascites	1

warranted urgent surgical intervention (of whom 3 died). In 5 of the 7 cases straight radiographs of the chest and the abdomen would have given the correct diagnoses. Two cases arose from mismanagement of gastro-intestinal bleeding and 2 from liver disease.

Nature of the adverse events

In two-thirds of cases clinicians either failed to recognise that the patients were very sick and needed urgent well-focussed attention, or they tried to manage a situation without having the necessary competence (Table 3). In 80% of cases errors in diagnosis were made because of inadequate interpretation of the clinical picture and initial investigations. For a third of these cases clinicians either did not

Table 1. Patients classified by specialty and by occurrence of adverse event.

System disorder	Total no. of patients*	Error in diagnosis	Poor management	Error in medication	Mismanagement with inappropriate discharge
Gastro-enterological	22	17	4	–	7
Respiratory	5	4	1	1	1
Neurological	4	4	–	–	–
Cardiac	2	2	–	–	–
Renal	2	1	1	–	–
Disseminated infection	3	2	2	–	–
Other	2	2	–	–	1

*For this age-mix of patients one might have expected the following totals: gastro-enterological 6, respiratory 7, neurological (including stroke) 4, cardio-vascular 10, renal <1, infection 3, poisoning 3, diabetes mellitus 1, musculo-skeletal 1, haematological 1, other 3. In some cases there were errors in more than one category.

record a diagnosis or failed to consider alternative possibilities. In 30% of cases tests were either misread or ignored, of which half were radiological. Inadequate treatment or care was identified in 9 cases, of which 5 would not have occurred had the clinicians followed standard protocols (eg for the management of gastro-intestinal bleeding). The available evidence suggested that such protocols were not available. Eight patients were discharged from hospital, still unwell, without being checked by competent clinicians.

Human error or organisational failure

Ten of the patients were not seen by a consultant or senior registrar and all of these patients died (6 within 24 hours). In a further 10 cases consultant input was minimal. For example, a 60 year-old man who was semicomatose and had diarrhoea was noted to have 'harsh' breath sounds on the left side of the chest and a 'whiteout' on chest x-ray. The junior doctors struggled to correct a concomitant metabolic acidosis but decided to wait for the result of stool cultures before giving antibiotics. Sixteen hours after admission the patient died of untreated lobar pneumonia.

In 24 cases there was a failure to grip the problem, which appeared to indicate organisational weaknesses. This is illustrated by the case of a 19 year-old girl who died of an undiagnosed subarachnoid haemorrhage after 5 days in a teaching hospital. She was looked after by a succession of junior members of staff, the most senior of whom was a research registrar who saw her only once. She was given anticoagulants for an unconfirmed and, indeed, unlikely diagnosis of pulmonary embolism. At the inquest the consultant, who had appointments at two hospitals, stated that although he had not seen the patient himself, he was always available because he carried a bleep.

In 18 cases the need for urgent specialist help was not recognised (even though 10 of the patients had been seen by consultant general physicians); 11 patients should have received urgent surgical advice (9 had 'acute abdomens'); 4 patients should have been referred promptly to a gastro-enterologist; 2 to a cardiologist and one to a specialist in infection. In 3 cases there were ineffectual discussions between senior house officers in medicine and surgery instead of involvement of more senior staff.

In 6 cases errors occurred from the mis-reading of radiographs. In 3 cases the films were not seen by a radiologist and important signs were missed (1 intestinal perforation, 1 pneumonia and 1 pelvic abscess); in one case the clinician ignored the radiological opinion; in another case the clinicians were slow to act on important findings; and in the sixth case a CT scan of the head was reported as being 'consistent with a cerebral metastasis' when the patient had a cerebral abscess. The putative diagnosis was accepted and the patient died.

In 5 cases clinicians failed to follow standard lines of management for straightforward problems (acute chest pain, community acquired pneumonia, gastro-intestinal bleeding, acute diarrhoea and pyrexia of unknown cause).

Table 3. Nature of errors.

Available clinical evidence incorrectly interpreted (no differential diagnosis was offered in 10 cases)	32
Failure to focus on very sick patients (including failure to recognise 'acute' abdomen in 10)	26
Investigation misread or ignored	6
Radiological evidence missed	6
Standard procedure not followed	5
Inadequate treatment despite correct diagnosis	3
Day-to-day assessment inadequate	2
Discharge from hospital without proper assessment	9

In several other cases the usual guidelines were broken (eg not to treat acute colitis with opiates; not simply to treat heart failure without, at the same time, looking for a reversible cause). Finally, 9 patients were not adequately assessed before discharge from hospital; in these cases the work of junior staff was not sufficiently monitored.

How adverse events could have been prevented

In more than half the cases the errors probably would not have occurred had the patients been seen by experienced clinical staff shortly after admission (Table 4). In 45% of cases specialist care was needed and not sought. Systems for the prompt assessment of radiographs of acutely ill patients by radiologists and/or discussion between clinicians and radiologists would have helped in six cases and protocols for the care of patients with standard clinical situations in another five.

Discussion

The cases described in this paper are a highly selected group from around a million emergency medical admissions to hospitals in the UK each year. It may be argued that they are simply representative of the small number of unavoidable adverse events that arise from the fallibility of human endeavour. The age distribution shows that this is unlikely. There is no reason to believe that adverse events are more likely to occur in the care of younger patients, yet claims are 5 to 10 times more likely for patients under the age of 45. There is an even greater degree of selectivity by

Table 4. Defects in organisation underlying errors.

Medical emergencies not assessed by sufficiently experienced staff	21
Second opinion not obtained* (11 surgical opinion needed for acute abdomen; 1 gastro-enterological needed for liver failure)	12
Inadequate assessment before discharge	9
Radiographs not discussed with a radiologist	6
Protocol not used for a standard situation	5

*In another 10 cases a second opinion would have been desirable even though the problem was one with which a general physician would normally cope.

severity of outcome. Data from the USA suggest that adverse events occurred in about 4% of hospital admissions⁹ – in 70% of affected patients the resulting disability was slight or shortlived; in 9% illness was severe; 7% suffered permanent damage and 14% of the patients died⁹. In the present study the end results of the adverse events affecting the 40 patients were as follows: 3% minor disability; 9% severe illness; 15% permanent damage and 73% death. Although the two sets of figures are not directly comparable, the difference is striking.

It is likely that there are several hundred similar cases annually in the UK. Let us assume that, as in the US, only 10% of errors surface as claims or complaints and that I have assessed 10% of these. Then each year there are 400 cases of serious mismanagement in patients admitted to hospitals in England and Wales as medical emergencies. These data from emergency medical admissions contrast with the findings of a previous assessment of 100 sequential unselected medico-legal claims against hospital trusts which covered both inpatient and outpatient care, in which management was judged seriously inadequate in only 13% of cases¹⁰.

There are not sufficient data to indicate whether adverse events are more likely to occur in large or small hospitals. In the cohort of 13 events in teaching hospitals there were 3 in which patients were in a ward for several days, apparently without being assessed by a consultant; and in the smaller hospitals there were several cases in which specialist care appears not to have been available, especially for neurological and infective disorders. Much more information would be needed to determine the efficacy of care in individual hospitals.

Nevertheless it is possible to identify common strands which underlie the adverse events (Tables 3 and 4). Lack of involvement of consultant staff early in the management of medical emergencies and failure to obtain specialist help appears to have been at the root of 75% of adverse events. A patient may be in a critical condition for several hours before a senior member of staff is available to help. In this series, 10 patients died within 24 hours without being seen by a consultant. Add to this the evidence that the delay between time of arrival at hospital and admission to a bed correlates positively with the 28-day mortality for four key conditions (myocardial infarction, cerebrovascular accident, chronic lung disease and bronchopneumonia)¹¹ and there seems to be a very good case for ensuring that experienced clinicians free from other responsibilities are available to assess and treat medical emergencies promptly¹².

Further, 22 patients with acute abdominal conditions were admitted to medical wards and were not seen urgently by an experienced surgeon; 13 of these patients died. This supports the concept of establishing a central admissions ward for both medical and surgical emergencies¹² and provides substance for misgivings regarding recent reports of the actual or proposed removal of surgical services from a number of smaller hospitals even though they will continue to accept medical emergencies¹³.

Finally, ward doctors are often reluctant to ask consultants for help. They need direct support, with consultant-led post-take ward rounds at least twice and preferably three times a day¹².

The data presented in this paper add weight to the call for improvements in methods of coping with emergency admissions^{14,15}. This has been recognised by the Department of Health in their development of the concepts of 'clinical systems of care'¹⁶. Nevertheless, the real difficulty in providing adequate cover for emergencies, a large number of whom arrive without a definite diagnosis (75% in this series), appears not to be fully appreciated. The need for specialists to acquire and maintain generalist 'core' skills is a problem which may be more difficult following the recent changes in the education of consultant physicians in the UK which now emphasises more concentrated specialist training over a shorter period^{15,16}.

In conclusion, the data in this paper show that there is a need for:

- full assessment of emergencies by experienced physicians who, ideally, have no other duties on their 'take'-day other than to teach trainees how to assess and manage acutely sick medical patients
- developing systems which ensure that differential diagnoses and clear management plans are made for all patients
- greater use of specialist opinions, including getting help from laboratory-based staff
- developing systems for the expeditious reporting of radiographs (with joint discussion of difficult cases by clinicians and radiologists)
- using clear protocols for the management of defined problems
- senior staff to review patients before discharge from hospital (including patients who are seen in accident and emergency departments but not admitted).

There is, thus, clearly a need to increase the number of consultant physicians competent to diagnose and initiate the treatment of all patients presenting as medical emergencies^{12,15,17}. At present, too much responsibility is invested in trainees and too many mistakes occur because of failure to obtain the help of specialists. Research into the epidemiology of medical accidents will provide the basis for better care in hospital practice and for improving organisational structures.

Acknowledgements

I am grateful to Nickie Harding for providing me with data regarding the pattern of emergency medical admissions to Addenbrooke's Hospital, Cambridge.

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**NEW
TITLE**

Management of gonadal toxicity resulting from the treatment of adult cancer

Report of a working party of the Joint Council for Clinical Oncology

In certain circumstances, both radiotherapy and chemotherapy may result in impaired fertility. With an ever increasing number of patients being cured of their cancers as a result of these treatments, the issue of treatment related infertility is of growing importance. This report identifies the regimens most likely to result in impaired fertility, the steps that may be taken to minimise the risk of the problem developing and the management of those patients who do become infertile as a result of their treatment. It also includes very helpful patient information leaflets.

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APPENDICES: ■ Background reading ■ Abbreviations used in the report ■ Useful addresses ■ HFEA(96)6 Form for consent to storage and use of sperm and embryos ■ Patient information sheets on fertility and cancer treatment: advice for men and women

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