Evidence for cause of death in patients dying in an accident and emergency department

M Quigley, J Burton

**Objective:** This study assesses the evidence used for certification of the cause of death in an accident and emergency department.

**Methods:** The subjects were all patients for whom a certificate of the cause of death was issued in the A&E department of a Scottish district general hospital over a period of two years from September 1998 to August 2000. The case notes and details of necropsies were examined for evidence of the cause of death. Patients were allocated to one of three descending categories according to the strength of the evidence available; (1) Evidence of the cause of death was available at the time of death or from postmortem examination. (2) There was a history (hospital notes/from relatives/from GP) of morbidity supporting the cause. (3) There was no recorded history of morbidity supporting the stated cause of death.

**Results:** There were a total of 28 deaths in the A&E department over the study period. Two of the patients who died in A&E received postmortem examinations and had death certificates completed by pathologists. Death certificates were issued from A&E for a total of 24 cases. Of these 24, nine patients had strong evidence of the given cause of death and eight patients had a past history or other identifiable evidence that could support the cause of death. The cause of death in seven patients was not directly supported by available evidence.

**Conclusion:** Death certificates issued in an A&E department were supported by strong evidence in one third of cases. Many certificates seem to be issued with slender evidence for the cause of death readily identifiable, and few patients are subjected to necropsy.

**Methods**

We examined the counterfoil of the A&E death registration book to identify all patients who had a death certificate issued from A&E over a period of two years from September 1998 to September 2000. A computerised search of the database was made to uncover all patients who had died in the department. The pathology department was asked to provide details of any postmortem examinations performed on patients from A&E. The hospital notes and A&E records of all patients were examined by one doctor (MQ).

**Results**

There were 28 deaths in the A&E department in the two year period. The department sees about 30,000 cases a year. A death certificate was completed in A&E in 24 cases. One case had a death certificate completed by another hospital unit and another case had a certificate completed by the patient's GP. Two patients had postmortem examinations; the death certificates being completed by a pathologist. One of the postmortem examinations was carried out on a trauma case as a legal requirement, and the other was carried out at the request of the deceased's family.

**Conclusion**

Examination of the clinical notes established what evidence was used to arrive at the cause of death and identified if the case had been discussed with the GP or the PF. To determine the evidence for cause of death we considered all recorded details about the death, including elements of the history, clinical examination, and investigations. This included electrocardiograms (ECG), blood test results, and the findings of computed tomography (CT) scan or ultrasound. The case notes were examined for evidence of medical history (verified ischaemic heart disease or known aortic aneurysm for example) and drug history. Their presence was assumed to represent evidence of other active disease processes that the certifying doctor may have considered as contributing to the cause of death. If there was reported history available from a family member (the presence of chest pain before a collapse or a recent history of increasing angina, etc) then this again was assumed to contribute to evidence of a possible cause of death.

Three categories of evidence were considered;

1. There was acute evidence at presentation, either clinically, in the history or in investigations performed. (Table 1).
DISCUSSION

Given that most patients who die in an A&E unit are unknown to the medical staff, it is remarkable that many death certificates issued are supported by little evidence for the causes of death stated. Death certificates would appear to be completed on the basis of available clinical information, from the history, or after discussion with the GP or PF. Predicting the cause of death by analysing available clinical information has been shown to be an inaccurate process. Three pathologists in England attempted to predict the cause of death in 568 people by examining case notes. They were able to offer a prediction in 56% of cases and this matched the necropsy findings in 43%. When the cause of death is clinically “fairly certain” it has been confirmed correct in 71% of cases, but when the cause is clinically “uncertain” the agreement with PM findings decreases to 36%.

Necropsies are performed infrequently on patients dying in A&E and most doctors are aware of a growing aversion to postmortem examinations on the part of relatives. However, the fact that all cases where little evidence was available were discussed with the PF, suggests that doctors are well aware of the potential pitfalls. Unexpected findings are discovered at postmortem examination and these can have important health implications. In 1000 postmortem examinations in Sussex, England, 575 important findings were uncovered in 532 cases; these findings would have been investigated and treated if detected in life. American research has shown how up to 40% of necropsies demonstrated clinical findings that would have led to a change in management had they been discovered in life. Other studies have highlighted disagreement rates of 12%–22% between the PM cause of death and that stated in the death certificate.

There are many reasons why necropsy rates have declined. More sophisticated and non-invasive diagnostic techniques are available that can confirm diagnoses without the need for postmortem examination. However, in contrast with those

---

**Table 1** Acute evidence for cause of death; nine cases

<table>
<thead>
<tr>
<th>Death certificate entry</th>
<th>Age</th>
<th>History</th>
<th>Main evidence for cause of death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal aneurysm</td>
<td>68</td>
<td>Abdominal pain/collapse</td>
<td>Ultrasound showed aneurysm</td>
</tr>
<tr>
<td>Abdominal aneurysm</td>
<td>77</td>
<td>Abdominal pain/collapse</td>
<td>Ultrasound showed aneurysm</td>
</tr>
<tr>
<td>Abdominal aneurysm</td>
<td>70</td>
<td>Abdominal pain/collapse</td>
<td>Died in theatre during repair</td>
</tr>
<tr>
<td>Abdominal aneurysm</td>
<td>79</td>
<td>Abdominal pain/collapse</td>
<td>Died in theatre during repair</td>
</tr>
<tr>
<td>Myocardial infarct</td>
<td>86</td>
<td>Collapse</td>
<td>Acute ECG changes</td>
</tr>
<tr>
<td>Myocardial infarct</td>
<td>73</td>
<td>Chest pain/collapse</td>
<td>Acute ECG changes</td>
</tr>
<tr>
<td>Myocardial infarct</td>
<td>80</td>
<td>Collapse/hypotensive</td>
<td>Acute ECG changes</td>
</tr>
<tr>
<td>Cardiac failure</td>
<td>82</td>
<td>Gross clinical failure</td>
<td>Ischaemic ECG</td>
</tr>
<tr>
<td>Cerebrovascular accident (CVA)</td>
<td>74</td>
<td>Collapse/unresponsive</td>
<td>CT showed acute infarct</td>
</tr>
</tbody>
</table>

**Table 2** Secondary evidence for cause of death; nine cases

<table>
<thead>
<tr>
<th>Death certificate entry</th>
<th>Age</th>
<th>Main evidence</th>
<th>Additional evidence</th>
<th>Discussed with GP</th>
<th>Discussed with PF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischaemic heart disease (IHD)</td>
<td>73</td>
<td>Proven IHD</td>
<td>Sudden collapse/VF arrest</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>IHD</td>
<td>74</td>
<td>Proven IHD</td>
<td>Found unconscious Previous VF arrest</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>IHD</td>
<td>81</td>
<td>Proven IHD</td>
<td>Sudden collapse</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Myocardial infarct (MI)</td>
<td>64</td>
<td>Proven IHD</td>
<td>Sudden collapse no no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MI</td>
<td>79</td>
<td>Proven IHD</td>
<td>Sudden collapse yes yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MI</td>
<td>87</td>
<td>Proven IHD</td>
<td>Sudden collapse previous VF arrest yes yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MI</td>
<td>72</td>
<td>Proven IHD</td>
<td>Sudden collapse yes yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abdominal aortic aneurysm</td>
<td>71</td>
<td>Known aneurysm</td>
<td>History of abdominal pain and sudden loss of output no no</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 3** No concrete evidence for cause of death; seven cases

<table>
<thead>
<tr>
<th>Death certificate entry</th>
<th>Age</th>
<th>Main evidence available</th>
<th>Discussed with GP</th>
<th>Discussed with PF</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI</td>
<td>76</td>
<td>Sudden collapse PMH high blood pressure (HBP) son gave history of recent chest pain</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>MI</td>
<td>76</td>
<td>Sudden collapse PMH HBP</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>MI</td>
<td>86</td>
<td>Found collapsed PMH CVA</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>VF/IHD</td>
<td>68</td>
<td>Found collapsed PMH CVA, HBP, peripheral vascular disease</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>MI</td>
<td>80</td>
<td>Sudden collapse PMH primary biliary cirrhosis</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>MI</td>
<td>87</td>
<td>Sudden collapse PMH HBP</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Cardiorespiratory arrest</td>
<td>86</td>
<td>Choking episode collapse and VF arrest</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

2 There was secondary evidence in relation to medical history, previous pathology, drug history, or obtained from discussion with GP/relatives. (Table 2) 
3 There was no evidence for a cause of death identifiable, as determined by the investigators. (Table 3)
patients in hospital wards the patients who die suddenly in A&E often have not had the time to undergo computed tomo- 

graphy, echocardiography, or ultrasound. Some work has 
suggested that physicians may be more reluctant to request 
necropsy for fear of litigation if new or different causes of 
death are uncovered. There may be cost and staffing 
constraints that restrict necropsy use but studies have also 
confirmed that the limiting factor is often a reluctance of do-
tors to ask for a postmortem examination and a refusal of 
families to grant it. A Scottish study on ITU deaths revealed 
how the seniority of the doctor making the request and the 
number of family members present did not affect the decision 
of the relatives to allow the postmortem examination to pro-
cceed. The main reasons given for refusal were that the pro-
cedure would not benefit the deceased and that they had been 
through enough already. On introducing a universal postmor-
tem requesting policy in all patients dying in a hospital ward, 
consent rates of 31%–53% have been achieved. The feelings 
of relatives of ITU/ICU patients may not reflect those of the 
relatives of patients who die unexpectedly in A&E.

Often sudden deaths of patients arriving in an A&E depart-
ment are given the label of myocardial infarct; a label that is 
seldom questioned socially, medically, or legally. Six of the 
seven cases in our study that showed no supporting evidence 
for cause of death fell into this category. Circulatory disease is 
over-reported as the cause of death in up to 25% of patients 
and at the same time it can be under-reported by 18%–30%. 
Research has illustrated how deaths attributable to cardiovas-
cular disease showed well established evidence of cause in 
only 12% of cases and inadequately established cause in 
47%. Forty per cent of myocardial infarctions can be silent or 
atypical and therefore not clinically recognised, yet it is both 
the most over diagnosed and most under diagnosed entry on 
death certificates. Patients frequently die of causes unrelated 
to pre-existing problems and even using case notes to arrive at 
the cause of death can be misleading.

It is generally realised that death certificates have limited 
reliability and validity as a source of mortality statistics and 
despite these weaknesses they are still used for epidemiologi-
cal processes, health planning services, and research. Some 
work has suggested that as much as 30% of major cardiovas-
cular deaths are not recorded in death certificates because they are clinically silent. Death 
certificates issued from A&E would seem to perpetuate a false 
picture of our nation's health.

Doctors feel pressure from families, GPs, and the fiscal sys-
tem to make rapid decisions about the cause of death and this 
inevitably leads to errors, especially in the emergency depart-
ment where there is a lack of familiarity with the deceased. The 
doctors may have to rely on information from relatives at 
times when communication is difficult. A sudden death is 
such a traumatic event that is difficult for junior doctors to 
approach family with requests for a postmortem examination, 
let alone the family agreeing to allow it to proceed. It might be 
much kinder and often more convenient for us to issue a cer-
tificate on tenuous evidence rather than pursue and organise 
necropsy.

Not only does a necropsy aid as a teaching tool but 
confirming a diagnosis can be reassuring for medical staff and 
family and may be important for the grieving process. A&E 
doctors could be forgiven a little uneasiness when they 
complete certificates of the cause of death, uneasiness on their 
own behalf and that of the deceased.

Study weaknesses and further research

The numbers in our study are small and not suitable for statistical analysis but the findings should prompt other departments with larger numbers to examine their practices and establish guidelines for issuing death certificates and requesting necropsies. In our opinion the categories of evidence we arrived at represented the realities of clinical practice in our department. They may not apply to other hos-
pitals or departments. Inevitably the evidence for the cause of death required qualitative assessment of the available documentation and we relied on the accuracy and complete-
ness of clinical note keeping. There may have been other find-
ings that the certifying doctor may have used to establish the 
cause of death that were not recorded (verbal discussion with 
GP, clinical findings, etc). To promote consistency in inter-
preting the evidence only one investigator reviewed the notes. By 
performing this audit we also identified deficiencies and 
 inconsistencies in the quality of note keeping and documenta-
tion at the time of death. An area that would merit study in 
future work.

Conclusion

Death certificates issued in our accident unit were supported 
by strong evidence in one third of cases. Many certificates are 
issued with slender evidence of the cause of death available, 
and few patients are supported to necropsy. Information from 
such death certificates may misrepresent true mortality 
statistics. Improving the accuracy of death certification will 
result from promoting necropsy use. Greater use of necropsy 
will entail a combined approach in educating the doctors 
involved in dealing with sudden death, defining the role of the 
Pf and changing the public perception of the nature and pur-
pos of postmortem examinations.

Contributors

Michael Quigley gathered the clinical information, analysed the data, 
and performed the literature search. John Burton and Michael Quig-
ley were responsible for discussing core ideas and formulating the 
nature of the audit. Both authors contributed to writing the paper. Dr 
A McGowan, consultant in A&E, St James Hospital Leeds will act as 
guarantor for the paper. We would like to thank Dr Ivan Gibson, 
Department of Pathology, Dumfries and Galloway Royal Infirmary.

Authors' affiliations

M Quigley, J Burton, Accident and Emergency Department, Dumfries 
and Galloway Royal Infirmary, Dumfries, UK

Funding: none.

Conflicts of interest: none.

Correspondence to: Dr M Quigley, Accident and Emergency Department, 
Dumfries and Galloway Royal Infirmary, Bankend Road, Dumfries 
DG1 4AP, UK; M.Quigley@dgri.scot.nhs.uk

Accepted for publication 14 June 2002

REFERENCES


2 Bessler SA, Zimmerman HE, Stauffer JL. Do autopsies of critically ill patients reveal important findings that were clinically undetected? Crit Care Med 1998;26:1332–6.


Evidence for cause of death in patients dying in an accident and emergency department

M Quigley and J Burton

doi: 10.1136/emj.20.4.349

Updated information and services can be found at:
http://emj.bmj.com/content/20/4/349

References
This article cites 6 articles, 2 of which you can access for free at:
http://emj.bmj.com/content/20/4/349#BIBL

Email alerting service
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Topic Collections
Articles on similar topics can be found in the following collections
Ethics (396)

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/