

# The Review

## Uncertainties in death certification

### INTRODUCTION

Death is one of life's few certainties, and most GPs will inevitably preside over a few patient deaths each year. Indeed, the apotheosis of the 'good death' could be the patient who dies at home, dignified and pain-free following well-coordinated interdisciplinary palliative care.<sup>1</sup> Given that around three-quarters of people express a wish to die at home<sup>2</sup> yet only a quarter manage to do so,<sup>3</sup> that sentiment appears to have wide public support. Nonetheless, in common with many aspects of clinical medicine, death is riddled with uncertainty, especially when it occurs unexpectedly, these being relative rather than absolute terms.

In this essay we discuss two cases from our clinical practices, one occurring in the community that went to post-mortem, and another occurring in hospital which did not. This is followed by a discussion whose main theme centres on the role of the coroner post-mortem service, and explores the evidence for alternatives to traditional autopsy.

### CASE 1

A 59-year-old male was found by his carer having unexpectedly died at home. His GP attended and he was noted to be on the floor, collapsed in the foetal position on the floor by his bed. His home nebuliser mask was on his face. There was evidence of heavy alcohol intake with numerous beer and wine bottles by the bed, and also of heavy smoking with several ashtrays filled with cigarette butts. There were no suspicious circumstances so the body was moved to the mortuary, but the uncertainty of cause of death led to a referral to the coroner.

The patient's significant medical history included asthma, hypertension, peripheral vascular disease, and chronic alcoholism complicated by myopathy. He lived alone, having been widowed some years before, and his self-care was poor. The salient findings at post-mortem noted an underweight man looking older than his age, with marked peripheral cyanosis and cigarette staining of the fingers. The heart displayed signs of hypertensive heart disease and a recent subendocardial infarction on a background of widespread atherosclerosis. The bronchi showed mucus plugs consistent with asthma. The

liver was enlarged and had a pale, greasy appearance consistent with alcoholic steatosis, but there was no cirrhosis. The pathologist concluded that the main cause of death (1a) was acute myocardial infarction due to (1b) coronary atherosclerosis due to (1c) chronic ischaemic heart disease with (2) hypertensive heart disease and steatohepatitis contributing to death.

### CASE 2

The patient was an obese lady in her late 60s who died less than 30 days after undergoing an elective cystectomy and ileostomy for locally invasive carcinoma of the bladder. She had two brief admissions to the intensive care unit. The death was certified by the surgical resident as being due to pneumonia. The family initially found this difficult to accept but, following a discussion with the coroner's office, did so and registered the death.

Another junior doctor, a GP registrar at the time, was asked to complete the second part of the cremation form, but felt unable to agree on the cause of death. The grounds for doubt were that although the patient record indicated laboratory results suggesting infection, there was insufficient evidence, both clinically and radiologically, to specifically implicate pneumonia. Furthermore, the surgical team had not discussed the uncertainty of diagnosis, nor raised the possibility of post mortem examination with the family. The doctor sought advice from the ITU team who confirmed they had no knowledge of pneumonia, only basal atelectasis — scarcely surprising in an obese, ventilated patient. He subsequently consulted the coroner's office for advice, but they were unable to help. Finally, the case was discussed with a consultant pathologist, who suggested that pneumonia may have been present without presenting typically. Had the precise cause of death been

another source of sepsis, it would have been unlikely to affect the final outcome. Thus it was deemed reasonable, in good faith, to issue the cremation form with the original cause of death.

### DISCUSSION

Death remains medicalised by the requirement of a medical practitioner to issue a death certificate. Accuracy of cause of death is desirable as a marker of quality of care, a courtesy to relatives, and for national statistics, and autopsy may resolve uncertainty. However, it is also an intrusion by the state into what is otherwise a private family matter. The post-mortem rate in England and Wales is currently 22% (110 000 dissections per annum).<sup>4</sup> A significant body of professional opinion believes this rate to be unnecessarily high,<sup>4-6</sup> and concern has been expressed about referrals made out of defensive practice.<sup>7</sup>

Furthermore, even autopsy does not always resolve uncertainty, especially in the elderly with multiple pathology.<sup>8</sup> Biochemical disturbances that may cause death may have no structural pathology, while the latter may, even when present, have little or no relevance to the actual cause of death (for example, an early malignancy).<sup>8</sup> There are considerable costs: well over half the expenditure of the coroner's service in England and Wales is accounted for by autopsies<sup>9</sup> and high workload, combined with a national shortage of pathologists, may explain why around a quarter of all autopsy reports are of substandard quality.<sup>4</sup>

In our first case autopsy was justified on account of uncertainty in the presence of numerous potential causes of sudden death. The death was unexpected insofar as there was no known terminal illness, but was also unsurprising given his medical history, heavy smoking, alcohol intake and poor social circumstances. Though he was

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not treated in life for coronary heart disease, it is well recognised that sudden death can be the first presentation of this,<sup>10</sup> and having peripheral vascular disease made it likely that he had widespread atheroma.

The second case raises other important issues, notably how to reconcile variance in professional opinion, and how an individual with an ethical dilemma can resolve this while avoiding conflict with colleagues. Reasonable steps were taken to obtain other opinions without recourse to autopsy. However, one could still argue that there was pressure not to 'rock the boat', understandable given that this may be deemed unwise for a junior doctor, and that, whatever the reasons behind it, the careers of whistleblowers in the NHS generally suffer.<sup>11,12</sup>

If the current autopsy rate in England and Wales is to be reduced, what are the alternatives? In Scotland there are no coroners; suspicious and uncertain deaths are investigated by procurators fiscal, who carry out the role of coroners as part of a much wider remit within the criminal justice system. The autopsy rate is half that in England and Wales,<sup>5</sup> and there exists, at the pathologist's discretion, the option of an external examination of the body as an alternative to dissection.<sup>13</sup> This is done with access to the medical records and, where relevant, police reports. The external examination includes the option of obtaining tissue for histological and toxicological analysis to help establish or refine the likely cause of death, and to proceed to full autopsy in cases where the level of certainty is insufficient to certify death.<sup>5</sup>

The use of high-resolution imaging by computerised tomography (CT) and magnetic resonance imaging (MRI) has also made significant inroads as a tool for post-mortem investigation.<sup>14</sup> In an early study of its potential use, researchers examined 20 fetuses and found that MRI and autopsy showed broad agreement on the cause of death in 18 cases.<sup>15</sup> MRI was found to be less useful in cardiovascular anomalies but good at demonstrating CNS anomalies, though it failed to provide the microscopic detail possible with histological examination.<sup>15</sup> Another landmark scheme in the UK started in March 1997 when the Jewish community in Manchester funded three MRI facilities to take the work of six coroners.<sup>16</sup> The bodies examined were predominantly, though not entirely, Jewish. Bissett and colleagues published initial findings in 2002.<sup>16</sup> The bodies of 53 people with an age range of 54–96 years were subjected to 'virtual autopsy'. A diagnosis

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was confidently made in 47 cases (87%), with only six requiring traditional autopsy. However, the study excluded people known to have metabolic disease or other pathology unlikely to cause macroscopic changes, and the high cost was acknowledged,<sup>16</sup> though it is likely that the relative cost of scanning will fall if its use becomes more widespread.<sup>14</sup> A subsequent study, which had two authors who also contributed to the aforementioned Manchester project, compared MRI with traditional autopsy in cases of sudden death in adults.<sup>17</sup> A reasonable correlation was noted; however, MRI scanning was limited in detecting coronary atheroma.<sup>17</sup> However, this may matter less than previously thought, given that MRI can accurately demonstrate myocardial infarction, and the age of ischaemic changes.<sup>18</sup> The Coroners and Justice Act 2009 specifically allows non-invasive methods including MRI scanning,<sup>19</sup> sealing its move as a mainstream rather than merely research investigation.

In summary, the recognition that the coroner's service needs an overhaul is not new,<sup>20</sup> and while the traditional autopsy has an important role in evaluating the cause of death, it is not the only such tool. In selected cases consideration should be given to the external examination as in the case in Scotland. The growth in CT and MRI scanning is set to continue, and death certification is likely to become a multi-disciplinary activity involving clinicians, pathologists, and radiologists,<sup>14</sup> with many of the latter likely to sub-specialise in post-mortem assessment.<sup>21</sup>

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##### Provenance

Freely submitted; not peer reviewed.

DOI: 10.3399/bjgp12X659439

#### REFERENCES

1. Lakasing E, Mahaffey W. Caring for the dying patient at home. *Geriatric Medicine* 2006; **36(3)**: 21–28.
2. Karlisen S, Addington Hall J. How do cancer patients who die at home differ from cancer patients who die elsewhere? *Palliat Med* 1998; **12(4)**: 279–286.
3. Bosanquet N. New challenges for palliative care. *BMJ* 1997; **314(7090)**: 915–918.
4. Furness P. *The coroner's autopsy: do we deserve better?* London: NCEPOD, 2006.
5. Pounder D, Jones M, Peschel H. How can we reduce the number of coroner autopsies? Lessons from Scotland and the Dundee initiative. *J R Soc Med* 2010; **104(1)**: 19–24.
6. Palmer R. Coronial autopsies. [Letter]. *J R Soc Med* 2011; **104(3)**: 99.
7. Reisner C. What are coroners and pathologists for? *BMJ* 2009; **338**: b1355.
8. Alderson MR, Bayliss RI, Clarke CA, Whitfield AG. Death certification. *Br Med J (Clin Res Ed)* 1983; **287(6390)**: 444–445.
9. Secretary of State. *Death certification and investigation in England, Wales and Northern Ireland. The Report of a Fundamental Review 2003*. London: HMSO, 2003.
10. Chi JS, Kloner RA. Stress and myocardial infarction. *Heart* 2003; **89(5)**: 475–476.
11. Gooderham P. Changing the face of whistleblowing. *BMJ* 2009; **338**: b2090.
12. Bolsin S, Pal R, Wilmshurst P, Pena M. Whistleblowing and patient safety: the patient's or the profession's interests at stake? *J R Soc Med* 2011; **104(7)**: 278–282.
13. Davidson AM, McFarlane JH, Clark JC. Differences in forensic pathology practice between Scotland and England. *Med Sci Law* 1998; **38(4)**: 283–288.
14. Stawicki SP, Aggrawal A, Dean AJ, *et al*. Postmortem use of advanced imaging techniques: Is autopsy going digital? *OPUS 12 Scientist* 2008; **2(4)**: 17–26.
15. Brookes JA, Hall-Craggs MA, Sams VR, Lees WR. Non-invasive perinatal necropsy by magnetic resonance imaging. *Lancet* 1996; **348(9035)**: 1139–1141.
16. Bissett RAL, Thomas NB, Turnbull W, Lee S. Postmortem examinations using magnetic resonance imaging: four year review of a working service. *BMJ* 2002; **324(7351)**: 1423–1424.
17. Roberts IS, Benbow EW, Bissett R, *et al*. Accuracy of magnetic resonance imaging in determining cause of sudden death in adults: comparison with conventional autopsy. *Histopathology* 2003; **42(5)**: 424–430.
18. Jackowski C, Christe A, Sonnenschein M, *et al*. Postmortem unenhanced magnetic resonance imaging of myocardial infarction in correlation to histological infarction age characterization. *Eur Heart J* 2006; **27(20)**: 2459–2467.
19. Ministry of Justice. *Coroners and Justice Act 2009*. London: HMSO, 2009.
20. Pounder D. The coroner service. A relic in need of reform. *BMJ* 1999; **318(7197)**: 1502–1503.
21. O'Donnell C, Woodford N. Post-mortem radiology — a new sub-specialty? *Clin Radiol* 2008; **63(11)**: 1189–1194.