Quality assurance programme for necropsies

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SUMMARY One hundred and eight consecutive necropsies were entered into a quality assessment of the necropsy service in this hospital using a previously published American protocol. Our results were similar to those of the American series, with confirmation of the major clinical diagnosis in 75%, but a higher rate of unsuspected diagnosis (44%). Necropsy was helpful in 58% of cases. The presentation of selected cases at a monthly conference on causes of death was valuable in correlating clinical and pathological findings, and in helping integrate both services.

"To investigate the causes of death, to examine carefully the condition of organs, after such changes have gone on in them as to render existence impossible and to apply knowledge to the prevention and treatment of disease, is one of the highest objects of the physician".

"To practise pathology without books is to sail uncharted seas; to practise pathology without performing autopsies is not to go to sea at all."

Sir William Osler

Since the early 1950's there has been a general decline in the rates of hospital necropsies (defined as the percentage of inpatients who die and on whom necropsies are performed, and excluding those brought in dead). This decline has been especially well recorded in America, where the rate has fallen from between 60%–80% in 1950 to 10% in 1980, but has also been noted in Britain.^{1,2} To our knowledge the position in Ireland is unknown. Factors contributing to the decline of the necropsy include the following:

- 1 The necropsy findings may not be considered relevant by the clinician.
- 2 The procedure may be poorly performed by a trainee pathologist who is insufficiently supervised, or it may be rushed by a trained pathologist, anxious to deal with other duties.
- 3 The results may not be sent back to the clinician for several months after necropsy has been performed.
- 4 There may be no direct contact with the clinician or with the family of the deceased.
- 5 Interest in traditional clinicopathological conferences has waned.
- 6 Fear of litigation arising from the results of necropsy is on the increase.
- 7 There is a mistaken belief in the precision of modern techniques in clinical diagnosis.

8 The cost is excessive (estimated in America to be US\$1500 to 1700 per necropsy), with no clear method of payment for the procedure, either to the institution or to the individual pathologist.

The literature on the value of the necropsy shows that in a substantial minority of cases necropsy indicates that the major clinical diagnosis in 20–30% of cases was incorrect or inaccurate.⁵ Furthermore, error in major diagnosis involved a treatable condition in about half the cases.^{3,4} The proportion with incorrect diagnosis has not changed since 1950,^{3,5} and there is no variation in this regardless of whether or not the clinician feels certain of his or her diagnosis.^{6,7} But the nature of the disorders overlooked by clinicians has changed over the decades, with unusual infections and pulmonary emboli now being the most common.³

In America the mandatory 20% necropsy rate required for accreditation for postgraduate training was withdrawn in 1971, on the grounds that each institution should set its own rate but that ideally it should be around 100%. Although the decline was well advanced at that point, this may well have aggravated the downward trend in the United States. And, despite numerous publications in both pathology and clinical journals emphasising the importance of the necropsy and its contribution to diagnostic and therapeutic accuracy,^{1,2,6} the decline has continued.

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Lack of interest on the part of clinical staff is often cited as a factor in its decline, but in most instances the evidence for "lack of interest" is anecdotal. In Yugoslavia, however, where the law is such that the clinician caring for the patient during life has to decide whether a necropsy should be performed, a similar decline has taken place.⁸

The premise that the fear of litigation may prevent necropsy from being carried out has not been proved, and experienced pathologists believe that the opposite is true,¹ and even that the rate of litigation is low when the necropsy rate is high.

Finally, the financial argument for curtailing necropsies cannot be sustained—the major cost is in "plant" and staff, and if these are already in place, the actual number of necropsies performed does not materially affect the overall cost of each procedure.⁶

Besides just providing intellectual stimulation and satisfaction for the clinician or pathologist necropsies yield information of both specific and general importance, including validation of the cause of death and accurate mortality statistics. Death certification without necropsy is known to be seriously defective,⁹⁻¹¹ and it has been shown that the major disease category has to be reclassified after necropsy in up to 30% of cases.⁹ This information is essential if we are to learn from these inaccuracies and have some form of quality assurance. While clinical diagnostic precision is now up to 80% there is little likelihood of further improvement unless the general level of 20% inaccuracy in diagnosis is recognised. Furthermore, the necropsy may uncover disorders which are of relevance to family counselling, especially in the realm of genetic disorders, and the procedure provides essential material for education of both under- and post-graduates, investigational research, and organ donation.

Method

Using a form, which has been published as part of a prospective audit of clinical and pathological performance (PACPP),¹² a quality assessment of the necropsy service in this hospital was carried out. It is the custom in this hospital to hold a monthly clinico-pathological conference on causes of mortality: after each conference the PACPP forms are completed by the pathology staff. Over five months (August 1–December 31 1988) 108 consecutive necropsies on inpatients were performed and the results compared with those of similar series published by Schned *et al.*¹²

Results

Table 1 lists four categories of clinical factors contributing to death and compares the figures with those

Table 1 Clinical factors contributing to death

Category	No (%)	Comparison with Schned <i>et al</i> No (%)
Irrevocable course of disease	83 (77)	95 (86)
Error in judgment or treatment	9 (8)	3 (3)
Therapeutic complication	10 (9)	7 (6)
Unrecognised existing evidence of disease	14 (13)	5 (5)
Total No of necropsies	108	111

Some cases were included in more than one category in our study.

obtained by Schned *et al.*¹² In both series 80% of patients died as a result of "irrevocable course of disease". An example of a therapeutic complication is as follows:

A 46 year old woman presented to her local practitioner with arthritis restricted to one wrist, for which she was treated with a three week course of phenylbutazone. She was admitted to a local hospital six weeks later with fleeting arthralgia and intermittent erythematous rash. She subsequently became feverish, with a generalised erythematous rash and jaundice, and received steroids and antibiotics intravenously. Dyspnoea and chest pain led to admission to this hospital where her condition deteriorated and she died. Necropsy showed that she had multisystem disease affecting the liver, spleen, skin, pericardium and myocardium. After detailed discussion, hypersensitivity reaction to phenylbutazone was thought to be the cause of her fatal illness.

Table 2 compares accuracy of clinical diagnosis in the two studies. While a similar proportion of major clinical diagnoses was confirmed, there were considerably more patients with a major unsuspected diagnosis in our series. The following are examples of the four categories of clinical factors:

- 1 "Major clinical diagnosis confirmed and necropsy unhelpful"—a woman diagnosed as having tuberculous meningitis in life had this confirmed at necropsy with the presence of acid fast bacilli shown in the subarachnoid space.
- 2 "Major unsuspected diagnosis"—a diabetic woman was thought to have had a cardiac arrest. At

Table 2 Clinical importance of necropsy findings

Category	No (%)	Comparison with Schned <i>et al</i> No (%)
Major clinical diagnosis confirmed	81 (75)	79 (71)
Major unsuspected diagnosis	44 (41)	13 (12)
Differential diagnosis clarified	65 (60)	14 (12)
Necropsy considered helpful	63 (58)	Not recorded
Total No of necropsies	108	111

necropsy she was found to have bilateral pulmonary emboli with infarction of the right lower lobe, the latter present for some time before death.

3 "Autopsy helpful"—a man who had multiple foci of ? neoplasm in bone at necropsy was found to have Hodgkin's lymphoma of lymphocyte depleted type, affecting lymph nodes, spleen, liver and bones.

4 "Major discrepancy, clinical diagnosis not confirmed"—an elderly woman was thought to have had a pelvic mass due to a colonic neoplasm which had perforated giving rise to peritonitis. At necropsy she had a perforated benign gastric ulcer with acute diffuse peritonitis.

A man with angina of recent onset was thought to have died of a dissecting aneurysm of the aorta, possibly involving the coronary arteries, or of a fresh coronary occlusion, and was found at necropsy to have an occlusive lesion of a major coronary artery two to three weeks old, in an advanced state of organisation, but no dissecting aneurysm.

The two conditions which are most often overlooked clinically are infections and pulmonary embolism.

Bacterial infection was a common cause of death in this study and 24 (22%) cases were classified as due to sepsis or septicaemia, six of these in association with carcinoma or chemotherapy, and one in a patient who was HIV positive. An elderly woman with advanced degenerative joint disease which had rendered her immobile, and severe venous stasis ulcers of the legs, presented with back pain and a positive blood culture for *Staphylococcus aureus*. A source was sought for the bacteraemia and not identified in life, and the finding of a destructive abscess of a lumbar vertebral body at necropsy was thought to pre-date the acute presentation when the history was heard in full. The varicose ulcers were probably the focus for the initial bacteraemia and osteomyelitis.

Pulmonary emboli were also a common major cause of death and in most of the patients the clinical diagnosis had not been established. Although emboli had been queried, no treatment had been given. Emboli were considered to be the major cause of death in 13 (12%) patients, and in 11 of them the clinical diagnosis was uncertain and no treatment had been offered. This agrees with figures from other centres.¹³

Discussion

Clinicopathological correlation after necropsy is, or should be, an important exercise in every hospital. There is no doubt that the method of communicating the result of a necropsy has a bearing on the benefit or value of the procedure. Long delays in informing the clinician of the findings devalue the whole exercise. Poor dissection, such as failure to show extrahepatic

bile ducts, or inadequate clinical contact, such as a unrelated list of anatomical findings, have also contributed to clinicians' perception of the necropsy as irrelevant.

A regular forum, where results are discussed and clinicopathological correlation is attempted, is absolutely necessary if the relevance of the necropsy as a constructive contribution to patient care is to be emphasised. Clinicopathological conferences of causes of death are essential to the continuing education of both clinicians and pathologists and are indispensable for assessment of the standards of care. "Organ reviews" or attendance of the clinical staff in the necropsy room are of considerably less value. This is because the information available for correlation at a conference is far more detailed than that at hand during the necropsy dissection. The custom of medical groups giving an hour or so to visit the necropsy room has also fallen out of favour for a variety of reasons, not least of which is increasing pressure on the clinician's time and the sad fact that most such visits are uninformative.

At monthly clinicopathological conferences on causes of death all current necropsies should be eligible for discussion, at the discretion of the pathologist chairing the conference. With a large volume of cases there is insufficient time or interest for every necropsy to be given equal airing. Cases which are uncomplicated, such as inoperable lung cancer or large myocardial infarct, might not be discussed at all, so that those with major discrepancies between the clinical and pathological findings or those of academic interest can receive the attention they deserve.

In this hospital two to three major cases taking 15 to 20 minutes each are presented at each conference, along with nine to 10 minor cases, where the pathologist summarises findings with minimal discussion. On average, three to five cases, by agreement, are not discussed at all. For the major cases, gross colour photographs are used if lesions of importance or interest are present, but photomicrographs are only used when the histology is crucial to establishing a major discrepancy or is of academic interest—for example, an undiagnosed case of infective endocarditis or an AIDS patient with numerous infections. Photomicrographs are required in approximately one case each month.

In this laboratory it is noticeable that the standard of the necropsy has improved because each prosector is aware, during the dissection, that the case may well be discussed in detail at the subsequent conference, and the production of convincing gross photographs and histological analysis will be essential. The monthly conference also ensures that cases are not forgotten, as discussion of a case is only postponed if there is unusual neuropathology or where special techniques,

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such as electron microscopy, are required. The postponed cases are automatically carried over to the following monthly conference.

The attendance of clinical staff at the conference is most encouraging and the consultant clinician and team who were responsible for the patient almost invariably attend. Normally a total of about 60 people, including eight or 10 consultant clinicians attend and many contribute to the discussion. Questions are taken, irrespective of status, from consultant to junior medical student. The presence of consultant microbiologists, with the appropriate data on individual patients, has been extremely helpful in identifying "sepsis" as a major cause of death. Most histopathology consultants attend each conference along with four to five of the seven trainee pathologists. Despite this, however, our necropsy rate has not increased significantly during the period studied and remains between 24 and 27%.

The issue of the decline of the necropsy rate and what steps might be taken to reverse the present trend was discussed at the XVIIth International Meeting of the International Academy of Pathology in Dublin, September 1988, without a clear consensus on recommendations. Some of the suggestions made from the panel at a symposium on the decline of the necropsy have been published,¹⁴ and many of the contributions at the symposium attributed the low rate to lack of clinical interest.

While the low rate in this hospital is disheartening, the introduction of a seven day week for the necropsy service and the involvement of senior nurses in necropsy policy are being considered as two steps which might have a positive effect. The possible benefit of routine consultation between the pathologists and the relatives of the deceased, as practised in some hospitals in America,¹⁵ is also under discussion. Such consultations, practised on a routine basis, are claimed to have eradicated or greatly reduced community resistance to necropsy, because relatives often welcome the opportunity to discuss the findings and are appreciative of having some results from the examination.

There are now signs for optimism on both sides of the Atlantic. A recent editorial refers to public interest in America, as reflected in the national press and in one of the federal funding agencies where a more positive attitude is indicated towards necropsies, and to a new regulation from the Joint Commission on Accreditation of Health Organisations which recommends the use of necropsies in the pursuit of quality assurance.¹⁶ This regulation avoids the requirement of a minimum necropsy rate, but seeks to establish the necropsy as part of a quality assurance programme.

In the United Kingdom the Royal Colleges of Surgeons, Physicians, and Pathologists are presently discussing what contribution necropsy makes to audit in a hospital,¹⁷ so the practice of clinicopathological conferences on causes of death with relevant constructive discussion may well become established if the three Royal Colleges favour such a step, especially if postgraduate accreditation is contingent on such a conference as a routine element in assessing standards of care.

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