

The slow death of the clinical post-mortem examination: implications for clinical audit, diagnostics and medical education

Urszula Carr, Lesley Bowker and Richard Y Ball

ABSTRACT – The adult clinical post-mortem examination has seriously declined in Norwich recently, with only 34 of them (representing 1.4% of deaths in hospital) having been undertaken in 2003. Moreover, the next-of-kin are increasingly restricting the extent of the examination when they give consent. Analogous but less severe changes have occurred in the post-mortem examination of stillbirths and perinates.

Many clinicians are unaware of these events, which may come to have wide-ranging detrimental effects. One possible cause is the lack of training of junior medical staff in obtaining consent for post-mortem examination, though other factors are also important.

KEY WORDS: audit, autopsy, decline, diagnostic errors, post-mortem examination

Introduction

Post-mortem examinations (PMs) have been important in the development of modern medicine, their value having been recognised for about two centuries.¹ PMs of hospital patients should continue to be valuable in clinical governance by providing an independent means of checking the accuracy and completeness of ante-mortem diagnoses and an assessment of the effects of treatment. Indeed, a programme of well-conducted clinical PMs forms the heart of a method of quality assessment of medical diagnostics.² Additional benefits include: a greater understanding of disease and its management; the description of new diseases or the effects of new treatments;³ the retention of tissue and organs for teaching and research; the training of medical students,⁴ junior doctors and histopathologists;³ and continuing professional development of clinical consultants. They also increase awareness of the multiplicity of conditions which many patients (particularly the elderly) have and of the level of uncertainty – ‘necessary fallibility’ – in medical practice.⁴⁻⁶ Moreover, the greater understanding following PM may also be beneficial for the family,⁷ something that should not be overlooked when the recently bereaved

are counselled by clinicians. This is particularly the case in pregnancy loss and possible inheritable disease, where there may be important implications for other family members.

It has long been recognised that the clinical (consented) PM is in decline^{1,3,8-12} and, if not dead, then terminally ill.¹³ In Britain, this decline appeared to start in the 1950s^{8,12,14} and has continued ever since. There are, however, few recent data to support this contention, and the effects of the publicity following events in Bristol and Liverpool have not been explored. Here we describe the recent consented PM rate for patients dying in the Norfolk and Norwich University Hospital NHS Trust (NNUH), which has 989 beds and serves a population of at least half a million, and the nature of the consent given. We also explore clinicians’ opinions about the numbers of PMs they request and how they obtain the necessary consent.

Methods

Review of the numbers and extent of consented post-mortem examinations

We examined the records of the mortuary and Department of Histopathology for the period 1 January 1996 to 31 December 2003 to determine the number of adults dying in NNUH, the number undergoing consented PM, and the extent of the examination permitted by that consent. From these data we derived the clinical PM rate (number of consented PMs divided by the number of deaths, expressed as a percentage). The number of stillbirths and perinatal deaths, the number of consented PMs undertaken on them, and their clinical PM rate during the period 1 January 2000 to 31 December 2003 were also determined. Coroners’ PMs were excluded from both groups.

Consultant survey

In December 2002, 107 consultants working in disciplines likely to have at least occasional deaths of in-patients were sent a questionnaire, which asked about their attitudes to PMs and how they went

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Clin Med 2004;4:417-23

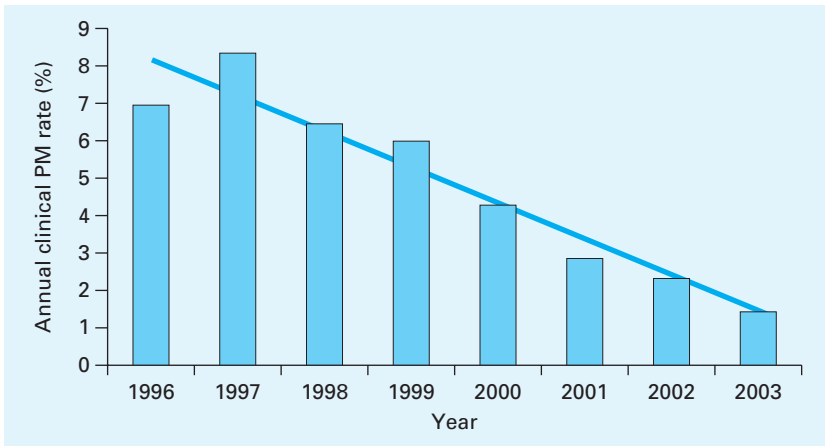


Fig. 1. The annual clinical PM rate for adults in Norwich.

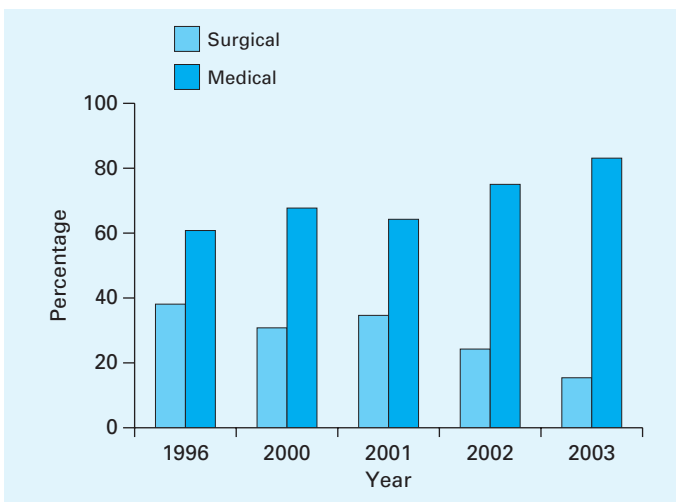


Fig. 2. The percentage of adult clinical PMs for surgical and medical disciplines.

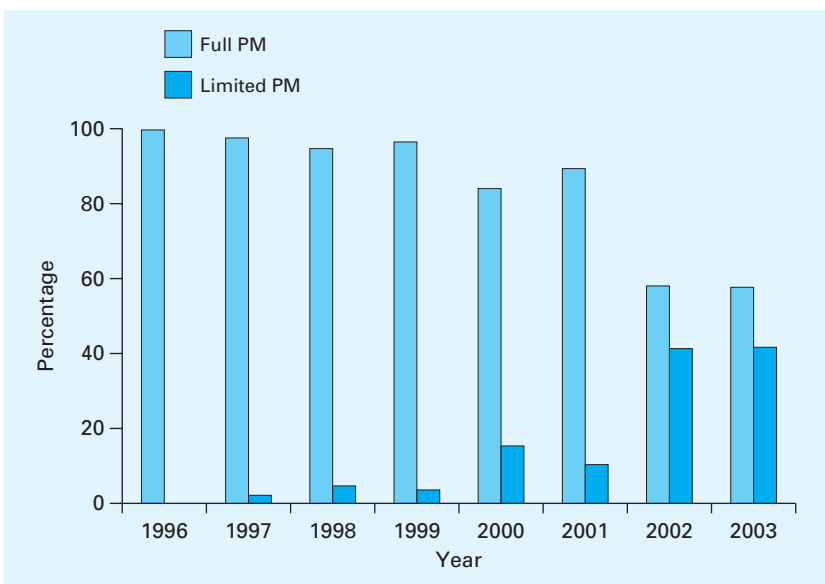


Fig. 3. The percentages of adults undergoing full and limited PMs.

about obtaining permission for them. We also enquired whether they believed that the numbers of consented post-mortem examinations had changed over recent years and, if so, how, and whether events at Bristol and Alder Hey had had any effect on their practice for requesting PMs. The questionnaire asked respondents to say how many PMs they had requested over the preceding six months, how many had received consent by the family, and how many such requests had been rejected. Coroner's cases were explicitly excluded.

Questionnaires were coded to allow tracking by a secretary. A reminder and new coded questionnaire were sent to colleagues who had not responded within two weeks. The investigators were unaware who had responded and how.

Because the individual subspecialty groups were small, they were amalgamated into three larger groups: children's services (obstetrics and gynaecology, and paediatrics – 15 consultants); medical disciplines (general medicine, medicine for the elderly, oncology, and palliative care – 44 consultants); and surgical disciplines (surgery, orthopaedic surgery, and accident & emergency/intensive care unit – 31 consultants).

Results

Review of the numbers and extent of consented post-mortem examinations

Adults – During 1996–2003 the number of adult PMs undertaken with the families' consent declined from 167 (1997) to 34 (2003), a reduction of nearly 80%. This represents a change in the adult clinical PM rate from 8.4% of deaths in 1997 to 1.4% of deaths in 2003. The rate of decline of the adult clinical PM rate was approximately linear during this time (Fig 1). During the period 1996–2001, approximately one third of adult clinical PMs were requested by surgical disciplines (Fig 2). In 2002, the proportion had fallen to about 24% and in 2003, it was only 16%.

There were also changes in the extent of examination permitted by the consenting family member. During 1996–1999, almost all (median = 97.4%; range = 95.1–100%) adult clinical PMs were full, allowing the pathologist unrestricted access to all parts of the body. During the next two years, about 10–15% of adult PMs were limited in the extent of dissection permitted by the family. In 2002 and 2003,

such a limitation was present in 41–43% of examinations (Fig 3). Most such consent stipulated examination of either chest alone or chest plus abdomen, but a significant number detailed precisely which organs could be examined (eg gallbladder or adrenal glands). One family allowed a complete examination except for the heart, which had to be left intact and *in situ* for religious reasons. Special methods of PM examination, such as needle autopsy and radiological methods,¹² were not undertaken.

There has also of late been a small decline in the proportion of PMs in which the consent allows retention of samples for histopathological examination, and a greater reduction in the number allowing retention of material for research and teaching (Fig 4).

Stillbirths and perinates – The clinical PM rate on stillbirths and perinates fell from 69% in 2000 to 50–54% during 2001–2003 (Fig 5). During this period, consent by the parents for external examination only increased from 8–10% of deaths in 2000/2001 to 16–25% of deaths in 2002/2003. The percentage of cases in which there was no PM investigation whatsoever fluctuated between 23% and 37% during 2000–2003.

Consent for PM in stillbirths and perinates almost always allowed material to be retained for histopathological assessment: there was no decline in this function.

Consultant survey

Altogether, 93 (87%) responses were received. Two consultants wrote saying that they were unable to take part in the survey. One physician no longer requested PMs, despite having done so in the past, because of a lack of time and ‘emotional energy’. The other, a paediatric surgeon, shared care with his paediatric colleagues; it was the latter who decided whether to request PMs. Ninety-one (85%) questionnaires were returned, 74 quickly and 17 after a written reminder. One consultant was newly appointed and felt that (s)he had no useful comment to make. This return was excluded from assessment, leaving 90 (84%) useful for analysis.

For the useful returns, the rate of response from the various specialty groups ranged from 63% to 100% (median 87.5%; Table 1). All groups except consultants in accident & emergency medicine/intensive care unit achieved a return of more than 80%. The relatively low response rate for that group may reflect the small number of questionnaires sent to it. The spectrum of time served as a consultant was very similar for the major subgroups of consultants responding (Table 1). As the specialty subgroups were small, they were amalgamated into three larger groups: children’s services; medical disciplines; and surgical disciplines, as described above and shown in Tables 2–4.

A small majority of consultants (48/87; 55%) believed that the

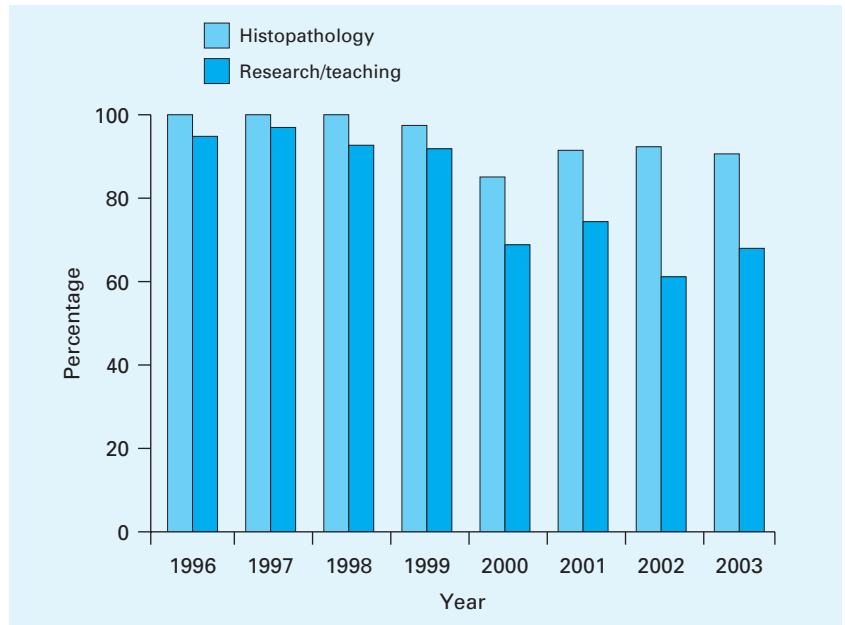


Fig. 4. The proportions of consent forms for adult PM allowing retention of material for histopathology and/or research and teaching.

number of consented PMs had declined over recent years (Table 2). Only one, an obstetrician, expressed the opposite opinion. A significant minority of consultants (38/87; 44%) believed that there had been no change. As a group, most physicians expressed the view that the number of consented PM examinations had declined (30/43; 70%). Most obstetricians

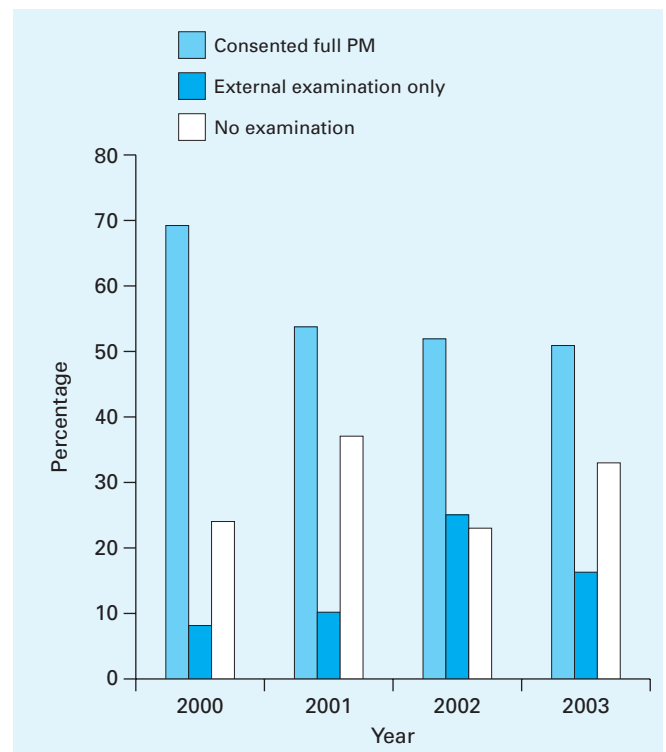


Fig. 5. The percentages of consented full PM and external examination only for stillbirths and perinates.

Table 1. Number (%) of questionnaire returns from subgroups of consultants and their length of service in the grade.

| Group | No (%) of useful returns | Years as a consultant Median (range) |
|-----------------------------|--------------------------|--------------------------------------|
| All consultants | 90 (83%) | 7 (0.2–27) |
| O&G | 9 (100%) | 7 (0.3–25) |
| Paediatricians | 6 (86%) | 7 (2–18) |
| Physicians | 26 (81%) | 7 (0.25–26) |
| MFE ^a physicians | 8 (89%) | 11 (1–24) |
| Oncologists etc | 10 (91%) | 10 (0.2–23) |
| Surgeons | 16 (84%) | 7.5 (1–27) |
| Orthopaedic surgeons | 10 (91%) | 8.5 (1–24) |
| A&E/ICU ^b | 5 (63%) | 8 (0.7–12) |

A&E/ICU = Accident and emergency/intensive care unit; MFE = Medicine for the elderly; O&G = obstetrics and gynaecology.

and paediatricians (9/14; 64%) and surgeons (16/30; 53%) thought that there had been no change in their number.

Consultants treating adults thought that they had requested 91–97 clinical PMs in the six months before they completed the questionnaire, of which 49–53 (50–58%) had been accepted by the families (Table 3). The corresponding figures for children’s services were 35–36 requested and 18–20 accepted (50–57%; Table 3).

Opinion about the effect of the events at Bristol and Alder Hey on the requesting of PMs was divided. Twenty-four respondents (27%) believed that there had been an adverse effect on their requesting practice, 38 (42%) had the opposite view, and 28 (31%) offered no opinion (Table 2). Factors cited which had affected PM requesting practice included difficulty in approaching the family and the complexity of, and time required to complete, the new consent form.

Overall, few consultants always (6; 7%) or never (14; 16%) delegated responsibility for obtaining consent for PM to their junior medical staff. Most delegated this responsibility either rarely (34; 38%) or usually (35; 39%) (Table 4). Fifty per cent was taken arbitrarily as the boundary between the groups that rarely or usually delegated this responsibility. Consultants in

children’s services and in some medical disciplines (eg medicine for the elderly and oncology) rarely or never asked their juniors to obtain consent, whereas surgeons tended to do so more often (Table 4).

Sixty (67%) consultants commented on the training that their junior staff had received for requesting PMs. Only seven of them (12%) were aware that their juniors had received some training. Fifteen (25%) did not know whether they had been trained and 30 (50%) thought that they had received no, or little, training. Seven (12%) suggested that their junior staff had received the same amount as they themselves had had (usually little or none).

Comment

During recent years there has been a marked decline in the number of adult clinical PMs undertaken in Norwich and an increasing restriction placed by the consenting family member on the extent of examination permitted. The rate of decline has been relatively greater for surgical disciplines, whose proportion of total adult clinical PMs fell from approximately one-third during 1996–2001 to one-sixth in 2003, than for medical disciplines. The decline in the overall adult clinical PM rate, which continued a trend seen in other English cities during the 1980s⁸ but starting at a lower base level, antedated the adverse publicity following revelations about events at Bristol and Liverpool, and the trend in decline continued at the same (linear) rate afterwards. Thus there is no evidence that adverse publicity following Bristol and Alder Hey had any effect on the crude adult clinical PM rate, suggesting that other factors were responsible for its decline. However, the relatively greater decline of surgical clinical PMs since 2001 suggests that Bristol and Alder Hey may have had an effect with that group of clinicians or with the families of their deceased patients.

Attitudes of all those involved – clinicians, pathologists, and families – may be important in the decline of the adult clinical PM, a phenomenon which has been taking place over the last 50 years.^{8,12,14} Consenting relatives have recently become increasingly likely to limit the extent of examination allowed. This change followed the introduction in 2000 of a new local consent form, which made explicit the option of a limited examination. In March–May 2002 the Trust became involved in the trial of the new national consent forms (a response to public concern about

Table 2. Consultants’ opinions about the number of consented PM examinations and the effect of the events at Bristol and Alder Hey.

| Group | No of returns | No of PM examinations | | | Bristol/Alder Hey effect | | |
|-----------------------|---------------|-----------------------|-----------|-----------|--------------------------|----------|------------|
| | | Increased | Decreased | No change | Yes | No | No comment |
| All consultants | 90 | 1 (1%) | 48 (55%) | 38 (44%) | 24 (27%) | 38 (42%) | 28 (31%) |
| Children’s services | 15 | 1 (7%) | 4 (27%) | 9 (60%) | 4 (27%) | 6 (40%) | 5 (33%) |
| Medical disciplines | 44 | 0 (0%) | 30 (68%) | 13 (30%) | 17 (39%) | 19 (43%) | 8 (18%) |
| Surgical disciplines* | 31 | 0 (0%) | 14 (45%) | 16 (52%) | 3 (10%) | 13 (42%) | 15 (48%) |

* One questionnaire was incomplete.

PM consent and practice), which were even more detailed than our house version. During that study, 50% of adult clinical PMs were restricted by the family in the extent of anatomical examination allowed. Moreover, those consenting to PM of adult family members have become more likely to refuse permission for histopathological examination and, particularly, for retention of material for teaching and research from 2000.

The current adult clinical PM rate of 1.4% (which includes restricted examinations) is considerably less than that recommended by the Royal Colleges of Pathologists, Physicians and Surgeons¹⁰ and others.¹⁵ The Royal Colleges' joint working party was unable to specify a standard PM rate but suggested a minimum sample of 10% of adult deaths for audit purposes, and noted that a rate of 35% had been suggested by others as adequate.¹⁰ For perinatal cases, permission for PM should be sought in all cases.¹⁰

The increasing limitation in consent given by the family is a cause for concern as important information may be lost in cases where the dissection is only partial or retention of tissue for histopathological assessment is disallowed. Indeed, in the latter circumstance, it may be impossible to reach a definitive pathological diagnosis. While the pathologists have not been directly involved in obtaining consent for PM (and are only rarely asked for advice during that process), they have occasionally acted when the limitations have been such as to render the PM futile. In one case of a patient dying with an undiagnosed form of pulmonary fibrosis, the family initially agreed only to an

Key Points

The adult clinical post-mortem examination is in serious decline and may soon be extinct

This decline has been taking place over at least 50 years

Recent adverse publicity may be a factor in this decline in some groups, and in the restriction of examination and retention of tissue and organs for further assessment and research

The continuing decline of the clinical post-mortem examination has serious adverse implications for clinical audit, diagnostics and medical education

anatomical examination: the consent did not allow histopathological examination. The pathologist told the clinical consultant that he was not prepared to undertake the examination under those terms. When the latter explained the reasons for this to the family, they were happy to amend their decision to allow histopathological examination, with benefit for all parties, in that a definitive diagnosis was achieved. Cases such as this illustrate the importance of advice from pathologists during discussions with the family when eliciting consent for PM. It is arguable that pathologists should become more active in this regard. Indeed, the new national consent forms record whether discussion with a pathologist has occurred.

Table 3. Clinicians' recollection of the numbers of clinical PMs they requested during the previous six months and of the numbers they believed had been accepted by the families.

| Group | No of responses | No clinical PMs in preceding 6 months* | |
|-------------------------|-----------------|--|--------------|
| | | Requested | Accepted |
| Children's services | 14 | 35–36 | 18–20 |
| Medical disciplines | 42 | 62–68 | 31–35 |
| Surgical disciplines | 31 | 29 | 18 |
| Total for adults | 73 | 91–97 | 49–53 |

* Some replies gave ranges of numbers, rather than a specific figure.

Table 4. Delegation by consultants to junior doctors of the requesting of PM examination.

| Group | No of returns | Delegate requesting of PM examination | | | |
|------------------------|---------------|---------------------------------------|----------|----------|---------|
| | | Never | Rarely | Usually | Always |
| All consultants | 90 | 14 (16%) | 34 (38%) | 35 (39%) | 6 (7%) |
| Children's services | 15 | 5 (33%) | 6 (40%) | 4 (27%) | 0 (0%) |
| Medical disciplines | 44 | 6 (14%) | 19 (43%) | 17 (39%) | 2 (5%) |
| Surgical disciplines* | 31 | 3 (10%) | 9 (30%) | 14 (45%) | 4 (13%) |

* One questionnaire was incomplete.

Effects on clinical governance

These trends may have serious potential repercussions on clinical governance. Clinical PMs reveal important unexpected findings in a significant proportion of cases, which, had they been known in life, would have had implications for management and prognosis.^{1,2,5,10,11,15} There is no reason to believe that, despite new diagnostic methods, significant errors in diagnosis and management do not continue to occur. Indeed, we know from personal experience that this is the case, and this is supported by recent papers from a variety of clinical settings.^{16–19} The low clinical PM rate imposes a selection bias and prevents reliable quantification of the problem. This implies that the Trust's clinicians will be unable to follow trends and important lessons will not be learnt. Ideally, a sufficiently large sample of

hospital deaths should routinely and regularly undergo PM to allow sensitivity, specificity and clinical accuracy for individual diagnoses to be calculated,^{1,2} allowing a longitudinal assessment of diagnostic acumen with time. Given the current state of the clinical PM, it will require a considerable (probably unachievable) effort to achieve such a goal. This may not be possible in all hospitals but teaching and other large hospitals could become 'centres for autopsy studies', taking on such a role.¹

Collaboration by hospital trusts may be a means of pooling experience and collecting sufficient data to allow an assessment of diagnostic accuracy in particular clinical settings or to study particular diseases. The model described by Hill and Anderson² has several advantages, not least that it avoids placing blame in single cases and that it can focus on diagnostics for single diseases, rather than the entire spectrum of medical practice. The impetus for such a development in Britain would require general recognition of the current parlous state of the clinical PM and the potential large benefits for medical practice (not forgetting teaching, training and research) by clinicians and the general public.⁵

Implications for teaching and training

The implications for teaching medical students and junior doctors and for the training of histopathologists are also profound. Berthrong³ drew attention to the continuing value of good-quality PMs in the entire professional life of pathologists, refining their surgical histopathological and cytopathological skills in the process. While there are at present plenty of coroner's cases, experience based on that population would be skewed towards cardiovascular and unnatural causes of death. Developing knowledge and understanding of other disease processes and obtaining skills in clinico-pathological correlation would become correspondingly difficult. Changes in medico-legal PM practice in future could affect even this aspect of teaching and training.¹⁴

Perinatal and infant PMs

While falling far short of the recommendation to undertake a PM in all cases, the situation for stillbirths and perinates is somewhat better than that for the adult population. The number and proportion of PMs was relatively great, the obstetricians and paediatricians having well-developed protocols for requesting them and subsequently counselling the parents. In 2001 there was a 22% drop in the proportion of full PMs undertaken, with an increase in the proportion in which no examination was made, suggesting that events at Bristol and Alder Hey may have adversely affected the PM rate in Norwich for this group of patients. Over the next two years, the full PM rate remained at the same reduced level (51–52%). This is a matter of regret as perinatal and infant PMs provide important information (which may alter the clinico-pathological classification of death and in some cases have implications for future pregnancies) in a significant proportion of cases, even those in which the cause of death seems to be well understood clinically.²⁰

Training in seeking consent

The training of junior hospital doctors in obtaining consent for PM is clearly a neglected area of practice. Few consultants reported that their staff had received training or were supervised in requesting PMs; three-quarters either did not know or

believed that their trainees had had little or no training. There seemed to be a casual neglect of this responsibility. One consultant wrote, 'I don't know. It [training in obtaining consent for PM] cannot be less than I received (ie none)'. There were, however, some exceptions, where consultants ensured that their staff were properly briefed. Part of the explanation for this lack of training may be that many of the consultants had not themselves been trained in seeking consent for PM. Moreover, given the low numbers of PMs being requested, such training becomes increasingly difficult and irrelevant.

We are exploring further the reasons behind this decline in the numbers and extent of clinical PMs at NNUH, in the hope that some correction may be applied. Failure to do so will soon be followed by the death of the adult clinical PM in Norwich, with potentially serious effects on clinical care, audit, teaching and training.

Consultant perceptions of PM numbers requested

While most of the consultants surveyed recognised the value of PMs (data not shown), a significant number of them is not aware of the parlous state of PM requesting in adults. Indeed, there appears to be a discrepancy between clinicians' perception of the numbers of clinical PMs that are being undertaken and the reality. During the six-month period before completing the questionnaire (ie June–November 2002), the consultants in medical and surgical specialties thought that overall they had requested 91–97 PMs and that 49–53 cases had been accepted by the family. In fact, during the second half of 2002, only 23 adult clinical PMs were carried out and for the whole of 2002, there were only 53. These figures imply an over-estimate by clinicians by a factor of two. The reason for this is not clear; it should not be to do with coroner's cases as they were clearly excluded in the questions asked. The figures also imply that, as a group, these clinicians think that about half of the requests for an adult clinical PM will be refused. During our pilot study of the proposed new PM consent forms during Spring 2002, the refusal rate was, in fact, 33%. Those in the children's services group were more accurate in their assessment, with a tendency to under-estimate, if anything. They recalled having requested 35–36 PMs during the same six-month period and believed that 18–20 cases had been accepted by the families. During all of 2002, 52 full clinical PMs were carried out on stillbirths and perinates and 25 external examinations only were undertaken.

Other factors might include a reluctance to give time to seek consent for PM or to train junior staff (who are, in any case, busy with other work) and concern for the family. In the context of perinatal and infant PMs, Cartlidge and colleagues²⁰ pointed out that

the necropsy is an invaluable investigation which is currently under-used. The rate is likely to increase only if clinicians take a more positive attitude and realise how much clinically useful information can be obtained from a good quality examination.

We believe that the same could be said with at least as much force of the adult clinical PM.

Pathology liaison nurse

Recognising that clinicians' time is an important factor in the failure to request adult PMs, the Trust is in the process of developing the role of a specially trained pathology liaison nurse, based on models in Leeds and Nottingham,²¹ to facilitate improved requesting practice and better communication between bereaved families, clinical teams, pathologists, and others. It is hoped that one benefit will be to improve the adult clinical PM rate, supporting clinical governance, training and research. Indeed, there is already evidence from our region that consent obtained by specially trained non-medics can have such an effect.²² Moreover, the expertise of the pathology liaison nurse can be used to train junior doctors about how to undertake consenting procedures, which may itself have value in their professional lives.

Conclusion

We are exploring further reasons behind the decline in the numbers and extent of clinical PMs at NNUH, in the hope that some correction may be applied. Failure to do so will soon be followed by the death of the adult clinical PM in Norwich, with potentially serious effects on clinical care, audit, teaching and training.

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