

Necropsies in clinical audit

N H ANDERSON, J H SHANKS, G W G McCLUGGAGE, P G TONER

From the Department of Pathology, The Queen's University of Belfast, Royal Victoria Hospital, Belfast, Northern Ireland

SUMMARY The need for specialised forms of clinical audit was highlighted by the report of the Confidential Enquiry into Perioperative Deaths (CEPOD). Necropsy rates in a Northern Ireland teaching hospital were studied with particular reference to perioperative deaths. To provide an overall context for these observations, the pattern of the necropsy services in Northern Ireland as a whole was also determined. For 600 consecutive deaths in a major teaching hospital, the overall necropsy rate was 180 (30%). In the 74 perioperative deaths in this group (as defined by the CEPOD) the necropsy rate was 26 (35%), compared with 16 out of 72 (22%) for other surgical deaths and 89 out of 386 (23%) for medical cases. More coroners' necropsies were carried out in the perioperative group. These figures are within the range of the CEPOD experience. In 1987, in the whole of Northern Ireland, there were 8859 hospital deaths, 520 (5.9%) hospital necropsies, and 516 (5.8%) coroners' necropsies, giving an overall necropsy rate of 11.7%. Outside the two major Belfast teaching hospitals, however, there were 6799 hospital deaths, 76.6% of all hospital deaths for Northern Ireland. In this group there were 180 (2.6%) hospital necropsies and 383 (5.6%) coroners' cases, the overall necropsy rate being only 8.2%. These wide variations reflect the fact that the number of pathologists in post in the peripheral areas of the province falls substantially short of levels recommended by the Royal College of Pathologists.

If clinical audit along CEPOD lines is to be effective nationally, more emphasis should be placed on the value of necropsy and local deficiencies in provision will have to be identified and remedied. It is suggested that this could be achieved by combining audit provisions with budgetary incentives.

The recent publication of the report of the Confidential Enquiry into Perioperative Deaths (CEPOD)¹ highlighted a growing trend towards specialised forms of clinical audit in current medical practice. The report recommended the adoption of a similar assessment on a national basis.

In their introduction the authors state that: "accurate audit can establish current standards of medical organisation and care—it allows for comparisons and helps to determine the value of procedures".¹ The Report, however, placed little emphasis on the role of the necropsy in cases of perioperative death. The overall necropsy rate for the cases studied by CEPOD was not quoted, but those for cases dying within 48 hours of operation in the three regions studied ranged from 29.1% to 43.4%. No attempt was made to assess the contribution of the necropsy findings to the conclusions drawn by the

Enquiry, nor was there any comment on the distribution of the necropsy services in these three regions. The weakness of the pathology component of the CEPOD report has already been the subject of some comment.²

It is important that an adequate overall level of necropsy provision should exist in every region and that there should be broad equality from area to area, if formal systems of clinical audit similar to CEPOD are to be applied on a national basis. Stimulated by the publication of this report, we decided to undertake a study of current necropsy practice in Northern Ireland, an area not covered by the original Enquiry. There were two main objectives. The first was to define the current pattern of practice in a major teaching hospital, with particular reference to perioperative deaths. This hospital has a comprehensive necropsy service available on request. The second objective was to assess the necropsy rates in different administrative territories within Northern Ireland as a whole and to draw conclusions regarding the distribution of necropsy services.

Material and methods

The first part of this study comprised a detailed examination of 600 consecutive recorded deaths in the Royal group of hospitals, a major teaching hospital complex located in Belfast. This group includes the Royal Victoria Hospital, the Royal Maternity Hospital, and the Royal Belfast Hospital for Sick Children, with a total bed complement of 1362. The clinical records were obtained for study, and in cases where a necropsy was carried out, the full necropsy record was also examined. Patients were excluded from the study if death had occurred outside hospital or in the accident and emergency department.

On the basis of the clinical notes, the cases were subdivided into medical, medical paediatric (less than 16 years old), and surgical groups. The surgical group was further subdivided into perioperative deaths and other deaths. Perioperative deaths were defined as deaths occurring during surgery or within 30 days of operation, in accordance with the CEPOD report.

For the second part of this study, statistics of hospital deaths throughout Northern Ireland for the calendar year 1987 were obtained from the central records of the Department of Health and Social Services (Northern Ireland). Necropsy statistics for each Health Board were provided by the pathologists responsible for the necropsy services in each area. Individual pathologists were also invited to comment on the necropsy service in their area.

ADMINISTRATIVE FRAMEWORK

There are four Area Health Boards in Northern Ireland, designated as the Eastern, Northern, Southern and Western Boards (figure). The Eastern Health Board area includes the Belfast conurbation and incorporates the two largest teaching hospital groups, the Royal Victoria and the Belfast City Hospitals, both of which have pathology departments. These are the two laboratories approved for postgraduate training in pathology for Northern Ireland. The Eastern Board has two smaller hospitals with a teaching role, but with no on-site histopathologist. In the three other Health Board areas, two out of the three main district general hospitals at present have on-site histopathology laboratories. These provide services for large catchment areas, including various other small hospital units which have no on-site pathologist.

The populations served by the four boards and the numbers of consultant pathologists in post in each board area are shown in table 1. In addition to these hospital pathology services, the Northern Ireland office maintains a state pathologists department with a staff of four, which is based in Belfast but which carries out forensic and routine coroners' necropsies throughout Northern Ireland, particularly outside the major

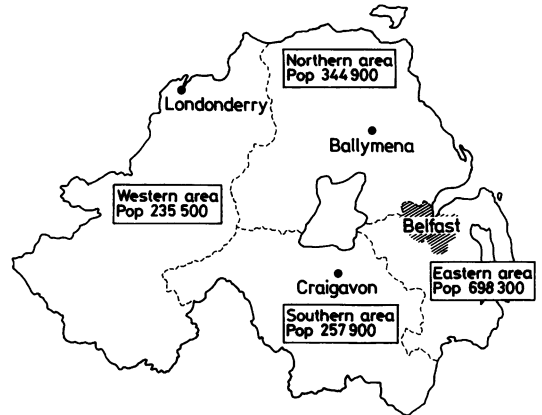


Figure The four Area Health Boards in Northern Ireland

teaching hospitals. National Health Service consultant pathologists do not normally undertake coroners' necropsies in Northern Ireland, a factor which no doubt influences the overall rate.

Results

TEACHING HOSPITAL STUDY

Of 600 consecutive hospital deaths occurring in the Royal group of hospitals, necropsies were carried out in 177 cases, giving an overall rate of 29.5%. Of these, 126 were routine hospital necropsies and 51 were coroners' cases. There was considerable variation in necropsy rates among the various speciality groups studied, the highest being found in paediatric cases, (68%), compared with 29% in all surgical cases and 23% in all medical cases. (table 2).

Out of the total of 146 surgical deaths, 74 occurred in the perioperative period and 72 were classed as other surgical deaths. The overall necropsy rate among perioperative deaths was 35%. This was higher than the rate for other surgical deaths (22%), which in turn was essentially the same as the rate for medical cases (tables 2 and 3). This difference was accounted for by a significantly higher rate of coroners' cases in perioperative deaths than in other hospital deaths

Table 1 Number of consultant pathologists (January 1989) and populations of each Health Board

Board	Population	Consultants (histopathologists and cytologists)
Eastern	698,300	13
Northern	344,900	2
Southern	257,900	1
Western	235,500	2

Table 2 Necropsy rates by clinical speciality

	Medical	Surgical	Medical paediatric
Deaths	386	146	68
Necropsies	89	42	46
Necropsy rate	23%	29%	68%

(table 3). It must be emphasised that these results apply to a major teaching hospital in which clinicians have access to a full necropsy service on request.

NORTHERN IRELAND STUDY

The overall necropsy rate for hospital deaths in Northern Ireland in 1987 was only 12%. A striking variation in necropsy rates was noted between the two main teaching hospitals, where the necropsy rate was 23% overall, and all other hospitals, which had an overall rate of only 8%. The rate of coroners' necropsies, at 6%, is uniform throughout Northern Ireland.

Most of these coroners' cases are carried out by the salaried state pathologists employed by the Northern Ireland Office. As indicated above, National Health Service consultant staff in Northern Ireland do not routinely undertake such necropsies. The main reason for the overall difference in necropsy rates between the teaching hospitals and other hospitals lies, therefore, in the routine hospital necropsy rates, which are 17% and 2%–3% respectively. When the figures for the Royal Victoria and Belfast City Hospitals are excluded, the hospital necropsy rates are uniformly low (2–3%) throughout the rest of Northern Ireland.

These pronounced regional variations in necropsy rates reflect the local deficiencies in pathology manpower provision (table 1). The number of consultant pathologists currently in post in Northern Ireland as a whole falls short of DHSS (NI) target figures, while in the Northern, Southern, and Western Area Boards in particular, staffing levels are far below the Royal College of Pathologists' recommendations. Consultant pathologists in each area were invited to express their views on the necropsy service provided in their own areas. All indicated concern that their laboratories were understaffed at consultant level and that there was no option but to prioritise their workload. Inevitably, necropsies ended up at the bottom of the list of priorities, due to the volume of biopsy and cytology work. This creates a climate of

limitation of service, which in turn feeds through to the clinicians, who place correspondingly severe limitations on the requests they make of their visibly overburdened pathologist colleagues. As further evidence of the lack of availability of necropsy provision, at least two necropsies in the Northern Board Area in the period of our study were found to have been performed by surgeons themselves.

The Northern Ireland pattern shown by this study suggests that an adequate provision for necropsy service is available only in the two major teaching hospitals, which have the benefit of on-site histopathologists working in a postgraduate training environment. Only 23% of all hospital deaths in Northern Ireland occur in these two hospitals. By contrast, 77% of all hospital deaths occur in areas in which only the most limited hospital necropsy service is available.

Discussion

The CEPOD obtained copies of necropsy reports relating to the cases studied, but did not comment on the value of the necropsy findings in the final assessment. This seems to reflect a somewhat ambivalent view of the role of the necropsy. An overall necropsy rate was not given in the CEPOD report, although the necropsy rates for patients dying within 48 hours of operation in the three regions covered by the study were quoted separately and varied from 29%–43%. No attempt was made to relate these variations to local conditions, nor to comment on their importance to the effectiveness of the study as a whole. The Report made no comment on the adequacy or otherwise of this level of necropsy provision.

In general, it is recognised that necropsy rates have been declining steadily over the past 40 years, both in the United States³ and in the United Kingdom.⁴ There has also been a change in the pattern of necropsy practice in the United Kingdom, with an increasing number of coroners' necropsies and a decline in those done in hospitals.⁵ Several possible reasons have been advanced for the decline in rates, including overreliance on hi-tech diagnostic techniques, poor communication between pathologists and clinicians, the fear of litigation based on necropsy findings and the pressure of work on pathologists in other more urgent areas of the hospital pathology services.

Despite improvements in diagnostic techniques,

Table 3 Necropsy in surgical cases

	Perioperative	Non-perioperative	Total
Deaths	74	72	146
Necropsies	26 (35%)	16 (22%)	42 (29%)
Hospital	6	15	21
Coroners'	20	1	21
	} (23% H; 77% C)		} (50% H; 50% C)
	} (94% H; 6% C)		

there are still significant differences between diagnoses in life and at death in up to 30% of cases.^{3,6,7} This figure remains constant even when necropsy rates are increased to include cases in which necropsy would not normally be performed.⁸ It is therefore impossible to predict which necropsies will have a high yield of discrepancies between diagnosis before and after death. When studies have been confined to missed diagnoses, which if made and treated during life could have led to an improvement in survival, the discrepancy rate is still in the order of 10%.⁶ There is good evidence, therefore, that necropsies still have a role in the accurate assessment of the cause of death, as well as in research and teaching. The present study was not designed to assess diagnostic accuracy, but it was apparent that on several occasions the diagnosis at necropsy did, indeed, differ considerably from the clinical diagnosis.

The main initial objective of the present study was to assess the current necropsy rates for various specialities in a major Northern Ireland teaching hospital, with particular reference to perioperative deaths. The necropsy rate for all deaths was 30%, a figure broadly in line with current experience in other similar centres. This figure represents the highest level of coverage achieved in any hospital in Northern Ireland, which reflects the teaching and training role of the pathology department as well as its relatively favourable level of medical staffing.

When cases were subdivided according to specialty, a high necropsy rate was found among children and infants due particularly to the inclusion of stillbirths in this group. In general, paediatric pathology seems to be the one area in which necropsy remains a flourishing procedure. This is in line with experience elsewhere.

The rate of necropsy in perioperative cases, at 35%, was apparently no worse than the CEPOD experience, although the lack of full figures in the CEPOD report makes any comparison incomplete. CEPOD, however, covered three regions, whereas the present figures relate to the much narrower catchment of a single major teaching hospital. Bearing in mind the high incidence of coroners' cases among perioperative deaths, these figures suggest that in teaching hospitals, no particular emphasis is currently being placed on the routine hospital necropsy in cases dying in the perioperative period.

It is debatable whether a necropsy rate of 35% at best represents an adequate input from the pathology services to a clinical audit of the CEPOD type, although even if it were agreed that a higher rate would be desirable, it is not immediately obvious how this would be achieved, given the consistent overall decline of necropsies in recent years. The primary need is probably for improved "public relations" between

Table 4 Hospital necropsy rates (%) for Northern Ireland 1987

	Deaths	Necropsies	Coroners' cases	Hospital cases
Two major teaching hospitals	2060	473 (23.1)	133 (6.5)	340 (16.6)
All other hospitals	6799	563 (8.2)	383 (5.6)	180 (2.6)

pathologists and clinicians of all specialties. The positive value and continuing relevance of the necropsy must be clearly communicated, particularly to junior hospital clinical staff, on whom falls the responsibility of seeking permission for a necropsy from the bereaved. In general, experience has shown that permission is rarely refused if the request is sensitively presented. Apart from a general enhancement of the necropsy rate, some form of additional partial audit, as proposed by Cameron,⁸ may be worthy of further consideration in the future. Additional cases for necropsy in particular categories could perhaps be randomly selected, subject to appropriate permission. All this, of course, presupposes the availability of sufficient manpower to undertake all appropriate necropsies in any geographical area.

If the pathology services are to make an important contribution to a national clinical audit along CEPOD lines, then all clinicians should, in principle, have equal access to a full necropsy service on request. The results of the present study show that this is not currently the case in Northern Ireland. Outside the two teaching hospitals with on-site histopathology services, the overall necropsy rate of 8% is low and the rate of hospital necropsies, at 2-3%, is especially low (table 4). The rate of coroners' necropsies, at 6%, is essentially uniform throughout the province. Most of these cases are undertaken by the state pathologist service. This has resulted in a fairly strict and relatively uniform definition of coroner's work within Northern Ireland. The financial implications of Coroners' work are not a factor in the distribution of necropsy services in Northern Ireland.

Although our study has shown that coroners' necropsies are more common in cases of perioperative death than in other categories of hospital death, it is apparent that not all cases in which necropsy would be desirable can be covered in this way. In at least two instances that came to our attention in the Northern Ireland survey, necropsies had been carried out in an outlying area by surgeons themselves, providing clear evidence that on occasion there was a particular need for a necropsy in a case outside the coroner's jurisdiction, but that the appropriate professional facilities were not available.

The ultimate root cause of the decline of the hospital

necropsy may lie in the fact that it is a service which there is little incentive to maintain because there is no one to meet the bill. Perhaps, therefore, in line with current government theory, the way forward may be to combine the concepts of clinical audit and budgetary incentive. The full hospital necropsy must first be realistically costed. Hospitals can then be set target necropsy rates that would be appropriately budgeted from the new resources which are to be provided for clinical audit. These necropsy targets would form an integral part of a hospital's audit provision, just as targets are to be set for immunisation and screening programmes in general practice. Alternatively, the baseline pathology budget could be enhanced to reflect an agreed level of necropsy provision. Whichever approach is accepted, the resultant flow of new budgetary resources into the pathology services would quickly resolve any local manpower shortages. Such a mechanism might well provide the key to the revival of the hospital necropsy.

In conclusion, this study suggests that at present there is no particular attention being paid to the role of the hospital necropsy in the assessment of perioperative deaths. It can be argued that a higher necropsy rate would enhance the effectiveness of the proposed National CEPOD. Moreover, if National CEPOD is to provide a valid basis for future comparisons between regions, an adequate and broadly uniform provision of necropsy services would seem to be an important prerequisite. Deficiencies in necropsy provision will need to be identified and corrected. These observations have important implications for manpower requirements in pathology departments, at least in Northern Ireland.

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Requests for reprints to: Professor P G Toner, Department of Pathology, The Queen's University, Royal Victoria Hospital, Grosvenor Road, Belfast, N Ireland.