Analysis of necropsy request behaviour of clinicians

R D Start, S G Brain, T A McCulloch, C A Angel

Abstract

***Aim*—To develop a necropsy related audit system to record accurate information in relation to necropsy requests, necropsy rates and coronial referrals.**

***Methods*—A simple audit form was used to record detailed necropsy related data via an integrated questionnaire design and data entry system based on available optical image scanning technology. The system recorded the numbers and locations of deaths, referrals to the coroner, clinical necropsy requests, hospital and medicolegal necropsies, the grade of clinician involved in these processes, and the identity of the consultant in charge of the case. The overall, hospital and medicolegal necropsy rates were calculated by individual consultant, specialty and for the whole hospital. Necropsy request rates and coronial referral rates were also calculated and these data were related to the grade of clinician. All data were available on a monthly or an accumulative basis.**

***Results*—Of 1398 deaths, 534 (38%) were discussed with the local coroner's office and 167 of these were accepted for further investigation. House officers and senior house officers referred over 80% of all cases, whereas consultants referred only 2%. There were no significant differences in case acceptance rates by grade of clinician. Clinicians made 307 hospital necropsy requests (overall hospital necropsy request rate 22%). House officers made 65% of all necropsy requests. Consultant necropsy requests represented 13% of all requests. There were no significant differences in necropsy request success rates by grade of clinician.**

***Conclusions*—The referral of cases to coroners and clinical necropsy requests are still being inappropriately delegated to the most junior clinicians. This study illustrates the type of useful information which can be produced for individual clinicians, specialty audit groups and pathology departments using a simple necropsy related audit system.**

(*J Clin Pathol* 1996;49:29-33)

Keywords: audit, necropsy requests, optical image scanning.

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Accepted for publication
8 September 1995

The concept that necropsies provide a good index of the quality of patient care is controversial. A significant factor in this debate has been the lack of nationally agreed standards of practice, such as standard necropsy rates, which can only be set with difficulty because of varying patient age and case mixes between individual departments and hospitals. Nevertheless, the continuing high levels of discordance between clinical diagnoses and necropsy findings have ensured a central role for necropsies in medical audit and an operational system of necropsy audit is considered to be an important criterion in the assessment of clinical departments for training and accreditation purposes.[1]

One consequence of this recognition of the role of necropsy in audit has been increased demand for more accessible information in relation to hospital deaths, clinical necropsy requests and subsequent necropsy examinations. Some of this information is already available from different sources such as patient administration system, bereavement office and mortuary records. Other details, such as referrals to the coroner, are not routinely recorded centrally and relevant information can only be assembled with considerable effort, if at all. This experience stimulated the development of a simple system of necropsy related audit which uses optical scanning technology to provide a valuable and regularly updated information service for clinicians. The system records detailed information about hospital deaths, necropsy requests, hospital and medicolegal necropsy rates, and referrals to the coroner.

Data collection by optical scanning technology has been available for some time to mark multiple choice examination papers and to input data from questionnaires. This technology is becoming increasingly sophisticated and the use of optical page scanning in association with more flexible software programs has permitted data input from more complex source forms. The necropsy related audit system represents just one of many potential applications for such an integrated questionnaire design and automated data entry system within medical audit.[2] Optical scanning systems can already be found in many medical audit departments.

This paper will discuss the technical merits of this type of system in the context of necropsy request and coronial referral data compiled using a necropsy related audit application during the first year of its operation at a large teaching centre.

Methods

A simple audit form was designed and introduced to provide quantitative data which can be captured via the Formic Optical Mark Reading system (Formic Limited, Unit 4 Ransome's Dock, 35-37 Parkgate Road, London SWIG 4NP). Formic is a versatile PC based software product which is designed to capture data automatically using optical image scanning technology. The integrated system has four main functions which are questionnaire/form design, optical scanning, logic based error, and

inconsistency detection and a data export option to most database and spreadsheet packages. The sheet-fed scanner (Fujitsu M3093E Document Image Scanner) is capable of scanning 1380 single-sided pages per hour with far greater accuracy than manual data entry through the inclusion of an integral logic based error and inconsistency detection function.[3] In our hospital the monthly data entry of approximately 150 forms, each with eight data elements, now takes less than 15 minutes compared with 120 minutes using the previous manual data entry system and an experienced keyboard operator. The design of an appropriate audit form with a companion database is relatively simple and requires no additional time input when compared with the development of a conventional manual database entry system. There is no requirement for specialist printing as the system uses photocopied images of appropriate forms.

The cost implications for individual users is low because a single system can serve a large number of applications for any number of individual departments within one or more health care centres. Although the cost benefit for individual applications may be modest (we have calculated an approximate saving of £150 per

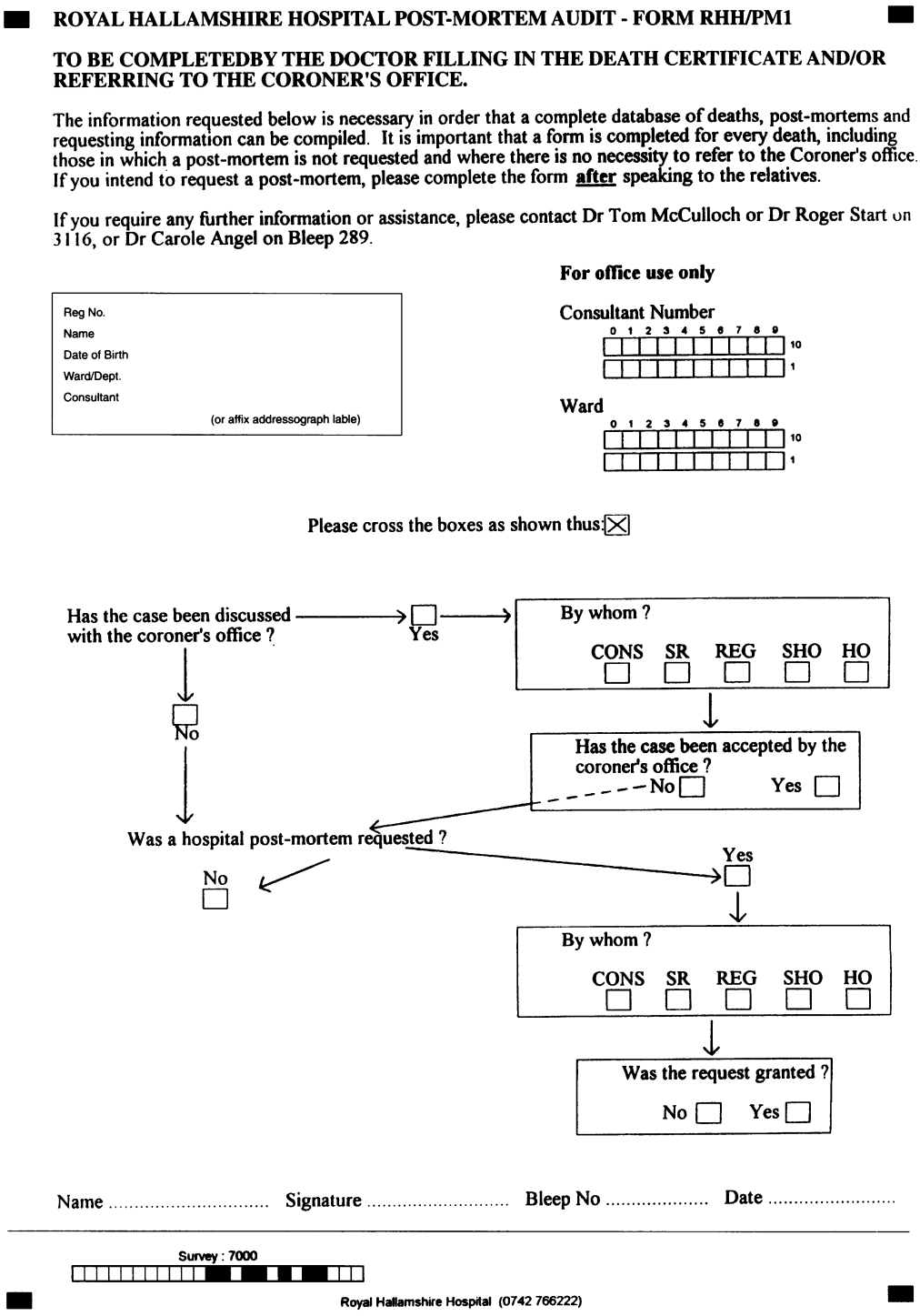

Figure 1 Royal Hallamshire Hospital necropsy related audit form. CONS = consultant; SR = senior registrar; REG = registrar; SHO = senior house officer; HO = house officer.

POST-MORTEM AUDIT
From 01/02/94 to 31/01/95

Consultant	Total Deaths	Case Referred	Case Accepted	HPM Requested	HPM Granted
16	60	29	6	39	22

Overall Autopsy Rate	46.7%	(HPM Granted+Case Acc)/Total Deaths
Coroner Autopsy Rate	10.0%	Case Accepted / Total Deaths
Hospital Autopsy Rate	36.7%	HPM Granted / Total Deaths
Corrected Hospital Autopsy Rate	40.7%	HPM Granted / (Total Deaths - Case Acc)
Hospital Autopsy Request Rate	65.0%	HPM Requested / Total Deaths
Corrected Hospital Autopsy Request Rate	72.2%	HPM Requested / (Total Deaths - Case Acc)
Hospital Autopsy Request Success Rate	56.4%	HPM Granted / HPM Requested
Coroner Referral Rate	48.3%	Case Referred / Total Deaths
Coroner Acceptance Rate	20.7%	Case Accepted / Case Referred

Case Referred By		HPM Requested By	
REG	5	REG	5
SHO	2	SHO	1
HO	20	HO	30
BLANK	2	BLANK	3
	29		39

Case Accepted		HPM Granted	
SHO	1	REG	3
HO	4	HO	17
BLANK	1	BLANK	2
	6		22

Figure 2 Royal Hallamshire Hospital individual consultant accumulative necropsy related audit data sheet (the location of deaths data have been omitted for simplicity). HPM = hospital postmortem; REG = registrar; SHO = senior house officer; HO = house officer; Acc = accepted.

year for the necropsy related audit, based on the replacement of the previous manual data entry system by the described optical scanning application), the overall cost saving derived from a large number of applications for multiple users can be considerable when these applications are based on a single optical scanning system.[3] The cost benefit is generally achieved through reductions in costs related to keyboard operator personnel.

The audit form was designed in conjunction with local clinicians in order to ensure that all of the necessary information was recorded with a minimal requirement for additional documentation (a specimen form is shown in fig 1). Clinicians complete an audit form for every hospital death at the time of death certification or discussion with the coroner, and the results are exported to a database after optical image scanning at the end of each calendar month. The simplicity and speed with which the audit form can be completed has resulted in acceptance by clinicians and administrative staff. Forms are completed immediately for over 85% of deaths and the remainder are obtained through personal contact with the certifying doctor.

The audit form records information relating to the location of deaths, the referral of cases to the coroner, hospital necropsy requests, the numbers of clinical and medicolegal necropsies, the grade of doctor involved in each process, and the identity of the consultant in charge of the case. The completed forms are stored and represent a useful risk management resource through the formal recording of individual hospital necropsy requests and referrals to the coroner.[4] Each consultant has an individual identification number known only to that consultant and the medical audit department, which codes each form with the appropriate consultant identification number and location code using the boxes in the upper right corner of the audit form (fig 1). All material produced by the system bears one or more consultant identification numbers without actual names in order to maintain complete confidentiality.

The database automatically calculates the overall, hospital, corrected hospital, and medicolegal necropsy rates by individual consultant and for the whole hospital. The methods for calculating these necropsy rates have been defined elsewhere.[5] Hospital necropsy request

Table 1 Cases discussed with local coroner's office by grade of clinician

Grade of clinician	Number of cases discussed	Proportion of all cases discussed	Number of cases accepted	Acceptance rate*
Consultant	13	2%	7	54%
Senior registrar	37	7%	12	32%
Registrar	24	5%	9	38%
Senior house officer	118	22%	28	24%
House officer	321	60%	104	32%
Blank	21	4%	7	
Total	534	100%	167	31%

* See fig 2 for definition.

Table 2 Hospital necropsy requests by grade of clinician

Grtade of clinician	Number of necropsy requests	Proportion of all requests	Number of necropsies granted	Hospital necropsy request success rate*
Consultant	38	13%	15	39%
Senior registrar	15	5%	7	47%
Registrar	13	4%	7	54%
Senior house officer	28	9%	13	46%
House officer	200	65%	86	43%
Blank	13	4%	8	
Total	307	100%	136	44%

* See fig 2 for definition.

rates and coronial referral rates are also calculated with data related to the grade of clinician (a specimen result sheet for one consultant is shown in fig 2). Individual consultants are currently supplied with necropsy related data on a monthly basis by personal request. This information consists of the figures for the previous month together with an accumulative record of necropsy related practice. The system can provide information over any time period based on complete calendar months and this enables comparisons and analysis for trends as required. Data relating to any combination of individual consultants can also be provided and this type of information is readily available in confidential form to specialty audit groups within the hospital.

The distribution of deaths within the hospital is monitored in several ways. Individual consultants are supplied with details of the location of all patient deaths under their care (fig 2). The monthly and updated accumulative figures for the whole hospital also include details of the locations of all deaths and those departments in which patients are cared for by more than one consultant—for example, coronary and intensive care units, are supplied with location specific necropsy related data on request. Any unusual clusters of deaths in a particular location within the hospital would be easily identified by the system.

The system has also facilitated the monitoring of necropsy practice by the pathology department and the results of a detailed analysis of clinician necropsy requests and coronial referrals are presented for the first year of operation of the necropsy audit system. The analysis excludes deaths occurring in the accident and emergency department which are subject to a separate system of audit.

Results

A total of 1398 deaths occurred in the hospital during the year. The local coroner's office was contacted about 534 (38%) cases and 167 of these were accepted for further investigation (table 1). A necropsy was performed in all accepted cases. House officers and senior house officers together referred over 80% of all cases. Consultants referred only 2% of all cases. There were no significant differences in case acceptance rates by grade of clinician.

Table 2 shows that a total of 307 hospital necropsy requests were made by clinicians (overall hospital necropsy request rate 22%). House officers made 65% of all necropsy requests. Consultant necropsy requests represented 13% of all requests. There were no significant differences in necropsy request success rates by grade of clinician.

Discussion

Standards of practice have not been established in many death related procedures but some standards have been agreed by a Joint Working Party of three Royal colleges.[1] These standards clearly state that the responsibility for necropsy requests lies with the consultant in charge of the case. Whilst this responsibility may be delegated, this should be a positive process and not merely left to the most junior doctors. The level of supervision cannot be determined by the audit system in its present form, but the high proportion of necropsy requests made by house officers in this study suggests that these standards are not being maintained by many senior clinicians. Frequent rotation of junior staff may be a contributory factor and those consultants or specialty audit groups which operate specific necropsy request protocols within their clinical practice have found the audit system to be useful for monitoring the application of these request policies.

Formal training of junior doctors in how to request necropsies in an informative and sympathetic manner should be an integral part of undergraduate medical education but further practical training must be the responsibility of consultant clinicians.[1] There is considerable evidence to suggest that the way in which nec-

ropsy requests are made can influence the decision of the relatives.[6] Some clinicians have found that the regular provision of information in relation to necropsy request success rates is useful for identifying those individuals who may benefit from further training in necropsy requests. The success of necropsy requests is also thought to be influenced by the grade of clinician making the request.[7] Previous studies have found consultants to be more successful in this respect but the relatively low number of consultant necropsy requests in our current audit prevents detailed assessment of this correlation. This information will become available in time, with the ability to study necropsy request behaviour on a long term basis.

The responsibility for communication with coroners or an equivalent authority must also lie with senior clinicians even though some may have less understanding of the indications which require referral than the junior clinicians under their supervision.[8] In this study consultants were directly involved in just 2% of all cases discussed with the local coroner's office. The high proportion of cases involving junior clinicians is unacceptable, particularly in view of recent local initiatives to improve performance in this area of clinical practice. These initiatives may partly explain the large number of cases, over one third of all deaths, which were discussed with the coroner's office. Other influential factors would be a local requirement to inform the coroner of all deaths which occur within 24 hours of admission to hospital and the accessible nature of the daily advice service offered by the local coroner's office. Many case discussions will have involved the clarification of minor details only and these would not previously have been formally recorded. The retention of the completed audit forms provides a permanent risk management resource if problems arise later.

Any failure to recognise those deaths which should be reported to the coroner can lead to administrative difficulties, delays in funeral arrangements and unnecessary distress to bereaved relatives. Other cases may evade medicolegal investigation altogether because they are not recognised as deaths due to unnatural causes.[8] Such situations represent poor quality service and inevitably lead to loss of respect for both the clinicians and the hospital. Although advice may be sought from senior clinicians, pathologists and the local coroner's office, this advice may be misleading or incorrect if the clinician fails to recognise and disclose all of the relevant information. All pathologists must be aware of the persisting problems with inaccurate death certification and failure to recognise deaths which require referral to coroners or equivalent authorities. In some centres pathologists have adopted the practice of scrutinising case notes of all patient deaths before direct discussions with the certifying or reporting clinician. This system provides an excellent opportunity for education, training and encouragement to make necropsy requests but must be time consuming for the participating pathologists.[9] Clearly, there are no simple solutions to these problems but the provision of detailed local information in relation to these areas of clinical practice must be an important step in the right direction. The provision of accurate information in relation to hospital deaths and necropsies is rapidly becoming an essential component of medical audit for individual clinicians, departments and hospitals. Our system provides a single and central source for all relevant information in relation to necropsies. Computer based protocols have been described for recording the accuracy of clinical diagnoses in relation to necropsy findings and this represents an important role for necropsies within medical audit.[10] Many of these systems do not seem to include details relating to clinical necropsy requests, referrals to coroners and the grade of doctors involved in these processes. This elementary information is essential to the appraisal of the procedures which occur after a death in hospital but the data can often only be collected with difficulty from a variety of different and potentially unreliable sources. Our hospital is currently developing a formal system of monitoring the accuracy of clinical diagnoses in cases where necropsy examinations are performed and the necropsy related audit will incorporate this additional information.

Our necropsy related audit system is based on the necropsy practice of a large teaching centre but would be equally applicable to a district general hospital. The development of the necropsy related audit system in association with local clinicians and administrative staff has ensured that all of the required information is recorded in the simplest and most cost effective manner. The accessibility and flexibility of the system has already proved beneficial to individual clinicians, specialty audit groups and the department of pathology. The increasing availability of accurate information in relation to hospital deaths and necropsies in this and other centres should facilitate the definition of further national standards for an area of medical practice in which this has so far proved extremely difficult.

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