Malaysian J Pathol 2009; 31(1) : 17 – 22

SPECIAL ARTICLE

Quality assurance in forensic pathology

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Abstract

One of the requirements for proper running of a pathology laboratory is implementation of a quality assurance programme. Forensic pathology is not exempted, especially so when cases are increasing in complexity. It is not difficult to introduce a quality assurance programme even in a small forensic centre. Among the steps that can be implemented including introduction of a set of minimal standards in performance of the autopsy, timeliness and report writing, a vigorous peer review process either internally or externally and participation in external quality programmes. Proper documentation of the post-mortem process (photography, slides and blocks and various imaging modalities) is to be encouraged. There should be limits set on workload of pathologists as overburden is known to lower standards. A pleasant work environment is also essential. Personal continuous medical education should be made mandatory. Introduction of a quality assurance programme will not only improve standards but minimise possible negligence. The post-mortem reports will be seen to carry more weight in court.

Keywords: forensic pathology, quality assurance, minimum standards, peer review, accreditation

INTRODUCTION

Among the purposes of a forensic post-mortem examination are to establish a cause of death, assist in medico-legal inquiry and in criminal cases, to assist in police investigation. In addition to these traditional medico-legal purposes, the outcome of a forensic post-mortem examination may assist the court in the civil litigation, next-of-kin in their grieving processes, alerting the next-of-kin of potential inheritable diseases and plays a role in assisting clinicians with clinical audit and medical education. The last role has been increasing in prominence with the decreasing numbers of hospital post-mortem examinations.

The forensic post-mortem examination itself is becoming more complex requiring a team effort involving other specialties which includes not only other fields of pathology like paediatric pathology and neuropathology but also other modalities like radiology and lately, newer forms of imaging. The proliferation of papers on post-mortem imaging indicates that in future most forensic examination will include imaging as part of the examination necessitating at least initially input from imaging specialists. Input from forensic anthropologist and odontologist may be required in certain cases. Cases which require toxicology interpretation and back-calculation of doses may need referral to a toxicology expert.

In Queensland as well as in many other medico-legal systems, new coronial or medico-legal systems implemented require more stringent reporting of deaths in hospital or care resulting in an increasing rate of post-mortem examination of hospital-related deaths[1]. These cases are often complex requiring input from various medical specialities.

The increased complexity of the post-mortem examinations will potentially increase the tendency for errors. The repercussions from the forensic post-mortem examination from such errors can be highly significant as the forensic investigation involves the criminal justice system which may result in failure of or wrongful conviction.

Therefore, it is vital for all forensic pathology departments to institute some form of quality assurance process to minimise these errors. At first glance, it appears to be a difficult process.

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The autopsy process is a destructive one and in most instances, the body is no longer available for examination at a later date. Interpretation can be very subjective which is similar to that encountered in the closely related field of anatomical pathology.[2] However, while it is not possible to reduce errors completely, with proper implementation of a quality assurance system, errors of catastrophic consequence can be prevented and minor errors can be reduced to a minimum with a few simple steps.

Definition[3]

Quality assurance refers to the outcome and the way resources are used to provide a service which will best benefit the client. Therefore, accurate cause of death and sensible interpretation are only part of the process which also includes timeliness, effective communication, outcome of the case and consumer (in this case, the Coroner and other medicolegal authorities) satisfaction. All these considerations are loosely defined as audit.

Quality control relates to control of processes leading to a diagnosis which in forensic pathology would be steps leading to find a cause of death. Therefore, quality control is part of the quality assurance.

QUALITY PROCESS IN A FORENSIC PATHOLOGY DEPARTMENT

Implementing a quality assurance programme does not need to be a very complex process. Most of steps taken are simple to implement even in a small department with two to three forensic pathologists. Pathologists practising on their own can even participate in a good quality assurance programme provided there is networking with colleagues elsewhere. While guidelines on how to implement quality assurance in forensic pathology has been published, it has to be tailored for individual departments taking into account the local conditions.[4] A few simple steps as suggested below are required to run a comprehensive quality assurance programme in a forensic pathology department.

1. Implementation of minimum standards required for various types of post-mortem examinations

This refers to a set of minimal standards required for various types of post-mortem examinations. There are guidelines from various institutions or Pathology Colleges which one can follow or from those published in journals.[5,6]

For example the Royal College of Pathologists in 2002 has published 'Guidelines on autopsy practice' suggesting a minimum dataset to be included in an autopsy report.[7] It included appendices (which have been regularly updated) with further guidelines in specific cases, among which are sudden unexpected death in infancy, forensic deaths, neuropathology-related deaths including death in epilepsy and maternal deaths.

This was followed up by another publication in 2004 titled 'Code of practice and performance standards for forensic pathologists' which reiterated guidelines not only of the post-mortem examination but the entire process including the scene examination, collection of specimens, writing of post-mortem report and even touching on defence post-mortem examinations and attendance in court.[8]

There is no reason on why similar guidelines cannot be devised at a local level. Minimal standards for post-mortem examination of various types of cases can be agreed upon amongst all pathologists in the centre taking into consideration the known local limitations. This will ensure such guidelines are simpler to adhere to. An example of such a guideline has been implemented at the Victorian Institute of Forensic Medicine in Australia.[9]

In line with the minimal standards for post-mortem examinations, benchmarking of timeliness is also important especially from the 'client' end. The timeliness can be further subdivided into time required for completion of an individual investigation within the control of the centre e.g. histology. Further benchmarking can be made for a report to be completed within a certain time frame after receiving the results of the last investigation. For example, a department could aim for histology slides to be processed within a week after the post-mortem examination and another week for preparation of special stains. A post-mortem report can be expected to be completed a week after receipt of the last histological slides. Similar, a time frame for expected completion of a report can be given after receiving a toxicology report.

In the Forensic Pathology section of Queensland Forensic and Scientific Services, cases of different complexities are given different time frames for expected completion date. In a routine uncomplicated natural case, the time frame is 4 weeks (or 2 weeks after the last test

result), whereas one is expected to issue a report of a complex case e.g. sudden unexpected death in infancy within 12 weeks (or 2 weeks of last test result).

Setting up guidelines is of no use if no one follows them. The next step is to ensure that these guidelines are adhered to. Therefore there should be random audit to ensure the guidelines are followed. The National Association of Medical Examiners (NAME) has advocated 10% of cases to be audited.[10] The audit, if it has discovered any deviation from the guidelines, should record steps taken to correct the defects. It has been proven that regular audits will improve recording of hospital post-mortem reports and one will expect the same result in forensic cases.[11]

2. Peer review process

In this process, autopsy reports are subjected to review by another colleague. This is usually conducted by a colleague within the same department but external review can be organised and should be encouraged especially so in the single practice setting.

The review should be comprehensive and should include images, histology slides and investigative results besides the autopsy report. If organs or tissue specimens are retained, these should also be subjected to review.[12] The review should be performed prior to finalisation of the report and should be recorded. Whilst realistically all reports cannot be possibly peer reviewed due to manpower constraints, one should aim for a review of at least all suspicious or controversial cases.

The peer review should include a protocol for corrective measures if a situation should arise where the responsible pathologist is in disagreement with the reviewer, especially so when the differing opinions can potentially change the nature of the case.

Besides this type of review, other forms of peer review can be introduced as well. This can be implemented through several means:

- Joint performance of post-mortem examination and report. This is a well known system compulsory in the Scottish Procurator Fiscal system where two doctors are required to conduct the post-mortem examination and jointly issue a report. Even in a jurisdiction which does not require another pathologist to jointly conduct a post-mortem examination, one can always ask a colleague to observe the post-mortem examination and to be included as one of the persons observing the examination in the report if the case is potentially controversial.
- Case discussion with colleagues in meetings. Difficult or controversial cases can be discussed among colleagues formally (in set meetings) or informally. Opinions can be sought not only on the interpretation of gross pathology but also on the histological slides and interpretation of other investigations from various other specialities (e.g. anatomical pathologists, clinical toxicologists). The discussion can be recorded in the contemporary notes or in the post-mortem report itself.
- Random review of past cases. This review is slightly different from the audit mentioned earlier. Whilst the former one is merely to ensure minimal data is included in the post-mortem report, this type of review (which can be combined together) is done by another pathologist who will scrutinise to see if the factual content are accurate (which may include review of images and histological slides as done above) and the opinion are just. This review can be performed internally or externally with agreement from a forensic pathologist working outside the department.
- Case conferences with clinicians in hospital deaths and with police in suspicious cases. The benefits to the pathologists may be two-fold. Useful information may come to light from these conferences resulting in amendment and change of both interpretation and cause of death prior to finalisation of the report. In addition, the pathologist, since he/she is aware during the post-mortem examination that the case may be discussed in detail in a case conference ensures taking of photographs, adequate dissection and taking adequate histology sampling to convince the clinicians of his/her findings, thus improving upon the post-mortem examination indirectly.[13]
- Indirect methods, through feedback from the Coroner or another medico-legal authority, defence forensic pathologists,[14] feedback or complaints from family,[15] treating physicians and general practitioners. Information obtained from hospital mortality reviews in cases dying in hospital can be useful.

3. Participation in External Quality and other accreditation programmes (EQP)

Participation of accreditation programmes is to be encouraged. In Australia, there is an accreditation programme run by NATA (National

Association of Testing Authorities) on forensic pathology. NAME (National Association of Medical Examiners) in United States runs a similar accreditation programme which can be provided internationally. Apart from the usual documentation of standard operation procedures, these accreditation programmes also require recording of compulsory meetings for discussion of cases amongst pathologists, other specialists (e.g. toxicologists, neuropathologists) and review of cases.

Even when finance is an issue especially in forensic centres in Third World countries, there are ways of indirectly participating in an accreditation process. One is of course, to form national accreditation teams which will look at forensic centres locally. The other is to adhere to checklists by established accreditation agencies, some of which is easily available from the internet.[16]

The American Society of Clinical Pathologists and Clinical Association of Pathologists in the United States provide quality assurance programmes tailored specifically for forensic pathology. In addition, under the quality assurance programme organised by the Royal College of Pathologists of Australasia, there is a forensic module under the anatomical pathology QAP although it tends to be bias towards the histological slide component. These programmes can be augmented by other external quality programmes (EQP) like the anatomical or paediatric pathology modules where in some instances are relevant to forensic pathology. These types of EQPs are tailored for individual pathologists but may be used by the pathology team as an opportunity to share and discuss ideas.

The individual pathologist is also encouraged to participate in local continuing professional development programmes (CPD) like the one run by RCPA in Australia and RCPath, United Kingdom or CME (continuing medical education) programmes in Malaysia.

4. Documentation of the post-mortem examination

In suspicious cases, documentation of the autopsy process and its findings is usually provided by the police photographers. The availability of relatively cheap digital cameras means that pertinent findings of routine cases can also be easily photographed. These cameras do not need to be sophisticated. The usual point-and-shoot cameras are adequate provided macro-images can be taken. The images can be easily stored in the department storage server or filed individually with each report. In our department, it is required to capture images in all cases. The stored images have been shown to be very useful not only in controversial cases but in routine cases which are sent for review or when controversy unexpectedly arises.

Histology makes a valuable contribution to the diagnosis of many post-mortem cases and should be made compulsory.[17] Besides assisting in formulating a diagnosis and in other forensic matters (e.g. dating of wound), it provides a useful record that may be stored perpetually. The slides can be easily retrieved for review at a later date by another reviewer.

Imaging is another modality that can be stored permanently. Traditional x-rays have always played an important role in post-mortem examinations and the films can be stored physically and lately, digitally permanently. The advent of CT scans and MRIs have seen a few forensic centres installing such machines in their premises which not only improve the diagnostic capability but also provide valuable archives should the images be required later. Another additional advantage is that the documentation of forensic findings is objective and investigator independent[18].

5. Limits on number of cases performed

As in any other medical practice and indeed any other types of work, overwork can result in error and delays and hence, there should be limits placed on number of cases a pathologist should performed. Limits should be set not only on numbers of cases performed annually but also on a daily basis. For example, if a pathologist is involved in a complex or suspicious case, he or she should not be overburden with additional cases. It will be very taxing to expect a pathologist to perform more than 3 routine cases in a day and in our department, a pathologist is usually not given additional cases after two cases have been allocated. According to NAME, a medical examiner should not examine more than 250 cases annually.[19] The Royal College of Pathologists does not specify any numbers; instead it recommends that the pathologist should be overburdened resulting in decrease in the quality of the post-mortem examination.[7]

6. Miscellaneous

Another important consideration is provision of

a proper workplace. In forensic pathology, it will be a mortuary in a good working condition with proper logistical support, health and safety practices and good staff support.

In addition to the workplace, provision of adequate computer system is essential. This is already known in the closely related field of histolopathology.[20] An ideal system should be capable of integrating all modalities, starting from entry of the body by the police/medico-legal authorities to labelling of slides and blocks and accessing toxicology reports.

Cooperation from other agencies (e.g. police, toxicologists and other forensic scientists, members of the judiciary) is important. Certain cases will be highly dependent on findings from these agencies and will be affected by the quality of such reports, which are beyond the control of the forensic pathologist.

Individual development and continuous medical education is essential. As stressed earlier, pathologists are expected to follow a CPD programme. Besides CPD, teaching and participation in research are good opportunities for self-improvement. Hence, it is encouraged for forensic pathology departments to have a close-working relationship with various universities.

Lastly, trainees who are the future manpower of a department should not be left out. A proper training programme suitable for local conditions should be developed.

CONCLUSIONS

To err is human. The phrase has been widely quoted in the context of practice of medicine. The practice of forensic pathology is no different and not immune to errors. Errors in forensic pathology can result in major repercussions. Therefore, it is prudent for any department of forensic pathology, even though a small one, to introduce a quality assurance programme. Some of the known disadvantages of introducing such a programme would be increased expenses and additional manpower. However, the benefits will be manifold and substantially mitigate these disadvantages.

Having a quality assurance programme is only a step towards improving a forensic department. Recommendations should be acted upon if any deficiencies are uncovered, either internally or by an external accreditation team. This action has been shown to improve outcome in a surgical pathology setting.[21] There is no reason why a forensic pathology department, however small cannot benefit from such a programme. Forensic Pathology is also not immune to medical litigation. A well-run quality assurance programme will assist in minimising negligence. The post-mortem report will also carry more weight in court if shown to have undergone a rigorous review.

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