

## Chapter 5. Guide to Post Mortem Examination

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### 1. Introduction

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- 1.1 A post mortem examination, sometimes referred to as an autopsy, is a careful examination of a body after death by a pathologist. A pathologist, who works in hospitals and medical schools, is a qualified doctor specialising in the study of disease. The pathologist investigates the changes in body tissues and organs that cause, or are caused by, disease. Pathologists who specialise in the examination of fetus, babies and children are called paediatric or perinatal pathologists. They usually work in children's hospitals, maternity hospitals or large pathology departments in teaching hospitals.

### 2. Reasons for Post Mortem Examination

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- 2.1 The post mortem examination is performed primarily for the parents to help them to understand better the reasons for their baby or child's death. The post mortem may find a medical condition that caused or contributed to death. In some cases, it will provide important information about an underlying abnormality or condition that might recur in a future baby in that family and enable appropriate genetic counselling.

- 2.2 Sometimes the post mortem examination does not identify the cause of death and some questions may remain. This can be distressing but may provide reassurance that death did not result from any treatable disease or birth defect.
- 2.3 Post mortems also have wider functions. Clinicians learn from post mortems. In many cases, the examination will confirm clinicians' diagnoses. In others there may be unsuspected findings. The availability of this information is critical in the process of audit, when clinicians constantly evaluate their own performance with the aim of improvement. Parents should derive reassurance that they are being seen or their child is being treated by doctors who are engaged in the process of critical appraisal of their own work. Post mortem information has an important contribution to make in this process.
- 2.4 Post mortems also contribute to research and play a role in changing methods of investigation and treatment of infants and children. For instance they offer an opportunity to compare the results of different types of scanning with the actual structure of the abnormalities found. This process has been particularly important in the development of scanning for birth defects during pregnancy and the investigation of congenital heart disease. It has resulted in the diagnosis of more complex defects, greater accuracy and diagnosis earlier in pregnancy. Some of these developments have come about over a relatively short space of time. Obstetricians and radiologists have become more confident about diagnosis, allowing them to plan the future management of pregnancy with parents. Post mortems can assist in the evaluation of new treatment protocols, or the results of surgery, and be instrumental in improving infant mortality rates, particularly from conditions such as congenital heart disease.
- 2.5 In an even wider context, accurate information about the cause of death makes an important contribution to epidemiology and national statistics. This and the investigation of the cause of disease is relevant in determining how best to spend health service resources.
- 2.6 Sometimes tissue samples in wax blocks (see paragraph 4.6 below) and slides that remain once the diagnostic microscopy (see paragraph 4.5 below) has been completed, can be used for important research into the cause of disease. These tissues can be re-examined many years later and the pathology can be better understood in the light of newer discoveries and developments.

### 3. Types of Post Mortem Examination

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- 3.1 There are two types of post mortem examination.
- 3.2 A Coroner's post mortem examination is carried out according to the provisions of the Coroner's Act 1988 and the Coroner's Rules 1984. Parental consent is not required but parents should be informed as to when, where and by whom the examination is to be performed. This matter is considered in detail in Chapter 9.
- 3.3 A hospital post mortem examination is carried out according to the provisions of the Human Tissue Act 1961. Lack of objection or informed consent on the part of the parents is required. Consent needs to be fully informed and the many options available to parents need to be discussed and explained (see Chapter 11 Consent).

### 4. Post Mortem Examination

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- 4.1 The most benefit can be gained from post mortem examination if it is done as soon as possible after death. Increasingly, post mortems on babies and children are performed by perinatal or paediatric pathologists. As they may not work in the hospital where the baby died, the baby may have to be transferred to another hospital for the post mortem examination to be conducted. Parents should be informed before any transfer of their baby or child is to occur and this should be part of the information provided when consent for post mortem is obtained.
- 4.2 In the case of fetus, babies or children, it is usual for X-rays to be taken before the post mortem. Photographs might also be taken, particularly in the presence of abnormality or trauma.
- 4.3 A post mortem examination will be carried out with great care and respect for the body, as if the baby or child is having an operation. Two openings are made in order to remove those organs necessary to establish the cause of death, one down the front of the body and another across the back of the head. The major organs within the body, which will be removed, examined and weighed as part of the examination include the brain, heart, lung, liver, kidneys, spleen, thymus and adrenals.
- 4.4 The placenta is also an important part of the post mortem examination of fetus, stillbirths and deaths of newborns. The condition of the placenta should be considered in the process of reaching a conclusion about the cause of death.
- 4.5 A wide range of organs and tissues are examined microscopically, especially in babies and children. Microscopy is more likely to produce new information in perinatal or paediatric post mortem examination than in adult post mortem examinations. Firstly,

this is to ensure that no unsuspected disease process has been missed, even in tissues that are not obviously the site of disease. Confirmation that these tissues are normal can be helpful. Secondly, even when the naked eye inspection of organs shows an abnormality, it may not be specific for a particular disease process. For example, the lungs of newborn babies affected by pneumonia, lack of oxygen, or by hyaline membrane disease (a lung disorder affecting premature babies) look very similar on naked eye examination.

- 4.6 To examine tissues microscopically, small samples are taken and then passed through a process whereby they are embedded in wax blocks. Very thin sections (approximately five thousandths of a millimetre) are then cut off these blocks and placed on a glass slide for examination through a microscope.
- 4.7 Sometimes samples are taken for culture to look for bacteria or viruses. It may be important to take a tissue sample for chromosome analysis.
- 4.8 In order to obtain as much information as possible it may be important to remove and retain an organ for detailed investigation. In babies and children in particular, the brain is very soft and it may not be possible to examine it in sufficient detail until it has hardened in fixative. This can take a number of weeks. Further, it is often important for a specialist, with particular expertise, to examine the brain to ensure any pathology is fully recognised and understood. The heart may also need to be retained. This is usually in cases of a complicated heart defect.
- 4.9 Organs should not be retained without specific consent. Parents, properly informed, might express a willingness to delay the funeral to allow for full examination of an organ after which it can be reunited with the body, in time for the funeral to take place.
- 4.10 Unless the parents have consented to retention, once the post mortem examination is completed, all the organs will be returned to the body. The body is then carefully restored, usually by the mortuary technician. The baby or child can then be seen and held by family members and dressed in his or her own clothes.

## 5. The Limited Post Mortem Examination

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- 5.1 Most information is gained from a full post mortem examination, which involves examination of all the major organs of the body including the brain. However, the examination can be limited, for example to a body cavity such as the chest or abdomen. Particular organs might be specified and, in a death resulting from congenital heart disease, examination could be limited to the heart and lung. Another type of limitation might be to restrict access to a previous surgical incision or removal of small samples of tissue through a tiny incision or biopsy needle for microscopic examination. A restricted or partial examination will often provide useful information, but there is

always a risk that important pathology will be missed. Because of this risk, when a more limited examination is being contemplated, discussion with the pathologist is advisable before consent is obtained.

## 6. The Post Mortem Report

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- 6.1 Most pathologists dictate their reports on the day the examination is carried out, or the following day at the latest. Delay in dictation can result in loss of important detail. The report should be produced promptly. The report should contain an accurate description and interpretation of the post mortem finding.
- 6.2 The pathologist should report all the findings in a way that ensures their significance is understood by the clinician. The clinician is then able to provide full and correct information to the parents.
- 6.3 A preliminary report to the clinician should be available within days of the post mortem, either in the form of a letter or as a provisional report. Often initial communication will be by telephone, the content of which should be recorded. A final report, however, will usually take three to six weeks to be completed, as the results of the microscopic examination and sometimes other investigations become available and are incorporated in the report and conclusions. Some investigations may occasionally lead to a final report taking even longer to complete. Such investigations might include cytogenetics or retention of the brain for detailed study.
- 6.4 Clinicians should be aware of the timescale for reports. It is important that the post mortem report is available following perinatal death when the mother returns for her postnatal appointment. Scheduling appointments for parents with clinicians following death is far easier when completion of the report can be confidently anticipated. This avoids parental disappointment and frustration. It encourages full information, openness and fosters the parent/clinician relationship.

## 7. Communication

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- 7.1 Good communication between clinicians, pathologists, parents and Coroner is essential. It helps to reduce the incidence of misunderstanding and should result in parents receiving the information to which they are entitled. We regard this as so important that it is fully developed in Chapters 10 and 11.

- 7.2 There are a number of points in the process of the post mortem at which good communication can be encouraged. The pathologist can obtain a considerable amount of information from case notes, and access to these is important for the pathologist. Direct discussion between the pathologist and clinician before the post mortem can help to clarify particular questions, especially in a complex case.
- 7.3 There may even be advantages, in some cases, for the discussions between clinician and pathologist to occur before the clinician discusses consent for post mortem with the parents. For instance, the pathologist may recognise the importance of retention of an organ, or other special investigation, and the clinician will be more informed to discuss this with parents.
- 7.4 In some cases, it may be appropriate for the pathologist to assist the clinician in discussing the post mortem with the parents. Not only is the pathologist better able to answer parents' questions about the procedure than anyone else, but it may provide parents with greater confidence about the post mortem once they have spoken directly with the person who will undertake the procedure.
- 7.5 It is good practice for clinicians who have been looking after the baby or child in life to attend the post mortem examination. Clinicians should have the opportunity of seeing for themselves the true extent of disease. Attendance during post mortem examination will assist in ensuring that the clinicians' expectation of the examination is realistic. A post mortem examination cannot answer every question but good communication assists the process.
- 7.6 Pathologists recognise that it is not always possible for clinicians to attend post mortem examination. While prior warning and flexibility in timing of the examination will increase the window of opportunity for clinicians to attend it is inevitable there will be difficulties if babies or children are transferred to other hospitals for a post mortem examination, perhaps by a specialist paediatric pathologist.
- 7.7 The pathologist's report will provide an accurate description of the post mortem findings and will include an interpretation of those findings in the context of the clinical history. A clinician's presence during an examination will not change the substance of the report. When a condition is missed in life it will be recorded. The results of an operation will be fully described including any associated pathology. However, while the information provided by the post mortem will assist an understanding of the causes of a baby's or child's death, in isolation the post mortem cannot constitute a complete investigation into the correctness or otherwise of complex medical management.
- 7.8 Once the cause of death is established, the results must be explained sensitively to the parents by the clinician or their general practitioner. The pathologist should also be available for the parents and it may sometimes be appropriate for both clinician and

pathologist to be involved with explanation of the post mortem results. A copy of the post mortem report should be made available to parents. The parents' interests in the results of post mortem examination are paramount.

- 7.9 It is good practice for the pathologist to attend clinical meetings when cases of the babies or children they have examined are being discussed. This includes perinatal mortality meetings, prenatal diagnosis/fetal anomaly meetings and unit audit meetings. These are excellent opportunities for communication between clinician and pathologist and permit exchange of both specific and general information between other consultants in the specialty, junior staff, nursing and midwifery staff and other professionals. They are important opportunities for discussion of changes to inpatient management and improvement of interdepartmental communication.

## 8. The Way Forward

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- 8.1 The most important role of the post mortem is to help parents understand why their baby or child died and it may sometimes help them make decisions about the future. It also improves the body of medical knowledge, contributing to audit, medical education and research. Parental confidence in the post mortem will only occur if the procedure is discussed by clinicians who are fully aware of the procedure and possible outcomes. This will be facilitated by good communications with their pathologist.
- 8.2 It is important for individual units within the hospital to maintain a high post mortem rate. The number of children who die is small. It is important to find out as much as possible from each death. Units should look critically at their post mortem rates. Current medical practice means that many children with illnesses of long duration do not die in hospital. This should not, however, preclude post mortem examination.
- 8.3 Fully informed consent to hospital post mortem examinations must always be obtained and we explore this in detail in Chapters 10 and 11.