2. Invited commentary: Perinatal pathology

Perinatal pathology assists in explaining adverse outcomes, including, stillbirth, neonatal death and cases of neurologic injury and growth restriction. While international recommendations are that perinatal pathology should be provided by specialist pathologists,[30] geography and resource limitations mean that it is part of the workload of many general pathologists in Ireland.

Perinatal autopsy

A comprehensive perinatal autopsy is in general more time and labour-intensive than many adult autopsies. It comprises external examination, measurements and photography. External assessment is followed by a three-cavity autopsy, with macroscopic assessment of the organs, organ weight, and selection of tissue samples for subsequent microscopic examination. The autopsy may take place over one or two working days, the latter permitting overnight fixation of the brain before it is returned to the body. Completion of the report requires integration of information gained not just from histology, but from microbiology, maternal and infant serology, cytogenetics, and other investigations such as the Kleihauer-Betke test. The placenta is also examined, as discussed in more detail below.

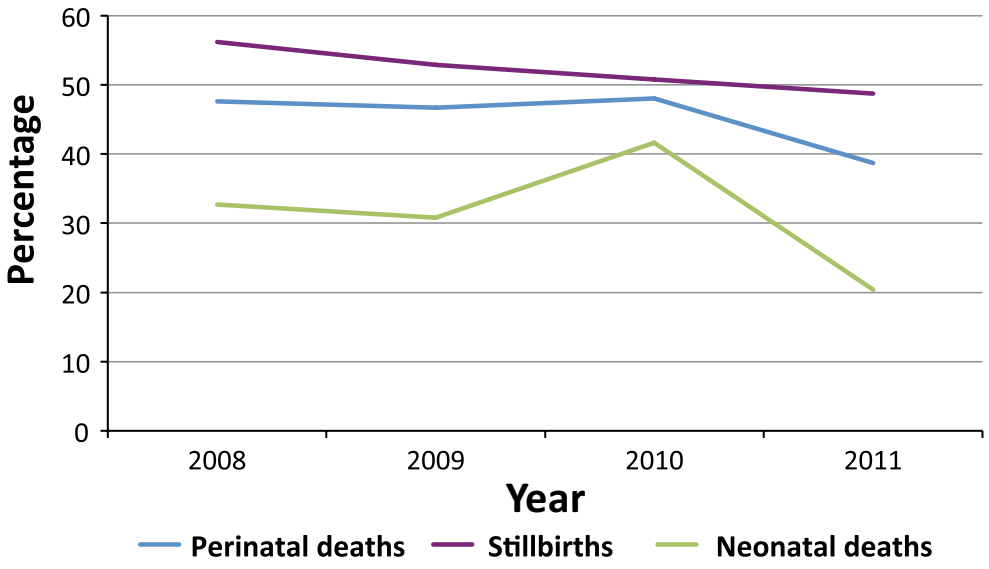

Figure 2.1: Autopsy uptake rate, 2008-2011

The frequency of perinatal autopsy examination over the past 4 years has declined from just under 50% to approximately 40% (Figure 2.1). The rate of autopsy in stillbirths is relatively stable (48%-56%), but the rate of autopsy in neonates has declined to 21%. Where autopsy was declined in 2011, clinicians had offered this investigation to bereaved parents in 83% of cases of stillbirth and 63% of neonatal deaths. More research is needed to explain the decline in autopsies in cases of neonatal death.

30 Desilets V, Oligny LL. Fetal and Perinatal autopsy in prenatally diagnosed fetal abnormalities with normal karyotype. J Obstet Gynaecol Can 2011;33:1047-1057.

Placental examination

The importance of placental examination cannot be overstated in this context. A detailed placental examination (and autopsy if possible), with appropriate clinical details, by an experienced and specialised pathologist provides the optimal basis for understanding perinatal loss. In an evaluation of 1,025 fetal deaths, placental examination was shown to be the most valuable test in determining cause (95.7%) followed by autopsy (72.5%) and cytogenetic analysis (29%).[31] In a study of 104 consecutive perinatal deaths, death could be explained by the placental findings alone in 48%.[32] Even with maceration, successful cytogenetic analysis from the placenta has been reported in 84% of cases.[33] Chromosomal microarray testing offers the chance to increase the identification of genetic abnormalities, especially in stillbirths with anomalies.[34]

The current report shows that placental examination was performed in 93% of stillbirths; this is encouraging, and reflects awareness of the importance of the placenta in explaining the loss. A figure of close to 100% should be achievable in the context of stillbirth. However, the prevalence rates reported for some specific placental conditions may be underestimates. An example of this is villitis, a condition that was reported in only 3.8% of stillbirths in 2011 whereas villitis of some degree is found in 10-13% of all placentas.[35] This emphasises the importance of a standardised approach to placental examination and reporting in cases of stillbirth.

That placental examination was performed in 69% for neonatal deaths reflects the fact that it is more difficult to ensure that the placenta is available in such cases, as some deaths will occur after a normal pregnancy and delivery and the placenta may have been discarded. Maternity units and their supporting laboratories should have in place a triage system that enables retrieval of placental tissue in such circumstances, which should also encompass cases of neonatal morbidity. Figure 2.2 illustrates a potential model to assess ways of identifying placenta for assessment.

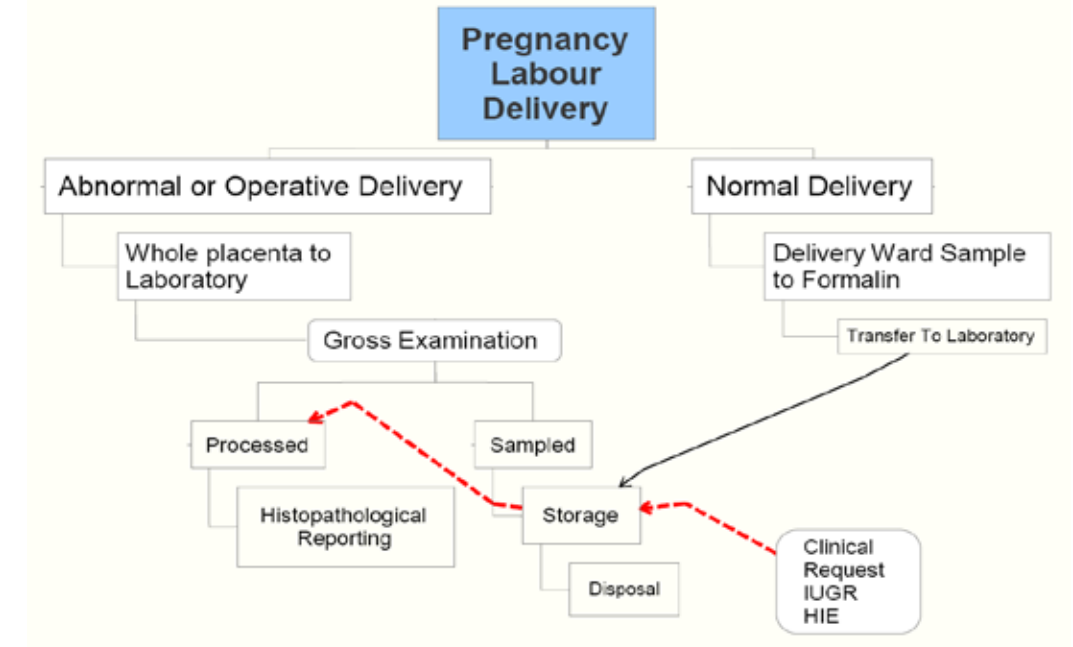

Figure 2.2: Potential model to assess ways of identifying placenta for assessment

31 Korteweg FJ, Erwich JJ, Timmer A, van der Meer J, Ravise JM, Veeger NJ, Holm JP. Evaluation of 1025 fetal deaths: proposed diagnostic workup. Am J Obstet Gynecol 2012 206:53.e1-53.e12
32 Tellefsen CH, Vogt C. How important is placental examination on cases of perinatal deaths? Ped Devel Pathol 2011;14:99-104.
33 Doyle EM, McParland P, Carroll S, Kelehan P, Mooney EE. The role of placental cytogenetic cultures in intrauterine and neonatal deaths. J Obstet Gynecol 2004;24:878-880.
34 Reddy UM, Page GP, Saade GR et al. Karyotype versus microarray testing for genetic abnormalities after stillbirth. N Engl J Med 2012;367:2185-93.
35 Mooney EE, Robboy SJ. (2009). Nidation and placenta. In: Robboy's pathology of the female reproductive tract. 2nd ed. Edinburgh: Churchill Livingstone Elsevier, pp.829-861.

Internationally, institutions have developed different ways of doing this, usually dictated by a varying combination of local interest and the limitations imposed by infrastructure. Some units refrigerate and store all placentas for one to two weeks, retrieving those subsequently identified as having neonatal problems. Many have criteria for immediate submission to the laboratory, such as abruption, chorioamnionitis, or growth restriction. Others combine a clinical triage model with a "sample and hold" policy, with small samples of cord, membranes and parenchyma held in formalin for six to 12 months in case processing for histology is required. The attraction of this latter option is that it permits cases of abnormal development that may only be identified at three or six months of age to have retrospective placental examination.

The importance of the placenta is reflected in the first tissue pathway for this organ published by the Royal College of Pathologists (UK) in 2011.[36] This provides a standard for placental examination that is widely applicable in Ireland.

Service development and quality

Perinatal pathology is usually thought of in the context of histopathology. However, in complex cases, the input of colleagues from several disciplines including radiology, neuropathology, genetics and microbiology is essential. It is evident that such collaboration is facilitated where these disciplines exist in reasonable proximity, and can contribute to multidisciplinary morbidity and mortality meetings and to clinical governance issues. An example is the availability of specialist radiology in providing a bone age on stillbirths and neonates, useful in establishing whether an infant is growth restricted. Another example is liaison with a clinical geneticist in preparing the autopsy report, where discussion and reviewing clinical photography helps to provide the most relevant service to the family who may subsequently be referred to that geneticist for clinical consultation. The scarcity of both geneticists and perinatal pathologists in Ireland makes this collaborative working model difficult to achieve.

In 2009, the Faculty of Pathology of the Royal College of Physicians in Ireland reported on service requirements in the area of perinatal pathology and advocated a regional and national approach to such a service. This document, based on a national survey and on meetings with interested professionals, should form the basis for future planning in this area. The cost-effective implementation of newer techniques such as microarrays would be well served by such an approach. The report also addresses issues including transport in the interest of development of a seamless service. There was an impression that ready availability of a specialist service would encourage clinicians to offer the service to parents to a greater extent than is currently the case. As such, current autopsy uptake may be an underestimate of actual usage were a cohesive national service in place. Given the logistic difficulties and emotive issues surrounding autopsies and the small number of specialist pathologists available, an initial focus on optimising placental examination is logical. Transport and sampling of placentas poses fewer problems. Such a service could avail of the planned hospital network structure, ideally with a professional working group at national level to support best standards of reporting.

In contrast with adult autopsy practice, only a minority of perinatal cases are performed at the request of a coroner. To avail of a regional and national specialist service will require flexibility within the coronial system in terms of jurisdiction. It is unrealistic to develop one or more specialist centres and then to spend specialist time travelling to inquests because of the historic nature of coronial jurisdictions. This may be best addressed within future legislation that will reform the current coroner system.

36 www.rcpath.org/publications-media/datasets-TP.htm

The quality of services is a high priority for all health professionals. To promote high-quality perinatal autopsy standards, the National Quality Assurance Programme of the Faculty of Pathology lists and scores tests that should be performed in perinatal autopsies and documented in the autopsy report. This programme is currently accumulating national data and a perspective on the perinatal aspect of laboratory service is expected during 2013. Standards for autopsy practice were previously published by the Royal College of Pathologists[37] and are referenced in the Standards and Recommended Practices published by the HSE in 2012.[38]

Conclusion

Perinatal pathology is a service that many parents will avail of only once in their lives. Close liaison with obstetricians and neonatologists, amongst others, is vital to make this service responsive and relevant. Service development in this area should take cognisance of developments in understanding of perinatal disease, and work towards an optimal provision of a specialist service.

37 www.rcpath.org/index.asp?pageID=687
38 Health Service Executive Standards and Recommended Practices for Post Mortem Examination Services. HSE, March 2012 QPSD-D-007-1. V1