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The placenta in stillbirth

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Summary Stillbirth is an absolute indication for pathological examination of the placenta. Placental histopathology can shed light on the cause of the stillbirth and help in the management of future pregnancies and in the resolution of medicolegal issues. Placental lesions that are likely causes of stillbirth are discussed. They can be broadly classified into umbilical cord lesions, fetal vascular lesions, maternal uteroplacental insufficiency and placental inflammation. In some of these lesions, the direct contribution to the stillbirth may be obvious; in others, it may be debatable. Medicolegal questions that are frequently posed in placental examination in stillbirths are the timing of fetal demise and whether there was fetal distress.

Introduction

The reasons for examining the placenta in stillbirth are similar to those for other indications: in summary, clarification of the pathophysiology of adverse outcome, management of subsequent pregnancies and assessment of factors for resolving medicolegal issues.[1] Of the many indications for a placenta to be examined pathologically,[1] stillbirth would seem to be incontrovertible. Nevertheless, for whatever reasons, placentas were not examined in 7.7% of stillbirths in South Australia[2] and 11% of stillbirths in northern England.[3] On a country-wide basis, the problem of non-examination of the placenta in stillbirth is probably of a larger magnitude. The 4th Confidential Enquiry into Stillbirths and Deaths in Infancy showed that placentas were examined in only 44% of intrapartum stillbirths,[4] and yet, four Confidential Enquiry reports later, failure to send the placenta for histology remains a problem: 'there was no histology on the placenta which might have shed light on the cause of this unexplained stillbirth'.[5]

Standards of reporting of the placenta vary,[6] but it has been shown that perinatal/placental pathologists are able to detect clinically significant placental lesions more frequently and more accurately than general anatomical pathologists.[7] It is important, therefore, that meticulous gross examination and appropriate sampling should be the prime objectives, supplemented, if necessary, by photography of gross lesions and slices of the placenta. In this way, at the very least, the slides could be reviewed by an expert pathologist.[8]

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It is not the intention of this review to cover all aspects of placental pathology. There have been recent publications on how placentas should be examined,[9–11] and a list of recent texts on placental pathology is appended. This review will focus on those aspects which are pertinent to stillbirth and are topical.

Clinical history

The placenta should, like other surgical pathology specimens, be examined with as much clinical information available as possible.[12] Many placental findings are not specific to a disease process, and interpretation may be dependent on the clinical context. For example, the placenta responds to reduced uteroplacental blood flow by developing pathological changes that may be attributable to several maternal conditions such as hypertension, diabetes, prolonged pregnancy and maternal autoimmune disease. Information about the maternal obstetric history, antenatal course and delivery is therefore important to allow a correct clinicopathological correlation to be made.[13]

If permission for an autopsy has been given, the placental findings should be interpreted in the light of those of the autopsy. A history of fetal hydrops and antenatal monitoring indicating increasing heart failure would lead one reasonably to conclude that a sizeable chorangioma found on placental examination could be the cause of the stillbirth: chorangiomas are vascular tumours in the villous stroma, and the vascularity could lead to increased shunted blood flow. On the other hand, in the absence of the history and autopsy findings, the chorangioma may or may not be felt to have been the cause of the stillbirth.

Cause of the stillbirth

Cord lesions

Even where placental examination is performed, there is considerable variation in terms of which gross or histological lesions are accorded significance. A good example of this conundrum is illustrated by the wide variation in the reported incidence of cord pathology as a cause of or related finding in stillbirth (Table 1). Cord complications that have been cited as being related to stillbirth have included a single umbilical artery and a velamentous or marginal insertion. Although these lesions can be identified objectively at gross examination, the interpretation of whether these are sufficient to explain the cause of the stillbirth is subjective and may be biased by past experiences. The incidence of a single umbilical artery varies from 0.2% to 1.1% of births, but has varied from 2.7% to 12% in perinatal autopsy series. A single umbilical artery in itself is clearly insufficient to explain a stillbirth. However, its associations with anatomical malformations and karyotypic anomalies could account for the perinatal loss. Parenthetically, an overcalling of the significance of umbilical cord lesions did not result in a lower unexplained stillbirth rate (Table 1).

Another example of where there is a need for close clinicopathological correlation is the issue of cord entanglement and knots. Cord entanglement is frequent and can be present in as many as a third of pregnancies at term.[14] Entanglement around a limb or torso is less frequent than entanglement around the neck, but it still has a potential to produce sufficient kinking to affect the fetal circulation, especially if there is looping of the cord around itself. Adverse perinatal

Table 1 Cord pathology and relation to unexplained stillbirth rate.

Study area	Number of cases with cord pathology (Number of stillbirths)		% Stillbirths with cord pathology	% Cases of unexplained stillbirth in the study
Germany[19]	43	(310)	22.5	15
Greece[20]	42	(164)	25.6	12
Denmark[21]	21	(84)	25.0	Not stated
China[22]	27	(114)	28.0	14
South Africa[23]	8	(150)	5.3	15
USA[24]	9	(89)	7.8	Not stated
Finland[25]	29	(243)	11.9	9
South Australia	0	(242)	0	24