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28.1 Clinical

Routine examination of all placentas is unnecessary: there are maternal, fetal, and placental indications for examination, which include hypertension, diabetes, infection, placental abruption, prematurity, and fetal death. In general, around 10–15% of pregnancies are complicated by maternal, fetal, or placental disease and these are the cases that should be examined.

28.2 Anatomy

The average placenta weighs 400–500 g and measures approximately 20 cm in diameter at term: there are considerable variations in size, shape, and form. The placental tissue itself is composed of chorionic villi lined by cytotrophoblast and syncytiotrophoblastic cells. The fetal surface of the placenta is the chorionic plate: the umbilical cord inserts into this. The umbilical cord consists of two arteries and one vein embedded in a gelatinous matrix, and is covered by amnion. The placental (peripheral) membranes are continuous with the chorionic plate and com-

prise two layers, the chorion and the amnion. The maternal surface of the placenta is divided into lobules or cotyledons.

28.3 Surgical Pathology Specimens: Laboratory Protocols

The placenta can be examined fresh or formalin-fixed (microbiology and karyotyping is possible from fresh placentas).

These measurements should be made initially:

- Trimmed weight (following removal of the membranes) in grams.
- Size of disc in three dimensions in cm.
- Length and diameter of umbilical cord in cm.
- Note the following:
 - Placental form: normal, succenturiate/accessory lobe, circumvallate, circummarginate.
 - Cord: presence of knots (false, true), cord spiralling (increased, decreased, normal), cord insertion (central, eccentric, marginal, velamentous), oedema, number of vessels.
 - Membranes: completeness, translucency/opacity, meconium staining.
 - Maternal surface: completeness, crater, adherent haemorrhage.
 - Chorionic plate: distribution of vessels, meconium staining, translucency/opacity, dullness, amnion nodosum.

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The disc is then sliced at 0.5–1.0 cm intervals and simultaneous palpation carried out to identify infarcts and other anomalies. Infarcts should be assessed as old or recent, the size of the largest recorded, and an estimation of the volume of the disc affected made.

Blocks for histology:

Usually 4–5 blocks are sufficient, including.

- Three representative sections of placental parenchyma.
- Three cross sections of the umbilical cord (taken from at least 2 cm above cord insertion, at the midpoint, and at the fetal end of the cord).
- A membrane roll is prepared by cutting a strip of membranes from the site of rupture to the margin of the disc, grasping the edge of the disc with forceps, rolling the membranes around, and sliding the roll from the forceps; a cross section of the roll is taken.
- Any grossly abnormal area is sampled.

28.3.1 Multiple Gestations

Twins account for a significant proportion of perinatal morbidity and mortality: placentas from twins demonstrate the same pathology as singleton placentas, as well as pathology related to twinning (twin–twin transfusion, asymmetry, vanishing twin).

Determination of Chorionicity.

This is the most important step in the examination of twin placentas. A dichorionic placenta means that two placentas have formed, but these may be separate or fused together. A monochorionic placenta indicates a shared disc: monochorionic twins are monozygotic (“identical”), but dichorionic twins can be monozygotic or dizygotic, depending when the fertilized egg divided into two.

Twin placentas are one of four types:

1. Diamniotic, dichorionic separated twin placentas. The two discs are completely separate.
2. Diamniotic, dichorionic, fused twin placentas.
3. Diamniotic, monochorionic, fused twin placentas.

In 2 and 3, there is a single placental disc with two umbilical cords. Common outer membranes are present. The dividing membrane between the two placental territories must be examined to determine chorionicity.

4. Monoamniotic, Monochorionic, Twin Placentas.

There are two umbilical cords but no dividing membrane. The two cords are usually positioned closely together.

Additional examination for twin placentas:

The dividing membrane comprises two amnions (in monochorionic twins), or two chorions and two amnions (in dichorionic twins with fused discs). Monochorionic membranes divide easily and are thin and transparent, whereas dichorionic membranes are opaque, thicker, and difficult to separate. There is often a distinct ridge between the territories of dichorionic twins on the fused common disc; in monochorionic twins there is no ridge. The common membrane is studied histologically from both a non-separated area and the T zone point of attachment to the chorionic plate. Vascular anastomoses between the two territories can lead to discrepancies in size and viability of the infants. The type of anastomosis should be described (artery–artery, artery–vein, vein–vein).

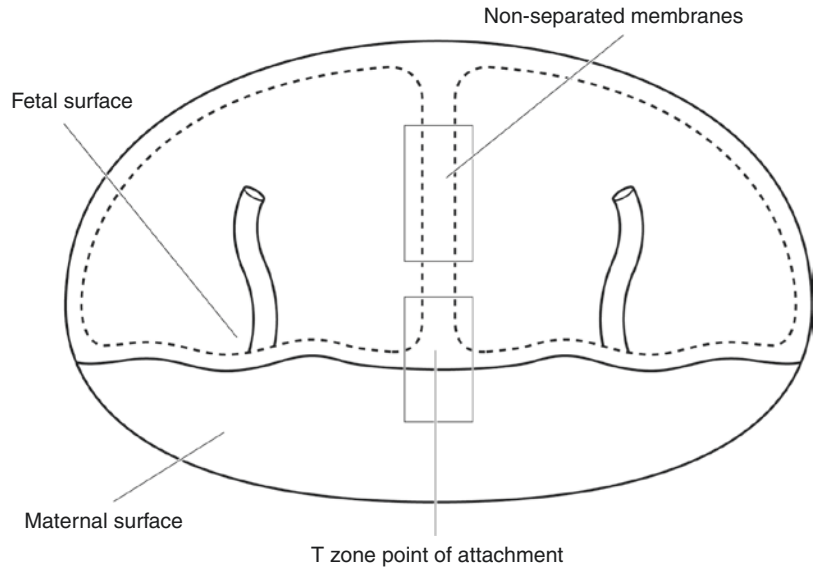
In triplets and higher multiples, similar principles apply with the examination of the dividing membranes between placental territories (Fig. 28.1).

Histopathology report:

The macroscopic description should include

- The trimmed weight and dimensions of the disc
- The length, diameter, coiling index, and insertion of the umbilical cord
- A description of the maternal surface, chorionic plate, and membranes
- The microscopic description should include
- An assessment of villous maturation (accelerated, delayed, dysmature)
- An assessment of villous morphology (dysmorphism, hydrops, molar, oedema, villous inflammation, infarction)
- An assessment of the intervillous space (intervillositis, intervillous fibrin)

Fig. 28.1 Examination of membrane distribution in twin pregnancy (Reproduced, with permission, from Allen and Cameron (2013))



- A description of any haematoma (extent, position-intervillous, maternal, subchorionic)
- An assessment of the chorionic plate (presence of chorioamnionitis, chorionic plate vasculitis)
- An assessment of the cord (presence of inflammation, number of vessels involved).

28.3.2 Placenta Accreta

This is defined as abnormal adherence of the placenta to the uterine wall. There is considerable maternal morbidity and mortality associated with the condition, which is the leading cause of peripartum hysterectomy.

Predisposing factors include advanced maternal age, previous caesarean section delivery, placenta previa, previous placental retention, multigravidity, and high parity.

Pathologically, placental villi are present adjacent to myometrium with no intervening decidua layer. Placenta accreta is classified according to the depth of infiltration through the uterus. In placenta accreta vera the villi embed directly onto superficial myometrium; in placenta increta, the villi are found deeper in the body of myometrium; and in placenta percreta,

the villi penetrate the full thickness of myometrium with the risk of uterine perforation and haemoperitoneum. There may be variations in the depth of penetration and the condition may be focal or diffuse.

Examination of a hysterectomy specimen in which placenta accreta is suspected involves careful sampling of the placental bed. The larger radial and arcuate arteries of the uterus may show pregnancy-induced changes, a feature usually only seen in the smaller spiral arteries, and this may be responsible for the severity of haemorrhage usually seen in placenta accreta.

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