
SPECIAL ARTICLE

Practical placental examination for obstetricians

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ABSTRACT

Placental examination can simply be performed immediately in delivery room by obstetricians in which takes only few minutes. The evaluation should be done step by step, starting from umbilical cord, membranes, and disk. Indications for placental examination are divided into maternal, fetal, and placental indications. The submitted placenta for further evaluation by pathologist can be kept in refrigerator or fixed in buffered formalin.

Keywords: gross placental examination, umbilical cord, membranes, placental disk

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Placenta is a special and unique organ that composed of both maternal and fetal components. Theoretically, every placenta should be examined whether in delivery room or pathology unit. The examination can be performed by any trained personnel such as nurse or assistant; not necessary to be pathologist or obstetrician. However, such personnel may not be available in most hospital and there are also small numbers of specialized pathologists in this field. In general circumstances, obstetrician has to be the one who examine the placenta in delivery room and makes the decision to submit the placenta for full gross and microscopic examination by pathologist. The initial examination is quite simple and takes only a few minutes, but it is very useful especially in cases that do not have significant clinical signs and symptoms immediately after delivery.

Steps for placental examination in delivery room

The gross examination can be done immediately after delivery. It is not necessary to be serious of making precise diagnosis. The most important issue is to detect the “abnormal thing” and submit the specimen to pathologist for further evaluation. Therefore, the examination should be followed each step as all features are properly evaluated. In this article, the guideline is only for singleton type placenta.

1. Observe the “usual things” besides of the placenta.

The unusual odor as feces may indicate E.coli infection. The separated fresh blood clots can be seen in cases with early placental abruption.

2. Umbilical cord examination

2.1. Evaluate the number of vessels at cut

end of cord

Normal cord contains two arteries and one vein. Single umbilical artery occurs in 1% of deliveries and more frequently seen in twins other gross cord abnormalities⁽¹⁾. Approximately 20% of fetus with single umbilical artery will have other major malformations, but it is non-specific to any anomaly or syndrome.

2.2. Length

It is quite hard to evaluate the definite cord length in delivery room due to lacking of measuring tools. The main factor that determine cord length is stretch on the cord which is related to fetal activity. Both abnormally long and short cords have related adverse fetal outcomes^(2, 3). Long cord is associated with true knots and cord entanglement, while short cord may cause traction and subsequently results in cord tearing, hematoma, and prone to placental abruption. The diagnosis of excessively long cord or short cord is based on the measurement of the entire cord length and comparing to the reference chart of each gestational age which can be ideally done in delivery room. However, most placentas are later sent for weighing and cord length measuring by assistants, not the obstetricians who delivered the case; and the reference chart may be too complicated for the assistants. So if the abnormal cord length is suspected, then the placenta should be sent to fully gross examination by pathologist.

2.3. Diameter

Similar to cord length, it is quite hard to immediately measure the diameter after delivery. Umbilical cords of preterm fetuses tend to be thicker than those of term fetuses. The thin umbilical cord may reflect the uteroplacental insufficiency. Another serious condition that should be identified is cord stricture which is more frequently seen with hypercoiling.

2.4. Count the number of twists

Twists in cord play an important role in prevent compression of the umbilical vessels. The twist can be in left or right direction without significantly difference of clinical outcome between both types. However, the most important factor is number of twists. In general, the twist should be less than 3 coils in 10 cm length⁽⁴⁾. Excessive twisting or hypercoiling is associated with adverse perinatal outcome, including an increase in perinatal mortality, intrauterine growth restriction, and fetal distress⁽⁵⁾. With excessive coiling, stricture may be formed and compromise the umbilical blood flow to the fetus, leading to fetal hypoxia.

2.5. Identify type of cord insertion

There are five types of cord insertion into the placental disk: central, eccentric, marginal, membranous or velamentous, and furcate (Fig. 1 and 2). Central and eccentric insertions are considered to be normal, while the later three types of insertion are abnormal and associated with adverse outcome⁽⁶⁾.

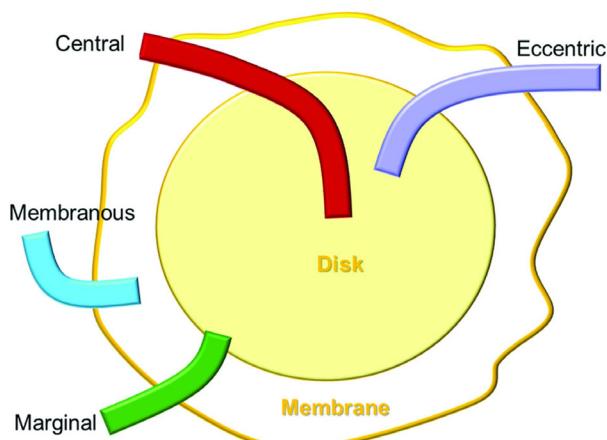


Fig. 1. Diagram of umbilical cord insertion type.

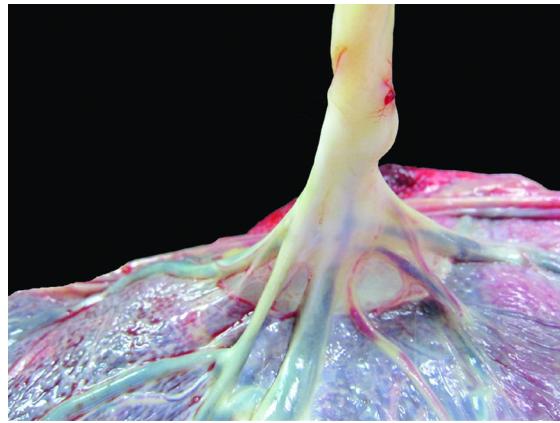


Fig. 2. Furcate insertion.

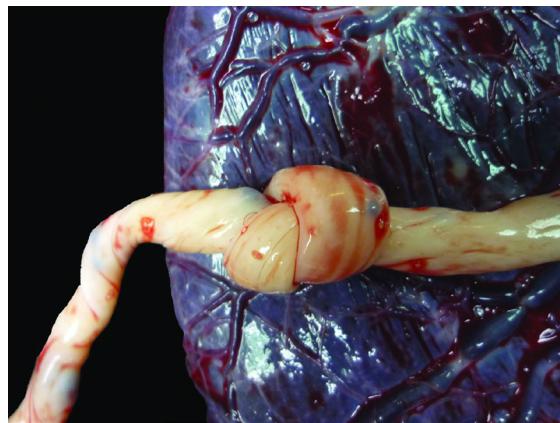


Fig. 3. True knot.

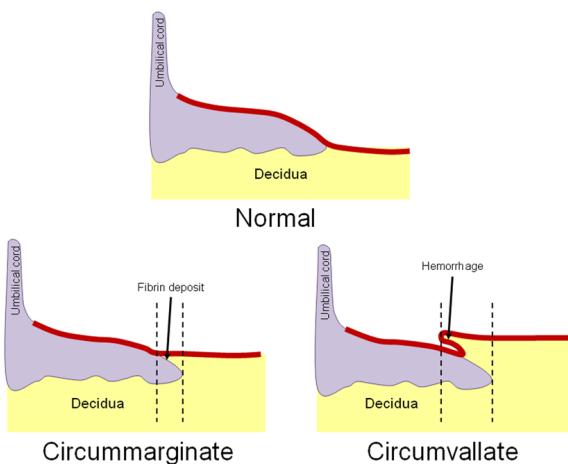


Fig. 4. Extrachororial placentation.

2.6. Knots

True knot is developed in early gestation as the whole body of fetus has to pass into the loop of umbilical cord, but the outcome depends on the tightening of the knot⁽⁷⁾. With chronic loose knot, the finding may be only groove in Wharton's jelly without obvious adverse outcome. In acute tightening, there will be congestion and thrombosis in cord vessels on the placental side and collapsed vessels on fetal side of knot (Fig. 3).

2.7. Discoloration

Infection may cause opacity and calcification surrounding the vessels seen as a white stripe. Meconium stain will be seen as green brown discoloration, while red brown discoloration may be present in cases with chronic hemorrhage.

3. Membranes

3.1. Type of insertion into the disk

The membranes normally insert at the edge of placental disk and can be called as marginal insertion. If there is villous tissue remaining beyond the chorionic plate, then it will be classified as extrachoroidal placentation which can be divided into two types: circummarginate and circumvallate (Fig. 4). Circummarginate membranes are flat with small deposit of fibrin at the junction, seeing as a thin ridge, and are not associated with adverse clinical outcome. In contrast, circumvallate membrane insertion is associated with high incidences of preterm delivery, placental abruption, intrauterine growth restriction, and adverse neonatal outcomes, including neonatal death^(8, 9). The circumvallate placenta has a double-back membrane fold, often containing old hemorrhage and necrotic decidua in that fold. It can be seen as a very thick ridge on the chorionic plate.

3.2. Completeness

The distance of rupture point to the edge of placenta may reflect the location of placenta. The closer distance to the edge indicates the lower location of placental implantation. The opening in complete delivery of membranes is usually small, while the incomplete one is frequently fragmented or has extensive opening.

3.3. Color, opacity and other lesions such

as hemorrhage, cyst, or nodules

Normal membranes are translucent and white in color. The opaque membranes are frequently seen in cases with ascending infection which may be associated with yellow green discoloration. Meconium stained amniotic fluid may display green brown discoloration. Red brown discoloration is seen in cases with old hemorrhage.

4. Placental disk

4.1. Assess the shape and extra lobes

In general, placenta displays round to oval shape. The abnormal shape of placenta may be more frequently seen in cases with placenta previa or localized impaired vascular supply. Succenturiate placenta is associated with postpartum hemorrhage as it is commonly retained in the uterine cavity after delivery⁽¹⁰⁾.

4.2. Evaluate the fetal surface

The fetal surface or chorionic plate is examined for color, vascular pattern and thrombosis, hemorrhage, abnormal nodules, and cysts. The normal fetal surface is generally glistening white and smooth. The artery should be paired by vein and the vessels are tapering from the cord insertion to the edge of placental disk. The thrombosed vessels can be seen as opaque white and hard in consistency. White nodules or amnion nodosum can be seen in cases with oligohydramnios.

4.3. Evaluate the maternal surface

The maternal surface or basal plate is observed for color, completeness, discoloration, and adherent blood clot. The normal maternal surface will be seen of rough cobble stone appearance and beefy red in color. Pale discoloration may be infarct or excessive fibrin deposits. Adherent blood clot can be seen in cases with placental abruption.

Indications and how to submit the placenta for examination by pathologist

In general, obstetrician has to be the person who makes the decision for sending the placenta to pathology unit. Indications for placental examination can be divided into three categories as follows:⁽¹¹⁾

1. Maternal indications: vascular disorders (e.g.

diabetes mellitus, hypertension, connective tissue disease), poor reproductive history, repetitive bleeding, oligohydramnios, polyhydramnios, fever or suspected infection

2. Fetal indications: stillbirth or perinatal death, hydrops, multiple gestation, premature labor, postterm, intrauterine growth restriction, major congenital anomalies, suspected infection, low Apgar scores, nonreassuring fetal heart tracing

3. Placental indications: any cord, membranes, or placental disk abnormalities

The placenta can be refrigerated at 4°C for at least three days before handling to pathologist. Another method is fixation in buffered formalin which is more convenient to transportation and less infectious. The request form for placental examination should be completed and detailed the clinical indication, including the suspected condition. Gestational age is also a critical item to be stated in every submitted case.

Conclusion

Placental examination can simply be performed in delivery room and takes only few minutes. The evaluation should be done step by step, starting from umbilical cord, membranes, and disk. Indications for placental examination are divided into maternal, fetal, and placental indications. The submitted placenta for further evaluation by pathologist can be kept in refrigerator or fixed in buffered formalin.

References

1. Sun L, Wang Y. Demographic and perinatal outcome data of fetuses with SUA/PRUV. *J Matern Fetal Neonatal Med* 2017;3:1-6.
2. Baergen RN, Malicki D, Behling C, Benirschke K. Morbidity, mortality, and placental pathology in excessively long umbilical cords: retrospective study. *Pediatr Dev Pathol* 2001;4:144-53.
3. Tantbirojn P, Saleemuddin A, Sirois K, Crum CP, Boyd TK, Tworoger S, et al. Gross abnormalities of the umbilical cord: related placental histology and clinical significance. *Placenta* 2009;30:1083-8.
4. de Laat MW1, Franx A, van Alderen ED, Nikkels PG, Visser GH. The umbilical coiling index, a review of the literature. *J Matern Fetal Neonatal Med* 2005;17:93-100.
5. Dutman AC, Nikkels PG. Umbilical hypercoiling in 2nd- and 3rd-trimester intrauterine fetal death. *Pediatr Dev Pathol* 2015;18:10-6.
6. Pinar H, Carpenter M. Placenta and umbilical cord abnormalities seen with stillbirth. *Clin Obstet Gynecol* 2010;53:656-72.
7. Räisänen S, Georgiadis L, Harju M, Keski-Nisula L, Heinonen S. True umbilical cord knot and obstetric outcome. *Int J Gynaecol Obstet* 2013;122:18-21.
8. Taniguchi H, Aoki S, Sakamaki K, Kurasawa K, Okuda M, Takahashi T, et al. Circumvallate placenta: associated clinical manifestations and complications-a retrospective study. *Obstet Gynecol Int* 2014;2014:986230.
9. Suzuki S. Clinical significance of pregnancies with circumvallate placenta. *J Obstet Gynaecol Res* 2008;34:51-4.
10. Ma JS, Mei X, Niu YX, Li QG, Jiang XF. Risk Factors and Adverse Pregnancy Outcomes of Succenturiate Placenta: A Case-Control Study. *J Reprod Med* 2016;61:139-44.
11. Langston C, Kaplan C, Macpherson T, Manci E, Peevy K, Clark B, et al. Practice guideline for examination of the placenta: developed by the Placental Pathology Practice Guideline Development Task Force of the College of American Pathologists. *Arch Pathol Lab Med* 1997;121:449-76.