Amniotic fluid and cord prolapse

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Amniotic fluid

❖ Protects the fetus from mechanical trauma
❖ Bacteriostatic
❖ Development of both the lungs and the limbs.
❖ Fetal diagnosis

Volume

❖ 10 mL at 8 weeks
❖ 630 mL at 22 weeks
❖ 770 mL at 28 weeks
❖ After 30 weeks, the increase slows
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Volume of Amniotic Fluid Over Gestation

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Composition of Amniotic Fluid

- First trimester: isotonic with maternal or fetal plasma minimal protein components. extremely low oxygen tension and an increased concentration of sugar alcohols
- Second half of pregnancy: urea, creatinine, and uric acid increase

Production of Amniotic Fluid

- Early pregnancy:
  - nonkeratinized fetal skin
  - From the mother across the uterine decidua or the placenta surface
- Second half of pregnancy
  - Urine production
  - Fetal lung fluid

Amniotic fluid abnormality

- Polyhydramnios: Amniotic fluid index (AFI) > 24 cm or a single pocket of fluid at least 8 cm in depth that results in an amniotic fluid volume of more than 2000 mL
- Oligohydramnios: AFI < 7 cm or the absence of a fluid pocket 2-3 cm in depth.
Polyhydramnios

**Causes:**
- Poorly controlled maternal diabetes mellitus
- Fetal anomalies: CNS abnormalities and neuromuscular diseases
- Congenital cardiac-rhythm anomalies, hydrops
- Twin-to-twin transfusion syndrome
- Fetal infection - TORCH
- Chromosomal abnormalities
- Fetal akinesia syndrome
- Idiopathic

**Laboratory Workup:**
- OGGT
- Kleihauer-Betke test to evaluate fetal-maternal hemorrhage
- Hemoglobin Bart in patients of Asian descent (who may be heterozygous for alpha-thalassemia)
- Fetal karyotyping for trisomy 21, 13, and 18
- TORCH
- Blood group and antibody assessment

**Ultrasound Workup:**
- Evaluate the fetal anatomy; assess for diaphragmatic hernia, lung masses, and the absence of the stomach bubble. The double-bubble sign!
- A macrosomic fetus is observed in association with poorly controlled maternal diabetes.
- Assess the blood flow velocity in the middle cerebral artery of the fetus for fetal anemia.
- Test for fetal arrhythmias and malformations
- Large abdominal circumference may be observed with ascites and hydrops fetalis.

**Medical care:**
- Higher incidence of preterm labor secondary to overdistention of the uterus.
- Weekly or twice weekly perinatal visits and cervical examinations.
- Bed rest to decrease the likelihood of preterm labor.
- Serial ultrasonography to determine the AFI and document fetal growth.
- Fetal anemia
Oligohydramnios

Causes:

❖ PROM and chronic leakage of the amniotic fluid
❖ Fetal urinary tract anomalies, such as renal agenesis, polycystic kidneys, or any urinary obstructive lesion
❖ Placental insufficiency, as seen in pregnancy-induced hypertension (PIH), maternal diabetes, or postmaturity syndrome
❖ Maternal use of prostaglandin synthase inhibitors or ACE inhibitors

Laboratory Workup:

❖ Nitrazine test
❖ Ferning test
❖ PAMG-1 test
❖ Placental insufficiency tests

Ultrasound Workup:

❖ Visualize the fetal kidneys, collecting system, and bladder. If these are normal, suspect the chronic leakage of amniotic fluid or hypertensive disorders.
❖ Assess fetal growth. If PROM or urinary tract anomalies are absent, consider placental insufficiency and IUGR.
❖ Uterine artery Doppler study findings may aid in the diagnosis of placental insufficiency.
Cord prolapse

❖ The cord lies in front of the presenting part and the fetal membranes are ruptured.
❖ Umbilical cord passes through the cervix at the same time as or in advance of the fetal presenting part.

Cord prolapse

❖ Occult: cord passes through the cervix alongside the fetal presenting part; it is neither visible nor palpable.
❖ Overt: cord presents in advance of the fetus and is visible or palpable within the vaginal vault or even past the labia.
Risk factors

Several factors increase the risk of cord prolapse. The main precipitating event is rupture of membranes (ROM), either spontaneous or performed artificially by a healthcare provider. Most risk factors for UCP can be separated into two categories: spontaneous and iatrogenic (Table 1).

Spontaneous
- Fetal:
  - Malpresentation
  - Fetal anomalies
  - Prematurity
  - RUG/ESGA
  - Funic presentation
  - Cord abnormalities
- Uterine:
  - Polyhydramnios
  - Multiple gestation

Iatrogenic
- Amniotomy
  - Placement of an intrauterine pressure catheter or fetal scalp electrode
  - Amnioreduction
  - Attempted rotation of the fetal head
  - Placement of a cervical opening balloon catheter
  - External cephalic version

Prevention

- Avoid amniotomy unless the fetal head is well-engaged

Diagnosis

- Fetal heart rate abnormalities
- Visual of prolapsed cord

Management

- It is a top emergency
- NEEDS URGENT DELIVERY
- However, Lethal anomaly, demised foetus.
Elevation of the presenting fetal part.

The key first step after identifying a UCP is to elevate the presenting fetal part off the prolapsed cord. This is generally performed manually, with the physician placing 2 fingers or an entire hand into the vagina to elevate the fetus off the cord. Care should be taken to avoid palpation of the cord because that may cause vasospasm, potentially leading to a worse outcome.

Placing the patient in steep Trendelenburg or in knee-chest position is believed to be helpful by taking advantage of gravity to further relieve pressure on the cord.

In cases in which the interval to delivery is likely to be prolonged (that is, requiring maternal transport to a facility where cesarean delivery can be performed), bladder filling may be a better option. With this technique—commonly called Vago's method, in reference to the physician who first described the technique—a Foley catheter is placed and the bladder is filled with 500 to 750 mL of saline, and then clamped. The patient's enlarging bladder provides upward pressure on the fetus, thus alleviating the compression on the cord. Vago described this as an alternative to manual elevation, which he described as "effective, but . . . unpleasant for the mother and wearying for the doctor." He also noted that in his experience, filling the bladder tends to calm uterine contractions, which would certainly further relieve pressure on the cord. Over the years, studies have shown Vago's method to be effective.

To employ this strategy requires that a cord prolapse tray be immediately available (Figure 1). Comparison of manual elevation of the presenting part versus bladder filling shows essentially equal outcomes between the 2 groups.

It should be noted that the combination of the 2 methods does not lead to any improvement over using either alone.

References


Questions?