Prolapsed Cord

There are three varieties:

- **Overt cord prolapse** - if the presenting part of the fetus does not fit the pelvis snugly after membrane rupture, there is a risk that the umbilical cord can slip past and present at the cervix or descend into the vagina. This is known as overt cord prolapse. It represents an acute obstetric emergency, as prolapse exposes the cord to intermittent compression compromising the fetal circulation. Depending on its duration and degree of compression, fetal hypoxia, brain damage and even death can occur. Exposure of the umbilical cord to air causes irritation and cooling, resulting in vasospasm of the cord vessels.
- **Occult cord prolapse** - where the umbilical cord lies alongside the presenting part.
- **Cord presentation** - where the cord can be felt to prolapse below the presenting part with or without membrane rupture. The cord may slip to one side of the head and disappear as the membranes rupture. When the cord can be felt to prolapse below the presenting part before membranes have ruptured, this is referred to as funic presentation.

Epidemiology

**Incidence**

The overall incidence of overt prolapsed cord is between 1 and 6/1,000 deliveries.\(^1\) The perinatal mortality rate from cord prolapse is 91 per 1,000. Overt cord prolapse occurs in more than 1% breech deliveries:

- 0.5% cephalic and frank breech presentations.
- 5% complete breech.
- 15% footling breech.

Transverse lie is associated with a risk of cord prolapse as high as 20%.

The incidence of occult prolapse is unknown but 50% of monitored labours show fetal heart rate changes suggesting umbilical cord compression. This is usually transitory and relieved by changing the mother’s position.

**Risk factors**\(^1\)

- Prematurity.
- Fetal congenital abnormality.
- Second twin
- Multiparity.
- Low birth weight (<2.5 kg).
- Breech.
- Oblique, transverse and unstable lie.
- Cephalopelvic disproportion.
- Pelvic tumours.
- Low-lying placenta.
- Polyhydramnios.
- Macrosomia.
- High fetal station.
- Long umbilical cord.
- Obstetric interventions including:
  - Amniotomy with high presenting part.
  - Vaginal manipulation of the fetus with ruptured membranes.
  - Insertion of intrauterine pressure catheter.
  - Attempted external cephalic or internal podalic version.

Induction of labour with prostaglandins is not associated with an increased risk of cord prolapse. A Cochrane review showed no difference in the risk of cord prolapse between women who had artificial rupture of the membranes to speed up labour and those who did not.\(^2\)

Presentation

**Signs**

Cord prolapse may occur with no outward physical signs and a normal fetal heart trace.
Abdominal examination: an ill-fitting or non-engaged presenting part should alert one to the possibility of cord prolapse.

Vaginal examination (VE) - examine for the cord at every VE during labour and specifically after rupture of membranes if risk factors:

- With an overt prolapse, the cord can be seen protruding from the introitus or loops of cord can be palpated within the vaginal canal. If the cord is pulsating, the fetus is alive.
- Occult prolapses are rarely felt on pelvic examination and the only indication may be fetal heart rate changes.
- With a funic presentation, loops of cord are palpated through the membrane.

Whilst it is generally important to avoid digital examination of women in premature labour, suspicion of cord prolapse is an important exception and speculum and/or digital examination should be swiftly undertaken in these circumstances.

Fetal monitoring

- Whilst the fetus remains in good condition, variable fetal heart rate decelerations are seen during uterine contractions, which promptly return to normal after a contraction subsides.
- With prolonged and complete compression, bradycardia occurs.
- With deteriorating fetal status, activity diminishes and eventually stops.

Have a high index of suspicion for cord prolapse, particularly if fetal monitoring changes occur soon after rupture of membranes, whether spontaneous or with amniotomy.

Any fetal bradycardia or decelerations that may indicate compression of a prolapsed cord should be confirmed/ruled out with a vaginal examination.

Investigations

Routine antenatal ultrasound is not adequately sensitive to detect cord presentation. Most suspected cord presentations do not develop into a cord prolapse at delivery.

Loops of cord in front of the presenting part can be visualised using colour Doppler studies. This is not routinely done but can be used to examine women serially at high risk.

Management

Treat a prolapsed cord as an acute obstetric emergency.

- With an overt prolapse:
  - Administer oxygen to the woman 4-6 L/minute.
  - If the fetus is viable, place the mother in the knee-chest position (patient facing the bed, chest level to bed, knees tucked under chest, pelvis and buttocks elevated) or head-down tilt in the left lateral position and apply upward pressure against the presenting part to lift the fetus away from the prolapsed cord. This can be done manually (gloved hand/two fingers pushing upwards against the presenting part or once the presenting part is above the pelvic brim, using continuous suprapubic pressure in an upwards direction) or by filling the urinary bladder.
  - Manual replacement of the prolapsed cord above the presenting part is not currently recommended. Avoid handling the cord outside the vagina, as this induces vasospasm.
  - Proceed to emergency caesarean section as soon as possible.
  - If available, give terbutaline 0.25 mg subcutaneously to reduce contractions when there are persistent fetal heart rate trace abnormalities, despite attempts to prevent cord compression manually, and there may be delays in achieving delivery.
  - Only proceed with vaginal delivery if delivery is imminent, the cervix is fully dilated and there are no contra-indications.
  - This can be expedited with episiotomy/vacuum extraction or forceps.
  - Ensure resuscitation is available for the baby post-delivery.
  - If the fetus has died, deliver in the manner that is safest for the woman.

- If an occult prolapse is suspected:
  - Place the mother in the left lateral position.
  - If the fetal heart rate returns to normal, allow labour to continue with the mother receiving O₂ and fetal heart rate being continuously monitored.
  - If the fetal heart rate remains abnormal, expedite a rapid caesarean section.

- With funic presentation, a decision needs to be made between prompt elective caesarean section prior to membrane rupture or artificial rupture of membranes (ARM) with full preparations for an emergency caesarean section, in case the cord does become an overt prolapse on rupture.

In the community, cord prolapse is associated with a ten-fold increase in perinatal mortality rate, compared with that occurring in hospital.

Emergency community management of cord prolapse

[1]
• Arrange 999/112/911 ambulance transfer to the nearest consultant-led obstetric unit for delivery, unless spontaneous vaginal delivery is assessed as imminent by a competent professional’s VE. Even then, still ensure urgent transport is on its way in case delivery is delayed or the baby requires resuscitation.
• Advise knee-chest, face-down position whilst awaiting the ambulance.
• Elevate the presenting part whilst awaiting transfer and during transfer to hospital.
• Use the left lateral position with pillow under hip for transfer in the ambulance.

Prognosis
The perinatal mortality rate (associated with cord prolapse) is 91/1,000. Prematurity and congenital abnormality are underlying factors in most cases. Even congenitally normal, full-term babies can die as a consequence of cord prolapse - home birth and delay in transfer to hospital have been identified as particular risks in these cases. [1]

The most common serious morbidities associated with cord prolapse relate to asphyxia: hypoxic brain injury and cerebral palsy. [5] There are few long-term studies looking at long-term sequelae of cord prolapse.

Prevention [1]
• Discuss admission with all pregnant women with transverse, oblique or unstable lie from 37 weeks of gestation. Cord prolapses occurring in hospital have better outcomes than those occurring within the community. Advise women who choose to stay in the community that they will require rapid assessment if they start labour or have a spontaneous rupture of membranes and should seek help as soon as possible.
• Women with premature rupture of membranes and a non-cephalic presentation should be advised to be admitted.
• Avoid ARM where possible. When amniotomy to induce labour is necessary, the umbilical cord should be palpated for at the VE and the head should not be dislodged. Amniotomy should be avoided if the head is high. [6]
• If an ARM is performed with a mobile presenting part, ensure arrangements have been put in place for an immediate emergency section should a cord prolapse occur.
• Whenever a VE or other obstetric procedure is performed following rupture of membranes with a high presenting part, avoid any upward pressure on the presenting part.
• Treat high-risk patients with continuous fetal monitoring during delivery.

Further reading & references
1. Umbilical Cord Prolapse; Royal College of Obstetricians and Gynaecologists (November 2014)
6. Induction of labour; NICE Clinical Guideline (July 2008 - currently under review)

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