Management of Umbilical Cord Prolapse

By Ashraf Fouda, MD

- Medline and NHS databases
- Women’s Hospitals Australasia – Clinical Practice Guidelines - Cord Prolapse - Last Reviewed June 2005
- RCOG - Green-top Guideline - No. 50 - April 2008

Levels of Evidence
  Evidence Category and Source
  Grading of Recommendations
  Recommendation Grade

Definition
Cord prolapse has been defined as descent of the umbilical cord through the cervix alongside (occult) or past the presenting part (overt) in the presence of ruptured membranes.

Definition
Cord presentation is the presence of one or more loops of umbilical cord between the fetal presenting part and the cervix, without membrane rupture.

Background
- The overall incidence of cord prolapse ranges from 0.1% to 0.6%.
- With breech presentation, the incidence is just above 1%.
- Male fetuses seem to be predisposed.
- The incidence is higher in multiple gestations.

Background
Cases of cord prolapse appear consistently in perinatal mortality enquiries, and one large study found a perinatal mortality rate of 91 per 1000.

Background
- Prematurity and congenital malformation account for the majority of adverse outcomes associated with cord prolapse in hospital settings, but cord prolapse is also associated with birth asphyxia and perinatal death with normally-formed term babies, particularly with home birth.
- Delay in transfer to hospital appears to be an important factor with home birth.

Background
- Asphyxia may also result in hypoxic-ischaemic encephalopathy and cerebral palsy.
- The principal causes of asphyxia in this context are thought to be:
MANAGEMENT OF UMBILICAL CORD PROLAPSE
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SOURCES

- Medline and NHS databases
- Women’s Hospitals Australasia – Clinical Practice Guidelines - Cord Prolapse – Last Reviewed June 2005
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Levels of Evidence
<table>
<thead>
<tr>
<th>Evidence category</th>
<th>Source</th>
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</thead>
<tbody>
<tr>
<td>Ia</td>
<td>Systematic review and meta-analysis of randomised controlled trials</td>
</tr>
<tr>
<td>Ib</td>
<td>At least one randomised controlled trial</td>
</tr>
<tr>
<td>IIA</td>
<td>At least one well-designed controlled study without randomisation</td>
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<tr>
<td>IIb</td>
<td>At least one other type of well-designed quasi-experimental study</td>
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<tr>
<td>III</td>
<td>Well-designed non-experimental descriptive studies, such as comparative studies, correlation studies or case studies</td>
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<tr>
<td>IV</td>
<td>Expert committee reports or opinions and/or clinical experience of respected authorities</td>
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Grading of Recommendations
<table>
<thead>
<tr>
<th>Recommendation grade</th>
<th>Evidence</th>
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<tbody>
<tr>
<td>A</td>
<td>Directly based on category I evidence</td>
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| B                    | Directly based on:  
  - category II evidence, or  
  - extrapolated recommendation from category I evidence |
| C                    | Directly based on:  
  - category III evidence, or  
  - extrapolated recommendation from category I or II evidence |
| D                    | Directly based on:  
  - category IV evidence, or  
  - extrapolated recommendation from category I, II or III evidence |
| Good practice point  | The view of the Guideline Development Group |

**Recommendation Grade**
Definition

- **Cord prolapse**

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- With breech presentation, the incidence is just above 1%.
- Male fetuses seem to be predisposed.
- The incidence is higher in multiple gestations.
Cases of cord prolapse appear consistently in perinatal mortality enquiries, and one large study found a perinatal mortality rate of 91 per 1000.
Background

- **Prematurity and congenital malformation** account for the majority of adverse outcomes associated with cord prolapse in hospital settings, but cord prolapse is also associated with **birth asphyxia and perinatal death** with normally-formed term babies, particularly with home birth.
- **Delay in transfer to hospital** appears to be an important factor with home birth.

**Background**

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- Delay in transfer to hospital appears to be an important factor with home birth.
Background

- **Asphyxia** may also result in **hypoxic-ischaemic encephalopathy and cerebral palsy**.
- The principal causes of **asphyxia** in this context are thought to be:
  - **cord compression** preventing venous return to the fetus and
  - **umbilical arterial vasospasm** secondary to exposure to vaginal fluids and/or air.
Identification and Assessment of Evidence

• Because of the emergent nature and rare incidence of the condition, there are no randomised controlled trials comparing interventions.
• There are a large number of case reports, case-control studies and case series.
What are the Risk Factors for Cord Prolapse?

- Several risk factors are associated with cord prolapse.
- In general, they predispose to cord prolapse by preventing close application of the presenting part to the lower part of the uterus and/or pelvic brim.
- Rupture of membranes in such circumstances compounds the risk of prolapse.

Evidence level 2++
What are the risk factors for cord prolapse?

- **Cord abnormalities** (such as true knots or low content of Wharton’s jelly) and **Fetal hypoxia-acidosis** may alter the turgidity of the cord and predispose to prolapse.

*Evidence level 4*
Risk Factors for Cord Prolapse

- About half of cases of prolapse being preceded by some form of obstetric manipulation.
- The manipulation of the fetus in the presence of membrane rupture (external cephalic version, internal podalic version of the second twin, manual rotation, placement of intrauterine pressure catheters) or
- The artificial rupture of membranes, particularly with an unengaged presenting part, are the interventions that most frequently precede cord prolapse.

Evidence level 3
What are the Risk Factors for Cord Prolapse?

Induction of labour with prostaglandins *per se* is not associated with cord prolapse.

Evidence level 2++
Risk Factors for Cord Prolapse

- Multiparity
- Low birth weight <2.5 kg
- Prematurity <37 weeks
- Fetal congenital anomalies
- Breech presentation
- Transverse, oblique and unstable lie
- Second twin
- Polyhydramnios
- Unengaged presenting part
- Low placenta, other abnormal placentation
- Fetus of male gender
Risk Factors for Cord Prolapse

- Artificial rupture of membranes
- Vaginal manipulation of the fetus with ruptured membranes
- External cephalic version
- Internal podalic version
- Stabilising induction of labour
- Applying fetal scalp electrode
- Insertion of uterine pressure transducer*
Can cord presentation be detected antenatally?

Ultrasound examination is not sufficiently sensitive or specific for identification of cord presentation antenatally and should not be performed routinely to predict cord prolapse.

Grade B
Can Cord Prolapse or its Effects be Avoided?

• Women with transverse, oblique or unstable lie should be offered elective admission to hospital at 37+6 weeks of gestation, or sooner if there are signs of labour or suspicion of ruptured membranes. Grade D

• Women with noncephalic presentations and preterm prelabour rupture of the membranes should be offered admission. Grade C
Can Cord Prolapse or its Effects be Avoided?

- In-patient care will minimise delay in diagnosis and management of cord prolapse.
- Labour or ruptured membranes of an abnormal lie is an indication for caesarean section.

Evidence level 3
Can cord prolapse or its effects be avoided?

- Bradycardia or variable fetal heart rate decelerations have been associated with cord prolapse and their presence should prompt **vaginal examination**.
- Mismanagement of abnormal fetal heart rate patterns is the **commonest feature of substandard care** identified in perinatal death associated with cord prolapse.

Evidence level 2

Can Cord Prolapse or its Effects be Avoided?

- Bradycardia or variable fetal heart rate decelerations have been associated with cord prolapse and their presence should prompt vaginal examination.
- Mismanagement of abnormal fetal heart rate patterns is the commonest feature of substandard care identified in perinatal death associated with cord prolapse.

Evidence level 2
Can Cord Prolapse or its Effects be Avoided?

- Speculum and/or a digital vaginal examination should be performed when cord prolapse is suspected, regardless of gestation.
- Prompt vaginal examination is the most important aspect of diagnosis.
- It is important to avoid digital vaginal examinations in women with preterm labour, but suspicion of cord prolapse was regarded as an exception to that rule.

Evidence level 3
Can Cord Prolapse or its Effects be Avoided?

- Artificial rupture of membranes should be avoided whenever possible if the presenting part is unengaged and mobile.
- If it becomes necessary to rupture the membranes in such circumstances, this should be performed in theatre with capability for immediate caesarean birth.

Grade B
Can Cord Prolapse or its Effects be Avoided?

- Vaginal examination and obstetric interventions in the context of ruptured membranes carry a risk of upwards displacement of the presenting part and cord prolapse.
- Pressure on the presenting part should be kept to a minimum in such women.
- Rupture of membranes should be avoided if on vaginal examination the cord is felt below the presenting part in labour (Cord presentation).
- A caesarean section should be performed.
When should cord prolapse be suspected?

- Cord presentation and prolapse may occur without outward physical signs.
- The cord should be felt for at every vaginal examination and after spontaneous rupture of membranes in labour.
When should cord prolapse be suspected?

Cord prolapse should be suspected when there is an abnormal fetal heart rate pattern (bradycardia, variable decelerations etc) in the presence of ruptured membranes, particularly if such changes occur soon after membrane rupture, spontaneously or with amniotomy.

Grade B
When should cord prolapse be suspected?

Speculum and/or digital vaginal examination should be performed at preterm gestations when cord prolapse is suspected.

Grade D
What is the optimum management of cord prolapse in hospital settings?

When cord prolapse is diagnosed before full dilatation:
1. Assistance should be immediately called,
2. Venous access should be obtained,
3. Consent taken and
4. Preparations made for immediate delivery in theatre.
What is the optimum management of cord prolapse in hospital settings?

- There are insufficient data for the evaluation of manual replacement of the prolapsed cord above the presenting part to allow continuation of labour. This practice is not recommended
  Grade D

- To prevent vasospasm, there should be minimal handling of loops of cord lying outside the vagina which can be covered in surgical packs soaked in warm saline.

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To prevent vasospasm, there should be minimal handling of loops of cord lying outside the vagina which can be covered in surgical packs soaked in warm saline.
What is the optimum management of cord prolapse in hospital settings?

- To prevent cord compression, it is recommended that the presenting part be elevated either manually or by filling the urinary bladder.
  
Grade D

- Cord compression can be further reduced by the mother adopting the knee–chest position or head-down tilt (preferably in left-lateral position).
What is the optimum management of cord prolapse in hospital settings?

- **Elevation of the presenting part** is thought to relieve pressure on the umbilical cord and prevent mechanical vascular occlusion.
- **Manual elevation** is performed by inserting a gloved hand or two fingers in the vagina and pushing the presenting part upwards.
- **Excessive displacement** may encourage more cord to prolapse.
- **Remove the hand from the vagina once the presenting part is above the pelvic brim, and apply continuous suprapubic pressure.**

Evidence level 4

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Evidence level 4
What is the optimum management of cord prolapse in hospital settings?

- If the decision-to-delivery interval is likely to be prolonged, particularly if it involves ambulance transfer, elevation through bladder filling may be more practical.
- Bladder filling can be achieved quickly by inserting the cut end of an intravenous giving set into a Foley’s catheter.
- The catheter should be clamped once 500-750 ml have been instilled.
- It is essential to empty the bladder again just before any delivery attempt, be it vaginal or caesarean section.

Evidence level 3

What is the optimum management of cord prolapse in hospital settings?

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Evidence level 4
What is the optimum management of cord prolapse in hospital settings?

- **Tocolysis** can be considered while preparing for caesarean section if there are persistent fetal heart rate abnormalities after attempts to prevent compression mechanically and when the delivery is likely to be delayed.

- Although the measures described above are potentially useful during preparation for delivery, they must not result in unnecessary delay.
What is the optimal mode of delivery with cord prolapse?

A caesarean section is the recommended mode of delivery in cases of cord prolapse when vaginal delivery is not imminent, in order to prevent hypoxia-acidosis.

Grade B
**Recommendation:**

Reassess cervical dilatation (particularly in the multigravida in strong labour) prior to commencing an emergency caesarean section as the woman may well have achieved full dilatation and may now be suitable for an assisted vaginal delivery.
What is the optimal mode of delivery with cord prolapse?

- Caesarean section is associated with a lower perinatal mortality and reduced risk of APGAR score <3 at 5 minutes compared to spontaneous vaginal delivery in cases of cord prolapse when delivery is not imminent.
- However, when vaginal birth is imminent, outcomes are equivalent to and possibly better than those for caesarean.

Evidence level 2
What is the optimal mode of delivery with cord prolapse?

- A caesarean section of urgency category 1 should be performed within 30 minutes or less if there is cord prolapse associated with a suspicious or pathological fetal heart rate pattern.
- Verbal consent is satisfactory.

Grade B
What is the optimal mode of delivery with cord prolapse?

• The 30-minute decision-to-delivery interval (DDI) is the target for category 1 CS.

• For women at term with a grossly pathological fetal heart rate pattern on transfer from home (severe bradycardia), category 1 caesarean section should be advised.

• For women with a grossly pathological pattern at extremely preterm gestations (24-26 weeks), a discussion of the chance of survival should be offered and the options of delivery and expectant management discussed.

Evidence level 2
What is the optimal mode of delivery with cord prolapse?

- **Category 2 caesarean section** is appropriate for women in whom the fetal heart rate pattern is normal.
- **The presenting part should be kept elevated while anaesthesia is induced.**
- **Regional anaesthesia may be considered in consultation with an experienced anaesthetist.**

**Grade C**

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- The presenting part should be kept elevated while anaesthesia is induced.
- Regional anaesthesia may be considered in consultation with an experienced anaesthetist.

Grade C
What is the optimal mode of delivery with cord prolapse?

- **Vaginal birth, in most cases operative,** can be attempted at full dilatation if it is anticipated that delivery would be accomplished within 20 minutes from diagnosis.

- **With parous women or for second twins,** ventouse extraction can be attempted by experienced operators at 9 cm dilatation if there are severe CTG abnormalities and an easy delivery is anticipated.

Grade D
What is the optimal mode of delivery with cord prolapse?

- **Breech extraction** can be performed under some circumstances, e.g. after internal podalic version for the second twin, or for singleton breech babies when the presenting part is distending the perineum.

  Grade C
What is the optimal mode of delivery with cord prolapse?

- A practitioner competent in the resuscitation of the newborn, usually a neonatologist, should attend all deliveries with cord prolapse.
- Neonates liveborn after cord prolapse are at significant risk of needing neonatal resuscitation, as evidenced by a high rate of low APGAR scores (<7); 21% at one minute and 7% at five minutes.

Evidence level 3
What is the Optimal Management in Community Settings?
What is the optimal management in community settings?

- Women should be advised, over the telephone if necessary, to assume the knee-chest face-down or steep Trendelenburg position while waiting for hospital transfer.

- During emergency ambulance transfer, the knee–chest is potentially unsafe and the left-lateral position should be used.

What is the optimal management in community settings?

- Women should be advised, over the telephone if necessary, to assume the knee-chest face-down or steep Trendelenburg position while waiting for hospital transfer.
- During emergency ambulance transfer, the knee–chest is potentially unsafe and the left-lateral position should be used.
What is the optimal management in community settings?

- All women with cord prolapse should be advised to be transferred to the nearest consultant unit for delivery, unless an immediate vaginal examination by a competent professional reveals that a spontaneous vaginal delivery is imminent.
- Preparations for transfer should still be made.

Grade B
What is the optimal management in community settings?

- The presenting part should be elevated during transfer by either manual or bladder filling methods.
- It is recommended that community midwives carry a Foley catheter for this purpose and equipment for fluid infusion.

Grade D
What is the optimal management in community settings?

To prevent vasospasm, there should be minimal handling of loops of cord lying outside the vagina.
What is the optimal management in community settings?

Perinatal mortality is increased by more than ten-fold in cases occurring outside hospital compared to inside the hospital, and neonatal morbidity is also increased in this circumstance. Evidence level 3
What is the Optimal Management of Cord Prolapse Before Viability?
What is the optimal management of cord prolapse before viability?

- Expectant management can be considered for cord prolapse complicating pregnancies with gestational age at the limits of viability.
  
  Grade D

- Women should be offered both continuation and termination of pregnancy following cord prolapse before 24 completed weeks of pregnancy.

What is the optimal management of cord prolapse before viability?

Expectant management can be considered for cord prolapse complicating pregnancies with gestational age at the limits of viability.

Grade D

Women should be offered both continuation and termination of pregnancy following cord prolapse before 24 completed weeks of pregnancy.
What is the optimal management of cord prolapse before viability?

- At **extreme preterm gestational age** (before 28 weeks), expectant management has been recorded for periods up to three weeks.
- Prolongation of pregnancy at such gestational ages creates a chance of survival but morbidity from prematurity remains a frequent serious problem.
- Some women might prefer to choose termination of pregnancy, perhaps after a short period of observation to see if labour commences spontaneously.

Evidence level 3
Debriefing
Postnatal debriefing should be offered to every woman with cord prolapse.

Grade D
Debriefing

- After severe obstetric emergencies, women might be psychologically affected with postnatal depression, post-traumatic stress disorder, or fear of further childbirth.
- Women with cord prolapse who undergo urgent transfers to hospital are possibly particularly vulnerable to psychological trauma.
- Debriefing is an important part of maternity care and should be offered by a suitably trained professional.