



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive



INSTITUTE OF OBSTETRICIANS
& GYNAECOLOGISTS

ROYAL COLLEGE OF PHYSICIANS OF IRELAND

CLINICAL PRACTICE GUIDELINE

CORD PROLAPSE

Institute of Obstetricians and Gynaecologists,
Royal College of Physicians of Ireland
and the
Clinical Strategy and Programmes Division,
Health Service Executive

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1. Revision History

Version No.	Date	Modified By	Description
1.0	March 2015	MH	Version 1.0

2. Key Recommendations

Women with an unstable lie (transverse, oblique) at 37-38 weeks gestation should be advised that admission to hospital for inpatient observation until the lie stabilizes or delivery is achieved is the preferred option. If a woman declines admission, both the woman and her partner should be advised to contact their local maternity unit immediately they suspect or the woman experiences contractions or her membranes have ruptured.

Amniotomy should only be considered when the presenting part is fixed and not excessively high; otherwise it should be delayed. If amniotomy is deemed suitable (following discussion with a senior obstetrician) then a controlled artificial rupture of the membranes should be performed, with the appropriate health care professionals informed +/- present (eg theatre staff and NICU).

Cord prolapse with a viable fetus should result in delivery of the fetus. Timing of delivery will depend on fetal and maternal wellbeing (e.g. category 1 delivery if suspected fetal distress; category 2 delivery if reassuring fetal status – though this needs to be continuously monitored until delivery in case the fetal status changes). In the second stage of labour delivery can be achieved either by caesarean section or instrumental delivery.

When transporting a woman with a cord prolapse for delivery (either from out of hospital or within the hospital to a theatre or labour room, position the woman to encourage the fetus to gravitate towards the diaphragm i.e., knee-chest position or head down left lateral (exaggerated Sims) position.

3. Purpose and Scope

The purpose of this guideline is to improve the diagnosis and management of umbilical cord prolapse. These guidelines are intended for healthcare professionals, particularly those in training, who are working in HSE-funded obstetric and gynaecological services. They are designed to guide clinical judgement but not replace it. In individual cases a healthcare professional may, after careful consideration, decide not to follow a guideline if it is deemed to be in the best interests of the woman.

4. Background and Introduction

Cord prolapse is defined as the descent of the umbilical cord through the cervix in the presence of ruptured membranes. Cord prolapse can either be occult (alongside the presenting part and not visible externally) or overt (past the presenting part, and easily palpable or visible externally) (Holbrook et al., 2013).

Cord prolapse is an acute obstetric emergency with an increased risk of perinatal morbidity and mortality. The mechanism of fetal demise is via near or total acute asphyxia, either as a result of mechanical compression of the cord by the fetal presenting part, or vasospasm of vessels. Cord prolapse is not a rare event, occurring in 1.7/1000 live births during the last decade in Dublin (Gibbons et al., 2014) – which is well within the other quoted rate ranges of 0.1% - 0.6% (Yla-Outinen et al. 1985; Tan et al., 2003; Kahana et al., 2004; Dilbaz et al., 2006; Bako et al., 2009; Obeidat et al., 2010; Gannard-Pechin et al., 2012; Gabbay-Benziv et al., 2014). This incidence has declined dramatically from the 1940s, where 6.4/1000 live births were complicated by cord prolapse, with an associated perinatal mortality of 54%. The reduction in cord prolapse has been associated with an increased rate of survival, which now is reported as 94% (Gibbons et al., 2014).

Increased use of caesarean delivery for women with unstable lie at term and a reduction in the rate of grand multiparity have been proposed as possible mechanisms resulting in reduction in rates of cord prolapse; other possible mechanisms include increased use of prostaglandins for cervical ripening, delay in artificial rupture of membranes until the presenting part is well applied, and no longer allowing trial of labour for footling breeches (Silver, 2014).

5. Methodology

Medline, EMBASE and Cochrane Database of Systematic Reviews were searched using terms relating to cord prolapse. Other sources, including academic colleges (RCOG, ANZCOG, ACOG, SOGC) and the Cochrane Library were searched for relevant studies. The search for this guideline was performed in August 2014.

Databases were searched using the relevant MeSH terms, including subheadings, combined with free text and keywords. Search words included "cord prolapse", "umbilical cord prolapse", "obstetric emergency", "training", "funic (cord)" with the search restricted to humans and open for all languages.

Searches were limited to humans and restricted to articles published between 1980 and 2014. Relevant meta-analyses, systematic reviews, intervention and observational studies were reviewed. As expected due to the rarity and emergency nature of the condition, no randomized controlled trials were

identified. Where possible recommendations are based on available evidence, though due to the rarity of the complication most of the recommendations are based as “good practice points”.

Guidelines reviewed included the RCOG guideline No 50 “Umbilical Cord Prolapse” (April 2008) (RCOG; 2008). The principal guideline developer was Dr Mary Higgins (National Maternity Hospital and University College Dublin). The guideline was peer-reviewed by: Dr Seosamh O Coighligh (Consultant Obstetrician, Our Lady of Lourdes (LOL) Hospital Drogheda), Ms C Mc Cann, (Assistant Director Of Midwifery. LOL, Drogheda), S Sugrue (Lead Midwife, (ONMSD), Prof. Declan Devane (NUI Galway and West, Northwest Hospitals Group), Dawn Johnston, (Group Director of Midwifery, West, Northwest Hospitals Group) and Helen McHale (Clinical Midwife Manager, National Maternity Hospital).

6. Clinical Guidelines on Cord Prolapse

6.1 Early identification of patients at risk

Multiple risk factors for cord prolapse have been identified. (Bako et al., 2009) (Murphy and MacKenzie 1995; Qureshi et al., 2004) (Gabbay-Benziv et al., 2014) (Yla-Outinen et al., 1985; Critchlow et al., 1994; Kahana et al., 2004; Dilbaz et al., 2006; Obeidat et al., 2010; Gannard-Pechin et al., 2012; Smit et al., 2014).

The incidence of cord prolapse is reported as 0.24, 3.5 and 9.6% for vertex, breech and transverse lie, respectively (RCOG 2008).

Most cases of cord prolapse occur shortly after rupture of membranes, with one study showing 57% occurring within 5 minutes of rupture, 67% within one hour and less than 5% occurring over 24 hours after rupture of membranes (Murphy et al., 1995).

6.2 Risk factors

Despite the identification of several risk factors for umbilical cord prolapse, the predictive ability of each of these individual factors in clinical practice is low (Obeidat, et al., 2010) and most of these risk factors are largely unavoidable (Dilbaz et al., 2006). The risk factors for cord prolapse are listed in Table 1. Favourable perinatal outcome is majorly dependent on the time interval from diagnosis of umbilical cord prolapse to delivery (Obeidat et al., 2010), though confounders (prematurity, congenital abnormalities) are also important prognostic indicators.

Antenatal Risk Factors	Intra-partum Risk Factors
Non vertex presentation (transverse lie "back up" or breech)	Artificial rupture of the membranes (especially with high presenting part)
Unengaged presenting part	Prematurity
Unstable Lie	Second twin
Polyhydramnios	Manual rotation or other vaginal manipulation of the fetus - internal podalic version - disimpaction of fetal head during rotational assisted delivery) - placement of a fetal scalp electrode - insertion of an intrauterine pressure catheter or amnioinfusion catheter,
External Cephalic Version	
Preterm premature rupture of membranes	
Multiparity	
Low birth weight	
Congenital abnormalities	
Cord abnormalities	
Male gender (if known)	

Table 1: Risk factors for Cord Prolapse

Antenatal diagnosis of a cord presentation may not be useful. In one study of 16 cases where the cord was presenting on antenatal ultrasound, there was resolution in eight cases and only two experienced a cord prolapse (Ezra, et al., 2003). Therefore, at present there appears to be a low predictive value for routine antenatal ultrasound to predict the condition.

Practically, should a cord presentation be noted on ultrasound for another indication then this would warrant individualization of care and discussion with a senior obstetrician, including a repeat ultrasound if the woman is not delivered.

6.3 Early diagnosis of the condition

It is good clinical practice to examine for cord presentation or prolapse with each vaginal examination in labour. Some units may also require documentation in the notes the absence of cord presentation at each vaginal examination.

An acute fetal bradycardia, or acute decelerations of the fetal heart rate in the presence of ruptured membranes should prompt immediate consideration of cord prolapse and indicate the performance of a vaginal examination in order to exclude or confirm the diagnosis. These abnormalities may only be present in 41% to 67% of cases (Koonings, et al.,1990; Murphy and MacKenzie 1995).

A cord prolapse is diagnosed by the presence of a palpable, soft, pulsatile mass either within the vagina or visibly extruding from the introitus. Differential diagnoses for a palpable mass may be a fetal limb, a face presentation and severe caput succedaneum that may confuse a less experienced clinician. It should also be remembered that the mass might not be pulsatile in the case of an intrauterine death (Holbrook and Phelan 2013).

6.4 Communication

Communication with the relevant multidisciplinary team members (midwifery, obstetrics, anaesthesia, portering, neonatology etc) will depend on the individual unit policy. When arriving on the scene the use of the ISBAR communication tool is recommended (Health Service Executive 2013).

Examples of describing the situation may include:

- “cord prolapse, no fetal distress, mother 6cm dilated”
- “cord prolapse, fetal bradycardia, mother fully dilated” etc.

6.5 Relief of pressure on the cord itself

Options include

- Knee-chest position
 - Traditionally the position recommended is to place the woman in a knee chest position with her head downwards. It may, however, be difficult to transport her (especially if cord prolapse occurs in the community and ambulance transfer is required to transport to hospital). In this case the head down left lateral may be more appropriate.
- Head down left lateral
 - Woman is placed in left lateral with a pillow underneath her left hip. Another option may be to place her in Trendelenburg (where the bed is tilted so that her head is lower than her pelvis).

- Manual elevation of the fetal head
 - Should a clinician, on vaginal examination, diagnose a cord prolapse in a viable infant, the clinician can then manually elevate the fetal head by pushing it upwards in order to relieve pressure on the prolapsed cord.
 - Care should be taken to avoid putting further pressure on the cord, as this may cause vasospasm and increase the risk of perinatal morbidity (Lin 2006).
 - Should there be suspicion of fetal distress on fetal monitoring the clinician may need to continue to digitally elevate the fetal head until delivery is achieved, rather than filling the bladder (see below). Consideration should be given by the operator to ask the clinician to remove their hand prior to making a uterine incision.
- Bladder filling
 - If fetal heart rate patterns are reassuring, it is then an option to insert a catheter to fill the bladder and keep the fetal head elevated, until delivery can be achieved. This can be achieved by siting a urinary catheter, attaching a blood giving set to the catheter, filling with 500-750mls of fluid (e.g. normal saline) and then clamping the catheter (Vagos method) (Vagos,1970).
 - In order to reduce the possibility of trauma to the maternal bladder, consideration should be given to emptying the bladder when directed by the surgeon intra-operatively (e.g. when the peritoneum is opened).
 - One study investigated the effect of filling the bladder as well as relieving the pressure digitally –this did not prolong the decision to delivery time but equally does not improve outcome (Bord et al., 2011)
- Wrapping the cord in warm saline
 - While there is no evidence to support this, courses (MOET, ALSO, PROMPT) do mention wrapping the cord in warm saline, but this has not been evaluated in the context of a clinical trial or study
 - There should be minimum handling of loops of cord lying outside the vagina to prevent vasospasm of the cord
- Consideration of tocolysis
 - Terbutaline is suggested as a tocolytic to reduce uterine contractions and pressure on the cord (Griese et al.,1993; RCOG; 2008), though the clinician should be aware of the increased risk of uterine atony after use of a tocolytic.

- One small study (12 cases) used backfilling of the bladder and an intravenous infusion of ritodrine- there were no neonatal or intrauterine deaths and normal Apgar scores in most infants (Katz et al., 1982). The team expanded on numbers with a further study reviewing 51 cases, showing a reduction in fetal distress from 33 cases to 8 cases by use of ritodrine and bladder filling (Katz et al., 1988). Ritodrine is **now no longer used** as a tocolytic due to maternal side effects – as a result terbutaline is suggested as an alternative.
- Replacing the cord (funic reduction)
 - Funic reduction was a management option that was common before the widespread availability of caesarean section. Only one paper, over twenty years old, has been published that evaluates the outcome in eight cases, with good outcomes in all and only one caesarean section required (Barrett 1991). **Because of the paucity of information, this would not be routinely recommended.**

6.6 Expedited delivery (viable infant)

Confirm that the fetal heart is beating – if the fetal heart is not heard on a Pinard or hand-held Doppler, then confirm its presence with ultrasound.

Decision to delivery time has been shown in one study to be important, with little effect on Apgar scores if delivered within 30 minutes (Murphy and MacKenzie 1995). Another study reviewing 44 cases had a mean delivery time of 18 minutes, with 13 infants requiring admission to the NICU. Ten of these 13 admissions had delivered within 18 minutes, but many of them had no additional procedures performed and others were premature, with transfer required to NICU independently of the cord prolapse (Khan, et al., 2007).

At full dilatation, delivery by the vaginal route may be quickest, and can be achieved in 75% of cases (Gannard-Pechin, Ramanah et al. 2012) of women, though this may depend on the parity of the woman and engagement of the fetal head. Median decisions to delivery intervals between 15 to 27 minutes have been reported (Murphy and MacKenzie 1995; Bloom, Leveno et al. 2006) for urgent operative deliveries. In one study specifically analyzing decision to delivery interval where there was a cord prolapse, all infants were delivered within 30 minutes, though the rate of Apgar <7 increased with longer time to delivery (Caspi et al., 1983).

6.7 Anaesthesia for delivery

Cord prolapse in a viable infant in early labour or prelabour with suspicion of fetal distress is considered a Class 1 caesarean section (maternal or fetal compromise - immediate risk to the life of the mother or newborn) (RCOG, 2010). Analgesia needs to be obtained as quickly as possible, either by general

or regional anaesthesia. A case report of obtaining spinal anaesthesia in the knee chest prone position has been published, with anaesthesia obtained in less than five minutes and a good fetal outcome (Ginosar, et al., 2008).

Cord prolapse in a viable infant in early labour or prelabour **without** suspicion of fetal distress may be considered a Class 2 caesarean section (maternal or fetal compromise – no immediate threat to the life of the mother or newborn) (RCOG, 2010). In this case regional anaesthesia may be more appropriate, if there are no other contra-indications.

6.8 Immediately following delivery

It is crucially important to have an experienced neonatal team present at birth in order to provide what neonatal resuscitation may be required. Paired umbilical cord gases should be taken after birth to aid assessment of the neonates condition

6.9 Cord prolapse in the setting of the non-viable infant, or one with multiple congenital abnormalities.

Cord prolapse may occur in these settings, where the infant has not reached viability (either based on gestational age or estimation of fetal weight) or has multiple congenital abnormalities (itself a risk factor for cord prolapse). In these situations, care options can be discussed between the woman, her partner and senior clinicians. Because of the poor outcome for the fetus, the welfare of the mother should be paramount. Two case reports of cord prolapse in the normally formed pre-viable infant managed expectantly and delivered alive have been reported (Leong et al., 2004; Lin 2006), though these are the exceptions rather than the usual outcome.

6.10 Cord prolapse outside of the hospital setting

There is a 18-fold increase in perinatal mortality in cord prolapse outside of hospital when compared to in hospital events (Koonings, Paul et al. 1990). Women with risk factors for cord prolapse (polyhydramniotic, unstable lie near term) should be advised of the risk of cord prolapse. Adapting the left lateral +/- trendelenburg or the knee chest position and emergency transfer to the nearest obstetric unit is advised (PHEC; 2012).

Women with an unstable lie (transverse, oblique) at 37-38 weeks gestation should be advised that admission to hospital for inpatient observation is the preferred option until the lie stabilizes or delivery is achieved. Timing of delivery can be individualized to the woman, her situation and the local hospital policy. If women are not admitted, or decline admission, they should be advised to contact their local maternity unit immediately they suspect or experience contractions or their membranes have ruptured.

6.11 Multidisciplinary education

Evidence exists for a positive impact of training in obstetric emergencies, although the majority of the available evidence applies to evaluation at the level of participants' confidence, knowledge or skills rather than at the level of impact on clinical outcomes (Calvert, et al., 2013). One study was identified which assessed the impact of simulation training on the management of cord prolapse; following training, diagnosis delivery time fell from 25 to 14 minutes, an increase in the actions taken to reduce cord compression and a non statistically significant (but perhaps clinically significant) reduction in low Apgar scores and rate of admission to NICU (Siassakos et al., 2009).

6.12 Documentation

As with any obstetric emergency, documentation should include the following: recognition of event, time emergency call made (if required), fetal wellbeing at time of recognition of cord prolapse, staff arrival time, decision to delivery interval, mode of delivery, fetal outcome, and maternal complications (if any). For a non-viable infant, the discussion regarding options should be documented. Debriefing should include both parents and staff.

7. Hospital equipment and facilities

All units providing maternity care should be have the staff and equipment available to be able to perform a caesarean delivery within thirty minutes.

8. References

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9. Implementation Strategy

- Distribution of guideline to all members of the Institute and to all maternity units.
- Distribution to the Director of the Acute Hospitals for dissemination through line management in all acute hospitals.
- Implementation through HSE Obstetrics and Gynaecology programme local implementation boards.
- Distribution to other interested parties and professional bodies.

10. Qualifying Statement

These guidelines have been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. Clinical material offered in this guideline does not replace or remove clinical judgement or the professional care and duty necessary for each pregnant woman. Clinical care carried out in accordance with this guideline should be provided within the context of locally available resources and expertise.

This Guideline does not address all elements of standard practice and assumes that individual clinicians are responsible for:

- Discussing care with women in an environment that is appropriate and which enables respectful confidential discussion.
- Advising women of their choices and ensuring informed consent is obtained.
- Meeting all legislative requirements and maintaining standards of professional conduct.
- Applying standard precautions and additional precautions, as necessary, when delivering care.
- Documenting all care in accordance with local and mandatory requirements.

11. Appendices

