MATERNAL911

Umbilical Cord Prolapse

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Course Description:

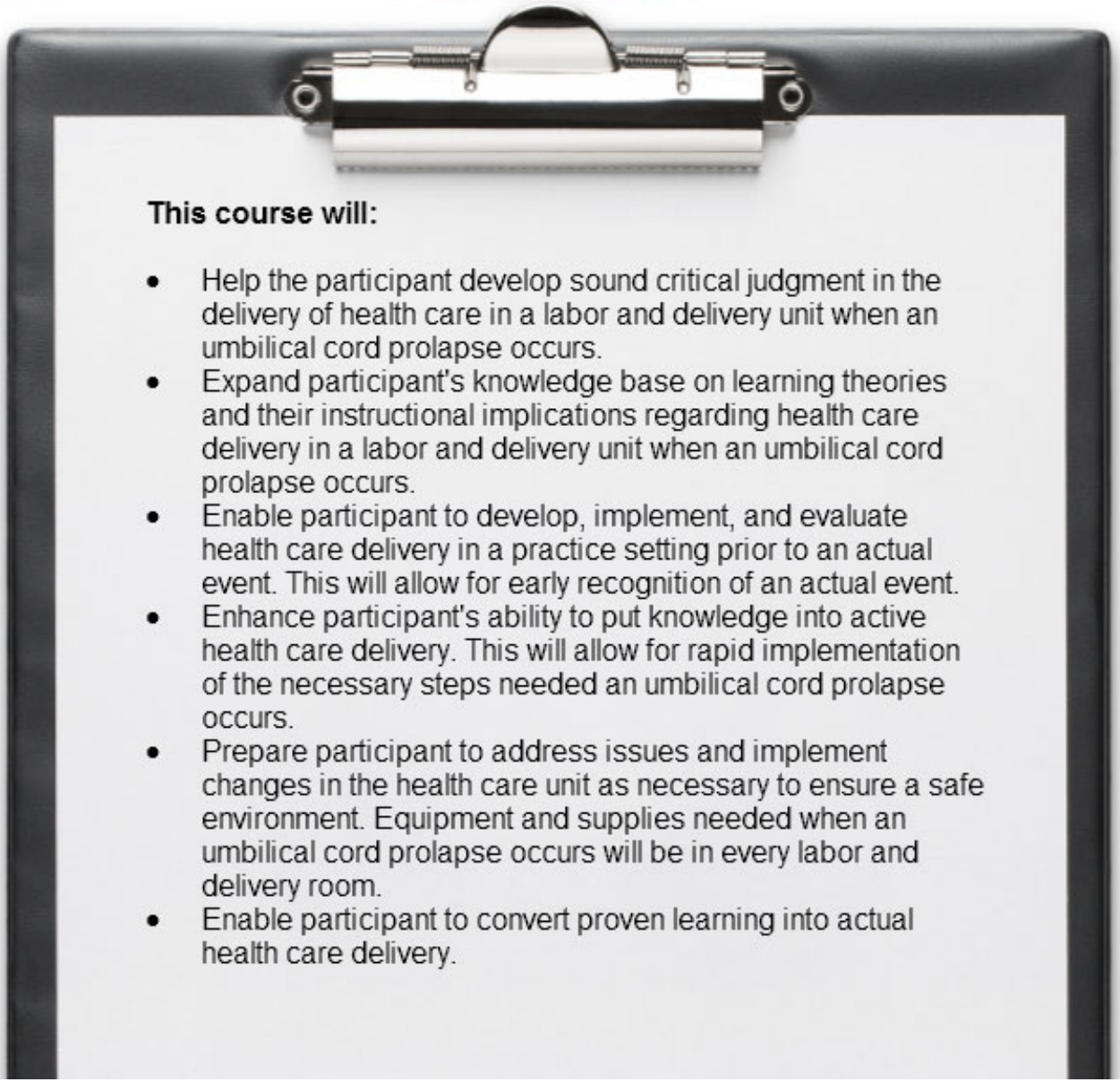
Will the next patient you care for have a cord prolapse? The events that occur after an umbilical cord prolapse if recognized may help to save the fetus. The course will help the participant to understand and implement the actions needed for the best outcome possible. The knowledge gained will help to communicate with other providers, the patient and her family.

Approximate Time to Complete: 45 minutes

Umbilical Cord Prolapse

print version

Summary



This course will:

- Help the participant develop sound critical judgment in the delivery of health care in a labor and delivery unit when an umbilical cord prolapse occurs.
- Expand participant's knowledge base on learning theories and their instructional implications regarding health care delivery in a labor and delivery unit when an umbilical cord prolapse occurs.
- Enable participant to develop, implement, and evaluate health care delivery in a practice setting prior to an actual event. This will allow for early recognition of an actual event.
- Enhance participant's ability to put knowledge into active health care delivery. This will allow for rapid implementation of the necessary steps needed an umbilical cord prolapse occurs.
- Prepare participant to address issues and implement changes in the health care unit as necessary to ensure a safe environment. Equipment and supplies needed when an umbilical cord prolapse occurs will be in every labor and delivery room.
- Enable participant to convert proven learning into actual health care delivery.

Objectives

Umbilical cord prolapse is defined as the presentation of the umbilical cord alongside or beyond the fetal presenting part and is a rare obstetrical emergency.

This is a life-threatening event for the fetus as blood flow through the umbilical vessels is compromised from the compression of the cord between the fetal presenting part and against the uterus, cervix, or pelvis.

Types of Umbilical Cord Prolapse

OCCULT

Occult umbilical cord prolapse refers to:
A situation where the cord descends along or beside, but not past, the fetal presenting part, and is rarely palpated.

Fetal membranes can be intact or ruptured.

This may be diagnosed when a sudden, prolonged fetal heart rate (FHR) deceleration, known as bradycardia, occurs.

Types of Umbilical Cord Prolapse

OVERT

Overt umbilical cord prolapse refers to:
Presentation of the cord in advance of the fetal presenting part, protruding through the cervical os, into the vagina, or beyond the introitus.

The membranes are usually ruptured and the cord is visible or palpable.

This is the most common form of cord prolapse.

Types of Umbilical Cord Prolapse

FUNIC

Funic or cord presentation refers to:
The umbilical cord below the presenting part.

The umbilical cord is palpated prior to rupture of membranes (ROM).

Types of Umbilical Cord Prolapse

The cause of umbilical cord prolapse is thought to be related to the flow of amniotic fluid when the membranes rupture carrying the cord past an unengaged fetal presenting part.

This can occur with spontaneous ROM or during obstetric procedures.

Cord prolapse occurs in 0.16 to 0.18 percent of live born deliveries [1 & 2 & 26].

Another reference indicates the incidence of cord prolapse has been reported occurring in 0.17 to 0.4 percent of deliveries [3 & 4].

Cause and Occurrence Rates

Pregnancy requires the health care professional to be alert to risks associated with causes for umbilical cord prolapse.

Early recognition and delivery of care can decrease the morbidity associated with this, as complications worsen with delay of resolution of cord compression and/or delivery of the fetus.

Risk Factors

Malpresentation of the Fetus

A presentation other than vertex, nonvertex, is more often associated with a higher occurrence of cord prolapsed [5-8].

Single or double footling breech presentation has a higher occurrence rate for cord prolapse than other types of breech presentation.

In a review of presentation, cord prolapse occurred in vertex 0.24%, breech 3.5%, and transverse lies 9.6% of occurrences [6].

Polyhydramnios

- Related to an unstable lie
- Unengaged presenting part [9]
- Forceful gush of the amniotic fluid after ROM [10 & 16]

Preterm Gestation

- This relates to the size of the fetus in comparison to the amount of amniotic fluid
- There are increased rates of malpresentation in this population group [7, 11, & 12]

- Birth weight less than 2500 grams
- Low birth weight <1500 grams
- Premature rupture of membranes (PROM)
  - Related to the forceful gush of fluid which carries the cord beyond the fetal presentation part which in most cases is not engaged
- Grand multiparity
  - Cord prolapse occurs with ROM as engagement of the presenting part occurs after labor has begun in this group [8]

Maternal and Fetal Risk Factors Cont'd

- Fetal male gender
- Pelvic tumors, uterine tumors, or malformations
- Placenta previa or low-lying placenta, (abnormal placentation)
  - Previa increases the occurrence of malpresentation and therefore cord prolapse
- Cephalopelvic disproportion (CPD) or pelvic deformities

Maternal and Fetal Risk Factors Cont'd

- Multiple gestation
  - Related to malpresentation of the fetus other than the first delivered [11, 12, 13, & 14]
- Fetal congenital anomalies/external fetal anomalies
- Long umbilical cord
- Unengaged presenting part

Maternal and Fetal Risk Factors Cont'd

- 50% of umbilical cord prolapse is associated with obstetic interventions [15]
- In a study of the obstetric population, augmenting labor by artificial rupture of membranes (AROM) is thought to increase rates of prolapse cord [10 & 16]
- The following interventions move the fetal presenting part from the cervix, which can allow the umbilical cord to drop down next to the fetus, cervix, vagina, or out of the vaginal introitious:
    - Balloon catheter used for cervical ripening [17]
    - Induction of labor (IOL) [18]
    - During the application of a fetal scalp electrode (FSE)
    - During the insertion of an intrauterine pressure catheter (IUPC)
    - Manual rotation of the fetal head
    - Amnioinfusion
    - External cephalic version (ECV)
    - During the application of a vacuum or forceps

RISK FACTORS

Other Risk Factors

When cord prolapse occurs an abrupt change in the fetal heart tracing may be observed.
The health care provider may see severe, prolonged fetal bradycardia or a moderate to severe variable deceleration [11 & 15].
The FHR tracing is usually normal prior to this event.
This change will be observed more often soon after membranes rupture or an obstetric intervention occurs which dislodges the fetal presenting part.

At decreased frequency, the health care provider may palpate a pulsating umbilical cord during a vaginal exam to evaluate the progress of labor or the patient will feel an overt cord prolapse.
The occult cord prolapse may or may not be confirmed at the time of a cesarean section (c/s) delivery.
In one study, at the time of cord prolapse, the mean cervical exam found the cervix 5.8cm dilated and -1.6 station [19].

Etiology

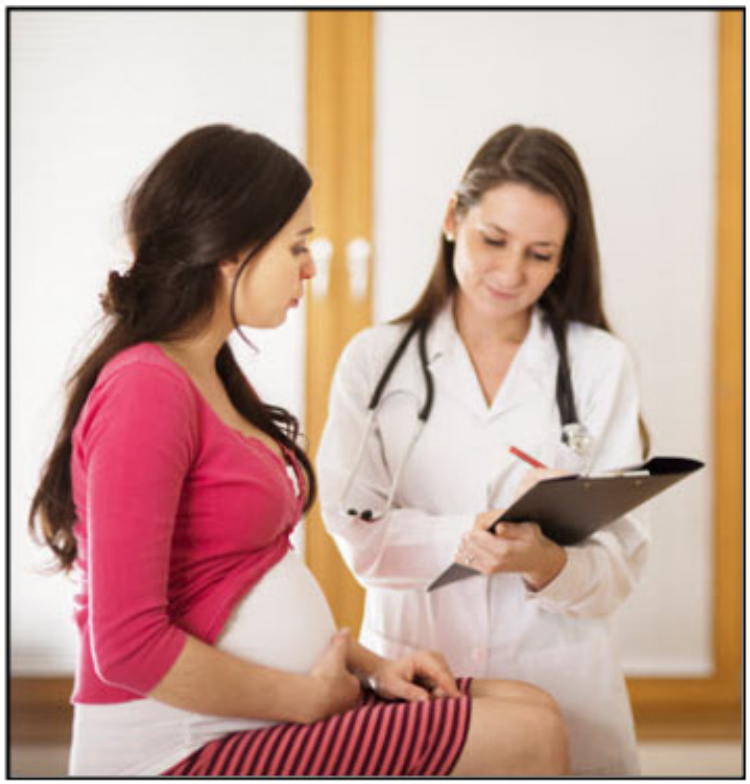
Other possible causes for FHR changes suggesting an occult cord prolapse:

- Decrease in maternal blood pressure
- Uterine tachysystole
- Placental abruption
- Uterine rupture
- Vasa previa

The clinical setting helps to distinguish these disorders from an occult prolapse:

- Fetal bradycardia following epidural anesthetic suggests maternal hypotension. When this occurs:
  - Check her blood pressure
  - Monitor FHR for improvement when mother is administered increased intravenous (IV) fluid infusion or medications, such as phenylephrine or ephedrine administration
- Vaginal bleeding is generally present with placenta abruption, vasa previa, and uterine rupture.
- Uterine rupture and abruption is also associated with pain when the laboring woman does not have epidural analgesia .
- Uterine tachysystole with FHR changes is defined by the presence of more than 5 contractions in 10 minutes. Tachysystole generally occurs in women receiving medication to induce uterine contractions [11 & 15].

Other Possible Causes of Fetal Heart Rate Changes



Women at risk for umbilical cord prolapse:

- Need to be aware of the potential for this to occur
- Understand the need for continuous fetal surveillance especially following ROM
- Be aware of positions she may need to assume to prevent compression or pressure on the cord
- Know the interventions necessary when or if this occurs

Women at Risk

The health care team providing care to pregnant women should always be alert to the risks associated with prolapse umbilical cord.

Women, who are diagnosed with a fetus in a position other than vertex, should be educated on the increased occurrence of cord prolapse and what should be done to prevent fetal asphyxia.

- This education will be discussed in the management section.

A woman with PROM or spontaneous rupture of membranes (SROM) should immediately have a vaginal examination to evaluate for prolapse and FHR evaluation for decelerations.

Planning and Prevention

If the woman is admitted to the antepartum unit, FHR monitoring is performed to evaluate for decelerations and education about the signs and symptoms of a cord prolapse.

When performing a vaginal exam, the health care provider should be focused on the presentation, station, and engagement of the fetus.

A pulsating umbilical cord may be palpated upon exam. If an overt prolapse is present, it may not be easily identified especially if the membranes are intact.

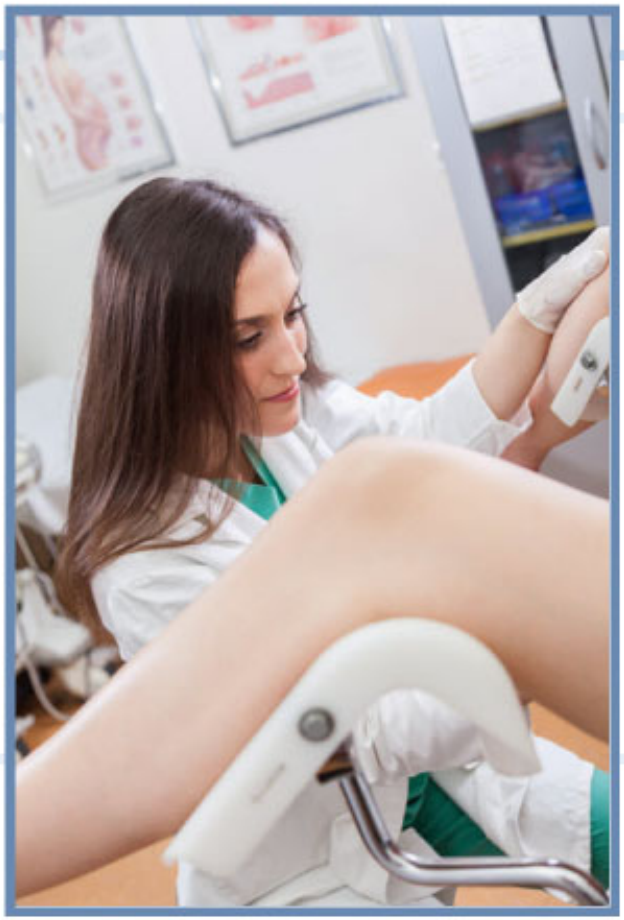
If a prolapse is suspected but not overt, confirmation may occur when a cesarean section is performed.

It is unclear if ultrasound can appropriately identify a cord prolapse as cord prolapses have occurred in women without antipartum ultrasound that identified funic presentation [20 & 21].

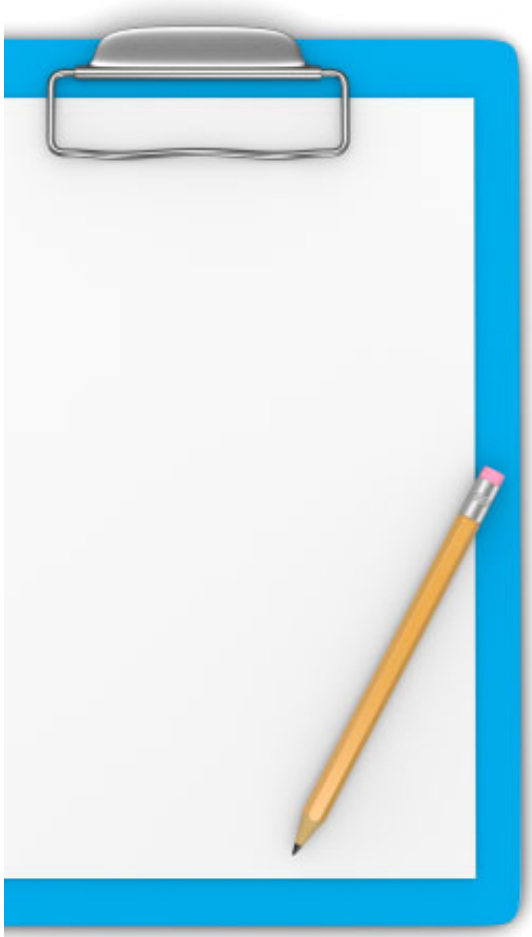
However, evidence has indicated ultrasound examination is reasonable when there is a clinical concern of funic presentation with fetal malpresentation [20, 22, 23].

Planning and Prevention Cont'd

- Women who have PROM and the fetus is in malpresentation are at increased risk of umbilical cord prolapse.
- Continuous FHR monitoring may identify those with sudden, severe, prolonged fetal bradycardia, or moderate to severe variable decelerations after a previously normal heart pattern [11 & 15].
- When an ominous FHR pattern occurs a vaginal exam should be performed immediately.
- If ROM is performed, the intervention should be performed when the fetal head is engaged and well applied to the cervix.
- If ROM is performed prior to engagement, careful controlled amniotomy is suggested with an FSE or small gauge needle to prevent a gush of amniotic fluid which may lead to a cord prolapse.



Planning and Prevention Cont'd



When performing any intervention:

- FSE application
- IUPC insertion
- Fetal scalp sampling
- Amnioinfusion
- Forceps or vacuum application
- Manual rotation of the head

The health care provider should avoid disengaging the fetal presenting part

Planning and Prevention Cont'd

Call for assistance of your team

- Nursing
- Obstetrician
- Neonatal/pediatric
- Anesthesia provider
- Operating room staff

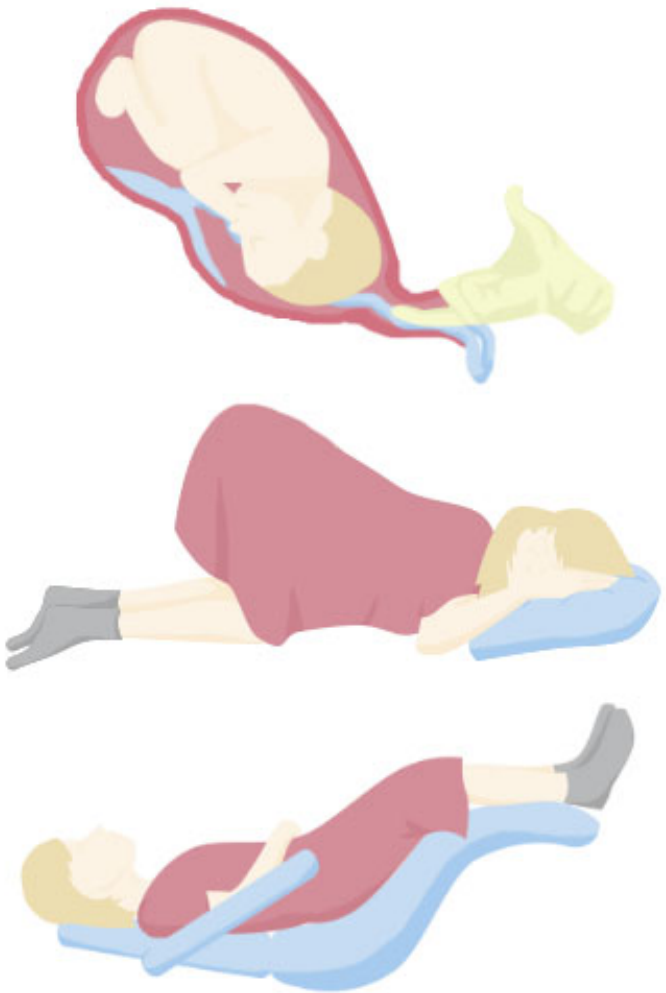
Continuous fetal monitoring is important to evaluate resuscitative efforts and should be implemented if the woman is not already on the monitor.

Initiate intrauterine resuscitation:

- Manually elevating the fetal presenting part off of the umbilical cord
- Repositioning the mother in trendelenburg or knee-chest position
- Retrofill the maternal bladder

There is no data indicating one maneuver is better than another.

Practice Approach



The most common method of reducing cord compression is manual elevation of the presenting fetal part.

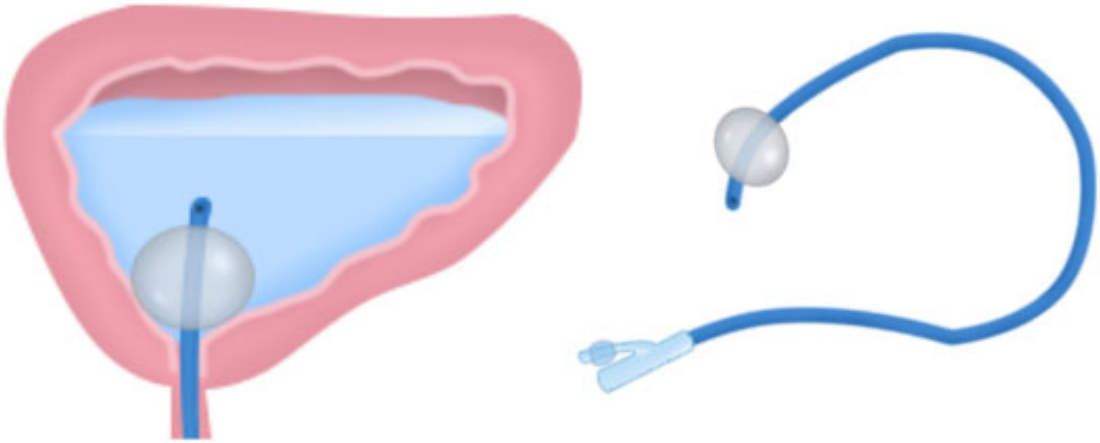
The heath care providers hand is inserted into the vagina and elevates the fetal presenting part off of the umbilical cord while preparations for delivery are made [12 & 24].

Over time this maneuver may be difficult for the health care provider and become uncomfortable for the woman.

To further assist with this maneuver, the patient's bed may be placed into Trendelenburg or she can be positioned in the knee-chest position to move the fetus off of the umbilical cord.

These maneuvers are fast, effective, and do not require special equipment.

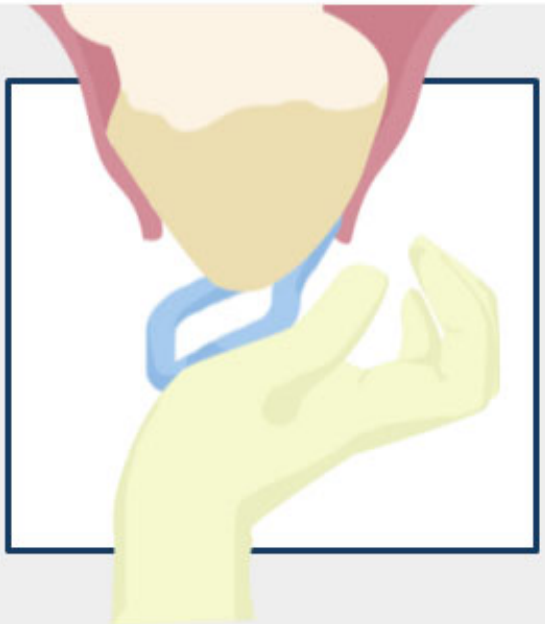
Practice Approach Cont'd



Bladder filling

- A foley catheter is inserted into the maternal bladder and filled with 500 to 700 milliliters (mL) of normal saline [25].
    - The purpose of filling the bladder is to elevate the presenting part, keeping it off of the umbilical cord, with no need for prolonged vaginal digital decompression.
    - To further reduce compression on the cord, the woman can be positioned in Trendelenburg position.
    - This procedure may be very helpful when a c/s cannot be immediately performed.

Practice Approach Cont'd



Funic reduction of the umbilical cord:

- This procedure is a controversial approach to reduction of umbilical cord prolapse.
- When the health care provider palpates the prolapsed cord, the cord can be reduced by sliding it over the fetal presenting part.
- This procedure may be initiated when a vaginal delivery is imminent, a c/s delivery is being set up, or a c/s delivery cannot be immediately performed.

During this maneuver elevation of the fetal head is accomplished by providing suprapubic pressure or transvaginal pressure or both and then sliding the cord over the vertex into the nuchal area [29].

Practice Approach Cont'd

Tocolysis

- Administration of a tocolytic medication may be useful if considering
  - Funic decompression
  - Fetal bradycardia persists
  - Delivery is not imminent
- Tocolysis relaxes the uterus and decreases the occurrence of contractions
- May perform bladder filling with tocolysis

Reduce handling of the umbilical cord and avoid exposure to the cold environment, both of which may cause spasm of the umbilical artery and further decrease perfusion.

The umbilical cord may be placed into the vagina and kept moist with a wet gauze to reduce spasm.

Overt cord prolapse requires prompt delivery to prevent or avoid fetal compromise.

Cesarean delivery may be the optimal mode; however, a vaginal delivery may occur if the health care provider's judgment is that the fetus can deliver safely and in a rapid manner compared to cesarean [26].

Overt Cord Prolapse Management

The type of anesthesia provided is dependent on the current treatment and the urgency of the birth; category I, II, or III tracing.

If a catheter is already in place:

neuraxial anesthesia may be administered

If a catheter is not in place:

general anesthesia may be more rapidly administered

If the FHR is present prior to moving to the operating room:

there should not be a delay in surgery to recheck the rate as a c/s will be performed regardless to the findings

Intrauterine resuscitation maneuvers may resolve the occult prolapse and lead to a Category I or II tracing.

If no improvement in FHR an alternative diagnosis may be considered for a Category III tracing.

The decision to proceed with an emergent C/S delivery will be based upon the FHR tracing.

Occult Cord Prolapse Management

CORD PROLAPSE MANAGEMENT

- Management is the same as that for the laboring woman.
- If there is no FHR an emergency c/s will not occur as successful neonatal resuscitation is not possible after a prolonged period of asystole.
- Women should be educated on the possibility of cord prolapse occurring with PROM outside of the hospital setting.
- Women should be instructed to call for help and position in the knee-chest face-down position or lie with hips elevated above her heart while waiting for an ambulance to arrive.
- In a report of cord prolapse occurring outside of the hospital setting, 3 of 7 occurrences resulted in fetal/neonatal death compared to no deaths among 70 in hospital occurrence [8].

- There is limited data on conservative management of ROM and overt cord prolapse at a previable gestation age.
- Standard obstetrical management of cord prolapse is prompt cesarean delivery to avoid fetal compromise or death from compression of the cord.
- However, vaginal delivery may be a reasonable option in select cases when delivery is imminent and can be safely assisted.

Previable Cord Prolapse Management

On a labor and delivery unit, 0 to 3% of mortality events are related to cord prolapse [12].

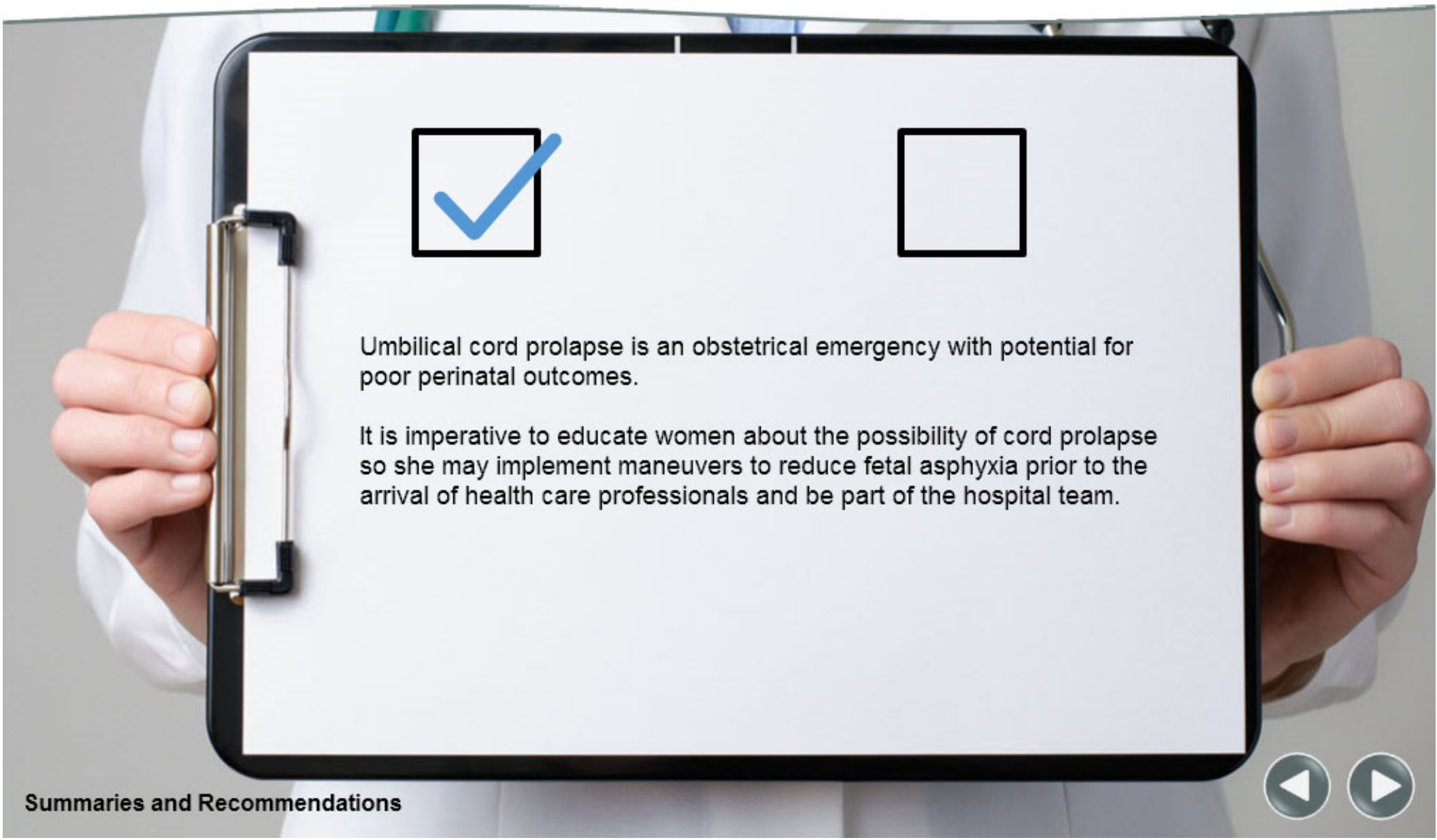
Prematurity, asphyxia and congenital anomalies are associated with mortality from cord prolapse [12].

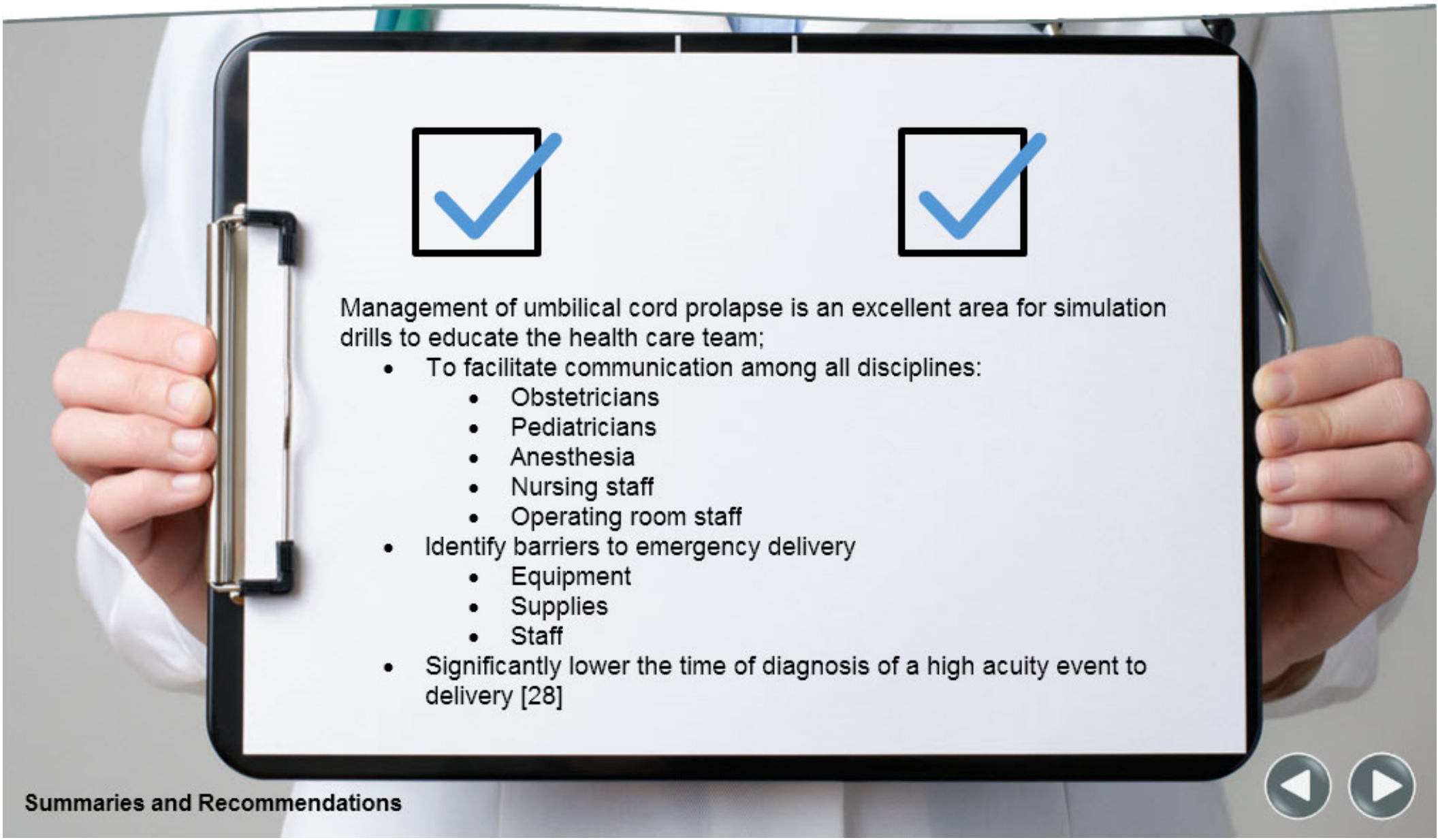
The degree of umbilical cord compression, the time between cord prolapse and delivery of the fetus, and successful use of intrauterine resuscitation maneuvers all impact the risk of asphyxia [14].

Neonatal complications occur more often in infants less than 32 weeks gestation [15].

Perinatal mortality rates of 38 to 40 percent are associated with cord prolapse occurring outside of the hospital setting [27].

Complications


MATERNAL911
Umbilical cord prolapse is an obstetrical emergency with potential for poor perinatal outcomes.
It is imperative to educate women about the possibility of cord prolapse so she may implement maneuvers to reduce fetal asphyxia prior to the arrival of health care professionals and be part of the hospital team.
Summaries and Recommendations


MATERNAL911
Management of umbilical cord prolapse is an excellent area for simulation drills to educate the health care team;
To facilitate communication among all disciplines:
Obstetricians
Pediatricians
Anesthesia
Nursing staff
Operating room staff
Identify barriers to emergency delivery
Equipment
Supplies
Staff
Significantly lower the time of diagnosis of a high acuity event to delivery [28]
Summaries and Recommendations

Congratulations!

You have successfully completed this module.

Click on the above 'X' to take the post-test for this course. If you do not attain a passing score after two attempts at the post-test the entire program must be repurchased.

References

1. Gannard-Pechin, E., Ramanah, R., Cossa, S., Mulin, B., Maillet, R., & Riethmuller, D. Umbilical cord prolapse: a case study over 23 years. J Gynecol Obstet Biol Reprod (Paris). 2012;41(6):574.

2. Gibbons, C., O'Herlihy, C., & Murphy, J. F. Umbilical cord prolapse--changing patterns and improved outcomes: a retrospective cohort study. BJOG. 2014 Dec;121(13):1705-8. Epub 2014 June 16.

3. Woo, J. S., Ngan, Y. S., & Ma, H. K. Prolapse and presentation of the umbilical cord. Aust N Z J Obstet Gynaecol 1983;23(3):142-5.

4. Kahana, B., Sheiner, E., Levy, A., Lazer, S., & Mazor, M. Umbilical cord prolapse and perinatal outcomes. Int J Gynaecol Obstet 2004;84(2):127-32.

5. Koonings, P. P., Paul, R. H., & Campbell, K. Umbilical cord prolapse. A contemporary look. Reprod Med. 1990;35(7):690.

6. Barclay, M. Umbilical cord prolapse and other cord accidents. In: Gynecology and Obstetrics, Sciarra JJ (Ed), JB Lippincott, Philadelphia 1989. p.1.

7. Ylä-Outinen, A., Heinonen, P. K., & Tuimala, R. Predisposing and risk factors of umbilical cord prolapse. Acta Obstet Gynecol Scand. 1985;64(7):567.

8. Uygur, D., Kis, S., Tuncer, R., Ozcan, F. S., & Erkaya, S. Risk factors and infant outcomes associated with umbilical cord prolapse. Int J Gynaecol Obstet. 2002;78(2):127.

9. Kahana, B., Sheiner, E., Levy, A., Lazer, S., & Mazor, M. Umbilical cord prolapse and perinatal outcomes. Int J Gynaecol Obstet. 2004;84(2):127.

References

10. Gabbay-Benziv, R., Maman, M., Wiznitzer, A., Linder, N., & Yogev, Y. Umbilical cord prolapse during delivery, risk factors and pregnancy outcome: a single center experience. J Matern Fetal Neonatal Med. 2014;27(1):14.

11. Koonings, P. P., Paul, R. H., & Campbell, K. Umbilical cord prolapse. A contemporary look. J Reprod Med. 1990;35(7):690.

12. Murphy, D. J., & MacKenzie, I. Z., The mortality and morbidity associated with umbilical cord prolapse. Br J Obstet Gynaecol. 1995;102(10):826.

13. Critchlow, C. W., Leet, T. L., Benedetti, T. J., & Daling, J. R., Risk factors and infant outcomes associated with umbilical cord prolapse: a population-based case-control study among births in Washington State. Am J Obstet Gynecol. 1994;170(2):613.

14. Qureshi, N. S., Taylor, D. J., & Tomlinson, A. J. Umbilical cord prolapse. Int J Gynaecol Obstet. 2004;86(1):29.

15. Usta, I. M., Mercer, B. M., & Sibai, B. M. Current obstetrical practice and umbilical cord prolapse. Am J Perinatol. 1999;16(9):479.

16. Smyth, R. M., Markham, C., & Dowswell, T. Amniotomy for shortening spontaneous labour. Cochrane Database Syst Rev. 2013 Jun;6.

17. Hasegawa, J., Sekizawa, A., Ikeda, T., Koresawa, M., Ishiwata, I., Kawabata, M., & Kinoshita, K., Group: Japan Association of Obstetricians and Gynecologists. The use of balloons for uterine cervical ripening is associated with an increased risk of umbilical cord prolapse: population based questionnaire survey in Japan. BMC Pregnancy Childbirth. 2015;15:4.

18. Boyle, J. J., & Katz, V. L. Umbilical cord prolapse in current obstetric practice. J Reprod Med. 2005;50(5):303.

References

19. Roberts, W. E., Martin, R. W., Roach, H. H., Perry, K. G. Jr., Martin, J. N. Jr., & Morrison, J. C. Are obstetric interventions such as cervical ripening, induction of labor, amnioinfusion, or amniotomy associated with umbilical cord prolapse? Am J Obstet Gynecol. 1997;176(6):1

20. Lange, I. R., Manning, F. A., Morrison, I., Chamberlain, P. F., Harman, C. R. Cord prolapse: is antenatal diagnosis possible? Am J Obstet Gynecol. 1985;151(8):1083.

21. Ezra, Y., Strasberg, S. R., Farine, D. Does cord presentation on ultrasound predict cord prolapse? Gynecol Obstet Invest. 2003;56(1):6.

22. Raga, F., Osborne, N., Ballester, M. J., Bonilla-Musoles, F. Color flow doppler: a useful instrument in the diagnosis of funic presentation. J Natl Med Assoc. 1996;88(2):94.

23. Kinugasa, M., Sato, T., Tamura, M., et al. Antepartum detection of cord presentation by transvaginal ultrasonongraphy for term breech presentation: potential prediction and prevention of cord prolapsed. J Obstet Gynaecol Res 2007; 33:612.

24. Duval, C., Lemoine, J. P., Ba, S., Demory, J. E. Prolapse of the umbilical cord, 79 cases. Rev Fr Gynecol Obstet. 1987 Mar;82(3):163-7.

25. Vago, T. Prolopse of the umbilical cord: a method of management. Am J Obstet Gynecol. 1970 Jul;107(6):967-9.

26. Behbehani S, Patenaude V, Abenhaim HA. Maternal Risk Factors and Outcomes of Umbilical Cord Prolapse: A Population-Based Study. PJ Obstet Gynaecol Can. 2016 Jan; 38(1):23-8.

27. Lin, M. G. Umbilical cord prolapse. Obstet Gynecol Surv. 2006 Apr;61(4):269-77.

28. Siassakos, D., Hasafa, Z., Sibanda, T., Fox, R., Donald, F., Winter, C., Draycott, T. Retrospective cohort study of diagnosis-delivery interval with umbilical cord prolapse: the effect of team training. BJOG. 2009;116(8):1089.

29. Barrett J. M. Funic reduction for the management of umbilical cord prolapse. Am J Obstet Gynecol. 1991;165(3):654.