MATERNAL911®

Umbilical Cord Prolapse

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Course Description:

Will the next patient you care for have an umbilical cord prolapse? The measures implemented immediately after an umbilical cord prolapse occurs may help to save the fetus. This module will help the participant understand and implement the actions needed for the best possible outcome. The knowledge gained will help communication with other providers, the patient, and her family.

Approximate Time to Complete: 45 minutes

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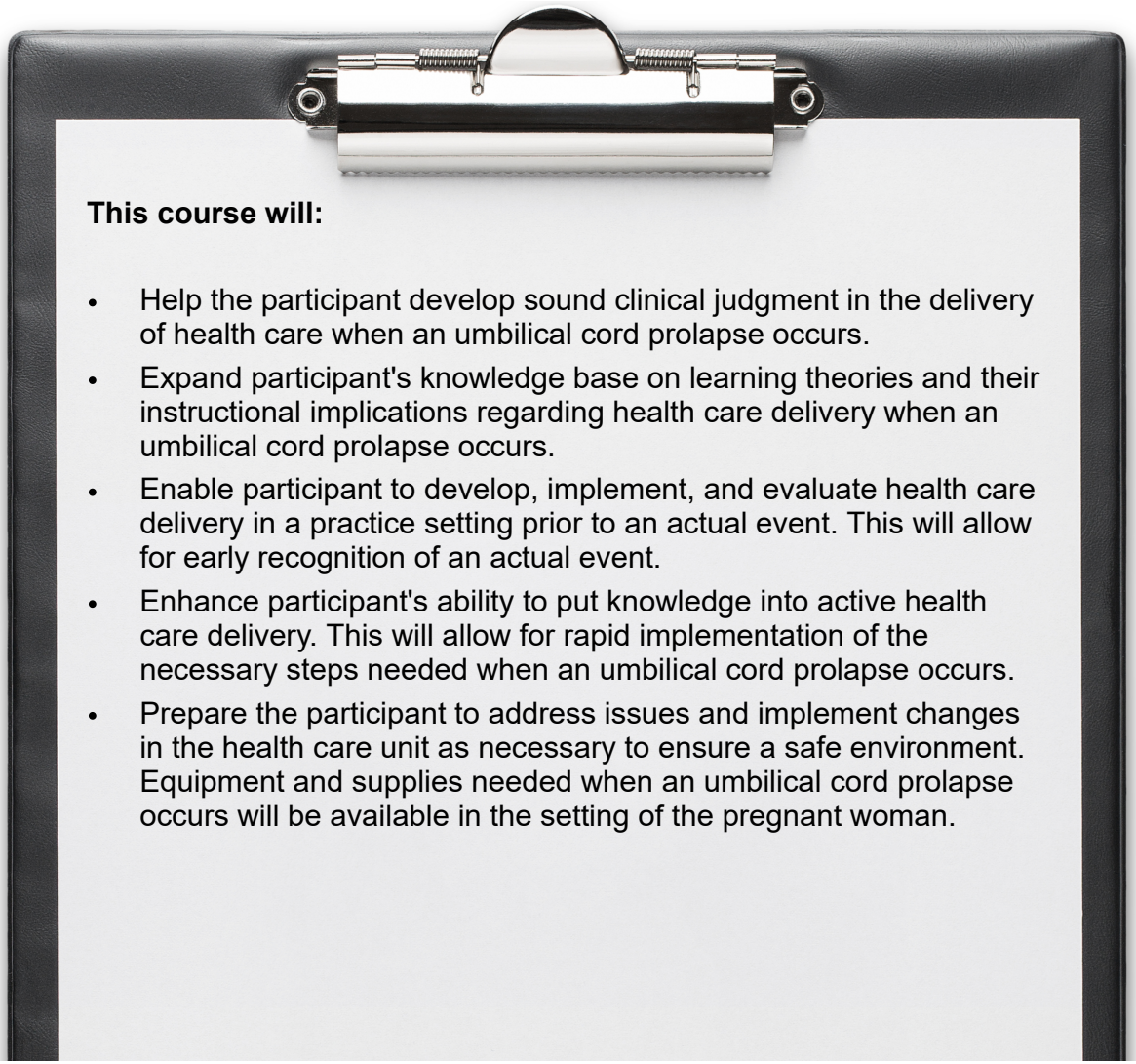

This course will:

- Help the participant develop sound clinical judgment in the delivery of health care when an umbilical cord prolapse occurs.
- Expand participant's knowledge base on learning theories and their instructional implications regarding health care delivery 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 when an umbilical cord prolapse occurs.
- Prepare the 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 available in the setting of the pregnant woman.

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

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

Click the images to learn more.

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.

Click the images to learn more.

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.

Click the images to learn more.

FUNIC

Funic Presentation refers to:

Typically transient and rare at term.

The umbilical cord is the presenting part.

May be detected by ultrasound or by palpation of the cord upon digital cervical exam prior to rupture of membranes.

If rupture of membranes occurs in the setting of funic presentation, there is extremely high risk for 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 rupture of membranes (ROM) or during obstetric procedures.

Cord prolapse occurs in 1-6 per 1000 of live born deliveries [1, 2, 20, 22].

With increased use of ultrasound in the third trimester, the rate of umbilical cord prolapse is decreasing [22].

It is a potentially devastating obstetric complication with 6-10% risk of perinatal mortality [3].

Health care professionals should be alert to risk factors for umbilical cord prolapse during the pregnancy, and particularly, during labor.

Early recognition and management of umbilical cord prolapse has the potential to decrease the fetal morbidity and mortality associated with this complication.

Risk Factors for Cord Prolapse

Malpresentation of the Fetus

A presentation other than vertex is associated with a higher occurrence of cord prolapse [5-8].

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

Cord prolapse occurs in vertex 0.24%, breech 3.5%, and transverse lie 9.6% [6].

Polyhydramnios

- Increased risk relates to an unstable lie and unengaged presenting part [9].
- Forceful gush of the amniotic fluid after ROM [10, 16].

Multiparity

- Increased risk is due to the fact that engagement of presenting part typically occurs after onset of labor [8].

Preterm Gestation

- Increased risk is attributed to small fetal size relative to amount of amniotic fluid and increased rates of fetal malpresentation [7, 11, 12].

Additional Risk Factors

- Multiple gestation
  - Particularly after delivery of first baby [11-14]
- External cephalic version
- Amniotomy
- Fetal congenital anomalies
- Long umbilical cord
- Unengaged presenting part

RISK FACTORS

- Obstetric interventions are associated with the occurrence of 50% of umbilical cord prolapses [11-16].
- The following interventions potentially moves the fetal presenting part from the cervix, which can allow the umbilical cord to prolapse next to the fetus, cervix, vagina, or out of the vaginal introitus:
  - Balloon catheter used for cervical ripening [16]
  - Induction of labor (IOL) [17]
  - Application of an internal scalp electrode
  - Insertion of an intrauterine pressure catheter (IUPC)
  - Manual rotation of the fetal head
  - Amnioinfusion
  - External cephalic version (ECV)
  - Application of a vacuum or forceps
  - Internal podalic version
- It is often difficult to determine whether prolapse would have occurred spontaneously if the intervention had not been performed [18].

Women at risk for umbilical cord prolapse:

- Should be counseled on this possible complication
- 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

Intrapartum Management

When women are admitted to Labor & Delivery, FHR monitoring is typically performed to monitor fetal status throughout labor. If risk factors are present, the woman should be counseled on signs and symptoms of cord prolapse.

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

If any cervical exam demonstrates concern for funic presentation or occult cord prolapse by palpation of a pulsating structure, no other interventions should be performed until the diagnosis is confirmed.

Consideration should be given for performing a bedside ultrasound to evaluate fetal presentation and location of the umbilical cord. [20, 22, 23].

- Performing artificial rupture of membranes (AROM) is one of the highest risk interventions for cord prolapse.
- When performing AROM, the intervention should be performed when the fetal head is engaged and well applied to the cervix.
- If AROM is attempted prior to fetal engagement or in the setting of polyhydramnios, controlled amniotomy is suggested with the use of fetal scalp electrode (FSE) or small gauge needle. At the time of AROM, the risk of prolapse can be reduced by application of fundal pressure by an assistant, which helps move the fetal presenting part into the maternal pelvis.

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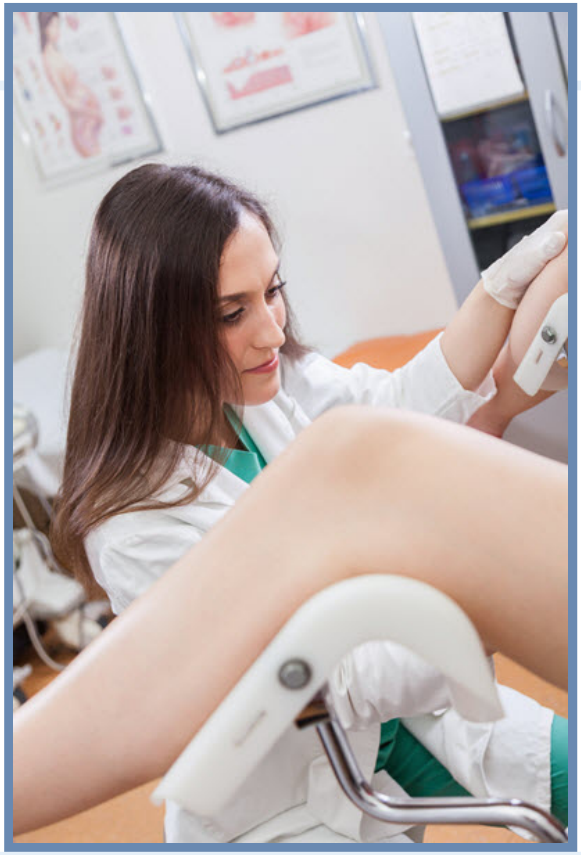
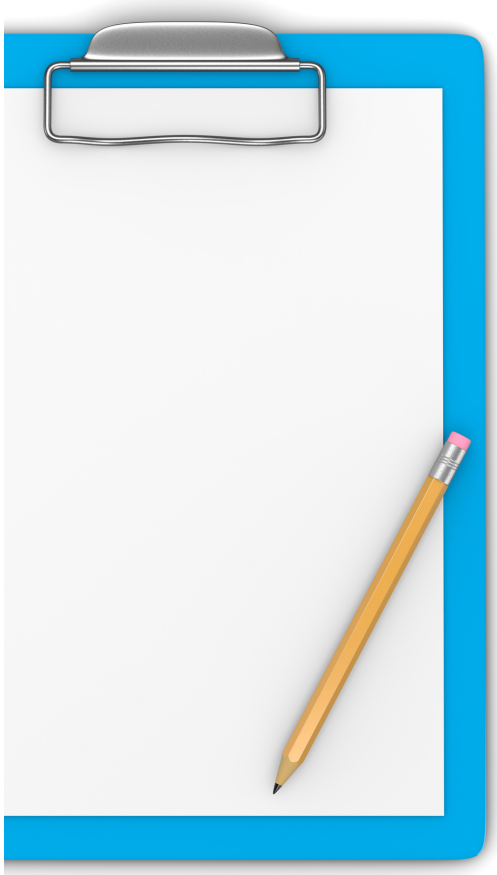




When performing any intervention:

- 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.

Diagnosis of Cord Prolapse

When cord prolapse occurs, an abrupt change in the fetal heart tracing may be observed.

The health care provider may see abrupt onset of fetal bradycardia or recurrent decelerations [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 [11,15].

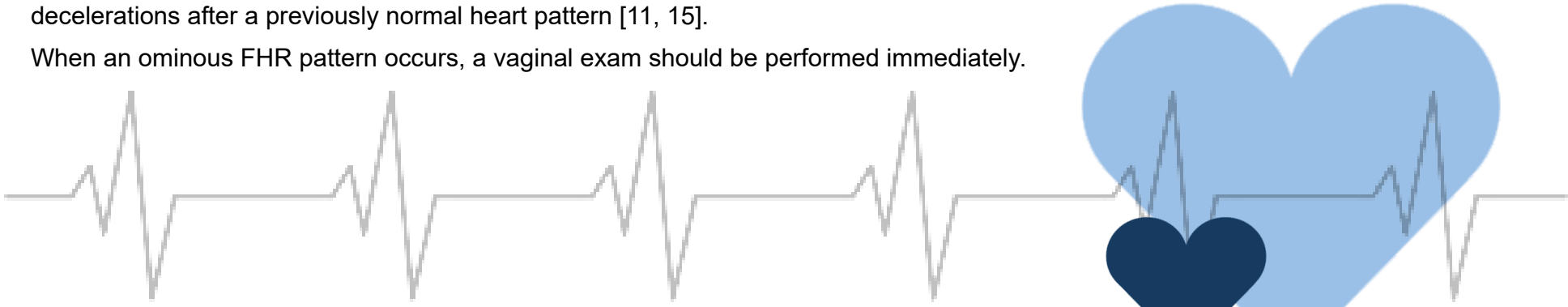
If abrupt fetal heart rate changes are noted, a cervical exam should be performed. A cord prolapse is diagnosed by palpation or visualization of the umbilical cord at the level of the cervix, beyond the presenting fetal part.

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.

In one study, at the time of cord prolapse, the mean cervical exam found the cervix 5.8 cm dilated and -1.6 station [19].

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.



Alternative etiologies for fetal heart changes should be considered and managed.

- Rapid progression of labor
- Recent epidural placement
  - Check maternal blood pressure
  - Administer intravenous (IV) fluids and/or medications such as phenylephrine or ephedrine with assistance of anesthesia
- Vaginal bleeding
  - Raises concern for possible cervical change, placental abnormality, abruption or uterine rupture
  - Abruption or uterine rupture may be suggested if level of pain is acutely different
- Uterine tachysystole
  - Defined as more than 5 contractions in 10 minutes averaged over a 30 minute time period.
  - Discontinue pitocin, if applicable [11,16]

Management of Umbilical Cord Prolapse

Manually replace the prolapsed cord.

Call for assistance of your team.

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

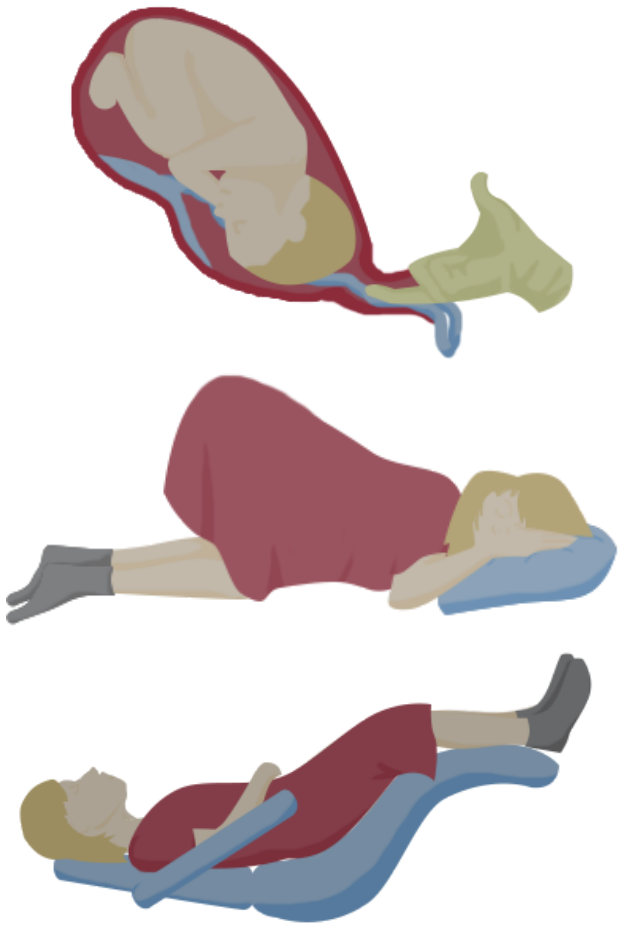
Continuous fetal monitoring is important to evaluate resuscitative efforts and should be implemented if the woman is not already on the monitor.

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
- Discontinue pitocin, if applicable, and consider administration of a tocolytic

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

Unless vaginal delivery is imminent, move to the operating room for urgent cesarean section.



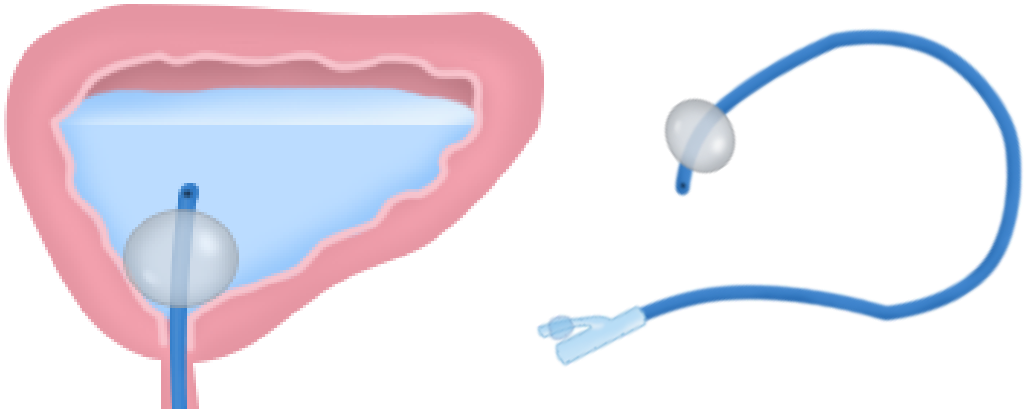
Management of Umbilical Cord Prolapse

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, 21].

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.

Knee-chest has been shown to be one of the most effective methods because it can be executed quickly, can be maintained by the patient independently and its elevation effect is not affected by fetal station [3].



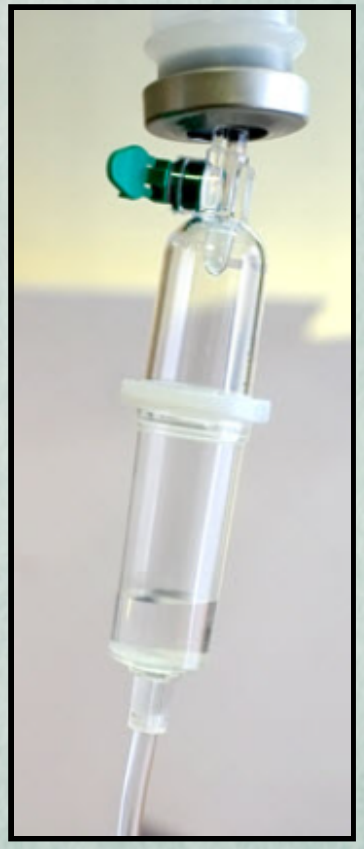
Bladder Filling

- A foley catheter is inserted into the maternal bladder and filled with 500 to 700 milliliters (mL) of normal saline [20].
- Studies have shown that filling the bladder with 500 mL elevates the fetal presenting part by 2 stations [3].
- 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.
- In addition, to further reduce compression on the cord, the woman can be positioned in Trendelenburg position with the catheter in place.
- This procedure may be very helpful when a cesarean delivery cannot be immediately performed.

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 [24].



Tocolysis [3]

- Use of tocolytics in this setting is controversial, but may be considered in the following scenarios:
  - Attempted funic decompression
  - Persistent fetal bradycardia
  - Long time interval until delivery can be accomplished
- Benefits of administering tocolytics may include easier manual fetal elevation and less risk of further prolapse.
- Tocolytic Options
  - Terbutaline 250 mcg subcutaneously every 20 minutes or more, hold for pulse >120 beats per minute.
  - Nifedipine 10 mg IR sublingually.
    - Can administer 10 mg q 15 minutes for 4 doses as needed if long delivery interval is anticipated
- Use tocolytics with caution if postpartum hemorrhage risk is elevated
- May perform bladder filling with tocolysis. Both bladder filling and a tocolytic drug appeared to be beneficial: there were no fetal or neonatal deaths despite a mean interval from diagnosis to delivery of 35 minutes; the majority of infants had Apgar scores ≥7 at five minutes [4].

Overt Cord Prolapse Management

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 warm and moist with a wet gauze to reduce spasm.

Overt cord prolapse requires prompt delivery to prevent fetal compromise.

Cesarean delivery is recommended unless vaginal delivery is imminent [22].

The type of anesthesia provided is dependent on the mode of delivery and fetal heart rate tracing: Category I, II or III tracing.

If an epidural catheter is already in place:

Attempt to bolus to achieve surgical anesthesia

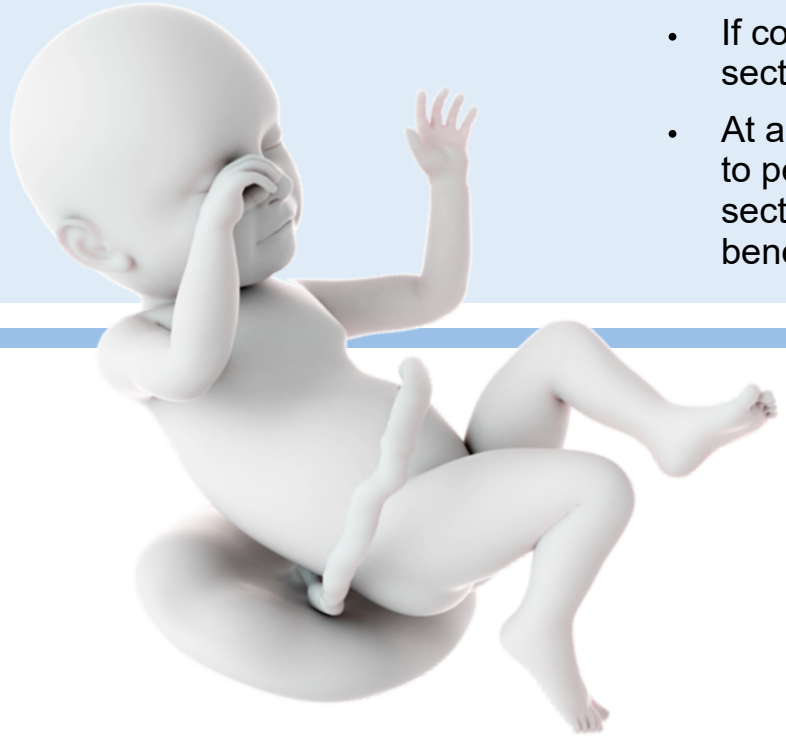
If a catheter is not in place:

General anesthesia is recommended

CORD PROLAPSE MANAGEMENT AT HOME

- 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 lay 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 occurrences in hospitals [8].

Click each circle to see more information.



- If cord prolapse occurs at a previable gestational age, cesarean section is not recommended.
- At any gestational age, if fetal demise occurs prior to the ability to perform a cesarean section, proceeding with cesarean section is no longer recommended due to lack of neonatal benefit.

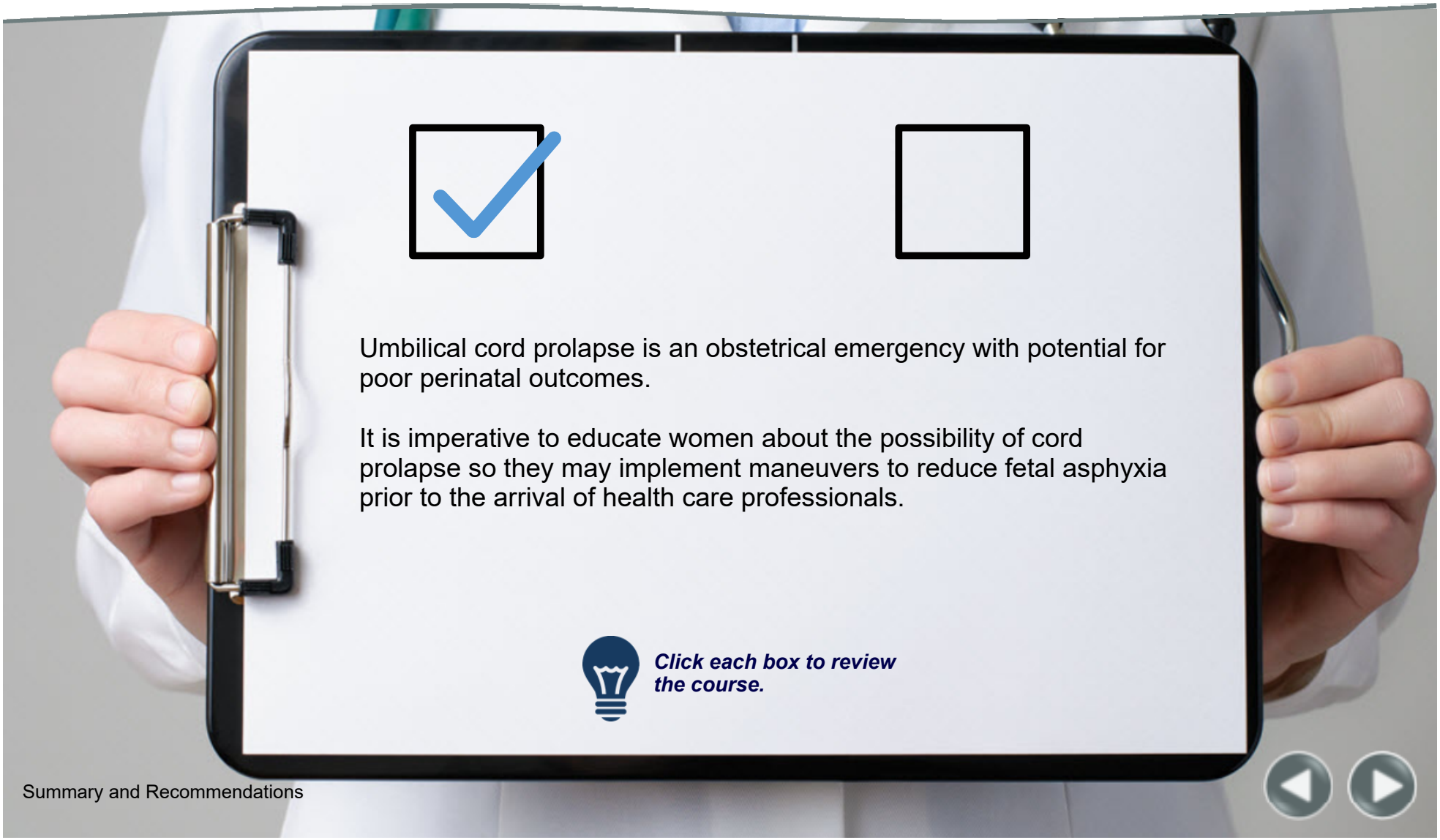
On a labor and delivery unit, 0 to 3% of mortality events are related to cord prolapse [12].

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 44% are associated with cord prolapse occurring outside of the hospital setting [23].



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 they may implement maneuvers to reduce fetal asphyxia prior to the arrival of health care professionals.

Click each box to review the course.

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
- To identify barriers to emergency delivery:
  - Equipment
  - Supplies
  - Staff
  - Significantly lower the time of diagnosis of a high acuity event to delivery [24]

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.

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