



Core Topic 3: Uterotonic drugs

Key definitions

Tonic or tetanic contractions: Continuous contractions with no relaxation.

Uterotonics: Substances that stimulate uterine contractions or increase uterine tone. Uterotonics include:

Oxytocin (the most commonly used uterotonic drug): Oxytocin is secreted naturally by the posterior pituitary during later pregnancy, labor, and when the baby breastfeeds. Synthetic forms of oxytocin can be found in products such as Pitocin[®] and Syntocinon[®]. In moderate doses, oxytocin produces slow, generalized contractions of the muscles of the uterus with full relaxation in between. High doses of oxytocin produce sustained tonic contractions that can be dangerous.

Ergot-based compounds (another class of uterotonic drugs): Methergine[®] (methylergonovine maleate) and ergometrine (ergometrine maleate) are the ergot preparations used today. They cause tetanic (continuous) contractions of the uterus and may cause or exacerbate high blood pressure.

Syntometrine (a combination of oxytocin and ergometrine maleate): Syntometrine has both the fast-acting quality of oxytocin and the tetanic contraction action of ergometrine.

Prostaglandins (naturally occurring fatty acids found in the uterus, menstrual fluids, and amniotic fluid): Misoprostol, an E₁ analog prostaglandin, is used for a range of obstetric and gynecologic purposes such as cervical ripening, induction of labor, prevention and treatment of PPH, and post-abortion care.

Use of uterotonics

Uterotonics act directly on the smooth muscle of the uterus and increase the tone, rate, and strength of rhythmic contractions. The body produces a natural uterotonic—the hormone oxytocin—that acts to stimulate uterine contractions at the start of labor and throughout the birth process.

Drugs such as oxytocin, ergometrine, and misoprostol have strong uterotonic properties and are used to treat uterine atony and reduce the amount of blood lost after childbirth. Oxytocin is widely used for induction and augmentation of labor. The use of a uterotonic drug immediately after the delivery of the newborn is one of the most important actions used to prevent PPH.

Improper use of uterotonic drugs

Uterotonic drugs (**oxytocin or misoprostol**) are sometimes used to induce or augment labor. When labor is augmented with a uterotonic drug, the quality and quantity of uterine contractions are greatly affected. The contractions tend to be longer and stronger, and have shorter relaxation periods between each. While augmentation with uterotonic drugs plays a major role in managing unsatisfactory progress of labor due to inadequate or ineffective uterine contractions, **improper use of uterotonics results in grave risks for the woman**, including:

- Umbilical cord compression and subsequent decrease in the baby's oxygen supply (occurs with the increased pressure of contractions).
- Uterine rupture and abruptio placentae.
- Increased pain of the uterotonic-induced contractions, which will likely increase the woman's stress and anxiety levels.
- Water intoxication that results when oxytocin—a strong anti-diuretic, even at low doses—is combined with intravenous (IV) fluids.
- Uterine fatigue after childbirth (associated with uterine atony and PPH).

Before deciding to augment labor, the provider should carefully assess the woman and fetus and evaluate the partograph. Labor should be augmented only if:

- Clear emergency or obstetric conditions are present, and
- Health care personnel familiar with the effects of uterotonics and able to identify both maternal and fetal complications are present, and
- A physician is readily available to perform a cesarean delivery should complications arise.

Never administer oxytocin intramuscularly (IM) during labor. If oxytocin is used for labor augmentation, it should be administered by controlled IV drip in a health facility that has an operating theater and qualified physician to perform an emergency caesarean operation. Always follow local guidelines or protocols for uterotonic dosages for labor induction and augmentation.

When 25 mcg tablets of misoprostol are not available, do not break higher dose tablets (usually 200 mcg) and administer for induction or augmentation. When 200 mcg tablets are broken, the exact dose of misoprostol being given to the woman is not reliable and could be dangerous. If more than 25 mcg of misoprostol is administered during labor, this could cause a uterine rupture and / or the death of the baby.



Uterotonic drugs used for AMTSL

Table 3 compares dosage, route of administration, drug action and effectiveness, side effects, and cautions for the most common uterotonic drugs used for AMTSL.

Table 3. Uterotonic drugs for AMTSL

Name of drug/preparation	Dosage and route	Drug action and effectiveness	Side effects and cautions
Oxytocin Posterior pituitary extract. Commonly used brand names include Pitocin or Syntocinon.	Give 10 units IM injection.*	<ul style="list-style-type: none"> Acts within 2 to 3 minutes. Effect lasts about 15 to 30 minutes. 	<ul style="list-style-type: none"> First choice. No known contraindications for postpartum use.** Minimal or no side effects.
Misoprostol Synthetic prostaglandin E ₁ (PGE ₁) analogue. Commonly used brand names include Cytotec, Gymiso, Prostokos, Vagiprost, U-Miso	Give 600 mcg (three 200 mcg tablets) orally.	Orally: <ul style="list-style-type: none"> Acts within 6 minutes. Peak serum concentration between 18 and 34 minutes. Effect lasts 75 minutes. 	<ul style="list-style-type: none"> No known contraindications for postpartum use.** Common side effects: shivering and elevated temperature.
Ergometrine (methylergometrine), also known as ergonovine (methylergonovine) Preparation of ergot (usually comes in dark brown ampoule). Commonly used brand names include Methergine, Ergotrate, Ergotrate Maleate	Give 0.2 mg IM injection.	<ul style="list-style-type: none"> Acts within 6 to 7 minutes IM. Effect lasts 2 to 4 hours. 	<ul style="list-style-type: none"> Contraindicated in women with a history of hypertension, heart disease, retained placenta, pre-eclampsia, or eclampsia.*** Causes tonic contractions (may increase risk of retained placenta). Side effects: nausea, vomiting, headaches, and hypertension. <p>Note: Do not use if drug is cloudy. This means it has been exposed to excess heat or light and is no longer effective.</p>
Syntometrine Combination of 5 IU oxytocin plus 0.5 mg ergometrine.	Give 1 ml IM injection.	Combined rapid action of oxytocin and sustained action of ergometrine.	<ul style="list-style-type: none"> Same cautions and contraindications as ergometrine. Side effects: nausea, vomiting, headaches, and hypertension.

*If a woman has an IV, an option may be to give her 5 IU of oxytocin by slow IV push.

**This is intended as a guide for using these uterotonic drugs during the third stage of labor. Different guidelines apply when using these uterotonic drugs at other times or for other reasons.

***Lists of contraindications are not meant to be complete; evaluate each client for sensitivities and appropriateness before use of any uterotonic drug. Only some of the major postpartum contraindications are listed for the above drugs.

IM - intramuscular; IV - intravenous

Comparison of uterotonic drugs for AMTSL

Oxytocin is fast-acting, inexpensive, and in most cases, has no side effects or contraindications for use during the third stage of labor. Oxytocin is also more stable than ergometrine in hot climates and light (when cold/dark storage is not possible). WHO recommends **oxytocin as the drug of choice for AMTSL** and advises that ergometrine, syntometrine, or misoprostol be used only when oxytocin is not available.

WHO recommends oxytocin as the drug of choice for AMTSL.

Misoprostol is a synthetic prostaglandin E₁ (PGE₁) analogue and is an alternative drug for AMTSL and directions on its use for AMTSL is included in the International Federation of Gynaecology and Obstetrics (FIGO)/International Confederation of Midwives (ICM) statement, *Prevention and Treatment of Post-partum Haemorrhage: New Advances for Low Resource Settings*. Oxytocin is the uterotonic of choice for AMTSL;¹⁸ however, administration of an injection requires skills and sterile equipment for safe administration. Oxytocin may be inactivated if exposed to high ambient temperatures.¹⁹

Misoprostol is reportedly more stable than oxytocin and has been administered by oral, sublingual and rectal routes in several studies.¹³ Oral misoprostol is being viewed as an alternative drug for AMTSL for women delivering in low-resource settings where oxytocin and a skilled birth attendant may not be available and as a PPH treatment when used in combination with other uterotonics. It has also been suggested that providers can provide misoprostol tablets where oxytocin is not available²⁰ to non-skilled providers²¹ and to women themselves for the prevention of PPH.²²

Oxytocin in the Uniject™ device—a prefilled, easy-to-use, non-reusable syringe—is an advance in the method of delivering oxytocin and is currently being used in pilot studies (Figure 5). This delivery method ensures the correct dose is given with little preparation and medical waste. The benefits of this device may improve the ability of midwives and other health workers to administer oxytocin outside of hospital facilities, in emergencies, or in remote locations. Appendix B contains information on activating and using the Uniject™ device.



Figure 5. Uniject™ device



Recommendations for selection of a uterotonic drug for prevention of PPH

In the context of active management of the third stage of labor, if all injectable uterotonic drugs are available:

- Skilled attendants should offer oxytocin to all women for prevention of PPH in preference to ergometrine/methylergometrine.

This recommendation places a high value on avoiding adverse effects of ergometrine and assumes similar benefit for oxytocin and ergometrine for preventing PPH²³.

- Skilled attendants should offer oxytocin for prevention of PPH in preference to oral misoprostol (600 mcg).

This recommendation places a high value on the relative benefits of oxytocin in preventing blood loss compared to misoprostol, as well as the increased adverse effects of misoprostol compared to oxytocin.²³

In the context of active management of the third stage of labor, if oxytocin is not available but other injectable uterotonics are available:

- Skilled attendants should offer ergometrine/methylergometrine or the fixed drug combination of oxytocin and ergometrine to women without hypertension or heart disease for prevention of PPH.²³
- Skilled attendants should offer 600 micrograms (mcg) misoprostol orally for prevention of PPH to women with hypertension or heart disease for prevention of PPH.

In the context of prevention of PPH, if oxytocin is not available or birth attendants' skills are limited, misoprostol should be administered soon after the birth of the baby²⁴. The usual components of giving misoprostol include:

- Administration of 600 micrograms (mcg) misoprostol orally after the birth of the baby
- Controlled cord traction ONLY when a skilled attendant is present at the birth
- Uterine massage after the delivery of the placenta as appropriate.

Keeping uterotonic drugs effective

The stability of a drug is defined by how well it maintains active ingredient potency (and other measures such as pH) when stored over time. Pharmaceutical companies conduct stability studies to determine the appropriate shelf-life, storage conditions, and expiration dating for safe storage of the oxytocin they produce. A manufacturer will recommend storage conditions based on the conditions under which he has performed stability studies, and will set the expiry date to be consistent with this. It is therefore important to read storage recommendations made by the manufacturer.

Since ergometrine and syntometrine are sensitive to heat and light, and oxytocin is sensitive to heat, following storage guidelines is critical to ensure the optimal effectiveness of injectable uterotonic drugs. When drugs are inadequately stored, drug effectiveness can diminish, posing serious consequences for the postpartum woman.

Storage practices in health care facilities vary widely and may not follow guidelines for correct storage. For example, vials of uterotonic drugs might be kept on open trays or containers in the labor ward, leaving them exposed to heat and light. Pharmacists, pharmacy managers, and birth attendants using the oxytocin need to carefully read and follow recommended guidelines for transporting and storing uterotonic drugs. Recommended guidelines for transporting and storing specific uterotonic drugs are noted in Table 4.

Table 4. Recommended guidelines for transport and storage of uterotonic drugs

Drug	Transport	Storage
Oxytocin	Unrefrigerated transport is possible if no more than one month at 30°C.	<ul style="list-style-type: none"> Check manufacturer's recommendations – some manufacturers are producing oxytocin that is more heat stable than previously available Temporary storage outside the refrigerator at a maximum of 30°C is acceptable for no more than three months. If possible, keep refrigerated at 2–8°C.
Misoprostol	Protect from humidity.	<ul style="list-style-type: none"> Store at room temperature in closed container and protected from humidity.
Syntometrine	Unrefrigerated transport in the dark is possible if no more than one month at 30°C. Protect from freezing.	<ul style="list-style-type: none"> Store in the dark. Keep refrigerated at 2–8°C. Store in closed container. Protect from freezing.
Ergometrine	Unrefrigerated transport in the dark is possible if no more than one month at 30°C. Protect from freezing.	<ul style="list-style-type: none"> Store in the dark. Keep refrigerated at 2–8°C. Store in closed container. Protect from freezing.

Effect of heat and light on uterotonic drugs

Two factors can influence the effectiveness of uterotonic drugs: temperature and light. This is especially important in hot temperatures and in conditions where refrigeration is not always available or reliable. A WHO research program examined the effectiveness of different injectable uterotonic drugs at various temperatures and light conditions. Table 5 shows one comparison from this study.

Table 5. Change in effectiveness of injectable uterotonic drugs after one year of controlled storage

Uterotonic drug	Dark 4–8°C	Dark 30°C	Light 21–25°C	Effects of heat and light/key findings
Oxytocin	0% loss	14% loss	7% loss	Minimal effect from light, more stable for longer time at higher temperatures than ergometrine



Uterotonic drug	Dark 4-8°C	Dark 30°C	Light 21-25°C	Effects of heat and light/key findings
Ergometrine	5% loss	31% loss	90% loss	Significantly more affected by heat and light, not stable at higher temperatures

Time temperature indicators

Vaccine vial monitors (VVMs)* are small stickers that adhere to a vaccine vial and change color as the vaccine is exposed to heat. The color of the sticker indicates whether a vaccine or medication is bad or can be safely used. In 1996, the first monitors became commercially available for oral polio vaccine. Today, monitors are available for all vaccines used in immunization programs in developing countries.

Oxytocin in the Uniject™ device is the first uterotonic drug to use VVM technology, where the label contains heat-sensitive material and indicates heat exposure over time. As the device is exposed to warm temperatures, the time-temperature indicator (TTI) color darkens (Figure 6). The warmer the temperature, the faster the color changes on the TTI.

Figure 6. Reading the time-temperature indicator

	The inner square is lighter than the outer circle. If the expiry date has not passed, use the oxytocin-Uniject.
	As time passes the inner square is still lighter than the outer circle. If the expiration date has not passed, use the oxytocin-Uniject.
	Discard point: the color of the inner square matches that of the outer circle. Do not use the oxytocin in Uniject even if the expiration date has not passed.
	Discard point: the inner square is darker than the outside circle. Do not use the oxytocin in Uniject even if the expiration date has not passed.

Tips to increase uterotonic drug effectiveness

In the pharmacy:

- Make sure that there are adequate stocks of uterotonic drugs, syringes, and injection safety materials
- Check the manufacturer's label for storage recommendations

* The VVM concept was developed in 1979 by WHO and PATH, with funding from the United States Agency for International Development. Temptime Corporation (formerly Lifelines Inc.) today provides VVMs to all vaccine manufacturers.

- Make sure that there is a system in place to monitor the temperature of the refrigerator / cold box - record the temperature in the refrigerator on a regular basis, preferably at the hottest times of the day (put thermometers in different parts of the refrigerator)
- Make sure that there is a back-up system in place in case of frequent electricity cuts - for example, gas or solar refrigerators, placing ice packs in the refrigerator to keep it cool, etc.
- Follow the rule of first expired – first out (or first in – first out) and maintain a log to keep track of expiration dates to reduce wastage of uterotonic drugs
- Store misoprostol at room temperature and away from excess heat and moisture
- To ensure the longest life possible of **injectable uterotonics**, keep them refrigerated at 2–8°C
- **Protect** ergometrine **and** syntometrine **from freezing and light**.

In the delivery room:

- Check the manufacturer's label for recommendations on how to store injectable uterotonic drugs outside the refrigerator. In general:
 - Oxytocin may be kept outside the refrigerator at a maximum of 30°C (warm, ambient climate) for up to three months and then discarded
 - Ergometrine and syntometrine vials may be kept outside the refrigerator in closed boxes and protected from the light for up to one month at 30°C and then discarded
 - Misoprostol should be stored at room temperature away from excess heat and moisture
- Record the temperature in the delivery room on a regular basis, preferably at the hottest times of the day
- Periodically remove ampoules from the refrigerator for use in the delivery room – carefully calculate the number removed from the refrigerator based anticipated need
- Only remove ampoules or vials from their box just before using them
- Make sure that there are adequate stocks of syringes and injection safety materials
- Avoid keeping injectable uterotonics in open kidney dishes, trays, or coat pockets

Ergometrine loses 21–27 percent potency in one month of exposure to indirect sunlight.

Oxytocin has no loss of potency after one month exposure to indirect sunlight.

Cost

The cost of a drug is determined by many factors, including implications for its use and its availability worldwide. Many factors can affect the cost of uterotonics:

- Quantity of drug being ordered.
- Quality of the drug being manufactured.
- Manufacturer's set price.
- Country where the drug is manufactured (and whether the drug needs to be transported).



The cost to buy oxytocin and ergometrine are essentially the same, while the fixed drug combination of oxytocin and ergometrine is likely to be more expensive in most countries than oxytocin or ergometrine alone.

Costs for administering oxytocin, ergometrine, and the fixed drug combination of oxytocin and ergometrine are likely to be generally the same. Costs for administering misoprostol will be less because it does not require a syringe and needle, a skilled birth attendant trained and authorized to administer injections, or consumables and supplies to ensure safe injection and infection prevention practices.

Storage costs may be higher for ergometrine (and the fixed drug combination of oxytocin and ergometrine) because it requires temperature-controlled transport and storage and protection from light. Oxytocin is more stable and storage costs may be less than ergometrine.²¹ Costs for storage of misoprostol will be minimal as it is the most stable of the three uterotonic drugs and can be stored at room temperature.



Core Topic 4: AMTSL

AMTSL is a combination of actions to speed the delivery of the placenta by increasing uterine contractions and minimizing uterine atony. Using AMTSL helps prevent unnecessary blood loss and PPH.

Essential care during the third stage of labor

The time immediately following birth can be particularly active and involved because the skilled birth attendant must attend to both the woman and newborn. Regardless of how the third stage of labor is managed, basic care for the woman and baby during labor and postpartum remains the same. The following actions represent the elements of essential care for the provider and for the woman and newborn during the third stage of labor.

Essential precautions for the provider

Health care providers should take the following precautions for themselves:

- Wear protective gear (gloves, face mask/goggles, apron, and boots or closed shoes).
- Safeguard against splashes and sharps-related injuries.

Essential care for the woman

Health care providers should follow these guidelines in caring for the woman:

- Ensure the woman is in a comfortable position.
- Explain to woman and family what is happening around them.
- Inform the woman about her baby and explain what is happening while you attend to immediate newborn care.
- Encourage breastfeeding, if this is the woman's choice for infant feeding.
- Follow national guidelines for maternal interventions to prevent / reduce the risk of mother-to-child transmission (MTCT) of HIV/AIDS.
- Throughout all phases of care:
 - Give continuous empathetic and physical support.
 - Give the woman as much information and explanation as she desires.
 - Facilitate good communication among the woman and her caregivers and companions.
 - Practice infection prevention.

Essential care for the newborn

Health care providers should follow these guidelines when caring for the newborn:

- Thoroughly dry and stimulate the baby while assessing breathing.
- Place the newborn in skin-to-skin contact with the woman; cover both with a dry warm cloth or blanket. Cover the baby's head to ensure warmth (Figure 7).
- If breastfeeding is the woman's choice for infant feeding, place the baby close to the woman's breast to help encourage the baby to latch on to the breast.



Figure 7. Keeping the baby in skin-to-skin contact with the mother²⁵

- Wait to clamp and cut the cord until 2 to 3 minutes after the baby's birth. (Even if oxytocin is given within one minute after birth of the baby, clamping does not need to happen until 2 to 3 minutes after the baby's birth.)

Note: In situations where cord clamping and cutting was delayed, there were fewer cases of anemia in full-term babies at two months of age and increased duration of early breastfeeding.²⁶

Immediate cord clamping can decrease the red blood cells an infant receives at birth by more than 50 percent.²⁷ Studies show that delaying clamping and cutting of the umbilical cord is helpful to both full-term and preterm babies. In high-risk situations (e.g., low birth weight or premature infant), delaying clamping by as little as a few minutes is helpful. In situations where cord clamping and cutting was delayed for preterm babies, these infants had higher hematocrit and hemoglobin levels and a lesser need for transfusions in the first 4 to 6 weeks of life than preterm babies whose cords were clamped and cut immediately after birth.

- Follow national guidelines for newborn interventions to prevent / reduce the risk of MTCT of HIV/AIDS.

Preparing for active management

Before or during the second stage of labor:

- Prepare the injectable uterotonic (10 IU of oxytocin is the preferred injectable uterotonic) in a sterile syringe before second stage (Figure 8) or have oxytocin in Uniject™ or 600 mcg of misoprostol available.
- Prepare other essential equipment for birth and the third stage of labor before onset of second stage of labor.
- Ask the woman to empty her bladder when second stage is near.
- Assist the woman into her preferred position for giving birth (e.g., squatting, semi-sitting).

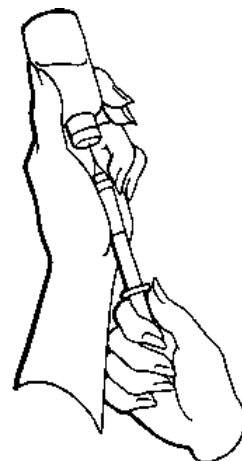


Figure 8. Preparing oxytocin injection



Steps for AMTSL

There are three main components or steps of AMTSL-administering a uterotonic drug, CCT, and massaging the uterus-which should be implemented along with the provision of immediate newborn care.

1. Thoroughly dry the baby, assess the baby's breathing and perform resuscitation if needed, and place the baby in skin-to-skin contact with the mother



Figure 9. Put the baby on the mother's abdomen

After delivery, immediately dry the infant and assess the baby's breathing. Then place the reactive infant, prone, on the mother's abdomen.* Remove the cloth used to dry the baby and keep the infant covered with a dry cloth or towel to prevent heat loss.

**If the infant is pale, limp, or not breathing, it is best to keep the infant at the level of the perineum to allow optimal blood flow and oxygenation while resuscitative measures are performed. Early cord clamping may be necessary if immediate attention cannot be provided without clamping and cutting the cord.*

2. Administer a uterotonic drug within one minute of the baby's birth

Administering a uterotonic drug within one minute of the baby's birth stimulates uterine contractions that will facilitate separation of the placenta from the uterine wall. Before giving the uterotonic drug it is important to rule out the presence of another baby. If the uterotonic drug is administered when there is a second baby, there is a small risk that the second baby could be trapped in the uterus.

The steps for administering a uterotonic drug include:

1. Before performing AMTSL, gently palpate the woman's abdomen to rule out the presence of another baby. At this point, do not massage the uterus.
2. If there is not another baby, begin the procedure by giving the woman 10 IU of oxytocin IM in the upper thigh. This should be done within one minute of childbirth. If available, a qualified assistant should give the injection.



Figure 10. Give a uterotonic drug

3. Cut the umbilical cord

Clamp and cut the cord following strict hygienic techniques after cord pulsations have ceased or approximately 2-3 minutes after birth of the baby, whichever comes first.



Figure 11. Pulsating and nonpulsating umbilical cord

4. Keep the baby warm



Figure 12. Keep the baby in skin-to-skin contact

Place the infant directly on the mother's chest, prone, with the newborn's skin touching the mother's skin. While the mother's skin will help regulate the infant's temperature, cover both the mother and infant with a dry, warm cloth or towel to prevent heat loss. Cover the baby's head with a cap or cloth.

5. Perform controlled cord traction

CCT helps the placenta descend into the vagina **after it has separated from the uterine wall** and facilitates its delivery. It is important that the placenta be removed quickly once it has separated from the uterine wall because the uterus cannot contract efficiently if the placenta is still inside. CCT includes supporting the uterus by applying pressure on the lower segment of the uterus in an upward direction towards the woman's head, while at the same time pulling with a firm, steady tension on the cord in a downward direction during contractions. Supporting or guarding the uterus (sometimes called "counter-pressure" or "counter-traction") helps prevent uterine inversion during CCT. CCT should only be done during a contraction.

Note: CCT is not designed to separate the placenta from the uterine wall but to facilitate its expulsion only. If the birth attendant keeps pulling on an unseparated placenta, inversion of the uterus may occur.

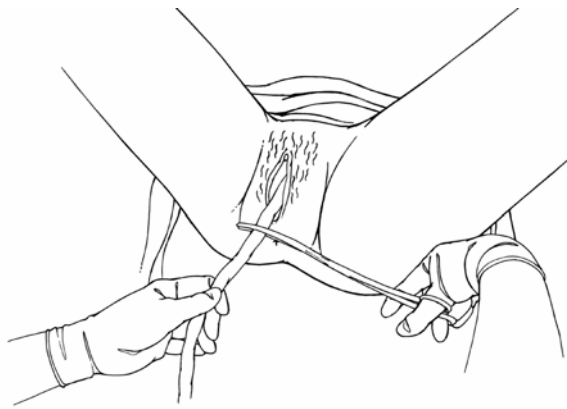
The steps for CCT include:

1. Wait for cord pulsations to cease or approximately 2-3 minutes after birth of the baby, whichever comes first, and then place one clamp 4 cm from the baby's abdomen.



Note: Delaying cord clamping allows for transfer of red blood cells from the placenta to the baby that can decrease the incidence of anemia during infancy.

2. Gently milk the cord towards the woman's perineum and place a second clamp on the cord approximately 2 cm from the first clamp.
3. Cut the cord using sterile scissors under cover of a gauze swab to prevent blood spatter. After mother and baby are safely cared for, tie the cord.
4. Place the clamp near the woman's perineum to make CCT easier (Figure 13).



5. Hold the cord close to the perineum using a clamp (Figure 13).

Figure 13. Clamping the umbilical cord near the perineum

6. Place the palm of the other hand on the lower abdomen just above the woman's pubic bone to assess for uterine contractions (Figure 14). If a clamp is not available, controlled cord traction can be applied by encircling the cord around the hand.

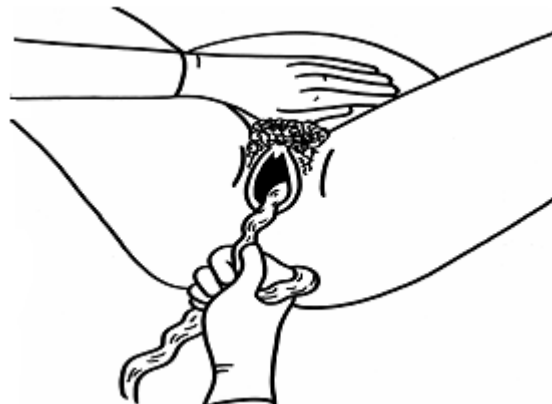


Figure 14. Holding the cord close to the perineum with the clamp or hand, maintain hand on uterine fundus to palpate the next contraction.

7. Wait for a uterine contraction. Only do CCT when there is a contraction.
8. With the hand just above the pubic bone, apply external pressure on the uterus in an upward direction (toward the woman's head) (Figure 15).
9. At the same time with your other hand, pull with firm, steady tension on the cord in a downward direction (follow the direction of the birth canal). Avoid jerky or forceful pulling.

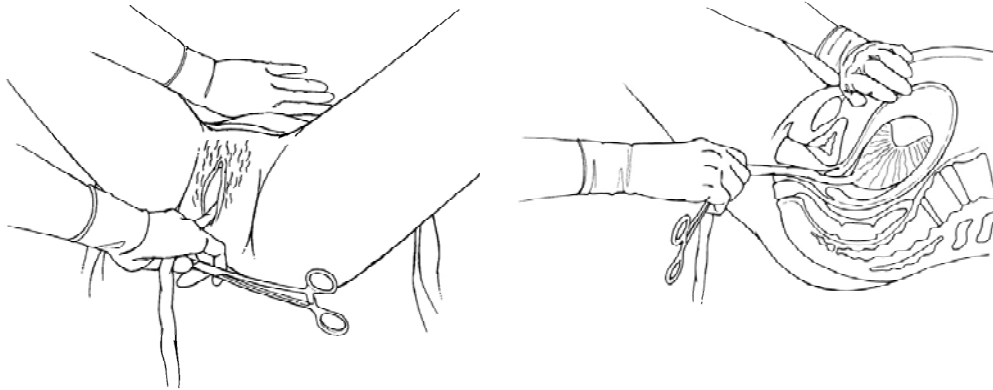
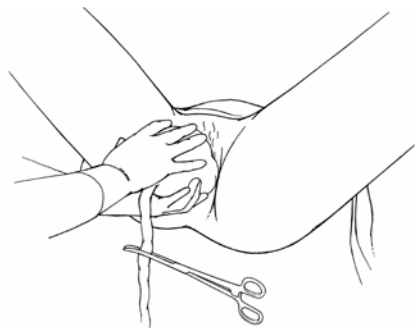


Figure 15. Applying CCT with countertraction to support the uterus

NOTE: If the placenta does not descend during 30–40 seconds of controlled cord traction (i.e. there are no signs of placental separation), do not continue to pull on the cord:

- Gently hold the cord and wait until the uterus is well contracted again. If necessary, use a sponge forceps to clamp the cord closer to the perineum as it lengthens;
- With the next contraction, repeat controlled cord traction with counter traction.



10. Do not release support on the uterus until the placenta is visible at the vulva. Deliver the placenta slowly and support it with both hands (Figure 16).

Figure 16. Supporting the placenta with both hands

11. As the placenta is delivered, hold and gently turn it with both hands until the membranes are twisted (Figure 17).
12. Slowly pull to complete the delivery. Gently move membranes up and down until delivered (Figure 18).

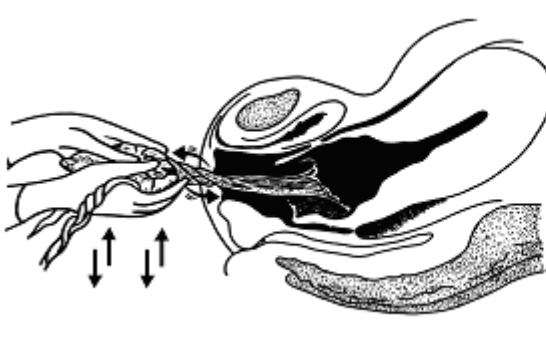


Figure 17. Delivering the placenta with a turning and up-and-down motion

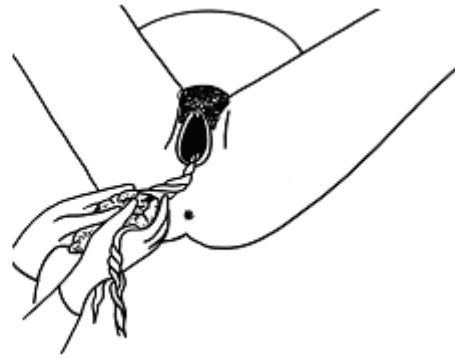


Figure 18. Slowly pull to complete delivery of the placenta.

NOTE: If the **membranes tear**, gently examine the upper vagina and cervix wearing high-level disinfected or sterile gloves and use a sponge forceps to remove any pieces of remaining membrane.

6. Massage the uterus

Massage the uterus immediately after delivery of the placenta and membranes until it is firm (Figure 19). Massaging the uterus stimulates uterine contractions and helps to prevent PPH. Sometimes blood and clots will be expelled during this process. After stopping massage, it is important that the uterus does not relax again. Instruct the woman how to massage her own uterus, and ask her to call if her uterus becomes soft.



Figure 19. Massaging the uterus immediately after the placenta delivers

7. Examine the placenta

Examine the fetal and maternal sides of the placenta and membranes to ensure they are complete. A small amount of placental tissue or membranes remaining in the woman can prevent uterine contractions and cause PPH.

Note: Follow infection prevention guidelines when handling contaminated equipment, supplies, and sharps.

To examine the placenta for completeness:

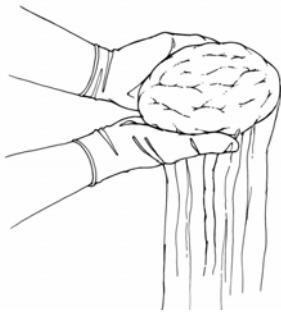


Figure 20. Examining the maternal side

1. Hold the placenta in the palms of the hands with the maternal side facing upward and make sure that all lobules are present and fit together (Figure 20).

13. Hold the cord with one hand, allowing the placenta and membranes to hang down. Place the other hand inside the membranes, spreading your fingers to ensure that membranes are complete (Figure 21).

14. Dispose of the placenta as appropriate.



Figure 21. Checking the membranes

8. Examine the lower vagina and perineum

1. Gently separate the labia and inspect the lower vagina and perineum for lacerations that may need to be repaired to prevent further blood loss (Figure 22).
2. Repair lacerations or episiotomy.



Figure 22. Gently inspect the lower vagina and perineum for lacerations.

3. Gently cleanse the vulva, perineum, buttocks, and back with warm water and a clean compress.
4. Apply a clean pad or cloth to the vulva.
5. Evaluate blood loss.
6. Explain all examination findings to the woman and, if she desires, her family.



9. Provide immediate care

After examining the placenta and external genitals, continue caring for the mother and newborn.



If the woman has chosen to breastfeed, the mother and baby may need assistance to breastfeed within the first hour after the birth and before transferring them out of the delivery room (Figure 23). Assess readiness of the woman and newborn to breastfeed before initiating breastfeeding; do not force the mother and baby to breastfeed if they are not ready.

Figure 23. Encourage breastfeeding Within the first hour after birth.

Also ensure that:

- The baby is kept warm.
- The mother and baby are kept together.
- The mother and baby are not left alone.
- The woman and baby stay in the delivery room for at least one hour after delivery of the placenta.
- PMTCT interventions are provided per national guidelines.
- AMTSL practices are recorded as required by local protocols (on the partograph, woman's chart, or delivery log).
- The woman receives information about how she will be cared for during the next few hours.

10. Monitor the woman and newborn immediately after delivery of the placenta

Perform a comprehensive examination of the woman and newborn one and six hours after childbirth. Continue with routine care for the woman and newborn, provide interventions to prevent / reduce the risk of MTCT of HIV according to national guidelines, and follow applicable requirements for recording information about the birth, monitoring of the woman and newborn, and any care provided.

Monitor and care for the woman

- During the first two hours after the delivery of the placenta, monitor the woman at least every 15 minutes (more often if needed) to:
 - Palpate the uterus to check for firmness.
 - Massage the uterus until firm. (Ask the woman to call for help if bleeding increases or her uterus gets soft.)
 - Check for excessive vaginal bleeding.

- Take action to evaluate and treat PPH immediately if excessive bleeding is detected.
- Ensure the uterus does not become soft after massage is stopped.
- Instruct the woman how the uterus should feel and how she can massage it herself.
- Encourage the woman to eat and drink.
- Ask the companion to stay with the woman.
- Encourage the woman to pass urine.
- Inform the woman about danger signs and when she should call for help.

Monitor and care for the newborn

Check the baby at the same time you check the mother every 15 minutes during the first two hours after childbirth:

- Check the baby's breathing.
- Check the baby's color.
- Check warmth by feeling the baby's feet.
- Check the cord for bleeding.
- Take immediate action if a problem is detected.



Frequently asked questions

How is a newborn affected if 10 IU of oxytocin IM is given before clamping the cord?

There are no known harmful effects from giving oxytocin before cord clamping. Mothers naturally produce some oxytocin during labor which is transmitted to the infants. Oxytocin given either IM or IV at delivery supplements this natural process.

Also, giving a uterotonic drug immediately after birth can speed the transfer of blood into the baby from the placenta. This increases the infant's red cell mass.²²

Are there more complications with AMTSL such as a ruptured cord (cord tears off), inverted uterus, or retained placenta?

Some providers express concern that active management increases uterine inversion rates and ruptured cords due to cord traction and increases the risk of retained placenta due to entrapment caused by uterotonic drugs. However research shows:

- No uterine inversions were seen in any of the trials comparing active and physiologic management. However, these trials were not designed to evaluate very rare outcomes.^{15, 22}
- Trials using oxytocin alone showed reduced rates of manual removal of the placenta, whereas those using ergot preparations (e.g., ergometrine) showed increased rates.^{8, 15}
- The trial findings did not show increased risk of cord rupture.

If oxytocin is supplied in 5 IU ampoules, is one ampoule sufficient for performing AMTSL?

Although the recommended dose of oxytocin has changed over the years, WHO now recommends administering 10 IU of oxytocin IM for AMTSL. Trials comparing active and physiologic management have also compared the different uterotonics in active management protocols. Results suggest that increasing the intramuscular dose of oxytocin from 5 IU to 10 IU increases the effectiveness of oxytocin.^{8, 15}

Will routine manual exploration of the uterus after AMTSL help reduce the incidence of PPH from retained placenta or placental fragments?

Routine manual exploration of the uterus is no longer recommended for normal deliveries or those following previous cesarean delivery. Manual exploration is painful and may likely increase the risk of complications, especially infections. Exploration is justified for women with a well-contracted uterus experiencing bleeding from high in the genital tract.

Will “milking” the cord help to increase the baby’s hemoglobin?

Because there is no documented benefit from the practice, “milking” the cord toward the baby to exaggerate the transfer of blood to the newborn is discouraged.

WHO supports the practice of delaying cord clamping. The practice of clamping for 2 to 3 minutes has proven beneficial to the baby as it results in higher hemoglobin and hematocrit values and possibly lower levels of early childhood anemia and greater iron stores.²⁸ This may be particularly important for low birthweight and premature infants. If maternal bleeding in the first few minutes after childbirth is significant, a decision to delay cord clamping for 2 to 3 minutes must be determined by assessing the risk of PPH with the benefit of delayed cord clamping.

What are the risks of giving oxytocin for AMTSL when there is an undiagnosed multiple pregnancy?

There is a theoretical risk of a trapped twin if providers administer oxytocin with an undiagnosed twin. Original research trials on AMTSL that established the effectiveness of AMTSL included giving a uterotonic drug with birth of the anterior shoulder.^{8, 15} However, updated AMTSL protocols take the theoretical risk of a trapped twin into account and now recommend giving oxytocin after birth of the baby and only after excluding the presence of an additional baby. Quality clinical assessment in labor and following delivery of the first baby can establish the diagnosis before giving a uterotonic drug.

If the woman has an IV infusion running at the time the baby is born, how should oxytocin be delivered (dosage and route) for AMTSL?

Typically with vaginal delivery, a dose of 10 IU of oxytocin is administered IM. In patients with an IV, the provider may give 5 IU of oxytocin as a slow intravenous bolus and then continue with the oxytocin infusion.

What part does each of the steps of AMTSL play in preventing PPH?

Trials that administered uterotonics at the time of delivery with physiologic management showed some reduction in PPH rates.⁸ However, a greater reduction in PPH rates is evident with AMTSL. In cases where a uterotonic drug is given without CCT, women experienced a greater incidence of retained placenta; additionally, no reduction in the number of patients receiving blood transfusions was detected.²⁹

A single trial examined the effect of CCT with and without the administration of oxytocin after delivery of the baby. The results suggest that CCT alone does not reduce the incidence of PPH or severe PPH. Another trial found that CCT used with oxytocin immediately after placental delivery resulted in outcomes similar to those with using all three components of AMTSL.³⁰ A third trial showed that true active management resulted in lower PPH rates when compared with CCT followed by oxytocin at the time of placental delivery.³¹

Should CCT be performed by an SBA if there are no uterotonic drugs?

CCT is not recommended unless uterotonic drugs are used or a skilled birth attendant is present. If CCT is applied in the absence of uterotonic drugs or a skilled birth attendant, the practice can cause partial placental separation, and might increase the risk of a ruptured cord, excessive bleeding, and uterine inversion.^{15, 24}

Should uterine massage be performed by an SBA before the delivery of the placenta?

There is no evidence to support the recommendation of providing uterine massage before delivery of the placenta in the absence of a uterotonic drug, and evidence is increasing that uterine massage before delivery of the placenta may lead to increased rates of PPH.

How should the third stage of labor be managed in the absence of uterotonic drugs?

In some settings there will be no uterotonics available due to interruptions of supplies or the setting of birth. In the absence of current evidence, ICM and FIGO recommend that when no uterotonic drugs are available to either the skilled or non-skilled birth attendant, management of the third stage of labor includes the following components (see Appendix A):

- Waiting for signs of separation of the placenta (cord lengthening, small blood loss, uterus firm and globular on palpation at the umbilicus)



- Encouraging maternal effort to bear down with contractions and, if necessary, to encourage an upright position
- Controlled cord traction is not recommended in the absence of uterotonic drugs, or prior to signs of separation of the placenta, as this can cause partial placental separation, a ruptured cord, excessive bleeding and uterine inversion
- Uterine massage after the delivery of the placenta as appropriate.

How should the third stage of labor be managed in situations where no oxytocin is available or birth attendants' skills are limited?

In situations where no oxytocin is available or birth attendants' skills are limited, the 2006 FIGO/ICM joint statement recommends administering misoprostol soon after the birth of the baby to reduce the occurrence of hemorrhage.²⁴ The most common side effects are transient shivering and pyrexia. Education of women and birth attendants in the proper use of misoprostol is essential.

The usual components of giving misoprostol include:

- Administration of 600 micrograms (mcg) misoprostol orally or sublingually after the birth of the baby
- Controlled cord traction ONLY when a skilled attendant is present at the birth
- Uterine massage after the delivery of the placenta as appropriate.

In the absence of active management, should uterotonic drugs be used alone for prevention of PPH?

The most recent WHO recommendations for the prevention of postpartum hemorrhage²³ promote the use of a uterotonic drug (oxytocin or misoprostol) by a health worker trained in its use for prevention of PPH in the absence of active management of the third stage of labor. This recommendation is based on results from two randomized trials and places a high value on the potential benefits of avoiding PPH. In the case of misoprostol, there is the additional benefit of ease of administration of an oral drug in settings where other care is not available.

How does practicing AMTSL differ for women who are infected with HIV?

The practice of AMTSL is the same for all women regardless of their HIV status. However, women who are HIV infected may choose not to breastfeed, so providers need to respect and support the woman's choice for infant feeding. In addition, providers need to ensure that national guidelines for PMTCT are implemented for the woman and newborn in addition to routine care during labor, childbirth, and in the immediate postpartum.

Does nipple stimulation prevent PPH?

Nipple stimulation results in the release of the oxytocin hormone in the woman. The nipples are easily stimulated through early breastfeeding. Research has not shown that nipple stimulation significantly helps to reduce the risk of PPH so this should not replace AMTSL to prevent PPH. However, promoting breastfeeding after birth has several benefits:

- Stimulates natural production of oxytocin.
- May help maintain tone of the contracted uterus.
- Promotes bonding between the mother and newborn.
- Breast milk is perfectly suited to nourish infants and protect them from illness.

