Women do not have to die from postpartum hemorrhage (PPH). Whether they give birth with a skilled provider at home or in a facility, most cases of PPH can be prevented using safe, low-cost, evidence-based practices. Knowing how to prevent PPH, however, is not enough. This knowledge must be translated into action when implementing essential maternal and newborn health care and basic emergency obstetric and newborn care interventions:

- Ensuring that national policies and clinical guidelines are in place to support the use of active management of the third stage of labour (AMTSL) at every birth attended by skilled providers.
- Incorporating the knowledge and skills needed to perform AMTSL into pre-service education and providing in-service training for skilled providers.
- Ensuring that supplies of tetrotetocin and other items needed for clean and safe birth are available.
- Bringing essential maternal and newborn health care and basic emergency obstetric and newborn care as close to the family as possible through community health workers and skilled providers.
- Mobilizing the community to help women and their families prepare for birth with a skilled provider and be ready for complications should they occur.

WHAT IS POSTPARTUM HEMORRHAGE?
Uterine atony causes up to 70% of PPH. Other causes include ruptured uterus; lacerations of the cervix, vagina or perineum; and retained placenta or placental fragments. Two-thirds of PPH cases occur in women with no known risk factors (Akins 1994). The most commonly used definition of immediate PPH is blood loss of 500 mL or more in the first 24 hours following childbirth; severe PPH is defined as blood loss of 1,000 mL or more (Prendiville and Elbourne 1998). However, it is difficult to accurately assess the amount of blood that a woman has lost because it is mixed with amniotic fluid or dispersed on sponges or linens, in buckets or on the floor. In addition, slow bleeding from an episiotomy or tear may go unnoticed. Clinical estimates of blood loss, where no special efforts are made to physically measure it, are generally thought to be underestimated by 34–50% (Prendiville et al. 2003). Blood measurement systems suitable for facility and home births in low-resource settings are being tested, including the BRASS-V drape used in PPH research in rural India. This is a plastic drape with a calibrated collection device that is placed under the woman after the birth of the baby. Since blood loss can be quantified objectively with this device, providers are more apt to intervene appropriately before life-threatening hemorrhage occurs (Patel 2003).

Because of the difficulty in accurately measuring blood loss, even in a clinical setting, work is being done to determine the best way to measure blood loss in the home setting where there is no skilled provider. In Tanzania, traditional providers were trained to recognize excessive bleeding using a local garment known as a “kanga.” In this study, it was determined that two kangas soaked with blood after birth of the baby indicated blood loss of slightly more than 500 mL (Prata et al. 2005).

Each year in developing countries:
- 14 million women experience postpartum hemorrhage (WHO 1998).
- Hemorrhage accounts for over 25% of maternal deaths in Latin America and the Caribbean, 30.8% in Asia and 33.9% in Africa (Khan et al. 2006).
- Nearly half of all postpartum deaths are due to immediate postpartum hemorrhage (Li et al. 1998).
- Millions of women suffer acute or chronic disability following immediate postpartum hemorrhage (Murray and Lopez 1998).

PREVENTING POSTPARTUM HEMORRHAGE*
In countries with high maternal mortality and limited resources, introducing safe, low-cost, evidence-based practices that prevent postpartum hemorrhage can save women’s lives.

PREVENTION OF POSTPARTUM HEMORRHAGE WHERE THERE IS A SKILLED PROVIDER

One of the most important prevention measures, therefore, is having a skilled provider present at birth. In addition to using the World Health Organization (WHO) partograph to monitor labor (to avoid obstructed labor and thus uterine rupture), the appropriately trained skilled provider is less likely to perform procedures such as episiotomy or operative vaginal delivery without clear indications. Finally, the skilled provider can administer oxytocin within one minute of birth, as required by the WHO partograph. This is the most common cause of immediate PPH. Active Management of the Third Stage of Labor

In order to understand how to prevent uterine atony, it is necessary to understand the physiologic processes that occur during the third stage of labor (the period of time from birth of the baby to delivery of the placenta).

Immediately after the birth of the baby, the muscles of the uterus contract and the placenta separates from the uterine wall as the surface of the uterus becomes smaller. At the end of a term pregnancy, 500–800 mL of blood flow through the blood vessels at the placental site every minute (WHO 1996). As the placenta separates, these vessels break and bleeding occurs. Continuous, coordinated contractions of the uterus compress these blood vessels to control bleeding at the placental site and allow formation of a retroplacental clot. When the uterus fails to have sustained muscular contractions (is said to be atonic), this blood in the atonic vessels at the placental site is not constricted and hemorrhage occurs.

Active management differs from physiologic or expectant management. In the latter, the placenta is allowed to deliver spontaneously, by gravity or maternal effort. Four, large-scale randomized controlled trials (RCTs) compared active and expectant management of the third stage of labor (Bagley 1998; Khan et al. 1997; Prendiville, Elbourne and MacDonald 2003). In 2003, the International Confederation of Midwives (ICM) and the International Federation of Gynecology and Obstetrics (FIGO) issued their first International Joint Statement endorsing the use of AMTSL by a skilled provider. Thus, given the importance of the third stage of labor and of preventing hemorrhage, skilled providers are trained in active management of the third stage of labor to minimize the occurrence of PPH and severe PPH, decreased need for blood transfusion, misoprostol should be considered an alternative, even if it is less effective than injectable uterine drugs (Darney 2001). For these situations, the use of 400–600 μg misoprostol as part of AMTSL (given orally or rectally) has received a Category A recommendation (good and consistent scientific evidence to support the recommendation) (Goldberg, Greenberg and Darney 2001). In addition, the United States Pharmacopoeia has noted that prevention of PPH is an acceptable indication for misoprostol, especially in settings where parenteral uterine drugs are not available (Carpenter 2001).

A double-blind clinical trial in Guinea-Bissau evaluated the routine administration of 600 mg of sublingual misoprostol after vaginal delivery in a local health center. While the incidence of PPH between the two groups was not significantly different, mean blood loss was lower in the misoprostol group, and significantly fewer women in the misoprostol group experienced blood loss of ≤1,000 mL or ≥1,500 mL. The authors concluded that sublingual misoprostol reduces the frequency of severe PPH (Heij et al. 2005). A recent placebo-controlled trial was carried out in Belguam, India, in home and peripheral facility births managed by auxiliary nurse-midwives (ANMs). ANMs who had previously practiced expectant management of third stage of labor with no uterotonic gave 600 μg of misoprostol (or placebo) orally after birth of the baby. Women who received misoprostol had a nearly 50% reduction in acute PPH, and an 80% reduction in acute severe PPH (Derman et al. 2006).

PREVENTION OF POSTPARTUM HEMORRHAGE WHERE THERE IS NO SKILLED PROVIDER

Misoprostol: A skilled provider can perform AMTSL in the home, or if the necessary supplies are not available to give an injection when the necessary supplies are not available to give an injection. Oxygen and syntometrine (oxytocin plus ergometrine) are both effective in preventing PPH (McDonald, Prendiville and Blair 2001). However, the use of syntometrine is consistently associated with an increased incidence of side effects such as nausea, vomiting, headache and increased blood pressure. In addition, ergometrine cannot be given to women with hypertension (a common problem during pregnancy). Oxytocin is therefore the preferred drug for use in AMTSL performed by a skilled provider.

Oxytocin and syntometrine, although effective in preventing PPH, can have disadvantages. In addition to the side effects mentioned above, these drugs must be handled and stored properly. They are unstable when exposed to tropical conditions of temperature and light, although oxytocin is more stable than ergometrine and may be stored at room temperature for up to three months without losing potency (WHO 1993). Furthermore, these drugs must be injected. This requires that the provider be trained and qualified to administer the drug, and have access to the drug and a readily available supply of sterile syringes and needles, which must be handled and disposed of properly.

An alternative uterotonic drug is misoprostol (Cytotec®), manufactured by G.D. Searle & Co, Skokie, IL, a prostaglandin E1 analogue. Misoprostol is inexpensive and readily available; easy to use; does not require special storage or transfer conditions (can be stored at room temperature, is light stable); and has a shelf life of several years (Gaud and Comors 1992; Kararli et al. 1991). In addition, it can be given orally or rectally. Two RCTs found that misoprostol (administered either orally or rectally) was comparable to syntometrine for preventing PPH (Baghaloo et al. 2001; Ng et al. 2001). However, a large WHO multicenter RCT and a Cochrane Review found that, in hospital settings, oxytocin is preferable to oral misoprostol (Gulmezoglu et al. 2004, 2001).

A skilled provider can perform AMTSL in the home. However, when the necessary supplies are not available to give an injection of oxytocin (e.g., at home birth, in a primary health care facility without oxytocin), misoprostol should be considered as an alternative, even if it is less effective than injectable uterine drugs (Darney 2001). For these situations, the use of 400–600 mg misoprostol as part of AMTSL (given orally or rectally) has received a Category A recommendation (good and consistent scientific evidence to support the recommendation) (Goldberg, Greenberg and Darney 2001). In addition, the United States Pharmacopoeia has noted that prevention of PPH is an acceptable indication for misoprostol, especially in settings where parenteral uterine drugs are not available (Carpenter 2001).

REFERENCES


The three components of AMTSL intended to augment uterine contractions and prevent PPH due to uterine atony are administration of uterotonin agents within one minute of birth, controlled cord traction, and uterine massage after delivery of the placenta, as appropriate (CAM/FIGO 2003).

AMTSL by skilled providers (using misoprostol when oxytocin is not feasible) and use of misoprostol by unskilled providers or the woman herself are life-saving interventions that can make an impact on maternal mortality in low-resource settings.
WHO 2005). A woman may give birth alone or in the presence of an untrained birth attendant or family members. If a woman begins to hemorrhage, the birth attendant and family are often unprepared to recognize and handle the emergency. Long delays may occur in making the decision to seek help and in transporting the woman to a hospital or center equipped to treat PPH.

Prevention of Postpartum Hemorrhage

One of the most effective measures, therefore, is having a skilled provider present at birth. In addition to using the World Health Organization (WHO) chart to monitor labor (to avoid obstructed labor and thus uterine rupture), the appropriately trained skilled provider is less likely to perform procedures such as episiotomy or operative vaginal delivery without clear indications. Finally, the skilled provider can administer oxytocin in order to prevent uterine atony, the most common cause of immediate PPH.

Active Management of the Third Stage of Labor

In order to understand how to prevent uterine atony, it is necessary to understand the physiologic processes that occur during the third stage of labor (the period of time from birth of the baby to delivery of the placenta). Immediately after the birth of the baby, the muscles of the uterus contract and the placenta separates from the uterine wall as the surface of the uterus becomes smaller. At the end of a term pregnancy, 500–800 mL of blood flow through the blood vessels at the placental site every minute (WHO 1996). As the placenta separates, these vessels break and bleeding occurs. Continuous, coordinated contractions of the uterus compress these blood vessels to control bleeding at the placental site and allow formation of a retroplacental clot. When the uterus fails to have correctly coordinated muscle contractions, it is said to be atonic; in this case, blood vessels at the placental site are not constricted and hemorrhage occurs.

Active management differs from physiologic or expectant management. In the latter, the placenta is allowed to deliver spontaneously, by gravity or maternal effort. Four, large-scale randomized controlled trials (RCTs) compared active and expectant management of the third stage of labor (Bagley 1998; Khan et al. 1997; Prendiville, Elbourne and Chalmers 1988; Rogers et al. 1998). All four studies found that AMTSL resulted in a decreased rate of PPH up to a 70% and a decrease in the length of the third stage. A 2003 Cochrane Review found that AMTSL was associated with an approximately 60% reduction in

In 2003, the International Confederation of Midwives (ICM) and the International Federation of Gynecology and Obstetrics (FIGO) issued their first International Joint Statement endorsing the use of AMTSL by a skilled provider, stating that AMTSL is “proven to reduce the incidence of PPH, the quantity of blood loss, and use of blood transfusion.”

Choice of Uterotonic Drug for AMTSL

Giving a uterotonic drug within one minute of birth is the component of AMTSL that has the greatest impact on the prevention of PPH.

Oxytocin and syntometrine (ergometrine plus oxytocin) are both effective in preventing PPH (McDonald, Prendiville and Blair 2001). However, the use of syntometrine is consistently associated with an increased incidence of side effects such as nausea, vomiting, headache and increased blood pressure. In addition, ergometrine cannot be given to women with hypertension (a common problem during pregnancy). Oxytocin is therefore the preferred drug for use in AMTSL performed by a skilled provider.

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A skilled provider can perform AMTSL in the home. However, when the necessary supplies are not available to give an injection of oxytocin (e.g., at home birth, in a primary health care facility without oxytocin) or misoprostol should be considered as an acceptable alternative, even if it is less effective than injectable uterotonic drugs (Darney 2001). For these situations, the use of 400–600 µg misoprostol as part of AMTSL (given orally or rectally) has received a Category A recommendation (good and consistent scientific evidence to support the recommendation) (Goldberg, Greenberg and Darney 2001). In addition, the United States Pharmacopeia (USP) has indicated that prevention of PPH is an acceptable indication for misoprostol, especially in settings where parenteral uterotonic drugs are not available (Carpenter 2001).

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Prevention of Postpartum Hemorrhage Where There Is No Skilled Provider

Misoprostol may also offer a solution for home births attended by a provider not qualified to perform AMTSL. The Maternal and Neonatal Health Program (1998–2004), funded by the U.S. Agency for International Development, established the safety of maternal and community-based distribution of misoprostol for prevention of PPH through a study conducted in rural Indonesia (Wijnskosastro et al. 2004). Community health volunteers (kader) were trained to provide counseling about the importance of giving birth with a skilled provider, the danger signs of PPH and the need to seek care immediately should the woman experience severe bleeding. Counseling also included information and guidance on the timing and safe use of misoprostol and its side effects. Pregnant women participating in the study received packets of misoprostol tablets and a safety reminder card in their eight month of pregnancy with instructions to take the misoprostol immediately after the birth of the baby. The community-based approach was found to be safe and acceptable to the women studied. Based on the study’s results, the Government of Indonesia has implemented plans to scale up community-based distribution of misoprostol as an effective strategy for reducing the risk of PPH when skilled care is not available. In situations where this approach is used, a careful monitoring and evaluation component should be included in order to demonstrate the impact on public health. (For a complete summary of research on use of misoprostol to prevent and treat PPH, please see the Prevention of Postpartum Hemorrhage Initiative [POPHHI] Web site (www.pphprevention.org)).

A second Joint Statement from ICM and FIGO was issued in 2006, addressing advances in the prevention and treatment of PPH in low-resource settings. The statement endorses the use of misoprostol for prevention of PPH in settings where oxytocin is not available and/o birth attendant does not perform AMTSL, as well as where there is no skilled attendant, stating, “administering misoprostol soon after the birth of the baby reduces the occurrence of haemorrhage.”

AMSL by skilled providers (using misoprostol when oxytocin is not feasible) and use of misoprostol by unskilled providers or the women themselves are life-saving interventions that can make an impact on maternal mortality in low-resource settings.

Resources on Postpartum Hemorrhage


For more information on PPH, please visit the ACCESS Web site at www.access-tohealth.org and the POPHI Web site at www.pphprevention.org.

REFERENCES


PREVENTING POSTPARTUM HEMORRHAGE*

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- Ensuring that national policies and clinical guidelines are in place to support the use of active management of the third stage of labour (AMTSL) at every birth attended by skilled providers.
- Incorporating the knowledge and skills needed to perform AMTSL into pre-service education and providing in-service training for skilled providers.
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WHAT IS POSTPARTUM HEMORRHAGE?

Uterine atony causes up to 70% of PPH. Other causes include ruptured uterus; lacerations of the cervix, vagina or perineum; and retained placenta or placental fragments. Two-thirds of PPH cases occur in women with no known risk factors (Akins 1994). The most commonly used definition of immediate PPH is blood loss of 500 mL or more in the first 24 hours following childbirth; severe PPH is defined as blood loss of 1,000 mL or more (Prendiville and Elbourne 1998). However, it is difficult to accurately assess the amount of blood that a woman has lost because it is mixed with amniotic fluid or dispersed on sponges or linens, in buckets or on the floor. In addition, slow bleeding from an episiotomy or tear may go unnoticed. Clinical estimates of blood loss, where no special efforts are made to physically measure it, are generally thought to be underestimated by 34–50% (Prendiville et al. 2003). Blood measurement systems suitable for facility and home births in low-resource settings are being tested, including the BRASS-V device used in PPH research in rural India. This is a plastic drape with a calibrated collection device that is placed under the woman after the birth of the baby. Since blood loss can be quantified objectively with this device, providers are more apt to intervene appropriately before life-threatening hemorrhage occurs (Patel 2003).

Because of the difficulty in accurately measuring blood loss, even in a clinical setting, work is being done to determine the best way to measure blood loss in the home setting where there is no skilled provider. In Tanzania, traditional providers were trained to recognize excessive bleeding using a local garment known as a “kanga.” In this study, it was determined that two kanga soaks with blood after birth of the baby indicated blood loss of slightly more than 500 mL (Prata et al. 2005).

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Nearly half of all postpartum deaths are due to immediate postpartum hemorrhage (Li et al. 1998). Millions of women suffer acute or chronic disability following immediate postpartum hemorrhage (Murray and Lopez 1998).

Hemorrhage, if uncontrolled or untreated, can quickly lead to shock and death. Most deaths due to PPH occur within the first seven days after childbirth (Li et al. 1996). One study in Egypt found that 88% of these deaths occur within the first four hours postpartum (Kane et al. 1992). Death from PPH may occur within two hours of onset of hemorrhage. Many factors influence whether or not PPH is fatal. Anemia, estimated to affect half of all pregnant women in the world, contributes to the high death toll (Brabin, Hakimi and Pelletier 2001). A woman who is anemic is unable to tolerate the amount of blood loss that a healthy woman can (Tsu 1993).

Another important consideration is that 66% of births in the least developed countries occur in the home without a skilled provider.