



Routine use of oxytocin at birth: just the right amount to prevent postpartum hemorrhage

↪ Administering the appropriate amount of oxytocin maximizes its benefits and minimizes its side effects. Regrettably, too little, too much or none at all is often administered at birth.

Postpartum hemorrhage is a common complication of birth—annually, it occurs in about 11% of natural, unmedicated childbirths and accounts for more than 50,000 maternal deaths worldwide. Administration of a uterotonic agent, such as oxytocin, at the time the anterior shoulder is delivered or after the birth of the baby reduces

the risk of postpartum hemorrhage by approximately 66%.¹ Administration of a uterotonic also reduces the risk of severe maternal hemorrhage (blood loss >1000 mL) and the risk of maternal transfusion by approximately 66% and 65%, respectively.¹ It had been thought that early cord clamping and controlled cord traction also might help reduce the risk of postpartum hemorrhage, but recent data indicate that administering a uterotonic is the key intervention and cord traction has little or no effect on reducing the risk of hemorrhage.²

When considering the optimal approach to uterotonic administration for the purpose of postpartum hemorrhage prevention, we must ask:

- Why do so few clinicians administer a uterotonic?
- What is the optimal time for uterotonic initiation?
- If using oxytocin, what is the optimal dose and route of administration?
- Is there a dose of oxytocin that is too much?
- If postpartum hemorrhage follows oxytocin administration, what is the next step?

These questions are the focus of this editorial.

Too little oxytocin

Why do so few clinicians administer a uterotonic agent?

Across the globe, many deliveries occur without the administration of a postpartum uterotonic. In the United States, beliefs about avoiding any nonphysiologic interventions during the birth process contribute to many birthing women not receiving a uterotonic. Deliveries that occur outside of a hospital and at birthing centers are more likely to be associated with the failure to administer a uterotonic, which contributes to unnecessary postpartum hemorrhage. In these settings, administration of uterotonics used in resource-poor settings (see “Alternative Uterotonics,” page 10) may be warranted.

Bottom line: **All obstetric care providers should ensure that every woman receive a uterotonic agent at birth.**

Timing of oxytocin initiation

The overarching clinical goal is to ensure that every birthing mother receives a uterotonic agent; the timing of administration is of secondary importance. In the United States, oxytocin is the uterotonic most often administered at birth. It is commonly administered: **1)** after delivery of the

Instant Poll



What is your preferred method of administering a uterotonic at birth?

What is your best clinical pearl concerning the prevention of postpartum hemorrhage that you would like to share with the obstetricians who read OBG MANAGEMENT?

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Single-use injection device



Uniject can be filled with oxytocin for use outside of a hospital setting. Photo courtesy of and © Becton, Dickinson and Company.

baby's anterior shoulder, **2**) after delivery of the baby but before delivery of the placenta, or **3**) after delivery of the placenta.

Of the three options, the last one is the least studied. There are insufficient data to identify the optimal timing for drug initiation conclusively, but most experts conclude it **should be administered somewhere between delivery of the anterior shoulder and delivery of the placenta**. Clinician preference is appropriate for selecting the timing of initiation.

Optimal route, dose, and duration

The most studied routes and doses of oxytocin are a single 10-unit intramuscular (IM) dose or an intravenous (IV) infusion of 20 to 40 units oxytocin in 1000 mL of saline or lactated Ringers solution, often infused at a rate of about 125 mL/hr. The onset of action of the IM dose is typically 3 to 5 minutes, while the onset of action of the IV dose is about 1 minute.

The optimal interval for administering the oxytocin IV infusion has not been well studied. I recommend the infusion be continued for at least 4 hours following delivery. My recommendation is based on the observation that when oxytocin is discontinued shortly after birth, the risk of a delayed postpartum hemorrhage increases significantly.

Too much oxytocin Avoid using a 5- or 10-unit IV bolus

IV boluses of oxytocin, at doses of 5 to 10 units, have been reported to be followed by hypotension,³ ischemic changes detected by electrocardiogram,^{4,5} and maternal death.⁶ Since an IV infusion of oxytocin appears to be as effective as a bolus or bolus plus IV infusion, it may be preferable to avoid the bolus and use only an IV infusion.⁷

Bottom line: Avoid IV bolus administration of oxytocin at doses of 5 units or 10 units due to adverse effects.

Alternative uterotonics

In addition to oxytocin, the following agents reduce the risk of postpartum hemorrhage:

- **misoprostol** (Cytotec) 600 µg orally (or rectally)
- **methylergonovine** (Methergine, a methyl derivative of ergonovine) 0.2 mg by IM injection
- **ergonovine** 0.2 to 0.5 mg.

Misoprostol is likely somewhat less effective than oxytocin in reducing the risk of postpartum hemorrhage,⁸ but it is more effective than placebo.⁹

Resource-limited settings. IV infusion or IM injection of a uterotonic may be difficult to perform outside of a hospital, in a resource-limited setting. In these environments, misoprostol may be useful because it can be administered orally (or rectally) and is stable at a wide range of temperatures.

In addition, a self-contained, single-use Uniject (BD, Franklin Lakes, New Jersey) injection device containing oxytocin has been developed specifically for use in resource-limited settings (**FIGURE**). The device can be used by minimally trained personnel and stored at room temperature for up to 2 months.

What's your next step if oxytocin isn't enough?

There is a high probability that administering oxytocin alone may not prevent postpartum hemorrhage in settings of:

- prolonged use of oxytocin for the purposes of labor induction
- a prolonged labor in which oxytocin has been used to augment labor
- chorioamnionitis.

Rather than continue to administer more and more oxytocin in these situations, **consider administering a second agent**, such as methylergonovine

(Methergine), misoprostol (Cytotec), or carboprost tromethamine (Hemabate, 0.25 mg IM).

Additionally, mechanical massage of the uterus can help to increase uterine tone and reduce bleeding. When postpartum hemorrhage fails to respond to the administration of multiple uterotonics, rapid institution of a postpartum bleeding protocol is warranted.^{10,11}

Review your medication order sets for oxytocin administration

It is likely that your hospital has a well-established order set for the administration of oxytocin at birth. Reviewing your hospital's protocols for administering oxytocin to prevent postpartum hemorrhage can help to ensure that all patients receive a uterotonic at a dose and duration that maximizes the benefits and reduces side effects and theoretical risks. Anesthesiologists play an

important role in the administration of a uterotonic during cesarean delivery, and they should be involved in the review of the medication order entry sets for prevention of postpartum hemorrhage.

Prevention of postpartum hemorrhage is a top priority for all obstetric providers. Routine administration of an optimal dose of oxytocin, or another uterotonic, should be a standard clinical process in all birthing units throughout the world. 



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