

Postpartum Hemorrhage

Cindy W. Su, MD

KEYWORDS

- Postpartum hemorrhage • Uterine atony • Uterotonic agents
- Uterine tamponade • Perineal lacerations
- Active management of third stage of labor

Postpartum hemorrhage (PPH) is an obstetric emergency that can follow either vaginal or cesarean delivery. It is the single most significant cause of maternal mortality worldwide. Annually an estimated 140,000 women die of PPH worldwide: one every 4 minutes.¹⁻³ The World Health Organization (WHO) estimates that approximately one-quarter of maternal deaths worldwide are caused by PPH.¹ In addition to death, serious morbidity may follow PPH because of the complications of adult respiratory distress syndrome, coagulopathy, shock, loss of fertility, and pituitary necrosis (Sheehan syndrome).

DEFINITION

There is no consensus on the single best definition of PPH. Traditionally PPH has been defined as estimated blood loss of 500 mL or more after vaginal delivery, or 1000 mL or more after a cesarean delivery. There are, however, two problems with this definition. First, studies have shown that objectively measured average blood loss after vaginal and cesarean deliveries is about 500 mL and 1000 mL, respectively.^{4,5} Second, clinicians are more likely to underestimate than overestimate the volume of blood loss.⁵ Using the traditional definitions would thus inaccurately categorize at least one-half of deliveries as having PPH.

Another classic definition of PPH is a 10% decline in postpartum hemoglobin concentration from antepartum levels. The problem with this definition is that determinations of hemoglobin or hematocrit concentrations may not reflect the current hematologic status, because this change depends on the timing of the test and amount of fluid resuscitation given.⁶ More importantly, the diagnosis would be retrospective, perhaps useful for research but not so in the clinical setting.

Some clinicians have suggested defining PPH as excessive bleeding that makes the patient symptomatic (eg, lightheadedness, weakness, palpitations, diaphoresis, and syncope) and/or results in signs of hypovolemia (eg, hypotension, tachycardia,

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Department of Obstetrics & Gynecology, Contra Costa Regional Medical Center, 2500 Alhambra Avenue, Martinez, CA 94553, USA

E-mail address: cindy.su@hsd.cccounty.us

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oliguria, and low oxygen saturation [$<95\%$]). However, this method of diagnosis also has its shortcomings. Maternal blood volume expands 40% to 50% during pregnancy because of an increase in both plasma volume and red blood cell mass. This increased blood volume, to some extent, protects the mother from the consequences of hemorrhage during and after delivery. Thus, after delivery a woman may lose up to 20% of her blood volume before clinical signs become apparent.⁷ Consequently, waiting for signs of excessive bleeding may delay initiating appropriate treatment.

INCIDENCE

Because of these varied definitions, the exact incidence of PPH is difficult to ascertain. However, estimates suggest that PPH complicates 4% to 6% of all deliveries.⁷

ETIOLOGY AND RISK FACTORS

PPH generally is classified as primary or secondary, with primary (also known as early) PPH occurring within 24 h after delivery, and secondary (also known as delayed) PPH occurring between 24 h and 6 to 12 weeks postpartum. **Box 1** lists the most common causes of primary and secondary PPH. The “Four Ts” mnemonic (Tone, Tissue, Trauma, and Thrombin) is another simple and effective way to remember and detect the specific causes (**Table 1**).

Tone

The most common cause of PPH is uterine atony (ie, lack of effective contraction of the uterus after delivery), which complicates 1 in 20 births and is responsible for at least 80% of cases of PPH.⁶ At term, blood flow through the placental site averages 600 mL/min. After placental delivery, the uterus contracts its myometrial fibers to occlude the spiral arterioles. If inadequate uterine contraction occurs, rapid blood loss will ensue. Risk factors for uterine atony include^{6,8}:

- Uterine overdistention (multiple gestation, polyhydramnios, and fetal macrosomia)
- Prolonged oxytocin use
- Rapid or prolonged labor
- Multiparity
- Chorioamnionitis

Box 1

Etiology of PPH

Primary (early or within 24 h)

- Uterine atony
- Retained placenta, especially placenta accreta
- Defects in coagulation
- Uterine inversion

Secondary (delayed or between 24 h and 12 weeks)

- Subinvolution of placental site
- Retained products of conception
- Infection
- Inherited coagulation defects

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