

# HOSPITAL PHYSICIAN®

## OBSTETRICS AND GYNECOLOGY BOARD REVIEW MANUAL

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The *Hospital Physician Obstetrics and Gynecology Board Review Manual* is a peer-reviewed study guide for residents and practicing physicians preparing for board examinations in obstetrics and gynecology. Each manual reviews a topic essential to the current practice of obstetrics and gynecology.

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## Postpartum Hemorrhage

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# Postpartum Hemorrhage

Michelle A. Kominiarek, MD

## INTRODUCTION

Postpartum hemorrhage (PPH) is the leading cause of maternal morbidity and mortality worldwide, although the prevalence varies between developing and developed countries.<sup>1</sup> According to Centers for Disease Control and Prevention reports on trends in pregnancy-related mortality in the United States, the maternal mortality rate was 12.1 per 100,000 live births in 2003,<sup>2</sup> and hemorrhage accounted for 18.2% of pregnancy-related deaths between 1991 and 1997.<sup>3</sup> Serious morbidity related to PPH can include adult respiratory distress syndrome (ARDS), disseminated intravascular coagulation, renal failure, and Sheehan's syndrome.

## DEFINITIONS

### Primary PPH

Early or primary PPH refers to excessive vaginal bleeding within the first 24 hours after delivery. Traditionally, primary PPH was defined as an estimated blood loss (EBL) of at least 500 mL for a vaginal delivery and at least 1000 mL for a cesarean delivery. Unfortunately, the description of blood loss at delivery is subjective, inaccurate, and usually underreported. Studies show that visual assessment of EBL can underestimate blood loss by 33% to 50%,<sup>4,5</sup> which limits the interpretation of outcomes in any study of PPH. Comparisons of pre- and postpartum hemoglobin or hematocrit may be more accurate, and a 10% decrease in hematocrit levels has also defined PPH.<sup>6</sup>

Clinically, PPH is characterized by signs and symptoms of hypovolemia, including pallor, dizziness, hypotension, and oliguria, which are usually apparent when blood loss exceeds 10% of the total blood volume. However, maternal blood volume expands by 40% to 50% in a pregnancy, so that a patient may lose up to 20% of her blood volume before clinical signs and symptoms become apparent. Although a patient may meet blood loss criteria for PPH, blood transfusion rates provide better estimates of the hemorrhage severity.

### Secondary PPH

Late or secondary PPH is defined as excessive vaginal

bleeding occurring between 24 hours and 6 weeks after delivery.<sup>7</sup> Secondary PPH is also referred to as persistent or delayed PPH and is estimated to occur in 1% to 3% of all deliveries.<sup>7,8</sup> Unlike the quantitative definition of primary PPH, the definition of secondary PPH is more subjective and essentially requires sufficient bleeding to prompt the patient to seek medical attention. Patients usually present during the second postpartum week, and the most common etiology is retained placental fragments.<sup>7</sup> In women with a personal or family history of menorrhagia or other bleeding problems, von Willebrand's disease is an etiologic consideration.

## ETIOLOGY AND RISK FACTORS

The etiology of PPH falls into 4 main categories: tone, tissue, trauma, and thrombin (**Table 1**). A contracting myometrium, local hemostatic factors in the decidua (tissue factor, plasminogen activator inhibitor), and systemic coagulation factors (platelets and clotting factors) all contribute to hemostasis after a normal delivery. The blood flow to a gravid uterus at term is between 800 and 1000 mL/min, and significant blood loss can occur rapidly if normal hemostatic mechanisms do not function. The major mechanism for hemostasis after delivery is the contraction of the uterus, not the formation of a clot or aggregation of platelets. Uterine atony is the cause in 75% to 90% of cases of PPH.<sup>6,9</sup>

Risk factors for PPH have been identified (**Table 2**); however, PPH more often occurs in the absence of risk factors. In a case-control study by Combs et al,<sup>6</sup> previous PPH was one of the strongest predictors of recurrent PPH in the authors' 17-factor logistic regression model. In a multivariate analysis, previous PPH had an odds ratio of 3.55 (95% confidence interval [CI], 1.24–10.19) for recurrent PPH (defined as a hematocrit decrease of  $\geq 10$  points between admission and post-delivery or the need for blood transfusion).<sup>6</sup> Of note, several studies have disputed the relationship between grand multiparity ( $\geq 5$  vaginal births) and PPH.<sup>6,7,9–11</sup> Although several studies have examined whether race is a risk factor for PPH, only Asian race has been reported as a risk factor in more than 1 study.<sup>6,12</sup>

This manual reviews current approaches to the diagnosis and management of PPH. Also discussed are