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Post Partum Hemorrhage

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Abstract

Postpartum hemorrhage (PPH) is an obstetric emergency. It is one of the top causes of maternal mortality in both high and low income countries, although the absolute risk of death from PPH is much lower in high-income countries. Several risk factors predispose to the development of PPH including prolonged labor, precipitous labor, uterine distension. In 2017, the American College of Obstetricians and Gynecologists revised the definition of PPH to help guide its management. In the present mini-review we focus on specific medical and minimally invasive interventions, and surgical interventions at laparotomyo

Key words: Postpartum, hemorrhage, blood loss, bleeding

Introduction

Postpartum hemorrhage (PPH) is an obstetric emergency. It is one of the top causes of maternal mortality in both high and low income countries, although the absolute risk of death from PPH is much lower in high-income countries. Timely diagnosis, appropriate resources, and management are critical for preventing death.

Postpartum bleeding is often defined as the loss of more than 500 ml or 1,000 ml of blood within the first 24 hours following *childbirth*[1,2].

In 2017, the American College of Obstetricians and Gynecologists revised their definition of PPH from the classic one (≥500 mL after vaginal birth or ≥1000 mL after cesarean delivery) to (1) cumulative blood loss ≥1000 mL **or** (2) bleeding associated with signs/symptoms of hypovolemia within 24 hours of the birth process regardless of delivery route in order to reduce the number of women inappropriately labeled with this diagnosis[3].

This topic will present an overview of major issues relating to PPH. Clinical use of specific medical and minimally invasive interventions, and surgical interventions at laparotomy[4].

Although vasodilatation due to neuraxial anesthesia and vasovagal reactions may result in lightheadedness/syncope, tachycardia, and hypotension, these entities are less likely postpartum than PPH, and they are readily reversible and generally not dangerous. Lightheadedness, tachycardia, or hypotension is unlikely to be due to neuraxial anesthesia if the woman

was hemodynamically stable prior to delivery, the level of the block did not become significantly higher immediately following delivery, and symptoms did not abruptly follow systemic administration of a drug known to cause hypotension[5].

Pathogenesis

The most common cause of PPH is uterine atony, which complicates 1 in 40 births in the United States and is responsible for at least 75 percent of cases of PPH .Risk factors for uterine atony include prolonged labor, precipitous labor, uterine distension (multi-fetal gestation, polyhydramnios, fetal macrosomia), fibroid uterus, chorioamnionitis, indicated magnesium sulfate infusions, and prolonged use of oxytocin. Ineffective uterine contraction, either focally or diffusely, is additionally associated with a diverse range of etiologies including retained placental tissue, placental disorders (such as morbidly adherent placenta, placenta previa, and abruption placentae), coagulopathy (increased fibrin degradation products) and uterine inversion. Body mass index (BMI) above 40 (class III obesity) is also a recognized risk factor for postpartum uterine atony .The diagnosis of atony is generally made when the uterus does not become firm after routine management of the third stage of labor. Atony may or may not be associated with retained tissue[6]. Placental disorders (eg, morbidly adherent placenta, placenta previa, abruptio placentae), retained products of conception, and uterine inversion result in PPH because they inhibit effective uterine contraction. With diffuse atony, blood loss can be much greater than observed because a flaccid and dilated uterus may contain a significant amount of blood. With focal localized atony, the fundal region may be well contracted while the lower uterine segment is dilated (ballooning) and atonic, which is difficult to appreciate on abdominal examination, but may be detected on vaginal examination.

Trauma-related bleeding can be due to lacerations or surgical incisions. Cervical and vaginal lacerations may develop as a result of the natural processes of delivery or may be related to provider interventions. They may not be noted until excessive postpartum vaginal bleeding prompts lower genital tract examination, including examination for vaginal and vulvar hematomas.Corpus lacerations may be complete transmyometrial ruptures or incomplete lacerations of the inner myometrium[7].

At cesarean delivery, hemorrhage from the uterine incision is generally caused by lateral extension of the incision, which can result from spontaneous tearing of an edematous lower segment during an otherwise uneventful cesarean delivery after prolonged labor, from an incision made too low or not sufficiently curved on the lower segment, or from delivery of the fetus through an incision that is too small.

Coagulopathy is a cause of PPH in women with an inherited or acquired bleeding diathesis, and a result of PPH when there is a severe reduction of clotting factors due to persistent heavy bleeding and hemodilution of the remaining clotting factors. Acute coagulopathies can be caused by amniotic fluid embolism, placental abruption, preeclampsia with severe features, or HELLP syndrome.

Risk Classification

The California quality improvement[8]. toolkit classifies patients as low, medium, or high risk for PPH:

Low Risk : Singleton pregnancy, fewer than four previous deliveries, chorioamnionitis, obesity(BMI > 35), estimated fetal weight >4,000 gr

Medium Risk: Prior uterine surgery,more than four previous deliveries,multiple gestation,large fibroids and chorioamnionitis

High Risk: Suspected placenta accreta or percretam hematocrit < 30%, platelets < 100,000 and active bleeding on admission

Management

When hemorrhage is suspected as the cause of hemodynamic instability, initial (and expedited) management with blood and blood products is advised (as opposed to large volume crystalloid infusion). Hypovolemic hemorrhagic shock is treated with aggressive volume resuscitation with packed red cells and other appropriate blood products. Transfusion should keep up with blood loss, with early activation of a protocol for large volume transfusion in those patients with heavy bleeding. Development of a standardized institutional approach to massive transfusion improves outcome . There are no data from clinical trials of PPH to help guide management of transfusion specifically in PPH

Uterine massage is a simple first line treatment as it helps the uterus to contract to reduce bleeding. Although the evidence around the effectiveness of uterine massage is inconclusive, it is common practice after the delivery of the placenta.

Intravenous *oxytocin* is the drug of choice for postpartum hemorrhage[9]. *Ergotamine* may also be used[10].

Oxytocin helps the uterus to contract quickly and the contractions to last for longer[11]. It is the first line treatment for PPH when its cause is the uterus not contracting well. A combination of syntocinon and ergometrine is commonly used as part of active management of the third stage of labor[12]. This is called syntometrine. It does reduce the risk of PPH by improving the tone of the uterus when compared with no treatment however it has to be used with caution due to its effect raising blood pressure and causing worse after pains.

Carbetocin compared with oxytocin produced a reduction in women who needed uterine massage and further uterotonic drugs for women having caesarean sections[13]. There was no difference in rates of PPH in women having caesarean sections or women having vaginal deliveries when given carbetocin[14]. Carbetocin appears to cause less adverse effects. More research is needed to find the cost effectiveness of using carbetocin[15].

Tranexamic acid, a clot stabilizing medication, may also be used to reduce bleeding and blood transfusions in low-risk women[16], however evidence as of 2015 was not strong.

Classification of Hemorrhage

Stage 0: normal - treated with fundal massage and *oxytocin*.

Stage 1: more than normal bleeding - establish large-bore intravenous access, assemble personnel, increase oxytocin, consider use of *methergine*, perform fundal massage, prepare 2 units of *packed red blood cells*.

Stage 2: bleeding continues - check coagulation status, assemble response team, move to *operating room*, place *intrauterine balloon*, administer additional *uterotonics* (misoprostol, *carboprost tromethamine*), consider: *uterine artery embolization*, *dilatation and curettage*, and *laparotomy* with uterine compression stitches or hysterectomy.

Stage 3: bleeding continues - activate *massive transfusion protocol*, mobilize additional personnel, recheck laboratory tests, perform laparotomy, consider hysterectomy[17].

Surgery

Surgery may be used in case of cervical lacerations or tear or uterine rupture or medical management fails. Methods used may include uterine artery ligation, ovarian artery ligation, internal iliac artery ligation, selective arterial embolization, B-lynch suture, and *hysterectomy*[18-20]. Bleeding caused by traumatic causes should be management by surgical repair.

Prevention

Active management of the third stage is a method of shortening the stage between when the baby is born and when the placenta is delivered[21]. This stage is when the mother is at risk of having a PPH. Active

management involves giving a drug which helps the uterus contract before delivering the placenta by a gentle but sustained pull on the umbilical cord whilst exerting upward pressure on the lower abdomen to support the uterus (controlled cord traction)[22].

Another method of active management which is not recommended now is fundal pressure during the delivery of the placenta. A review into this method found no research and advises controlled cord traction because fundal pressure can cause the mother unnecessary pain[23]. Allowing the cord to drain appears to shorten the third stage and reduce blood loss but evidence around this subject is not strong enough to draw solid conclusions[24].

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