Pregnancy-Related Unplanned Returns to the Operating Room

INTRODUCTION

The American Congress of Obstetricians and Gynecologists (ACOG) considers unplanned return to the operating room (OR) during the same admission an indicator that can be used to assess quality and track improvement in the practice of obstetrics and gynecology. The indicator is intended to identify events in which patients return to the OR after inpatient or outpatient surgery because of complications or untoward outcomes related to the original procedure.1

Early in the pregnancy, unplanned returns to the OR may be related to abortions. Abortions can be accomplished medically, by administration of medications, or surgically. Known complications include incomplete abortion, hemorrhage, damage to the uterus and surrounding organs, infection, and rarely, death; several of these complications may require surgical intervention. Ongoing patient assessment, both pre- and postprocedure, is key in readily identifying potential risks and complications.2-5

Immediately following delivery of an infant, postpartum hemorrhage is a major cause of maternal morbidity and mortality in the United States and the world. Postpartum hemorrhage is defined as vaginal bleeding in excess of 500 mL within 24 hours of delivery, with severe hemorrhage defined as greater than 1,000 mL of blood loss.6-8 A woman who has recently delivered an infant can be at risk for postpartum hemorrhage because of uterine atony, lacerations, retention of placental tissue, and uterine inversion or rupture.9-11

Literature supports that prompt identification and appropriate treatment of patients at risk for postpartum hemorrhage can decrease the incidence of adverse outcomes. Standardization of treatment guidelines, staff education, training, and especially simulation and prompt intervention are imperative in preventing injury and death.6,7,10,12-14

Pennsylvania healthcare facilities have reported events to the Pennsylvania Patient Safety Authority that are associated with pregnancy-related, unplanned return to the OR. Many maternal morbidity and mortality events are preventable through skilled care during labor and delivery, and quality improvement can be achieved by reviewing near misses as well as actual adverse outcomes.6,7,10 Best practices in the literature support patient safety practices that can prepare staff to respond in a swift and efficient manner to complications that may occur during pregnancy.

METHODS

Analysts queried the Pennsylvania Patient Safety Reporting System (PA-PSRS) database for events reported by hospitals, ambulatory surgical facilities, birthing centers, and abortion facilities from January 1, 2010, through December 31, 2014. The search criteria to identify events involving pregnant women included reports involving female patients between 10 and 60 years of age and containing the following terms in the narrative field: “pregnan,” “d&c,” “dilat,” “abort,” “fetus,” “fetal,” “partum,” “gestat,” “deliver,” “miscarry,” “cramp,” “stillborn,” “nonviable,” and “non-viable.”

All reports that identified aborted procedures not related to a pregnant woman, such as colonoscopy aborted due to inadequate preparation, were eliminated from the review. Reports involving an unplanned return to the OR were identified either from the event type coding or from information in the narrative details.
RESULTS

The initial query found 8,569 reports of events involving pregnant women, and the most frequently reported event type was complication of a procedure, treatment, or test (see the Table). Of these 8,569 reports, 1,031 involving an unplanned return to the OR were identified either from the event type coding (n = 261) or from information in the narrative details (n = 770).

The types of events identified among pregnancy-related unplanned returns to the OR were as follows:

- Incomplete abortions or abortions that resulted in increased bleeding or organ perforation that required an additional surgical procedure (44.7%)
- Postpartum hemorrhage (28.4%)
- Retained placenta (15.0%)
- Genital tract lacerations requiring surgical repair (7.6%)
- Other (4.3%)

The following are samples of events reported to the Authority. The details of the PA-PSRS event narratives in this article have been modified to preserve confidentiality.

The following two reports are examples of medical and surgical abortion complications:

A patient was seen for a medical abortion. The patient returned one month later for an ultrasound and examination. The physician detected a live intrauterine pregnancy at twelve weeks and four days. The physician determined that the medical abortion had failed. The physician performed a surgical abortion that same day.

Patient presented for an elective termination of pregnancy. The surgical termination was started with local anesthetic and ultrasound guidance after adequate dilation. The physician noted some bleeding with removal of the cervical dilator. The physician completed the procedure, and the patient continued to bleed briskly. The physician provided fundal massage and the patient was administered misoprostol and methergine. The patient was transported to another facility. The patient was brought to the OR and had significant blood in the uterus, thinned out uterine segments, and an inability to stop the bleeding. The patient had an abdominal hysterectomy, received a total of 6 units of blood, and was admitted to the hospital.

The following three reports are examples of postpartum hemorrhage complications:

The patient sustained postpartum hemorrhage following delivery due to uterine atony and required blood transfusion, examination under anesthesia with placement of a Bakri balloon, and uterine curettage. Patient was found to have cervical lacerations, with a required repair done at time of procedure.

The patient delivered a full-term infant vaginally. A retained placenta was noted. Part of the placenta was delivered with gentle traction and uterine massage after signs of placental separation. The placenta was palpated partially through the cervical os. The uterus was explored multiple times, and blood clots were removed along with placental fragments. The patient was taken to operating room, where large amounts of clotted material were removed and the uterus was further explored. Retained placental tissue approximately twelve centimeters in diameter was gently removed. The uterine bleeding continued, and methergine was administered. The estimated total blood loss was 1,250 mL. The patient delivered an infant vaginally without complication. Physician called to postpartum unit for postpartum hemorrhage. A large blood clot was evacuated, and patient was monitored for signs of increased bleeding. Patient had two more episodes of bleeding and ultrasound that showed possible retained products of conception. The patient was taken to the OR and placed under general anesthesia. Further inspection by physician revealed a 2 cm laceration on the left vaginal wall. The laceration was repaired, and the patient was transfused with two units of packed red cells. Patient’s condition stabilized, and the fundus remained firm and midline throughout the episode.

DISCUSSION

Induced Abortions

The most common type of reported event occurring during early pregnancy was induced abortion that was incomplete or in which other complications required a further surgical procedure. In the
Aborted pregnancy is performed at up to 23 weeks' gestation. After 24 weeks' gestation, the attending physician and another physician who has examined the patient must validate that the abortion is necessary to preserve the life of the mother or prevent serious risk of substantial and irreversible impairment of bodily function. The most recent Pennsylvania Department of Health vital statistics report states that 33,166 abortions were performed in 2012. Of these, 65.7% were accomplished by suction curettage, 25.9% were accomplished medically, and 8.4% were accomplished by dilation and evacuation.

Aborted pregnancy can be performed by medical or surgical methods. Medical abortions, also referred to as medication abortions, comprise 16.5% of all abortions done in the United States and are usually performed within the first 63 days after the first day of the last menstrual period. The US Food and Drug Administration–approved regimen and other regimens generally use oral mifepristone and vaginal, buccal, or sublingual misoprostol to induce the abortion. Mifepristone ends the pregnancy by blocking the hormone necessary for maintaining a pregnancy, while misoprostol causes the uterus to contract, expelling the pregnancy. In most cases, the abortion is complete within two weeks from the time of final medication administration.

Medical abortion is 92% to 99% effective at ending early pregnancies. Failures may require additional medication or a surgical procedure to completely terminate the pregnancy. An examination is usually performed one to two weeks after the medication administration to determine if a medical abortion is complete, using ultrasound and other diagnostic measures to determine if the gestational sac has been expelled. If the gestational sac is present on follow-up, the pregnant woman may be offered expectant care, with continued monitoring to see if further tissue is expelled on its own; an additional dose of misoprostol to induce further uterine contractions and expulsion of the gestational sac; or a surgical procedure, such as a uterine aspiration.

If a woman elects to have a surgical abortion, the type of surgical procedure performed will depend on the woman's stage of pregnancy. In the first trimester, the most frequent type of surgical abortion is suction aspiration or suction curettage, in which the uterine contents are removed via a suction device. After 12 to 14 weeks' gestation, dilation and evacuation is commonly utilized to terminate the pregnancy.

Postoperative complications of surgical abortion include hemorrhage, infection, uterine/bowel/bladder perforation, cervical laceration, and retained products. In addition, complications may arise related to the use of sedation or anesthesia. In a retrospective study of second-trimester abortions performed between 2004 and 2007, Frick et al. found that major complications occurred in 1.3% of the cases, with the greatest risk of complications in patients with a history of one or more previous cesarean deliveries. Advanced gestational age and insufficient cervical preparation requiring further dilation was also associated with an increased risk of major complications. Cervical lacerations were the most common complication, with this risk increasing with greater gestational age.

Niinimaki et al. compared the incidence of immediate adverse events and complications in 42,619 women—of whom 22,368 underwent medical abortions and 20,251 underwent surgical abortions at up to 63 days' gestational age—between 2000 and 2006. Outcomes monitored included hemorrhage, postabortion infection, incomplete abortion, injuries or other reasons for surgical operations, thromboembolic disease, psychiatric morbidity, and death. The study found that women who had medical abortions had an increased incidence of adverse events, the most frequent being hemorrhage and incomplete abortions, but that complications requiring surgical intervention were more frequent in women who had a surgical abortion.

Best-Practice Strategies for Induced Abortions

A thorough patient history and physical examination includes assessment of gestational age. Both gestational age and a woman's personal preferences will be factors in deciding on a medical or surgical procedure. Follow-up is often scheduled for one to two weeks later, in person or via telephone, to determine if the abortion is complete. Serial beta human chorionic gonadotropin levels can be drawn on the day of mifepristone administration and one week later; a significant drop in levels suggests termination of the pregnancy.

Grossman et al. performed a retrospective study comparing outcomes for women who underwent medical abortions via telemedicine versus an in-person appointment with a physician. Women who selected to use telemedicine completed a medical history and received an ultrasound exam by clinic staff. This information was sent electronically to the physician, who reviewed the information and consulted with the patient via a secured teleconferencing system. If the patient proceeded with the medical abortion, the physician released the medication at the clinic. The physician observed the patient taking the
Postpartum Hemorrhage

In the analysis, reports related to postpartum hemorrhage comprised 28.4% of pregnancy-related events of unplanned returns to the OR. Reports related to retained placental tissue and genital tract lacerations, both of which may contribute to postpartum hemorrhage, comprised an additional 22.6% of the reports.

Postpartum hemorrhage is a low-frequency but high-risk event during labor and delivery, responsible for 25% of maternal mortality worldwide. A 2011 report from the Center for Disease Control and Prevention’s Pregnancy Mortality Surveillance System indicates that hemorrhage is the fourth leading cause of pregnancy-related mortality in the United States, following cardiovascular diseases, noncardiovascular diseases, and infection or sepsis. Rocha Filho et al. studied the occurrence of obstetric complications in Brazil, from June 2009 to June 2010, and found that out of 9,555 women who sustained an obstetric complication, only 8% sustained an antepartum or intrapartum hemorrhage, but these hemorrhages were responsible for 18.2% of maternal near misses and 10% of maternal death cases.

Rapid recognition and treatment of postpartum hemorrhage, including initiating prompt resuscitation, are necessary, as untreated postpartum hemorrhage can result in a fatal outcome to a healthy woman within a few hours. In particular, staff’s inability to correctly assess blood loss has led to underestimation and failure to identify postpartum hemorrhage. Some patients may have risk factors for postpartum hemorrhage identified before or during labor (e.g., placenta accreta, increta, or percreta); however, a majority of women who sustain postpartum hemorrhage exhibit no risk factors. The leading cause of postpartum hemorrhage during and after the third stage of labor is uterine atony, defined as the uterus’ inability to contract after delivery of the fetus. Other causes of postpartum hemorrhage include trauma to the genitourinary tract, such as lacerations of the cervix, vagina, or perineal area; retained placental tissue; clotting disorders; or an inverted or ruptured uterus.

Prevention and Treatment of Postpartum Hemorrhage

In the last few decades, the shift to more aggressive active management of the third stage of labor (AMTSL) has given providers more methods with which to potentially avert adverse maternal outcomes and save women’s uteri. Preventive methods include administration of subcutaneous oxytocin combined with controlled cord traction and fundal massage after delivery of the placenta; keeping the woman’s bladder empty; replacing fluids intravenously; careful examination of the genital tract for signs of lacerations; and examination of the placenta to determine if any tissue may have been retained.

Treatment for uterine atony can include uterotonic medications, uterine massage, bimanual compression of the uterus, use of a balloon tamponade, or other hemostatic measures. Repair of birth canal lacerations and manual removal of retained placenta may be attempted in the delivery room but may also require moving the patient to the OR to facilitate prompt treatment, pain control, and patient comfort, including utilizing general anesthesia.

Surgical interventions to control hemorrhage may include dilation and curettage (D&C) to remove retained placental tissues; B-Lynch suturing to exert continuous vertical compression on the uterine vascular and muscular systems; and internal iliac artery ligation or stepwise devascularization. If the facility has interventional radiology services, uterine artery embolization can be performed, which may spare the uterus and preserve fertility. In some circumstances, hysterectomy may be the optimal option to save the woman’s life.

Best-Practice Strategies for Postpartum Hemorrhage

Literature supports implementation of evidence-based systematic protocols for recognition and response to postpartum hemorrhage to improve patient outcomes. The Council on Patient Safety in Women’s Health Care has published an obstetric hemorrhage patient safety bundle that may assist healthcare
facilities develop their own standards. The process is outlined in “Four Rs: Readiness, Recognition and Prevention, Response, and Reporting/Systems Learning.” \(^3\)

The California Maternal Quality Care Collaborative (CMQCC) has also published a toolkit that presents evidence-based protocols to help providers recognize and respond to postpartum hemorrhage, from the stages of early assessment and AMTSL through managing more severe hemorrhage scenarios. \(^10\) The management algorithm is based on the patient’s vital signs, blood loss, and other physiologic criteria, and it addresses options such as administration of intravenous fluids, medications, and transfusions, as well as various surgical interventions. To access the CMQCC Obstetric Hemorrhage Toolkit, see https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit.

As postpartum hemorrhage is an infrequent event in most birthing facilities; staff may not have actual experience managing this complication. Simulation training has been found to be an effective educational tool, ranging from tabletop exercises to employing simulation educators who role-play while using low-technology torsos or other props or high-technology electronic manikins that can “deliver” an infant manikin and demonstrate hemorrhage and other abnormalities. Simulation-based education allows staff to practice clinical skills and teamwork, including communication, and provides an opportunity to assess environmental resources. \(^10,33\)

Several healthcare organizations have published results of patient safety initiatives addressing postpartum hemorrhage. In a published account from Pennsylvania, Lehigh Valley Hospital initiated multiple actions, such as establishing a team and providing simulation and crew resource training to improve team communication, to reduce birth-related traumas in 2006. Quality measurements included maternal death, maternal admission to the intensive care unit, return to the OR, transfusions given, and third- and fourth-degree lacerations. The hospital reported a 2% decrease in birth-related trauma over a two-year period. \(^34\)

In Honolulu, Hawaii, Pacific Health implemented simulation training addressing massive hemorrhage. This training resulted in reduced staff response time for several key portions of their postpartum hemorrhage protocol, including recognition of the problem and getting medications, all supplies, and blood products for transfusion into the patient’s room. \(^35\)

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**FOUR Rs: READINESS, RECOGNITION AND PREVENTION, RESPONSE, AND REPORTING/SYSTEMS LEARNING**

**Readiness**

*Every unit*

- Hemorrhage cart with supplies, checklists, and instruction cards for intrauterine balloons and compression stitches
- Immediate access to hemorrhage medications (kit or equivalent)
- Establish a response team—who to call when help is needed (blood bank, advanced gynecologic surgery, other support and tertiary services)
- Establish massive and emergency release transfusion protocols (type-O negative/uncrossmatched)
- Unit education on protocols, unit-based drills (with post-drill debriefs)

**Recognition and Prevention**

*Every patient*

- Assessment of hemorrhage risk (prenatal, on admission, and at other appropriate times)
- Measurement of cumulative blood loss (formal, as quantitative as possible)
- Active management of the 3rd stage of labor (department-wide protocol)

**Response**

*Every hemorrhage*

- Unit-standard, stage-based, obstetric hemorrhage emergency management plan with checklists
- Support program for patients, families, and staff for all significant hemorrhages

**Reporting/Systems Learning**

*Every unit*

- Establish a culture of huddles for high risk patients and post-event debriefs to identify successes and opportunities
- Multidisciplinary review of serious hemorrhages for system issues
- Monitor outcomes and process metrics in perinatal quality improvement (QI) committee

Wagner et al. studied the implementation of evidence-based protocols, team training with an emphasis on communication, and simulation training at a tertiary care facility from 2007 to 2009. They measured 11 adverse outcome indicators and showed that implementing comprehensive patient safety initiatives resulted in reduced adverse outcomes, including peripartum hysterectomy, unplanned transfer to the intensive care unit, birth trauma, return to the OR, and uterine rupture.

**CONCLUSION**

Unplanned returns to the OR can occur because of complications or untoward outcomes related to the procedures undergone by pregnant women. In the events reported in Pennsylvania from 2010 through 2014, 1,031 reports of unplanned returns to the OR for women of childbearing age involved a pregnancy-related event. These event reports were clustered around two distinct times in the pregnancy. At the beginning of pregnancy, unplanned returns to the OR were often related to abortions that were incomplete or were associated with increased bleeding or injury to the uterus. In the immediate postpartum period, unplanned returns to the OR were often related to postpartum hemorrhage, retained placental tissue, or genital tract lacerations.

With regard to abortions, best-practice guidelines suggest careful assessment to determine the appropriate procedure based on the stage of the pregnancy and the patient’s personal preference; follow-up care will be guided by the type of procedure performed. With regard to postpartum hemorrhage, research shows multiple preventive measures that may result in fewer or less severe adverse patient outcomes. Literature shows that healthcare organizations that have implemented standardized protocols for recognizing and responding to postpartum hemorrhage and simulation-based education have improved patient outcomes.

**NOTES**


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