Rapid-Response Plan Curbs Maternal Hemorrhage

Management strategies include use of ultrasounds, vitamins, and faster availability of blood products.

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When a second woman died from complications of maternal hemorrhage at his hospital between 2000 and 2001, Isaac P. Lowenwirt, M.D., knew that an institutional approach to systemic change was necessary to provide a safety net.

"When we had two maternal deaths that were secondary to hemorrhage-related complications, we sat down and used a multidisciplinary approach to develop detailed guidelines to help manage these cases and improve outcomes," said Dr. Lowenwirt of the New York Hospital Queens. The hospital implemented the guidelines in 2001 and has had no maternal deaths since that time.

The New York Hospital Queens is a 439-bed hospital in Flushing, New York, affiliated with the Weill Medical College of Cornell University and the New York Presbyterian Hospital. It is designated as a level III neonatal intensive care center and serves an urban population, including many with Medicaid or other publicly funded insurance. The hospital handles about 3,500 deliveries a year, approximately 1,000 of which are cesarean deliveries.

Dr. Lowenwirt and his colleague Daniel W. Skupski, M.D., director of maternal-fetal medicine, were part of a multidisciplinary task force that included personnel from the divisions of maternal-fetal medicine, obstetric anesthesiology, neonatology, and the blood bank, as well as the departments of nursing, administration, and communications. The trauma team and operating room staff also helped shape the protocols.

The task force designed a multifaceted approach that included the following:

► Development of a rapid-response program, called Team Blue, based on the team approach used for cardiac arrest patients, with quarterly mock drills conducted on all shifts for various obstetric emergency clinical scenarios.

► Development of clinical pathways, guidelines, and protocols designed to provide for early diagnosis of patients at risk for major obstetric hemorrhage and for streamlined care in emergency situations.

► Revision of the duties of the in-house obstetrician to include monitoring all patients on the labor and delivery unit, including patients who had other private obstetricians.

► Empowerment of care providers (including physician assistants, nurses, and residents) to involve senior members of the department whenever there was a disagreement with the treatment plan concerning patients with hemorrhage.

Since the rapid-response plan's inception, the efforts have paid off. Maternal morbidity and mortality from hemorrhage dropped significantly at the hospital from 2002-2004, compared with 2000-2001.

In addition to the emergency response, the emergency team has developed strategies to care for the obstetric patient with known placenta previa. These strategies include prenatal consultation with the senior gynecologic surgeon and the divisions of maternal-fetal medicine and obstetric anesthesiology.

Ultrasound is used to identify placenta accreta in patients with prior uterine surgery, and the patients undergo a twice-weekly type and screen test to allow for faster availability of blood products in the event of hemorrhage.

In addition, patients with suspected placenta accreta are scheduled for cesarean deliveries at 36 weeks' gestation, following amniocentesis to determine fetal lung maturity. Other management strategies for patients at risk of hemorrhage include weekly autologous blood donations and the administration of erythropoietin, iron, and vitamin therapy, as well as the use of intraoperative blood collection and autotransfusion after delivery. The protocols call for judicious placement of extra intravenous lines for fluid volume resuscitation, as well as intraoperative monitoring and transfer to the postanesthesia unit or the surgical intensive care unit as needed.

Although the number of deliveries at the New York Hospital Queens has increased in recent years, there have been no deaths or major end-organ damage due to hemorrhage since they initiated emergency protocols and procedures, Dr. Lowenwirt said.

The rapid-response team includes members of various specialties involved with labor and delivery. In the event of an emergency, all team members are notified simultaneously by a special beeper.

"We disseminated the changes and protocols with the entire attending physician staff and ancillary staff through weekly didactic sessions," Dr. Lowenwirt explained.

As with anything new, there was some resistance. "The resistance comes when you work across different departments," he said. The challenge was to look at the situation in a nonthreatening way and to consider the end products, which are patient safety and good outcomes.

Once the staff experienced the system with real cases, they bought in, and the institution and its patients have benefited.

Although no insurance companies currently sponsor training programs for the management of maternal hemorrhage, Dr. Lowenwirt said that he could envision such programs in the future. "The rising payouts in the New York area have resulted in a particular awareness of this problem," he said.

In 2004, the State of New York Department of Health and the New York City Department of Health announced that maternal mortality from obstetric hemorrhage had reached an all-time high. They issued a memorandum outlining systematic steps to prevent maternal deaths from hemorrhage and to offer a safety net for obstetric patients.

"Our team began systematic change three years earlier, and the changes we outline can serve as a guide for many institutions around the country," Dr. Lowenwirt noted.

At the national level, the American College of Obstetricians and Gynecologists is developing an updated practice bulletin for dealing with maternal hemorrhage, said Jeffrey C. King, M.D., professor and chair of the department of obstetrics and gynecology at New York Medical College, Valhalla, and chair of ACOG's National Maternal Mortality Interest Group.

"ACOG tries to fit its guidelines to the vast array of hospitals providing obstetric service throughout the country; they try not to be dogmatic," he said. The guidelines focus on the systems that enable response to an obstetric emergency, and local institutions work out their own protocols, specific to their resources and personnel.

The New York State Department of Health and ACOG District II issued an alert in August 2004 that highlighted strategies to prevent death from maternal hemorrhage, and those guidelines are still current, said Dr. King, who helped develop the guidelines. (See sidebar.)

"We had a significant response to the health alert, with many hospitals at least looking at how their processes work," he noted.

"Clearly, operative deliveries in and of themselves increase the risk of excessive blood loss," he said. "There are certain situations in which hemorrhage is more likely to occur, but most of [those] occur in an unexpected situation."

Although many malpractice insurance companies have become involved in risk-reduction programs, those programs have more to do with patient communications and documentation than specific management strategies, Dr. King said. No malpractice insurance companies in the United States currently sponsor any training programs to improve the management of maternal hemorrhage. ■

Recommendations for Managing Maternal Hemorrhage

The New York State Department of Health and ACOG District II continue to support their joint recommendations for preventing maternal deaths by improving management of hemorrhage.

Seven steps to reduce the risk of maternal death from hemorrhage include:

► **Perform antepartum and postpartum assessments.** Identify women at increased risk of complications during pregnancy and childbirth. Women at risk include those with a history of postpartum hemorrhage, placenta previa, grand multiparity, current macrosomia, or several cesarean births. In addition, women with a history of bleeding disorders or hematologic disease are at increased risk for hemorrhage. Uterine atony is a frequent cause of postpartum hemorrhage, and women with multiple gestation, a macrosomic fetus, or a uterine abnormality are at particular risk.

► **Be aware of blood loss during pregnancy, labor, and delivery.** Blood loss often is underestimated. Gradual blood loss can add up to large amounts over time. Medications such as magnesium sulfate and terbutaline can increase the risk of hemorrhage. Keep in mind that 1 cup=250 cc=1 large clot=1 unit of packed red blood cells. Use clinical judgment about the need for transfusion.

► **Monitor fluids and urine output.** Poor urine output may indicate poor intravascular volume as a result of blood loss. Use fluid resuscitation and transfusion to replace current blood loss and continued bleeding, regardless of the mother's apparent hemodynamic stability. By the time women of reproductive age show instability, there may already be severe compromise. Keep in mind that laboratory results may not accurately reflect hemodynamic status.

► **Develop rapid-response protocols.** Hemorrhage is an infrequent occurrence, and hospitals with effective emergency protocols to respond to maternal hemorrhage are best able to prevent it. Rapid emergency blood transfusions and plenty of compatible un-crossmatched blood should be easily accessible for obstetric emergencies.

► **Conduct drills.** Conduct "hemorrhage drills" with the labor and delivery staff to improve efficiency during emergencies. The staff should treat maternal hemorrhage with the same urgency as a cardiac code and conduct drills at different times of day to ensure experience for all team members. The team should include a surgeon with experience in hemorrhage, a critical care specialist or anesthesiologist, and a hematologist and support from the blood bank.

► **Support the family.** Call social workers or support staff as soon as possible to provide support to the immediate family while the medical staff attends to the crisis at hand.

► **Educate the staff.** Continue to train the entire hospital staff on procedures for managing maternal hemorrhage. Incorporate the information into mandatory staff education and new staff training.

The complete document is available at www.acog.org/acog_districts/dist_notice.cfm?recno=1&bulletin=1517.

Sources: The American College of Obstetricians and Gynecologists, the State of New York Department of Health, and the New York City Department of Health and Mental Hygiene