OBSTETRICS

Maternal morbidity in patients with morbidly adherent placenta treated with and without a standardized multidisciplinary approach

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OBJECTIVE: The purpose of this study was to test the hypothesis that a standardized multidisciplinary treatment approach in patients with morbidly adherent placenta, which includes accreta, increta, and percreta, is associated with less maternal morbidity than when such an approach is not used (nonmultidisciplinary approach).

STUDY DESIGN: A retrospective cohort study was conducted with patients from 3 tertiary care hospitals from July 2000 to September 2013. Patients with histologically confirmed placenta accreta, increta, and percreta were included in this study. A formal program that used a standardized multidisciplinary management approach was introduced in 2011. Before 2011, patients were treated on a case-by-case basis by individual physicians without a specific protocol (nonmultidisciplinary group). Estimated blood loss, transfusion of packed red blood cells, intraoperative complications (eg, vascular, bladder, ureteral, and bowel injury), neonatal outcome, and maternal postoperative length of hospital stay were compared between the 2 groups.

RESULTS: Of 90 patients with placenta accreta, 57 women (63%) were in the multidisciplinary group, and 33 women (37%) were in the nonmultidisciplinary group. The multidisciplinary group had more cases with percreta ($P = .008$) but experienced less estimated blood loss ($P = .025$), with a trend to fewer blood transfusions ($P = .06$), and were less likely to be delivered emergently ($P = .001$) compared with the nonmultidisciplinary group. Despite an approach of indicated preterm delivery at 34-35 weeks of gestation, neonatal outcomes were similar between the 2 groups.

CONCLUSION: The institution of a standardized approach for patients with morbidly adherent placentation by a specific multidisciplinary team was associated with improved maternal outcomes, particularly in cases with more aggressive placental invasion (increta or percreta), compared with a historic nonmultidisciplinary approach. Our standardized approach was associated with fewer emergency deliveries.

Key words: invasive placenta, maternal complication, placenta accreta, placenta increta, placenta percreta, standard treatment

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Placenta accreta is a major cause of postpartum hemorrhage and not only is associated with a 40% chance of requiring massive transfusion (>10 units of packed red blood cells [PRBCs]) but also carries a maternal mortality rate that has been reported to be as high as 6-7%.[1-4] Placenta accreta results from abnormal invasion of the myometrium by chorionic villi and attempts to separate a placenta accreta manually from the underlying uterine wall frequently

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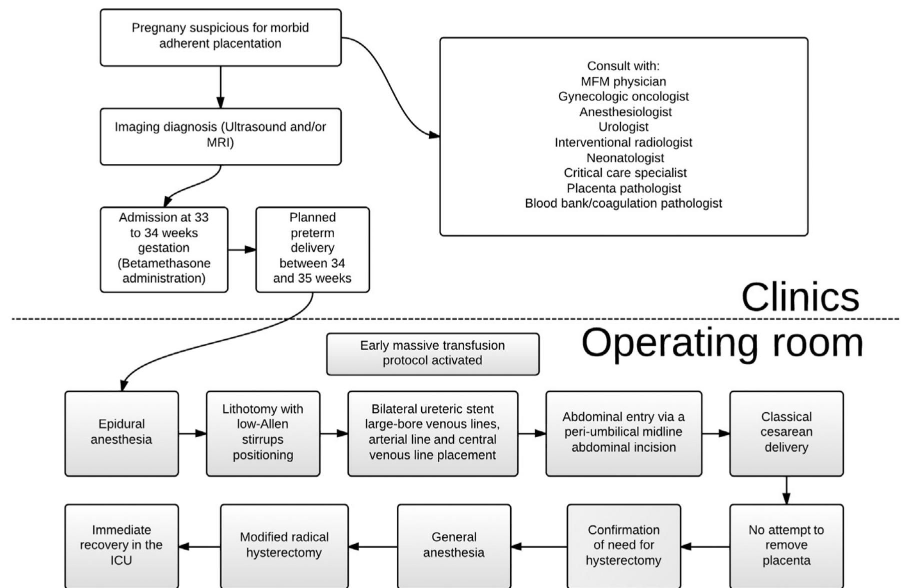
precipitates significant hemorrhage.[5] Based on the depth of the invasion and the amount of morbidly adherent placenta, hysterectomy frequently is performed as a life-saving procedure.[6,7] Placenta accreta is associated strongly with the combination of placenta previa and previous cesarean delivery.[1,2,6] Placenta accreta is now the leading cause of cesarean hysterectomy in developed countries.[8]

A defined management strategy has been shown previously to decrease the morbidity from placenta accreta.[9,10] Prenatal diagnosis, multidisciplinary consultation, and predelivery planning for cesarean hysterectomy are reported to be of benefit in the reduction of complication rates and maternal blood transfusion.[5] Such an approach is recommended particularly in cases of more aggressive placental invasion, such as placenta increta or percreta.[11,12] Planned preterm delivery[13] and a staged procedure with intraoperative arterial embolization[14] are 2 strategies that have also been reported to improve outcomes.

The technique of cesarean hysterectomy used in the management of the morbidly adherent placenta is different from that generally used for intractable uterine atony or uterine rupture. In the case of invasive placentation, the anatomy frequently is distorted; tissues are more friable; neovascularization is present; tissue planes are less defined, and massive hemorrhage are more likely. These factors worsen progressively with deeper placental invasion, which makes surgery for placenta percreta 1 of the most challenging operations in obstetric practice. This study introduces a potentially effective intervention strategy for management of placenta accreta, although sufficient confirmatory studies are already lacking in the literature.

The aim of this study was to evaluate our outcomes after implementation of a formal multidisciplinary management program in which standardized preoperative, intraoperative, and postoperative approaches were used. Our primary outcome measures were estimated blood loss (EBL), need for transfusion, and perinatal complications. We hypothesized that our multidisciplinary approach would result in reduced blood loss, decreased transfusion, and a decrease in preoperative, intraoperative, and postoperative complications.

FIGURE
Multidisciplinary protocol to treat patients who had morbidly adherent placentation (placenta accreta)



ICU, intensive care unit; *MFM*, maternal-fetal medicine; *MRI*, magnetic resonance imaging.

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Materials and Methods

A retrospective cohort study included all pregnancies with a histopathologically confirmed diagnosis of placenta accreta, increta, or percreta treated in 1 of 3 tertiary teaching hospitals for Baylor College of Medicine, Houston, TX, between January 2000 and September 2013. This study was approved by the Baylor College of Medicine Institutional Review Board.

A formal multidisciplinary management program was introduced in 2011 for known and suspected cases of morbidly adherent placenta. We instituted a standardized protocol with a multidisciplinary strategy (Figure). Briefly, the protocol included admission at 33-34 weeks of gestation, planned preterm delivery by cesarean hysterectomy between 34 and 35 weeks of gestation, preoperative consultation, and prospective planning for maternal and neonatal care by the multidisciplinary team. All patients were admitted to the maternal-fetal medicine (MFM) service under the "percreta team" protocol and treated by an MFM on the team. The MFM physician coordinated all care and planning. The team had a nursing coordinator who ensured that all preadmission and admission checklist items were completed. All patients had a standardized consultation scheduled after admission with pulmonary critical care (a 24/7 service on our labor and delivery unit), urology, blood bank, anesthesiology, nursing, and neonatal intensive care unit services. Other specialized services such as interventional radiology or vascular surgery were consulted on an as-needed basis in an individualized fashion. In some cases, patients began contracting or started bleeding before all consultations were completed; in a few cases, emergency surgery was required. In these cases, the multidisciplinary approach was still followed systematically to the extent that it was safe.

Whenever possible, patients underwent combined spinal-epidural anesthesia for bilateral ureteric stent placement and

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