Successful continuation of pregnancy after repair of a midgestational uterine rupture with the use of a fibrin-coated collagen fleece (TachoComb) in a primigravid woman with no known risk factors

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We report the first case of successful continuation of pregnancy after repair of a midgestational uterine rupture with the use of a fibrin-coated collagen fleece (TachoComb, Nycomed, Linz, Austria). For midgestational uterine rupture, adequate uterine repair and close surveillance of preterm labor could improve perinatal outcome by permitting continuation of the pregnancy.

Key words: fibrin-coated collagen fleece, uterine rupture

Uterine rupture is 1 of the most serious obstetric complications and may result in maternal and neonatal morbidity and mortality. It is generally believed that an unscarred primigravid uterus is immune to rupture, and spontaneous uterine rupture in a midgestational primigravid woman is exceedingly rare. Termination of the pregnancy with concurrent uterine repair or hysterectomy constitutes the usual approach to uterine rupture.[1] However, if uterine rupture occurs at a very premature stage of fetal development, there is even a higher risk of neonatal morbidity and mortality compared with rupture at term.[2] Uterine repair to allow continuation of the pregnancy potentially reduces these risks from prematurity. We report a case of spontaneous uterine rupture occurring at 24 weeks of gestation in a primigravid woman with no known risk factors. Utility of a fibrin-coated collagen fleece (TachoComb, Nycomed, Linz, Austria) for uterine repair and significance of close surveillance of preterm labor during continuation of pregnancy are discussed.

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CASE REPORT

A 30-year-old Japanese primigravid woman presented at 24 2/7 weeks of gestation to an emergency department complaining of acute onset of severe abdominal pain since midnight. Her past medical history was noncontributory, and her antenatal care had been uneventful. No uterine contractions or history of recent abdominal trauma were reported. For 4 days she had experienced a vague sensation of discomfort in the upper abdomen. On physical examination, there was marked tenderness to palpation throughout the upper abdomen, with guarding and rebound tenderness. Blood pressure was 94/47 mm Hg; pulse, 100; respirations, 32; and temperature, 36.5°C. Laboratory values included hemoglobin, 10.4 g/dL; hematocrit, 32%; white blood cell count, 7000 cells/mm^3; and platelets, 283,000/mm^3. Ultrasonography and computed tomography suggested a hematoperitoneum, located primarily in the right iliac fossa with minimal free fluid in the cul-de-sac, but imaging scans could not identify the primary lesion. Pelvic examination found no vaginal bleeding, the cervical os was closed, and the size and position of the uterus were consistent with gestation with no detected uterine activity. Obstetric ultrasound examination showed a single uterine pregnancy with normal fetal heart rate. The site of placental implantation was the right fundus, and there was no evidence of abruption. The working diagnosis at this stage was intra-abdominal hemorrhage of uncertain cause, possibly secondary to rupture of an artery in the gastrointestinal organs or the abdominal wall. Three hours later, the patient's condition had gradually deteriorated (blood pressure, 72/36 mm Hg; pulse, 125). The hemoglobin and hematocrit dropped to 8.9 g/dL and 25.7%, respectively. Thus, the transfusion of red blood cells was commenced.

Although we informed the patient and her families of the possibility of termination of the pregnancy before operation, they expressed a strong desire for the pregnancy to continue regardless the risks. Emergency laparotomy was performed by surgeons together with obstetricians and perinatal staff, and blood loss state consisting of 2200 mL of blood was found. Although abdominal examination detected no abnormality in the gastrointestinal organs, a partial uterine rupture of approximately 3 cm in the right posterior wall of the uterine fundus was identified as the source of bleeding. In addition, 2 surface varicose veins were torn. The site of placental implantation was located just beneath the partial rupture. The tear extended to about two thirds of the uterine wall, but the placental tissue was not protruding through the dehisced area. The patient's condition, including blood pressure (105/60 mm Hg) and pulse (80), improved after the

administration of 3 units of red blood cells and 2000 mL of crystalloid. The early gestational age, patient's relatively stable condition, and desire to maintain the pregnancy led to the decision to attempt the repair of the uterine rupture. The uterine rupture and torn varicose veins were repaired by using interrupted stitches of polyglactin (Vicryl, Ethicon, Somerville, NJ); however, adequate hemostasis could not be obtained because of neovascularization of the uterine wall over the placental implantation site. Therefore, a 50 × 30 mm piece of TachoComb (Nycomed) was placed to cover the entire repaired dehiscence. Manual compression with the TachoComb (Nycomed) was applied for 10 minutes, to achieve complete hemostasis. Six units of red blood cells and 2500 mL of crystalloid were administered intraoperatively. Postoperatively, the patient was strictly monitored and received an additional 2 units of red blood cells (total dose: 8 units) and 2000 mL of volume resuscitation. Mild pulmonary edema occurred, but the patient's respiratory condition was stable on room air. Because frequent uterine contractions were noted immediately after the operation, ritodrine hydrochloride—the first choice for tocolysis in Japan—was carefully administered, which resulted in the resolution of uterine contractions. Repeated ultrasonography showed a normal fetal heart rate. Although few uterine contractions had occurred since the day after operation, transvaginal ultrasonography demonstrated that cervical length had gradually shortened. Twenty-three days after the primary surgery, the patient underwent emergency MacDonald cerclage because cervical dilatation of 2 cm with membranes was noted. The postoperative clinical course was uneventful. The ultrasound follow-up showed normal fetal growth and no abnormality of the placenta. At 32 weeks of gestation, magnetic resonance imaging revealed no evidence of placenta percreta through the dehisced area. However, after 35 weeks of gestation, the patient repeatedly experienced discomfort in the upper abdomen similar to the sensation she had experienced before uterine rupture. Therefore, a primary low transverse cesarean section was undertaken at 35 2/7 weeks of gestation, delivering a 2612 g male infant with consistent Apgar scores of 9 at 1 and 5 minutes. The placenta was easily removed. Examination of the uterus showed no abnormal findings with the exception of inflammatory changes in the posterior wall. The TachoComb (Nycomed), which had been fitted over the rupture site, was found to be intact. Again, the patient's postoperative clinical course was uneventful. At the 8-week postnatal visit, both the mother and infant were found to be doing well. This case report was conducted with the patient's informed consent and with the approval of the hospital ethics board.

COMMENT

Few cases of spontaneous uterine rupture in midgestational primigravid women have been reported, and most of these have been associated with risk factors such as uterine abnormality, history of gynecologic surgery, and placenta percreta. Our patient had no known risk factors for rupture. After uterine repair, she underwent emergency cervical cerclage because of painless cervical dilatation, similar to cervical incompetence. Uterine rupture and cervical incompetence each have been related to abnormality of the connective tissues, which results from collagen deficiency.[4] Although the exact mechanism in our patient was unclear because of lack of pathologic or biologic examination, weakening of the connective tissue of the uterine wall induced by unidentified factors may have contributed to the pathogenesis of these 2 complications. Uterine rupture must be considered in the differential diagnosis of patients with acute, severe abdominal pain accompanying hemodynamic instability even in midgestational primigravid women with no known risk factors.

To our knowledge, there have been only 3 reported cases of repair for partial uterine rupture with the continuation of pregnancy occurring at midgestation (19-28 weeks of gestation).[1-3] Two cases were repaired by using only stitches, but 1 case required a Gore-Tex soft tissue patch (W. L. Gore and Associates, Inc, Flagstaff, AZ) for repair of uterine dehiscence.[1] All patients underwent cesarean delivery between 33-34 weeks of gestation, resulting in delivery of an intact infant. Our case is the first report of the successful continuation of pregnancy after repair for uterine rupture by using TachoComb (Nycomed), which consists of a sheet of collagen, coated on 1 side with human fibrinogen, bovine thrombin, bovine aprotinin, and riboflavin.[5] An in vitro study previously showed that TachoComb (Nycomed) provided reliable sealing and high adhesive strength. Its hemostatic efficacy and safety have been clinically assessed in various operative procedures, such as cardiac, thoracic, and hepatic surgery. We used TachoComb (Nycomed) on an oozing uterine rupture, thereby achieving complete hemostasis. Persistent retention of this graft on the uterus and the lack of complications from the midsecond trimester to the third trimester were apparent after the cesarean delivery. TachoComb (Nycomed) may be an effective hemostatic agent for the repair of uterine rupture and may support the ruptured lesion during gestation. For patients with otherwise favorable conditions, uterine repair, together with the use of artificial agents, should be considered to allow the pregnancy to continue, thus improving perinatal outcome in premature pregnancies. In addition, during the continuation of pregnancy after uterine repair, close surveillance of preterm labor, including painless cervical dilatation, is necessary. However, because the actual maternal risk associated with uterine repair during pregnancy may be much higher than that associated with such a repair after the termination of pregnancy and a hysterectomy, this essentially experimental approach should be followed only in carefully selected patients, after consideration of the patient's condition and desire to maintain pregnancy. Information about the possibility of increasing maternal risk and reducing neonatal morbidty is also helpful for patients and their families when making decisions regarding this approach. ■

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