Obstetric Uterine Rupture: A 20-Year Clinical Analysis

Yeou-Lih Wang, Tsung-Hsien Su*, Robert Kauo-Kung Lee

Department of Obstetrics and Gynecology, Mackay Memorial Hospital, and Mackay Junior College of Nursing, Taipei, Taiwan.

SUMMARY

Objective: To analyze the obstetric and gynecologic history of women with uterine rupture during pregnancy, and examine maternal and perinatal morbidity and mortality outcomes after uterine rupture.

Materials and Methods: A retrospective review of patients with rupture of the gravid uterus at Mackay Memorial Hospital, for the period between January 1984 and September 2003, was undertaken. The records of these patients were studied with regard to previous cesarean section, the use of uterine stimulants, the use of instruments in delivery, clinical features, treatment modality, and maternal and fetal morbidity and mortality.

Results: A total of 21 cases of rupture of the gravid uterus were found. The prevalence of uterine rupture was 1 in 6,056 deliveries. The most common risk factor was previous cesarean section scar (48%). Fetal distress (43%) and postpartum hemorrhage (24%) were the two most common manifestations of ruptured uterus. Fourteen cases were term pregnancies. However, seven cases presented before term, including one in the first trimester, two in the second trimester, and four in the early third trimester. There was only one maternal death (5%), but five cases (24%) presented with intrauterine fetal demise.

Conclusions: Physicians should be alert to the possibility of uterine rupture at all stages of pregnancy. The ability to recognize the various signs of a possible rupture event, such as fetal distress, maternal pain, or hypotension, and then to address the situation immediately, is critical to a good outcome. [*Taiwanese J Obstet Gynecol* 2004; 43(3):136–139]

Key Words: uterine rupture, labor complications, uterus

Introduction

Rupture of the pregnant uterus is a serious complication and is a potentially catastrophic event for both mother and fetus. Uterine rupture can be classified according to etiology: rupture of previous scar (myomectomy, hysterotomy, etc.), traumatic rupture (version, accident) of an unscarred uterus, spontaneous rupture of an unscarred uterus with pathology (anomalies, multiparity), and spontaneous rupture of an unscarred uterus in a primigravid patient without apparent pathology [1]. Despite significant advances in obstetrics, anesthesiology, and clinical pathology, rupture of the pregnant uterus continues to threaten both mother and fetus with high morbidity and mortality rates [2]. A greater awareness of this entity aided by prompt diagnosis and definitive treatment is the most important factor in reducing morbidity and mortality.

This retrospective study was undertaken to analyze the obstetric and gynecologic history of women with uterine rupture and to examine maternal and perinatal morbidity and mortality after uterine rupture.

Materials and Methods

We retrospectively reviewed cases with rupture of the gravid uterus at Mackay Memorial Hospital for the

*Correspondence to: Dr. Tsung-Hsien Su, Department of Obstetrics and Gynecology, Mackay Memorial Hospital, 92 Chung-Shan North Road, Section 2, Taipei 10449, Taiwan.
E-mail: sutsung@ms2.mmh.org.tw
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period between January 1984 and September 2003. The records of these patients were studied with regard to previous cesarean section, the use of uterine stimulants, the use of instruments in delivery, clinical features, treatment modality, and maternal and fetal morbidity and mortality.

Results

A total of 21 cases of rupture of the gravid uterus were found. Four patients had delivered at other clinics and were transferred to our hospital. Two cases were not included in our delivery database because the babies were of gestational age ≤ 16 weeks. There were a total of 127,175 deliveries at our hospital over the same time period; the prevalence of uterine rupture was 1 in 6,056 deliveries. The maternal age range was 23–37 years, and the mean gestational age was 34 weeks. Fourteen cases were term pregnancies. However, seven cases presented before term, including one in the first trimester, two in the second trimester, and four early in the third trimester. The mean parity was 1.2. Seven patients were nulliparous. Ten women with uterine rupture had a history of cesarean deliveries, seven with previous low-transverse uterine incisions and three with two or more previous cesarean deliveries. The mean birth weight was 2,715 g, and only one baby had macrosomia (> 4,000 g). The most common risk factor was previous cesarean section scar (Table 1). Four patients had two predisposing factors: two had previous cesarean section scars and vacuum extraction deliveries, while the other two had previous cesarean section scars and placenta increta. No obvious predisposing factor was identified in five cases. Fetal distress and postpartum hemorrhage were the two most common manifestations of a ruptured uterus (Table 2).

The lower anterior wall was the most common area for obstetric uterine rupture (Table 3). Most uterine ruptures can be managed by primary repair accompanied by hemostatic techniques such as hypogastric artery ligation. Only two patients underwent therapeutic hysterectomy; one patient died in the operating room during emergency laparotomy after resuscitation in the emergency room.

Five patients presented with intrauterine fetal demise. The mean blood loss was 1,955 mL: 11 patients (52%) had blood loss of less than 1,500 mL, five (24%) had blood loss between 1,500 and 2,500 mL, and five (24%) had blood loss of more than 2,500 mL. Sixteen patients received blood transfusions. The mean length of hospital stay was 9.6 days, and seven patients were admitted to the intensive care unit for further management. Other morbidities included two patients with pelvic inflammatory disease, one with bladder injury, one with postoperative ileus, one with dysfunctional voiding, and one with deep vein thrombosis.

Table 1. Predisposing factors leading to uterine rupture

	n (%)
Previous cesarean section scar	10 (48)
Injudicious use of uterine stimulants	4 (19)
Vacuum extraction	3 (14)
Placenta increta or percreta	3 (14)
Unknown	5 (24)

There were four patients who had 2 predisposing factors each: two had previous cesarean section scars and vacuum extraction deliveries, and two had previous cesarean section scar and placenta increta.

Table 2. Clinical features of ruptured uterus

	n (%)
Sudden onset of abdominal pain	3 (14)
Postpartum hemorrhage	5 (24)
Fetal distress*	9 (43)
Postpartum abdominal pain, distension, ileus	3 (14)
Abdominal pain with IUFD	3 (14)
Maternal hypovolemic shock	2 (10)
Insidious symptoms	2 (10)

**Fetal distress is defined as severe variable fetal heart rate decelerations, late decelerations, or poor variability on electronic fetal heart rate monitor. IUFD = intrauterine fetal demise.*

Table 3. Locations of rupture and surgery performed

Rupture location	*n* (%)	Management, *n* (%)				
		Hysterectomy	Repair	HAL + repair	Repair + ATS	Death
Fundal area	5 (24)	0	5 (100)	0	0	0
Lower anterior	11 (52)	1 (9)	4 (36)	3 (27)	2 (18)	1 (9)
Lower posterior	2 (10)	1 (50)	0	1 (50)	0	0
Upper posterior	2 (10)	0	1 (50)	1 (50)	0	0
Lateral	1 (5)	0	1 (100)	0	0	0
Total	21 (100)	2 (10)	11 (52)	5 (24)	2 (10)	1 (5)

HAL = hypogastric artery ligation; ATS = abdominal tubal sterilization.

Discussion

Rupture of the pregnant uterus is a serious complication and is a potentially catastrophic event for both mother and fetus. The incidence of ruptured uterus is reported as 0.3–7 per 1,000 deliveries, with the highest rates occurring in the third world [3–5]. However, in the developed world, Gregory et al reported an overall uterine rupture rate of 0.088% in hospitals with high rates of vaginal birth after cesarean section (VBAC) compared with an overall uterine rupture rate of 0.056% in hospitals with low VBAC rates [6]. In our series, the overall uterine rupture rate was 1 in 6,056 deliveries (0.017%), which was lower than Gregory et al's report. There may have been a lower uterine rupture rate in our series if most of our patients with a scarred uterus (previous cesarean section or myomectomy) had undergone scheduled cesarean section. The rates of cesarean deliveries for previous sections/myomectomy and VBAC were 93.8% and 6.2%, respectively, in our series.

Many clinical conditions have been associated with uterine rupture [7,8]. It usually occurs in a scarred uterus, for example, following myomectomy, deep corneal resection for corneal pregnancy, trauma, and previous cesarean section. Other less common causes are placenta increta, sacculation of a retroverted uterus, uterine anomaly (undeveloped uterine horn), difficult instrument delivery, excessive uterine stimulation, and thinning and weakening of the uterine musculature due to multiparity. In our series, the leading risk factor that predisposed patients to uterine rupture was previous cesarean section. Three patients had placenta increta or percreta, three had undergone vacuum extraction for delivery, and four patients received uterine stimulation.

Most cases of uterine rupture reported in the literature occurred during labor or late pregnancy. However, in our series, three patients suffered uterine rupture at 8, 16, and 23 weeks of gestation, respectively. The anterior wall, particularly in the lower segment, was the commonest site involved in our series. This was similar to other reports [3]. Spontaneous rupture usually involves the lower segment and occurs during labor, as women with upper-segment scars are delivered by cesarean section before the onset of labor [9].

In our series, the most common clinical manifestations of uterine rupture were fetal distress with severe fetal heart rate decelerations and poor variability. Other common signs included postpartum hemorrhage followed by abdominal pain and intrauterine fetal demise. These findings were similar to those in other reports. The clinical manifestations of uterine rupture may be insidious and nonspecific. However, fetal distress is the most reliable presenting clinical symptom [10,11].

Early diagnosis with proper and quick management is necessary to decrease maternal and fetal mortality and morbidity associated with rupture of a gravid uterus. Misdiagnosis and delayed management can be dangerous, especially if the initial symptoms are vague or if health resources are inadequate. A successful outcome might be dependent on clinical judgment as well as on available medical resources. As the presenting signs of uterine rupture are often nonspecific, the initial management of uterine rupture is often the same as that for other causes of acute fetal distress. Urgent delivery is indicated, which will typically mean cesarean delivery. It is during surgery that a uterine rupture will be diagnosed and surgical correction initiated. On detection of this condition, the physician should ensure adequate intravenous access, arrange for sufficient blood transfusion, and call for a neonatal team to be ready for intensive-care newborn resuscitation. In one study, the best outcomes were noted when surgical delivery was accomplished within 17 minutes from the onset of fetal distress on the electronic fetal heart rate monitor [10].

The treatment strategy for uterine rupture during pregnancy will primarily depend on the extent of the lesion, parity, magnitude of bleeding, and the availability of medical resources. If fertility is desired, especially in women with no surviving children, the rupture can be repaired layer by layer with close supervision of any subsequent pregnancy. However, if an obvious cause is detected during surgery, the patient is multiparous and no future pregnancy is desired, the available medical resources are inadequate, or it is suspected that future conception may be dangerous, either a repair of the rupture with tubal ligation for sterilization or hysterectomy may be the treatment of choice [12,13]. In our series, we performed ligation of the hypogastric artery to reduce hemorrhage in some cases. This may help stop bleeding and aid repair of the rupture [14,15].

In conclusion, physicians should be alert to the possibility of uterine rupture at all stages of pregnancy. The ability to recognize the various signs of a possible rupture event, such as fetal distress, maternal pain, or hypotension, and then address the situation immediately is critical to a good outcome. The main value of our study lies in the opportunity to alert the clinician to the possibility of uterine rupture at all stages of pregnancy, as it can be fatal.

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