

# Uterine rupture incidence, risk factors, and outcome

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## ABSTRACT

**Objectives:** To determine the incidence of uterine rupture and to analyze risk factors and outcome in a local hospital in Makkah, Kingdom of Saudi Arabia, (KSA).

**Methods:** The hospital records of the Maternity and Children's Hospital (MCH), in Makkah, KSA from April 1999 to December 2000 were retrospectively reviewed to identify women with ruptured uterus. The relevant data relating to the clinical features, risk factors, operative procedures, and maternal and fetal outcomes were assessed.

**Results:** During the study period, there were 23245 deliveries and 23 women were diagnosed to have uterine rupture giving an incidence of one in 1011 deliveries. Fifteen (65.2%) occurred in women with previous cesarean scar and 8 (34.8%) women had no previous uterine surgery. In the 15

women with uterine rupture and previous cesarean section there was no maternal death. They were treated by repair of the uterus. Two women sustained bladder injury, and one subsequently developed vesico-vaginal fistula. In contrast, in the 8 women with no previous uterine surgery, one woman died, one woman developed renal failure, and there were 3 fetal losses. Four women needed total abdominal hysterectomy, and 4 women needed repair. Two women needed internal iliac ligation in addition to the hysterectomy.

**Conclusions:** In our circumstances, uterine rupture is not rare and consequences can be life threatening. The outcome is worse in women with unscarred uterus.

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Rupture of uterus is an emergency catastrophic situation. It is frequently associated with foeto-maternal mortality and morbidity. It is divided into rupture of unscarred uterus and rupture of previous uterine scar. A further classification of rupture of uterine scar is complete and partial. In developed countries due to the availability of adequate and efficient obstetric care, uterine rupture is rare. It is mainly caused by dehiscence of previous scar.<sup>1</sup> On the contrary, the incidence of ruptured uterus in developing countries remains high due to the inadequate level of obstetric care, the high rate of home deliveries and grand multiparity (para  $\geq 5$ ).<sup>2</sup> In the Kingdom of Saudi Arabia

(KSA), vaginal birth after cesarean section (VBAC) and grand multiparity are common.<sup>3,4</sup> Also, the free antenatal booking system available to pregnant women, is not well utilized. These factors may lead to an increased incidence of rupture uterus. This study was designed to determine incidence of rupture uterus and to analyze risk factors and outcome in a local hospital in Makkah, KSA.

**Methods.** The study was carried out at the Maternity and Children's Hospital (MCH) Makkah, KSA from April 1999 to December 2000. The MCH is the main maternity hospital in Makkah. It covers the

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population of 1,000,000 of both Saudi nationals as well as non-Saudi residents. The average number of deliveries is over 14,000 per annum. The labor ward of the hospital accepts both booked and unbooked pregnant women. In spite of availability of free antenatal care, most of the women are not booked. An absence of antenatal booking is frequently noted among non-Saudi residents. The data has been extracted from the hospital records and charts of women that underwent laparotomy for rupture uterus. The incidence of rupture uterus was calculated. Data regarding personal history, risk factors, hospital course, and outcome was extracted and statistically analyzed using statistical package for social sciences for Windows. A  $p$  value  $\leq 0.05$  was considered statistically significant.

**Results.** During the study period, the total number of deliveries at the MCH was 23,245. Nine thousand two hindered and sixty-nine (40%) were Saudi and 13,976 (60%) were non-Saudi. The total number of cesarean section was 2635 representing (9%) of the total number of deliveries. Further, analysis showed that 1382 (52.4%) were primary cesarean section and 1253 (47.6%) were repeat cesarean section [763 (60.9%) women had previously one cesarean section, 310 (24.7%) women had 2 previous cesarean sections, 143 (11.4%) women had 3 previous cesarean sections, and 37 (3%) had 4 or more previous sections]. There were 23 cases of rupture uterus representing one in 1011 of the total number of deliveries. The mean age of the women who had the rupture was 31.1 years. No rupture occurred in 4386 primigavidae. Among 13947 women of para  $\leq 4$  and less, 13 women sustained uterine rupture giving an incidence of one in 1073. Similarly, among 4912 women of para  $\geq 5$ , 10 women had uterine rupture giving an incidence of one in 491. Scarred uterus was the main risk factor in 15 (65.2%) women (7 with one previous cesarean section, 2 with previous 2, 3 with previous 3, and 3 with previous 4 or more). Among those, 4 women were grand multipara. Grand-multiparty was the sole risk factor in 3 (13%) other women (all of them were para  $\geq 8$ ). Malpresentation and big baby (more than 4kg) were reported in 3 (13%) women. Instrumental delivery (ventouse) was involved in one (4.4%) woman. Prostaglandin E<sub>2</sub> was used for induction of mid-trimester abortion was involved in another woman (4.4%). With respect to the clinical presentation, fetal heart abnormalities were found in 10 (43.5%) women, vaginal bleeding was the main sign in 4 (17.4%) women, tender scar was reported in 2 (8.7%) women, 2 (8.7%) women presented in shock, obstructed labor was present in 2 (8.7%) women, and 3 (13%) women had silent rupture discovered only during cesarean section; all of them were partial rupture.

The outcome of uterine rupture is shown in **Table 1**. Estimated blood loss was statistically significantly higher in the women with unscarred uterus necessitating blood transfusion for all of them. However, in the

**Table 1** - Outcome of rupture uterus.

Variable	Non scarred uterus	Scarred uterus	P value
Hospital stay	7.7 days $\pm$ 1.195	7.4 days $\pm$ 3.54	NS
ICU admission	3 women	1 woman	
Estimated blood loss	2.74 $\pm$ 0.38L	1.02 $\pm$ 0.4L	<0.001
Blood transfusion	3 $\pm$ 0.5L	1 $\pm$ 0.3L	<0.001
IUFD	3	0	
Maternal mortality	1	0	
Bladder trauma	0	2	
Renal failure	1	0	
Utero vascial fistula	0	1	
Repair	3	14	
Repair+BTL	1	1	
Hysterectomy	2	0	
Hysterectomy + internal iliac ligation	2	0	
IUFD - intrauterine fetal death, BTL - bilateral tubal ligation, ICU - intensive care unit Data are presented as mean $\pm$ standard deviation.			

women with previous uterine surgery only 2 received blood and the bladder was injured in 2 women with subsequent development of vesico-vaginal fistula in one.

**Discussion.** Rupture of the gravid uterus is one of the most serious obstetric situations. In spite of recent advances in modern obstetric practice, it remains a life-threatening complication of pregnancy and labor especially in the developing world. Kafkas and Taner<sup>5</sup> reported 41 women with uterine rupture in Turkey. The maternal mortality rate was 7.3% and the fetal mortality was 80.9%. The incidence of rupture uterus at our hospital during the study period that extends for 21 months was one in 1011 deliveries. This incidence is high in comparison with one in 2213 deliveries reported recently from Bahrain<sup>6</sup> but much better than one in 246 deliveries reported from Sudan.<sup>7</sup> This high incidence in Sudan was reported to be due to poor antenatal care, poor provision of health services, and low socioeconomic standards.

The presence of previous scar is the most known predisposing factor in uterine rupture. The site and type of scar may play a role. Previous cesarean section, hysterotomy, myomectomy or cornual resection are good examples of uterine scars and may have a grave effect. Scarred uterus was the main contributory factor of rupture uterus representing 65% of our study group.

This is in accordance with many other reports.<sup>8-10</sup> In our center VBAC is allowed only in women with previous one cesarean section. The rate of rupture in this group was 0.9% (7 out of 736). This is within the reported and accepted rate.<sup>11</sup> The rate of rupture in women with previous 2, 3, and 4 and more was 0.7% (2 out of 310), 2.1% (3 out of 143), and 8.1% (3 out of 37). These women were not given VBAC but rather presented to the hospital after laboring at home. This finding underscores the importance of providing antenatal care for each pregnant woman and the careful management of high-risk women in order to decrease the rate of perinatal mortality and morbidity. The maternal morbidity in this group in our series is significant. In addition to surgical intervention, loss of blood, and blood transfusion, 2 bladder injury occurred with subsequent development of one vesicovaginal fistula. However, spontaneous rupture of unscarred uterus is even worse. This is confirmed in our study as the maternal and perinatal mortality is only reported among this group.

Grand-multiparity plays an important role in rupture uterus. It was reported as a sole risk factor in 3 women and was a contributing factor in 4 women. Increasing parity is used to being associated with increased rate of uterine rupture. Nevertheless, recent evidence suggests that with proper antenatal care, modern obstetrics, and advanced neonatal services there is no difference in outcome between grand multiparous women and women with low parity.<sup>12</sup> Undiagnosed malpresentation or a big baby may lead to obstructed labor and uterine rupture as a sequel of this situation. This was reported in 3 cases in our series representing 13%. This is very low in comparison to some African countries where obstructed labor is the most common factor representing 73.2%.<sup>13</sup> Prostaglandin E<sub>2</sub> is a potent oxytocic agent. Rupture of unscarred uterus has been reported with vaginal and intra-cervical application. It was reported in one woman in our series. Similarly, vacuum extraction was another cause of uterine rupture. Breech extraction, instrumental delivery, and application of external force have been reported as potential causes of uterine rupture.<sup>14</sup> The diagnosis of uterine rupture should be always entertained especially when there are risk factors so that prompt management can be instituted. In our study, the most common manifestation of uterine rupture was fetal heart abnormalities (10 women representing 43.5%). The observation of sudden fetal heart irregularity in laboring women should be taken as a potential sign of danger.<sup>15</sup> It has been shown that significant neonatal morbidity occurred in women with uterine rupture when more than 18 minutes elapsed between the onset of prolonged decelerations and delivery.<sup>10</sup>

The old classical teaching in the management of rupture of the gravid uterus is total abdominal hysterectomy unless cardiovascular decompensation necessitates subtotal hysterectomy or simple suture repair and bilateral tubal ligation. However, there is currently good reason for conservative surgery to preserve the uterus especially in young women and in those who wish to preserve their fertility. In general, the surgical procedure undertaken must be individualized and should be dependent upon the type, location and extent of the rupture as well as on the patient condition. If further pregnancies are allowed, the woman should be well-informed for delivery by elective abdominal route.

In conclusion, our circumstances, uterine rupture is not rare. Its consequences can be life threatening. The outcome is worse in women with no previous uterine surgery.

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