

Uterine Rupture: Changing Trends in Obstetrics and Lessons for Obstetricians

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ABSTRACT

Objectives: To determine the impact of improved obstetric care on the incidence, risk factors, management modalities and fetomaternal outcome of uterine rupture.

Materials and methods: Retrospective analysis of clinical records of uterine rupture cases at the department of Obstetrics and Gynecology, Abha General Hospital, Abha, KSA, from January 2007 to January 2012.

Outcome measures: Maternal and perinatal morbidity and mortality.

Results: Analysis showed 33 cases of uterine rupture among 34,590 deliveries, the incidence being 1/1048 (0.09%). Majority of the cases (73%) were unbooked. Important risk factors were previous cesarean section (88%) and grand multiparity (80%). Previous one C-section was also found to be an important risk factor (80%) for uterine rupture. Most of the patients were in their 30s. The frequency of complete and incomplete uterine rupture was almost the same (52 and 48% respectively). Total abdominal hysterectomy was required in 9 (27%), repair in 23 (70%) and one (3%) woman underwent subtotal hysterectomy. None of the patients agreed for tubal ligation. Seven (21%) cases were associated with bladder injury and three (9%) had vascular injury. There was no maternal mortality, 11 (33%) intrauterine fetal deaths and a live birth rate was 67%.

Conclusion: The absolute incidence of uterine rupture has not decreased in spite of the availability of ANC care and facilities for institutional deliveries. Only the etiological profile has changed. Our study found previous C-section as the most important emerging cause for uterine rupture. Reduction in C-section rate, awareness about the signs and symptoms of impending rupture, careful monitoring during induction in a scarred uterus on the part of caregivers and counseling about need for timely booking and importance of institutional delivery are important factors for reducing uterine rupture.

Keywords: Uterine rupture, Maternal mortality, Cesarean section, Perinatal mortality, Trial of labor.

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INTRODUCTION

Rupture of the uterus is an obstetric emergency threatening the life of both the mother and the fetus and increasing morbidity for both. Several direct and indirect factors have been identified which increase the risk of uterine rupture. These include low socioeconomic status, poor nutrition uncontrolled fertility, illiteracy, adolescent pregnancies, mismanagement of labor,

injudicious use of oxytocics, home deliveries by untrained personnel and contracted pelvis. A new and emerging cause responsible for majority of the cases in modern obstetrics is rupture of uterine scar as the cesarean delivery rate rises all over the world. In the United States, it has risen over the past decade to the highest level recorded: 29.1% in 2004.¹ Although it is stated that labor after cesarean section is reasonably safe and new guidelines from ACOG recommending that even previous two cesareans should be offered a trial, there is definite risk of severe morbidity and mortality to the fetus and mother as scar dehiscence is a common event in pregnancy and labor.^{2,3} In a WHO systemic review of uterine rupture, the incidence of rupture in the general population was 5.3/10000 births, while in a study from Netherlands it was 5.9 per 10,000 deliveries.^{4,5} Out of these only 0.8/10000 births were due to obstructed labor as it has become rare with the availability of ANC and institutional delivery.⁴ While the incidence of uterine rupture was reported as 5.1 per 10,000 deliveries in women with a scarred uterus in the same study.⁴ On the contrary, the incidence of uterine rupture in developing countries remains high because of grand multiparity, lack of antenatal care and unsupervised home deliveries. Uterine rupture is a rare event in primigravida.⁶ In the Kingdom of Saudi Arabia (KSA), grand multiparity and the desire for vaginal delivery even after previous CS and repeated cesareans with refusal for ligation from a desire to have large families make women more vulnerable to rupture.⁸ Improvement in antenatal care delivery, presence of skilled birth attendants and reduced cesarean section rates are important factors which can help in reducing uterine rupture.⁷ Early diagnosis and treatment results in improved maternal and fetal outcome. This study was designed to determine the impact of improved obstetric care on the incidence, risk factors, management modalities and fetomaternal outcome of uterine rupture and to make suggestions for improving the outcome in such cases.

MATERIALS AND METHODS

A retrospective analysis of hospital record of all uterine rupture cases between January 2007 to January 2012 admitted in the Department of Obstetrics and Gynecology, Abha General Hospital, Abha, KSA, was done. All cases presenting with rupture on admission or those who developed this complication after admission were included in the study. There were 33 cases who were studied. Age, gravidity, parity, number of deliveries in previous 5 years, surgical history and complications were noted. The signs and symptoms suggestive of uterine rupture like fetal heart rate abnormalities on CTG, abdominal pain, scar tenderness, bleeding per vaginum, maternal tachycardia with hypotension, arrest of uterine contractions, loss of station, per abdomen findings were analyzed. The peroperative findings, complications and management details like need for

blood transfusion were noted. Maternal and neonatal outcomes in terms of morbidity and mortality were studied.

RESULTS

Total number of deliveries during the period was 34,590. There were 33 cases of uterine rupture with frequency of 0.09%. Age range was between 21 and 42 years. Almost half of the patients 15 (45%) were below 30 years and 18 (55%) patients presented after the age of 30 years. Average age was 31 years. Parity ranged from 1 to 7 with mean parity being 3.3. However, rupture was more common 14 (42%) between parity 4 and 7, suggesting multiparity as an important risk factor. A significant number of women 12 (36%) were primigravidas. Gestational age ranged from 30 to 41 weeks but majority 23 (70%) of pregnant women were full term. Only six (18%) cases were below 37 weeks gestation. There were nine (27%) booked and 24 (73%) unbooked patients. Twenty-nine (88%) patients had previous cesarean scar with a range of 1 to 5. Of these thirteen (44%) women were having previous one cesarean section, while 16 (55%) patients had two or more previous cesarean sections. Only four (12%) cases had an unscarred uterus. Prolonged obstructed labor was observed in only four (12%) cases in which two were with unscarred uterus but had grand multiparity, while two cases were with previous one cesarean. Fifty-eight percent were in labor on admission. Two patients with an unscarred uterus who were induced with PGE₂, developed uterine rupture during labor. Grand multiparity and age above 40 years were the major risk factors in these patients.

Scar tenderness was found in 39%, as the major clinical presentation (Table 1).

Table 1: Clinical presentation

<i>Signs and symptoms</i>	<i>n = 33</i>	<i>Percentage</i>
Labor pains	19	58
Abdominal pain and scar tenderness	13	39
Intrauterine fetal death	9	27
Fetal distress on CTG	8	24
Maternal tachycardia and hypotension	4	12
Bleeding per vaginum	2	6
<i>Parameter</i>		
Type of rupture		
Incomplete rupture	16	48
Complete rupture	17	52
Type of surgery		
Repair	23	72
Total hysterectomy	9	27
Subtotal hysterectomy	1	3
Organ injury		
Bladder	7	21
Vascular	3	9
None	23	70
Late complications		
Vault hematoma	3	9
DVT	2	6
VVF	1	3
Fetal outcome		
Alive	22	67
Dead	11	33
NICU admission	8/22	36
Maternal mortality	None	0

A significant number of cases presented with intrauterine fetal death nine (27%), while fetal heart rate abnormalities were present in eight (24%) on CTG. Four patients with previous cesarean had a successful vaginal birth but developed post-partum hemorrhage after vaginal delivery and found to have rupture on exploration.

Total blood loss ranged from 800 to 4000 ml with an average of 1848 ml. Average blood transfusion given was 4.65 unit. Four patients received fresh frozen plasma (FFP). Hospital stay ranged between 5 and 22 days, with average of 11 days. However, there was no maternal death. Complications like bladder injuries occurred in seven patients and development of vesicovaginal fistula occurred in one patient.

Perinatal mortality was 33% of which nine came with IUFD. Of the remaining, 22 delivered live NICU admission was required in eight (36%). There were two neonatal deaths among those admitted in NICU resulting in a total perinatal mortality of 11 (33%).

DISCUSSION

Etiology and Incidence

Rupture of the uterus is a serious obstetric emergency associated with high perinatal morbidity and mortality. The commonest cause described has been obstructed labor with the patient presenting with classical sign and symptoms. With access to antenatal care and institutional deliveries, a dramatic reduction in the incidence of obstructed labor and its sequelae were expected. However our results show that uterine rupture may still contribute toward significant maternal and perinatal morbidity and mortality. The frequency of uterine rupture in our study was 0.09% (1 in 1,048 deliveries). This was similar to the study done by Rouzi AA in KSA that reported an incidence of 1 in 1,011 deliveries.⁸ But higher in comparison to 1 in 2,213 deliveries reported from Bahrain. Incidence reported from Sudan is one in 246 deliveries.^{9,10} Other developing countries, like Nigeria, Pakistan and Ethiopia, show this incidence to be higher at 0.83, 0.74 and 0.03% respectively.¹¹ The incidence in KSA when compared with developed countries is almost same, i.e. 0.086% in Australia and 0.023% in Ireland.¹² The high incidence in developing countries is attributed to no access to antenatal care, inadequate provision of health services and lower socioeconomic status. The most common risk factor in the developed world is previous uterine surgery especially cesarean section. The mean age of women with uterine rupture was 31 years in our study, which is consistent with Rouzi's study.⁸ Maternal age was not found to be an important risk factor for this obstetric problem. This may be explained by the earlier age at marriage in KSA and a tendency to have large families while still young. Multiparity was an important factor especially in patients who had uterine rupture in the absence of scarred uterus in our country. The assumption that multiparity with a scarred uterus is at a higher risk of uterine rupture when undergoing trial of scar was confirmed as 4/5th (80%) of our patients with previous cesarean were grand multipara. This finding is similar to other studies from different regions of KSA.^{10,15} Majority of the patients

(73%) were unbooked as also confirmed by Ekpo¹¹ but different from Jahan's report.¹⁵ In modern obstetrics, the single most important risk factor is the presence of previous scar on uterus. Our study confirmed this as previous cesarean was the single most important risk factor representing 88% of our patients. This is in accordance with many other reports.^{10,15,16,17} Our labor room protocol allows trial of labor in a case of previous one cesarean only. Incidence of rupture in this was 63.6% (21 out of 33) of our rupture cases were those with previous one section. This is a significant finding. This is not within the reported and accepted rate which is 0.7% for previous one C/S in Landon MB's American study.¹⁶ The view that multiple cesarean sections is a high-risk factor for rupture may not be true. In our study, majority 21 (63.6%) patients, who had rupture, had only one previous CS. Though it is difficult to either confirm or refute, this view as the number of patients is small. The number of women with uterine rupture with previous 3 to 5 CS was 12.12%. These women were not given a trial but presented to hospital after laboring at home. This finding underscored the importance of providing antenatal care for each pregnant woman, counseling her about risks of home delivery, scar rupture and delayed admission in labor.

Clinical Features

The clinical picture seen in our patients was abdominal pain accompanied with scar tenderness and fetal heart rate abnormalities and fetal death in labor, which is in keeping with other studies.^{13,14} The classical symptoms and signs of rupture of uterus like bleeding per vaginum, easily felt fetal parts and arrest of contractions were not common in our study in contrast to the study from Sudan.¹⁰ This was probably due to the fact that most patients were in hospital, presented early and cases of a scarred uterus rather than obstructed labor.

Maternal Morbidity

In our series is significant. In addition to the patient requiring surgical intervention, blood transfusion, ICU admission, there were complications like bladder injuries in seven patients and development of vesicovaginal fistula in one patient. Fortunately, there was no maternal mortality in our study. This is comparable with other studies from KSA but different from Ofer et al and Ahmed et al observations.^{8,10,13,14}

Perinatal Mortality

In this study, it was found to be 33% which is consistent with Sandhu's finding in KSA but far less than that reported in other series of as high as 59 to 88%.^{3,17} The reason maybe our excellent NICU facilities, patients being in hospital at the time of rupture, and most cases occurring in a scarred uterus who were being carefully monitored. Also in most of the cases, the diagnosis to delivery interval was just 20 to 30 minutes. Careful monitoring in labor of women with previous cesarean by continuous cardiotocography in order to decrease the rate of perinatal morbidity is essential.

Management

Management of uterine rupture depends upon the type, location and extent of rupture as well as the hemodynamic status of patient. Although total or subtotal abdominal hysterectomy is the procedure of choice, repair was performed in 39% of our cases. Ideally, repair should be combined with bilateral tubal ligation (BTL) to reduce the risk of recurrent rupture. In this study, none of our cases gave the consent for BTL due to cultural and religious issues and due to their desire for larger families. The fact that most patients in this region associate fertility with femininity may also be a cause for refusal as reported by Jahan in KSA.¹³

CONCLUSION

1. Absolute rates of uterine rupture have not decreased even in developed countries with good ANC care and institutional deliveries.
2. Only the etiological profile has changed from obstructed labor to scarred uterus which is now the leading cause of uterine rupture.
3. We should aim to decrease the absolute rate of cesarean section by using a more cautious approach in choosing indications for abdominal deliveries.
4. Women with previous scar and multiparity opting for trial of labor should be carefully chosen and continuously monitored by CTG during labor for fetal heart rate abnormalities and for scar tenderness. Injudicious use of oxytocin and prostaglandins should be avoided.
5. The commonest presentation in uterine rupture of a scarred uterus is not as classically described maternal signs and symptoms but as fetal heart rate abnormalities and fetal death.
6. Early diagnosis based on awareness about signs and symptoms, high index of suspicion, good anesthetic care, well equipped ICU, blood bank and NICU and availability of an experienced surgeon on floor, lesser diagnosis to delivery interval can help in decreasing the associated maternal and perinatal morbidity and mortality to a large extent.
7. Improvements are needed in antenatal care and counseling of patients for institutional deliveries especially after previous cesarean section.

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