

Uterine ruptures in Yemen

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ABSTRACT

Objective: To study the incidence, risk factors, clinical presentation, maternal morbidity and mortality, and perinatal mortality in cases with ruptured gravid uterus.

Methods: All cases with diagnosis of uterine rupture at Saudi Hospital at Hajjah, Yemen during 5-years period from April 1999 to March 2004 were studied. Detailed informations were obtained by reviewing hospital records.

Results: Out of the total number of deliveries during the period (N=5547), 60 cases had uterine rupture giving a hospital incidence of one in 92 deliveries (1.1%). Forty-three cases (71.7%) with unscarred uterus and 17 (28.3%) had a previous cesarean scar. Poor antenatal and intra-natal care were the main contributing factor (93.3% had no prenatal visit, 95% presented to the hospital late after long period of obstructed labor at home). Grand-multiparity was encountered in 69.8% of cases with unscarred uterus and 41.2% of cases with a previous scar ($p<0.05$). Associated factors in unscarred uterus cases included: cephalopelvic disproportion (39.5%), shoulder presentation (25.6%), oxytocin (14%), breech

delivery (7%), hydrocephalus (7%), brow (2.3%), misoprostol induction of labor (2.3%), and previous surgical evacuation (2.3%). In previous cesarean scar cases, cephalopelvic disproportion affected 58.8%, and shoulder presentation 5.9%. The complete rupture was reported in 48 cases (80%), hysterectomy was carried out for 33 cases (55%), repair for 23 cases (38%), and repair plus bilateral tubal ligation for 4 cases (7%). Five cases (8.3%) needed additional surgical intervention in the form of repair of ruptured bladder (3 cases), and repair of bladder injury (2 cases). Vesico-vaginal fistula developed in 2 cases (3.3%). Fifty-three cases required blood transfusion (88%). Hospital stay ranged between 1-17 days (mean 6.2, SD 3.6). There was one maternal death (1.7%) and 49 (81.7%) perinatal deaths.

Conclusion: This study confirms high incidence of such serious preventable obstetrical problem. Poor antenatal and intranatal care, poor provision of health service and low socio-economic standard are the main factors contributing to uterine rupture.

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Uterine rupture is one of the most serious obstetric complications. It is associated with high rates of maternal and fetal morbidity and mortality. In developing countries, the incidence and consequences of uterine rupture reflect the standard of the obstetric care. In developed countries, rupture of previously unscarred uterus is a rare and potentially catastrophic event.¹ Literature reports are chiefly concerned with rupture or dehiscence of a previous cesarean section scar and tend to discuss other causal factors in a non-specific fashion. Sweeten et al¹ reported 2 cases of rupture of unscarred uterus and they proposed several

current-day risk factors, including grand multiparity, fetopelvic disproportion, malpresentation, oxytocin use, macrosomic-hydrocephalic fetus, abnormal placentation, previous invasive mole, previous mid-trimester instrumental abortion, version, and uterine anomalies (namely rudimentary horn). Miller et al² reported 10 cases of intra-partum rupture of unscarred uterus during the period from January 1983 to December 1994, and they found that the majority of uterine ruptures occurred in women with at least one of the risk factors proposed by Sweeten et al.¹ Ahmed and Daffalla³ reported a total incidence of uterine rupture in a teaching

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hospital at Sudan with a ratio of 1:246 deliveries, wherein 45% of them were in cases with previous cesarean scar. The aim of this study is to review the incidence, risk factors, clinical presentation, maternal morbidity and mortality, and perinatal mortality associated with rupture of the gravid uterus.

Methods. This study was conducted at the Obstetrics and Gynecology Department, Saudi Hospital at Hajjah, Yemen. Hospital records for all patients with uterine rupture during 5-years period from April 1999 to March 2004 were reviewed. Relevant data related to age, parity, prenatal care, history of previous cesarean delivery, direct cause of rupture, whether the patient attended with already ruptured uterus or it ruptured at hospital, clinical presentation, type of rupture (complete or incomplete), operative procedure, the need for blood transfusion, duration of hospital stay, maternal complications and outcome, and perinatal outcome were collected. Complete rupture in this study was referred to as rupture involving all layers including the serous coat, while incomplete rupture of the uterus denoted that at least the serous coat is intact.⁴ The literature was reviewed to compare the results of similar studies.

Results. During the study period, there were 60 cases diagnosed as ruptured uterus. The total number of deliveries during the same period was 5547 cases, giving a hospital incidence of uterine rupture of 1:92 deliveries (1.1%). Forty-three cases (71.7%) had an unscarred uterus and 17 cases (28.3%) had a history of previous cesarean delivery. Among 60 patients with uterine rupture, only 4 (6.7%) patients had attended the prenatal care clinic, one of them attended once only at term. The remaining 56 cases (93.3%) had no prenatal care visit. The vast majority of cases, 57 (95%) presented to the hospital very late in labor, after trying home delivery, and after manipulations by traditional inexperienced midwives. The remaining 3 cases were as the following: the first case had an unknown type of previous cesarean scar and presented at term with complete ruptured uterus in midline. The second case presented with rupture during pregnancy at 20th week, was a para 5 gravida 1, with a history of one surgical evacuation. The third was Para 1, admitted at 42 weeks and was given 100 µg misoprostol vaginally for induction of labor, she delivered vaginally, then developed postpartum hemorrhage due to left cervical tear which was found extended to the lower uterine segment. In 54 (90%) patients the diagnosis of the uterine rupture was either established or suspected on admission and they were posted for laparotomy at once where the diagnosis of uterine rupture was

confirmed. In the remaining 6 (10%) cases, 2 cases presented with obstructed labor, breech presentation, with intra-uterine fetal death (IUFD). Assisted breech delivery was carried out, and uterine rupture was discovered after delivery. Two cases presented with prolonged labor, IUFD, and 9 cm dilated cervix. Oxytocin was given at a rate of 2 mIU/minute. There was no progress for one hour and vaginal bleeding supervened. One case presented with retained hydrocephalic after coming head, which was delivered by jaw flexion shoulder traction, and she developed extended left cervical tear. The sixth case developed left extended cervical tear after misoprostol induction of labor.

The age of patients ranged between 18-45 years. Cases with unscarred uterus were with a higher age than those with previous cesarean scar (69.8% of unscarred uterus cases and 35.3% of previous scar cases were at age of 30 years or more, $p<0.05$) (Table 1). The gravidity ranged between 1-13. Grand multiparity (gravida 5 or more) was more common in cases with unscarred uterus (69.8% versus 41.2%, $p<0.05$) (Table 2). Only 2 cases were nullipara, one case was primigravida with severe cephalopelvic disproportion and received oxytocin at home by traditional midwife, and the other one was third gravida with previous 2 abortions, presented with ruptured uterus due to severe hydrocephalic fetus. In 54 cases (90%), the rupture was anterior lower segment. Two cases (3.3%) had an anterior midline rupture (one had previous classical cesarean and the other one had a previous unknown type cesarean). Two cases (3.3%) had an extended cervical laceration. One case (1.7%) had rupture in the posterior lower segment (after assisted breech delivery of dead fetus with extended legs).

Table 1 - Age distribution of cases.

Age (years)	Unscarred uterus (N=43) n (%)	Scarred uterus (N=17) n (%)	<i>p</i> value
<20	1 (2.3)	1 (5.9)	NS
20-24	8 (18.6)	5 (29.4)	NS
25-29	4 (9.3)	5 (29.4)	NS
30-34	14 (32.6)	1 (5.9)	<0.05
35-39	10 (23.2)	4 (23.5)	NS
40-44	3 (7)	0	NS
>44	3 (7)	1 (5.9)	NS
Total	43 (100)	17 (100)	

Table 2 - Gravidity distribution of cases.

Gravidity	Unscarred uterus (N=43)		Scarred uterus (N=17)		p value
	n	(%)	n	(%)	
1	1	(2.3)	0		NS
2	6	(14)	7	(41.2)	<0.05
3	5	(11.6)	2	(11.7)	NS
4	1	(2.3)	1	(5.9)	NS
5 or more	30	(69.8)	7	(41.2)	<0.05
Total	43	(100)	17	(100)	

Table 3 - Direct causes of uterine rupture among cases with unscarred uterus.

Causes of rupture	Unscarred uterus (N=43)
	n (%)
Cephalopelvic disproportion	17 (39.5)
Transverse lie	11 (25.6)
Oxytocin	6 (14)
Breech delivery	3 (7)
Hydrocephalus	3 (7)
Brow	1 (2.3)
Induction of labor	1 (2.3)
Spontaneous rupture during pregnancy	1 (2.3)
Total	43 (100)

Table 4 - Direct causes of uterine rupture among cases with scarred uterus.

Causes of rupture	Unscarred uterus (N=17)
	n (%)
Previous one LSCS	3 (17.6)
Previous one LSCS + obstructed labor (CPD)	10 (58.8)
Previous one LSCS + neglected shoulder	1 (5.9)
Previous three LSCS	1 (5.9)
Previous one classical CS	1 (5.9)
Previous one CS of unknown type	1 (5.9)
Total	17 (100)
LSCS - lower segment cesarean section, CPD - cephalopelvic disproportion, CS - cesarean section.	

One case had a ruptured posterior upper segment reaching the fundus (this was the case with rupture during pregnancy at 20 weeks).

Blood units used ranged between zero and 5 units (mean 1.83, SD 1.14). Additional operative procedure was required for 5 (8.3%) cases in the form of repair of ruptured urinary bladder (3 cases), and repair of bladder injury in 2 cases. The hospital stays ranged between 1-17 days (mean 6.2, SD 3.6). There was one maternal death (1.7%), it was due to severe hemorrhage and irreversible shock, and 49 (81.7%) perinatal deaths all were stillborn.

DISCUSSION. This study was carried out at the Saudi Hospital at Hajjah, Yemen. This is a referral hospital in this government receiving most complicated cases from a wide area and large number of cities and villages lying on mountain's tops with poor transportation facilities, very difficult uneven roads, and low socio-economic standard. Traditional midwives conduct most deliveries in this area at home. This may explain the very high total incidence of uterine rupture in this study (1:92 deliveries) (1.1%), which was higher than any reported incidence all over the world except that reported by Chamiso⁵ from Ethiopia (2.6%). This high incidence reported in South Shoa, Ethiopia, during the period from September 1989 to August 1992 may be due to similar living conditions to that in Yemen. The uterine rupture incidence in this study was higher than that reported from Egypt (1:367),⁶ Sudan (1:246 and 1:651),^{3,7} Morocco (1:223),⁸ Tanzania (1:247)⁹ and much higher than that reported from Saudi Arabia (1:3369),¹⁰ Ireland (1:3300),¹¹ and Bahrain (1:2643).¹² Although today

Table 5 - Reported clinical presentations of cases with uterine rupture.

Clinical findings	n	(%)
Cessation of uterine contraction	34	(56.7)
Antepartum hemorrhage	13	(21.7)
Severe abdominal pain	33	(55)
Pallor	47	(78.3)
Rapid pulse (110 bpm or more)	52	(86.7)
Systolic BP < 100 mmHg	49	(81.7)
Easily palpable fetal parts	39	(65)
Absent fetal heart sounds	49	(81.7)
Obstructed labor	36	(60)
Abnormal abdominal contour	43	(71.7)
Dehydration	44	(73.3)
Tender scar	1	(1.7)
Postpartum hemorrhage	5	(8.3)
Premature rupture of membranes	1	(1.7)

rupture of intact unscarred uterus is rare, this study showed high incidence (1:129 deliveries) which was higher than that reported from Tunisia (1:2581),¹³ and California, USA (1:16,849).²

The major risk factor for uterine rupture encountered in this study was home delivery managed by inexperienced traditional midwives, as 95% of cases presented to the hospital late after trying home delivery for long time with either already ruptured uterus (90% of cases) or with obstructed labor for a long time with a dead fetus. Ninety-three percent of cases had no prenatal care visit. Most of these uterine ruptures could be prevented if they were predicted during prenatal visits or early in labor if they came to the hospital at an earlier stage. This goes with previous reports that high incidence of uterine rupture in developing countries have been attributed to poor antenatal and intranatal care resulting from several factors such as ignorance, poverty, and inadequate health facilities.^{3,7,14,15} On the other hand, scarred uterus and oxytocin administration were found to be the predominant factors for uterine ruptures in the developed countries.^{15,16} Previous cesarean scar with or without other abnormality was responsible for 28.3% of cases of uterine rupture in this study. All cases with a previous scar either presented with obvious ruptured uterus or with picture of obstructed labor to be confirmed as ruptured uterus on laparotomy. Trial for vaginal birth after previous cesarean was not given to any of these cases at hospital. Cases with ruptured unscarred uterus (71.7%) tended to be at higher age and parity than those with previous scar (69.8% versus 35.3% were >30 years and 69.8% versus 41.2% were gravida 5 or more, $p < 0.05$). As in older patients with higher parity there is a tendency for larger babies, malpresentation and malposition. These findings

were in agreement with previous studies.^{3,14,16} Historically, the most common predisposing factors for uterine rupture are grand multiparity, and obstetric trauma resulting from prolonged or neglected labor, fetal macrosomia, malpresentation, internal podalic version, breech extraction, manual cervical dilatation and instrumental vaginal delivery.^{17,26} Although today fetal macrosomia and malpresentation can be detected more reliably with ultrasound, also prolonged labor and difficult vaginal deliveries have been replaced largely by cesarean, unfortunately most of these historical factors are still present in cases of this study. The direct causes of rupture of unscarred uterus were obstructed labor due to cephalopelvic disproportion (39.5%), neglected shoulder (25.6%), oxytocin (14%), breech delivery (7%), hydrocephalus (7%), brow presentation (2.3%) and misoprostol induction of labor (2.3%) (Table 3). Also, in cases with previous scar, obstructed labor due to cephalopelvic disproportion was the main cause (58.8%) (Table 4). Oxytocin was given for 6 patients with unscarred uterus, 2 of them was given at the hospital; they attended after prolonged labor at home with dead fetuses. In the other 4 cases, traditional midwives gave oxytocin at home. Uterine rupture is rare in primigravidas as shown by Flannelly et al,¹¹ who found no uterine rupture in almost 28000 primigravidas despite 40% rate of oxytocin augmentation. In this study, there was one primigravida with severe cephalopelvic disproportion who had uterine rupture as result of injudicious use of oxytocin by a midwife at home. Induction of labor using 100 µg Misoprostol vaginally was the cause of one uterine rupture in this study. This strong oxytocic drug must be used with caution, particularly in multiparous patients and in combination with oxytocin, and the dose for

Table 6 - Comparison of maternal and fetal data, complications and outcome among cases with ruptured unscarred and scarred uterus.

Gravidity	Unscarred uterus (N=43) n (%)	Scarred uterus (N=17) n (%)	p value
Complete uterine rupture	37 (86)	11 (64.7)	Not significant
Hysterectomy	26 (60.5)	7 (41.2)	Not significant
Repair	13 (30.2)	8 (47)	Not significant
Repair + bilateral tubal ligation	4 (9.3)	2 (11.8)	Not significant
Need for blood transfusion	40 (93)	13 (76.5)	Not significant
Bladder injury	2 (4.7)	0	Not significant
Bladder rupture	0	3 (17.6)	Not significant
Readmission	3 (7)	0	Not significant
Wound infection	1 (2.3)	0	Not significant
Vesico vaginal fistula	1 (2.3)	1 (5.9)	Not significant
Birth weight (kg) means±SD	2.97 ± 0.68	2.86 ± 0.34	Not significant
Hospital stay (days) means±SD	6.2 ± 3.6	5.5 ± 3.4	Not significant
Perinatal death	40 (93)	9 (53)	<0.05
Maternal death	0	1 (5.9)	Not significant

induction of labor not to exceed 50 µg/4 hours.²⁷ Misoprostol has demonstrated consistently higher rates of tachysystole,²⁸ and there is growing number of reports of uterine rupture in women with a history of previous cesarean delivery who receive misoprostol.²⁹⁻³²

In earlier reports, 58-87% of ruptures are managed with hysterectomy.^{18,20,22-26} Several authors consider hysterectomy as the procedure of choice,^{19,20,22,23,33} whereas others contend that suture repair is a safer immediate treatment.^{25,34} In this study, hysterectomy was carried out in 55% of cases, repair for 38% of cases and repair plus bilateral tubal ligation for 7%. Repair raise the possibility of rupture recurrence in a subsequent pregnancy, which has a reported incidence of 4.3-19%,^{34,35} suggesting that a trial of labor following repair of a ruptured uterus is inadvisable and that repeat cesarean should be performed before onset of labor. Blood transfusion with its inherent risks was needed for 53 cases (88%). A similar result was shown by Ahmed and Daffalla,³ as all their cases needed blood transfusion. The clinical presentations of cases in this study were tachycardia in 86.7%, hypotension in 81.7%, absent fetal heart sounds in 81.7%, pallor in 78.3%, dehydration in 73.3%, abnormal abdominal contour in 71.7%, easily palpable fetal parts in 65%, obstructed labor in 60%, cessation of uterine contraction in 56.7%, severe abdominal pain in 55%, antepartum hemorrhage in 21.7%, postpartum hemorrhage in 8.3%, tender scar in 1.7%, and premature rupture of membranes in 1.7% (Table 5). These findings were markedly different from that reported by Miller et al,² as they made surgical intervention due to fetal heart rate (FHR) decelerations in 70% of cases and due to severe antepartum hemorrhage in 30% of cases. They suggested that FHR decelerations may be the earliest and most sensitive indicators of uterine rupture. They also stated that although FHR abnormalities and obstetric hemorrhage are relatively non-specific observations, the differential diagnosis should include rupture of the uterus, regardless of presence or absence of an uterine scar particularly in women with recognized risk factors or other suspicious findings such as abdominal pain, maternal tachycardia, or hypotension. In many cases of uterine rupture, maternal and fetal survival depends directly on the timeliness of intervention, as emphasized by Keifer's observation that "when death occurs it commonly follows procrastination".³⁶ Unfortunately, the vast majority of cases in this study attended to the hospital very late with an overt picture of uterine rupture or with obstructed labor. In 81.7% of cases, the fetus was dead at time of admission resulting in a very high perinatal mortality rate where all of them were stillborn. Cases with unscarred uterus had significantly higher perinatal mortality than those with previous

cesarean scar "93% versus 53%, $p < 0.05$ " (Table 6). Miller et al.² studied 10 cases with ruptured unscarred uterus and they did not have any maternal or perinatal deaths. They said that rapid surgical intervention played a critical role. Ahmed and Daffalla³ reported 7% maternal death and 79% perinatal death from Sudan. Elkady et al.⁶ reported 21.4% maternal death and 73.2% perinatal death from Egypt, Sandhu and Al-Jufairi² reported 33% perinatal death and no maternal death from Bahrain. Chamiso⁵ reported 15.8% maternal death from south Shoa, Ethiopia. Ahmadi et al.¹³ reported 7.1% maternal death and 24.1% fetal death in 28 cases with ruptured unscarred uterus in Tunisia. In this study, there was one maternal death (1.7%), the patient was brought to the hospital in shock due to internal hemorrhage with completely ruptured previous classical cesarean scar, and died on the same day due to irreversible shock. This variation in the incidence of maternal and perinatal death reflects the difference in the standard of provision of health services in different areas.

This study confirms the existence of a high incidence of uterine rupture as a serious complication of pregnancy in such developing countries. Deficient prenatal and intranatal care and grand multiparity were the main contributing factors, resulting in unrecognized fetopelvic disproportion, malpresentation, malposition, or fetal anomalies. This catastrophic obstetric complication can be prevented by improving the socio-economic standard, health education, proper education of traditional midwives, spread of maternity centers with trained personnel in areas away from hospital facilities and strict roles to prohibit using oxytocic drugs outside hospitals.

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