

# Uterine rupture - incidence and determinants in a teaching institute

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## ABSTRACT

**Background:** Maternal mortality is a major public health issue in India and Indian government run various programs to improve the scenario in present. Uterine rupture is an obstetrical emergency which may lead to serious undesired complications to mother and neonate and may lead to their mortality. Indian women come from various strata of society, economic background; even most of the population is not aware about these programs run by government for their wellbeing and even basic health rites and facilities provided to them. **Objectives:** In this study we assessed the incidence of ruptured uterus and the factors associated with, in remote Indian population at a tertiary level health facility. **Methods:** Prospective observational study conducted at UMAID Hospital between 1<sup>st</sup> January 2012 to 31<sup>st</sup> December 2013. The data related to cases of ruptured uterus and interventions taken to manage were collected and incidence and factors associated were analyzed and tabulated. **Results** - A total of 44464 deliveries were conducted in the period of two years, out of them 104 were the cases of ruptured uterus that gives the incidence of 1 in 427 deliveries. Previous uterine scar was found the most common risk factor (56.7%) followed by obstructed labour (20.19%) and multiparity (18.26%). Uterine tear repair was done in 63.5% cases and hysterectomy was done in 35.6 % cases, one patient died without any intervention could be performed. **Conclusion:** Incidence of ruptured uterus and its complications were high in the study population and the possibility of many more unreported cases can't be denied due to lack of awareness and lack of facilities. It reflects the need for improvement in maternity services and strong collaboration of information with referring health facilities to ensure prompt referral and management.

**Keywords:** Cervical cancer, liquid based cytology, HPV DNA.

Rupture of the pregnant uterus is a major catastrophic event and an obstetric emergency associated with high maternal and perinatal morbidity and mortality.<sup>1</sup> The prevalence is significantly higher in underdeveloped and developing countries<sup>2</sup> and most often encountered while attempting vaginal birth after previous caesarean (VBAC) delivery. The situation is bleak in developing countries, particularly in semi-urban and rural areas, due to cultural taboos, lack of awareness, poor socioeconomic status, and inadequate access to health care.

Uterine rupture is a defect or a full-thickness breach of the uterine wall including the whole uterine muscle layer and

the visceral peritoneum, sometimes involving the urinary bladder wall or beyond, resulting in extrusion of the whole fetus or any part of the fetus into the peritoneal cavity.<sup>1</sup> The causes of uterine rupture are complex, reflecting a combination of medical, reproductive health services, nutritional and socio-economic factors. Obstructed labour, previous uterine scar, injudicious use of oxytocics or prostaglandins, congenital uterine anomaly, grand multiparity, fetal macrosomia, fetal malposition, attempted forceps delivery or uterine instrumentation, external cephalic version, and uterine trauma are the factors associated with uterine rupture.<sup>3</sup> Risk factors for uterine rupture among the

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pregnant scarred uterus are previous cesarean section, hysterotomy, myomectomy, placenta percreta, previous difficult uterine curettage complicated by perforation.<sup>4</sup>

The risk of uterine rupture during VBAC-TOL varies based on the type and location of the prior scar. In low transverse uterine incision, risk of rupture is reported <1%, while in the classical vertical scar, longitudinal scar, and T shaped scar the prognosis is relatively poor, and the risk of rupture is estimated up to 12%.<sup>5</sup> In recent observational cohort analysis (ACOG), it is found that there is more incidence of uterine rupture during VBAC-TOL in women with single layer closure of uterus, and if inter delivery interval is less than 18 months and history of maternal fever or scar infection postoperatively.<sup>6</sup>

Fetal morbidity occurs as a result of severe haemorrhage, fetal anoxia. Fetal outcome in uterine rupture is related to the time elapsed between onset of prolonged deceleration and delivery. If early (<15 min), there is fetal hypoxia and metabolic acidosis (39%) and a low Apgar score. In the late presentation (>18 min), when the whole placenta and fetus are extruded into the peritoneal cavity, this may result in hypoxic ischemic encephalopathy and perinatal loss.<sup>7</sup>

The recurrence rate for uterine rupture is reported to be between 4.8% to 19 % with the highest rates of recurrence seen in women with a history of a ruptured upper uterine segment. Studies recommend planned cesarean delivery between 37 and 38 weeks or earlier if labor starts after administration of corticosteroids, in lower uterine segment scar and at 35-36 weeks for the history of ruptured of the upper uterine segment.<sup>8,9</sup>

This study was aimed to determine the incidence, demographic distribution pattern, and the risk factors associated with rupture uterus that are important for planning, implementing, and improving emergency obstetric care services.

### Methodology

This prospective observational study was conducted in the department of obstetrics & gynaecology, UMAID Hospital, Dr S N Medical College, Jodhpur, from 1<sup>st</sup> Jan 2012 to 31<sup>st</sup> Dec 2013.

Method of data collection: Relevant data were extracted using pre-designed format. All cases of rupture uterus whether booked, unbooked, which were admitted and managed in the department of obstetrics & Gynaecology, Umaid Hospital & Dr S.N. Medical College, Jodhpur were included in this study. Clinical details like age, place of residence, parity/ previous obstetric history, personal history, medical history, period of gestation, duration of labour pains

were recorded. The type of rupture, type of surgery performed, maternal and fetal outcomes were analyzed in detail.

Inclusion criteria:

- Second and third trimester pregnancy.
- Age group 20 – 45 yrs
- Uterine rupture in scarred and unscarred uterus
- Complete uterine rupture.
- Congenital malformation

Exclusion criteria:

- Scar dehiscence
- Cornual rupture
- First trimester pregnancy

Data presentation and statistical analysis: All the data were entered into the excel sheet. The statistical analysis was done by using Excel and SPSS V22. Qualitative data was summarized as number and percentage and quantitative data was summarized as mean±SD, rate of occurrence was measured in percentages.

### Results

A total of 44464 deliveries were conducted in the period of two years. In this period there were 104 reported cases of the ruptured uterus in our institute that gives occurrence 1 for 427 deliveries or 0.23%. Among these 36 cases (0.18%) were reported during 2012 and 68 cases (0.28%) during 2013. The increase can be explained by the increase in the number of cesarean deliveries despite a simultaneous increase in the total number of deliveries.

**Table 1: Demographic variable in respect to the incidence of the ruptured uterus**

Demographic variable	Incidence	%	
Age in years	<20	6 (5.8%)	5.8
	21- 25	38 (36.5%)	36.5
	26-30	38 (36.5%)	36.5
	31-35	15 (14.4%)	14.4
	>35	7 (6.7%)	6.7
Booking status	Booked	15	14.4%
	Unbooked	89	85.6%
Parity	0	5	4.8
	1	27	26
	2	27	26
	3	19	18.3
	4 & above	26	25
Rural / Urban	Rural	86	82.7
	Urban	18	17.3

Maximum patients belong to a group of 21-30 years (76%), and equal numbers of subgroups of (21-25), (26-30) that is 38 cases in each group. According to parity, majority of patients belong to groups P1 and P2 both having incidence of 26% respectively. The majority of patients were unbooked 89 (85.6%) in our hospital and 15 (14.4%) were booked

cases. Most of the patients belong to rural areas (82.7%) and (17.3%) cases were related to urban areas (table 1).

**Table 2: Risk factors associated with ruptured uterus**

Variables	Risk factors	Number	Percentage
Type of scar	Previous 1 cesarean scar	52	56.7
	Previous 2 cesarean scar	7	6.7
	Unscarred	45	43.3
Risk factors	Prev LSCS	59	56.73
	Grand multiparity	19	18.26
	Obstructed labour/ Malpresentation	21	20.19
	Oxytocin/prostaglandin induced	5	4.8
Type of rupture	2 nd trimester	9	8.7
	3 rd trimester	95	91.3

In 59 (56.7%) cases of the ruptured uterus had a history of prior uterine surgery among them mostly 52 women had one previous cesarean section and while 45 cases (43.3%) belonged to the unscarred uterus, other significant factors were grand multiparity (18.26%), obstructed labour including malpresentation (20.19%) and induced labour with oxytocin and prostaglandins (4.8%). Maximum ruptures were found in III rd trimester 95 (90.3%), while 9 cases (8.7%) in 2nd trimester (table 2). 1st trimester was not included in the study. 61 (58.7%) cases had antepartum uterine rupture while the remaining 43(41.3%) women had ruptured during delivery.

**Table 3: Showing site of rupture**

Site	No. of cases	%
Upper segment		
1) Left lateral wall	6	5.8
2) Right lateral wall	4	3.9
Lower segment		
1) LUS	32	30.7
2) Posterior wall	2	1.9
3) Prev LSCS	46	44.2
4) Involving vagina	2	1.9
5) Involving bladder	12	11.53

LUS - Lower uterine segment, Prev LSCS - Previous lower segment cesarean section

The most common site of rupture was the previous cesarean scar site in 46 cases (44.2%), in the unscarred uterus (LUS) lower uterine segment was the commonest site of ruptured (34cases), and bladder tear was involved in 12 cases (11.53%) (table 3).

Maximum patients managed with uterine repair surgery (63.5%) while hysterectomy was needed in (35.6%) patients. Other surgeries performed were, bladder repair (11.5%), cervical tear repair (13.5%), vaginal wall tear repair (9.6%), tubectomy (21.2%) (table 4). One woman died during the operative intervention.

The majority of babies (64.4 %) were stillborn and only 35.6 % were born alive. Most of the babies (45.2 %) had birth weight >3 kg hence. (5.8%) babies were having birth weight >4 kg (table 5).

**Table 4: Type of surgery**

Type of surgery	No. of cases	%
Uterine / Scar repair	66	63.5
Obstetric hysterectomy	(37)	(35.6)
• Total	14	13.5
• Subtotal	23	22.1
Other additional surgeries		
• Bladder repair	12	11.5
• Cervical tear repair	14	13.5
• Vaginal wall tear repair	10	9.6
• Tubectomy	22	21.2

**Table 5: Perinatal outcome in cases of ruptured uterus**

Perinatal outcome	No. of cases	%
IUD / Stillbirth	66	64.4
Alive	37	35.6
<b>Weight of baby (Kg)</b>		
<2	2	1.9
2-2.4	10	9.6
2.5-3	44	42.3
3-3.9	41	39.4
4 & above	6	5.8

## Discussion

The current study comprises 104 cases of uterine rupture for 2 years that is 2012 and 2013. During this period, total deliveries conducted in the institute were 44,464, thus bringing an incidence of 0.23% that is 1 per 427 deliveries, depending on the year; we found an incidence of 0.18% in 2012, and 0.28 % in 2013. The cumulative rate is similar to those reported by various reports such as Mishra SK et al<sup>10</sup> (0.33%) and (0.39%) of Sadia Saleem et al<sup>11</sup>. While Khanam RA et al<sup>12</sup> reported a high incidence (1.06%) and M Sinha et al<sup>13</sup> reported lower incidence than us (0.061%).

In our study, only 5 cases (4.8%) were primigravida whereas 27 (25%) of the cases were grand multiparity, which favours the higher risk for rupture uterus at increased parity. Various explanations have been given in favour. As a primiparous uterus reacts to obstruction by inefficient uterine action of hypotonic variety, unlike a multiparous uterus which reacts by hypertonic uterine action and results in ruptured<sup>14</sup>. The weakness of the lower segment due to overstretching bruising in previous pregnancy results in a rupture in the subsequent pregnancies<sup>15</sup>, and the amount of fibrous tissue is increased in the myometrium as the parity is increased.

In the present study 56 of 104 cases (56.7%) were previously scarred, while 45 cases (43.3%) were unscarred uterus. The results are comparable to the study of Keren Ofir et al<sup>16</sup> and MH Al Salem et al<sup>17</sup>. Other significant risk factors in our study were obstructed labour including malpresentation (20.19%), oxytocics induction/

augmentation (4.8%). According to Sadia Saleem et al (2012)<sup>11</sup> risk factors other than the scarred uterus (79%) were multigravidity (9%), obstructed labour (5%), oxytocin-induced (5%), and forceps application (2%). This indicates the risk factors like multiparity, obstructed labour, and neglected labour which was previously more common causes of rupture uterus due to higher incidence of unscarred rupture is now over the years replaced by previous cesarean scar rupture due to increased numbers of cesarean sections nowadays.

The classical history in a woman with a ruptured uterus is severe abdominal pain, vaginal bleeding, and loss of fetal movements. As the hemoperitoneum increases, there may be features of generalized peritonitis, hypovolemic shock, and features of diaphragmatic irritation. Sudden cessation of labour pains and loss of station of presenting fetal part are classical signs of rupture uterus in labouring woman. As such it is easier to suspect, diagnose and timely intervene in a woman with known risk factors presenting with these features<sup>18</sup>. But sometimes it becomes difficult when there is concealed history or facts, in early gestation periods, inexperienced examiners, and advanced stage of labour when the presenting part is fixed. Once the diagnosis is confirmed, prompt management is the essence<sup>13</sup>. The patient needs immediate resuscitation and surgical intervention. After the early resuscitation and evaluation there is a need to decide if the rupture is surgically repairable or hysterectomy is needed. The decision of the surgical procedure depends on the type, location, and extend of the tear. There are two different perspectives from the authors, some suggest hysterectomy is safer and some suggest uterine repair as the best way to manage uterine rupture cases.<sup>13</sup> In our study the repair of the uterus was done in 63.5% cases among these tubal ligation performed in 21.2 % cases, hysterectomy was done in 37 (35.65%) cases including subtotal hysterectomy in 22.1 % cases, the urinary bladder was repaired in 12 cases (11.5%), cervical tear repair 14 cases (13.5%), vaginal wall tear repair (9.6%). Pranoy Nath had uterine rent repair in 45.94% of cases while 54.05% cases had undergone hysterectomy, they found obstructed labour as a leading cause for ruptured uterus in their study conducted in Assam, India<sup>19</sup>. One of our patients died before any procedure can be performed.

We found lower uterine segment rupture in more than 90% of cases, and only 10% of cases had upper uterine segment rupture involving either right or left lateral uterine walls, bladder was involved in 11.53% of cases. It is the consensus that rupture occurring during labour usually

involves the lower segment. This is because the upper uterine segment undergoes contraction and retraction while the lower segment and cervix are stretched and thinned out. In obstructed labour cases, continued uterine action forces the whole fetus into the dilating portions, the LUS, and cervix. The upper segment may attain a thickness of 4 cm and lower uterine segment may be thin as a few mm, and hence later is drawn out in length and may tear transversely. The left uterine sidewall is more prone to get ruptured, due to physiological dextrorotation of the gravid uterus and the most common position is LOA. Occiput mostly presents on the left side subjected to compare more strain. Left ovarian vein enters the left renal vein at an angle of 90 degree thus favours the development of passive venous congestion in the left broad ligament.<sup>20</sup>

Complete uterine rupture mostly presents with extruded fetus into the peritoneal cavity.<sup>21</sup> In these situations foetuses are found dead. But in cases of scar rupture, the perinatal outcome is better and the fetus may be in live condition. In our study, 64.4% of the fetus delivered stillbirth, and only 35.6% born alive. Fetal mortality in cases of uterine rupture is very high hence there is the importance of early operative interference to prevent fetal hypoxia. Most of the babies (45.2%) had a birth weight of more than 3kg, hence the incidence of rupture uterus was high in patients with babies of high birth weight. 6 cases had babies with birth weight >4kg in whom chances of cephalopelvic disproportion are more.

### **Conclusion**

Ruptured uterus is one of the most hated and unwanted complication of pregnancy to all patients and for caregivers both. Cases of uterine rupture are not easy to manage, even if they occur in the same building at the same time. In Indian and other developing countries, the complications start far from the definitive treatment facility, making treatment much more challenging. The government must educate people, should disseminate awareness through the campaign, electronic and print media about pregnancy-related complications, and strengthen the health care system. Health care providers should focus on the identification of high-risk signs, early diagnosis, immediate referral, and optimal management. There is ignorance about seeking health care in the matter of women's health; this attitude to women's health should change among people. Now it is time to change the words "let it be" or "damn the consequences", for maternal and child health in India.

**Conflict of interest:** None. **Disclaimer:** Nil.

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