

# Uterine rupture: A preventable morbidity

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## ABSTRACT

**Objective:** The objective of our study is to identify the risk factors for rupture uterus, plan the preventive measures and emphasize on proper management. **Methods:** It is a retrospective cross sectional, observation study in a tertiary care referral hospital conducted as a part of research and audit during postgraduate training. The patients treated for rupture uterus between April 2013 to March 2014 were studied in a tertiary care centre. The clinical presentation, risk factors, intraoperative findings, treatment modalities, maternal foetal outcome, postoperative complications were studied and analysed. **Results:** There were 28 (0.43%) patients with rupture uterus during the study period. Most of the women who had rupture uterus were in the age group of 26-30 years (60%). Thirteen (46.2%) patients had previous antenatal visits (booked patients). The most common cause leading to uterine rupture was previous caesarean section (60.7%). Complete rupture of uterus was more common than incomplete rupture. The anterior wall of lower segment of uterus was the most common site of uterine rupture. Maternal mortality rate was 7.14% and perinatal mortality rate was 64.2% in the study group. The live birth rate was 35.8%. **Conclusions:** Uterine rupture still happens and remains a serious obstetric complication. It is mainly due to delay in referrals and poor health services in rural areas. Regular drills, simulation models, training programmes should be conducted for healthcare workers to identify and treat this life threatening complication. Timely referral to well equipped higher centres with proper details of the preceding events should be emphasized.

**Keywords:** Previous caesarean section, hysterectomy, perinatal mortality.

Uterine rupture is a rare, life threatening obstetric complication endangering the lives of mother and foetus. It may be primary, defined as occurring in a previously intact or unscarred uterus, or may be secondary and associated with a pre-existing myometrial incision, injury, or anomaly<sup>1</sup>. In the past, when multiparity was more common, the cause of rupture uterus was primary, mainly due to obstructed labour. But in the recent years with the increasing number of caesarean deliveries and trial of labour the cause of uterine rupture is secondary to previous scars.

Incidence of rupture uterus varies among developed and developing countries. It depends on the availability of expert obstetric care and a multidisciplinary team. According to WHO systematic review of uterine rupture, worldwide incidence of uterine rupture was 2.3 per 10,000 births<sup>2</sup>. Even in developed countries, the incidence of rupture is 1 in 4800

deliveries<sup>3</sup>. The frequency of primary rupture is around 1 in 10,000 to 15,000 births<sup>4</sup>.

With rupture and expulsion of the foetus into the peritoneal cavity, the chances for intact foetal survival are dismal<sup>5</sup>. In such instances perinatal mortality ranges from 80 to 90%<sup>6</sup>. The rate of uterine rupture is low in developed countries but higher in developing countries like India, and is a leading cause of maternal mortality. In India it is responsible for 5-10% causes of all maternal death<sup>7, 8</sup>. In rural areas of developing countries like India where literacy, poverty, lack of antenatal care, poor transport facilities, unfavourable geographical area and inadequate equipment /staffing combine to magnify the problem<sup>9, 10</sup>. Women in rural areas do not come for regular antenatal check up preferring home delivery by traditional birth attendant which may also lead to prolonged /obstructed labour in grand

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multipara leading to rupture uterus<sup>9,10</sup>.

This study aims at studying the risk factors for rupture uterus, clinical presentation and co-relation with aetiology, maternal and foetal outcome, planning the preventive measures and emphasizes on proper management options.

**Material and methods**

It is a retrospective, cross sectional, observational study in a tertiary care referral hospital conducted as a part of research and audit during postgraduate training. The patients treated for rupture uterus between April 2013 to March 2014 were studied in a tertiary care centre. The clinical presentation, risk factors, intraoperative findings, treatment modalities, maternal foetal outcome, postoperative complications were studied and analysed. The data was collected in a standard proforma from the medical records and tabulated in Microsoft excel. As it is an observational study and the sample size is small, statistical analysis is not used. The details of clinical presentation, past history, risk factors, intraoperative findings, treatment modalities, maternal foetal outcome, postoperative complications were studied. Pregnancy in congenital anomalous uterus presenting with rupture uterus was excluded. The definitions used to diagnose the uterine rupture were as follows<sup>5</sup>.

- a. Complete uterine rupture involves the full thickness of the uterine wall and visceral peritoneum.
- b. Incomplete uterine rupture/dehiscence/uterine window involves the myometrium, but the visceral peritoneum is intact.
- c. Traumatic uterine rupture is either due to blunt trauma, instrumental delivery, foetal anomaly like hydrocephalus, internal podalic version.

**Results**

Total no of deliveries were 6469. Total no of cases of rupture uterus were 28 (0.43%). The age group in the study population ranged from 20-35 years. Most of the women

**Table 1: Distribution of cases according to maternal age**

Maternal age	Number (n=28)	Percentage
<20 years	0	0
21-25 years	7	25%
26-30 years	17	60.7%
31-35 years	4	14.2%

who had rupture uterus were in the age group of 26-30 years (60.7%) as seen in table 1. Uterine rupture was more common in multipara, para 2-4(89.2%). Only two cases were primipara (7.14%). Out of 28 patients, 13(46.2%) patients had previous antenatal visits in our hospital signifying the lack of proper antenatal care in rural areas as depicted in table 2. Majority of patients (15 patients, 53.5%) did not have proper antenatal care during their current pregnancy.

Sixteen patients (57.14%) having uterine rupture were referred from other peripheral hospitals to our centre.

**Table 2: Status at presentation**

Parameters	Number of cases	Percentage
<b>Booking status</b>		
Booked	13	46.2%
Unbooked	15	53.5%
<b>Referral status</b>		
Referred from other hospitals	16	57.14%
Inpatients	12	42.8%

The most common aetiology leading to uterine rupture was previous caesarean section (60.7%). The other causes were inadvertent use of oxytocin and misoprostol, obstructed labour as shown in table 3. There were 2 cases of posterior

**Table 3: Aetiology of uterine rupture**

Aetiology	Booked	Unbooked	Percentage
Previous LSCS	10	7	17 (60.7%)
Oxytocin	1	4	5 (17.85%)
Misoprostol	1	2	3 (10.76%)
Obstructed labour	1	2	3(10.76%)

wall rupture and 1 case of fundal rupture in case of inadvertent use of oxytocics in multipara. There was a past history of dilation and curettage in one case, which could be the cause of fundal rupture when oxytocic was used for labour augmentation in multigravida. The case of posterior wall rupture was a referred case of a multiparous lady with hydrocephalic foetus, with prolonged labour leading to obstruction, haematuria and bladder injury. The clinical presentation of rupture uterus was variable.

**Table 4: Clinical presentation**

Clinical features	Number of cases		Percentage
	Referred from outside	Inpatients	
Classic signs of uterine rupture	8	3	39.5%(11)
Foetal distress	1	5	21%(6)
Unexplained maternal tachycardia	2	3	17.8%(5)
Silent rupture	1	1	7.14%(2)
Hemodynamically unstable	4	-	14.2%(4)

The classic signs of uterine rupture like irregular uterine contour, tense abdomen, absent foetal heart sounds were found in only 8 cases (39.5%). The other clinical features were unexplained maternal tachycardia, hemodynamic instability, foetal distress. Four women had silent rupture diagnosed on OT table as described in table 4.

**Table 5: Type of rupture**

Types	Scarred uterus	Unscarred uterus	Percentage
Complete	13	4	17(60.7%)
Incomplete	4	7	11(39.3%)

Complete rupture of uterus was more common than incomplete rupture. There were 17 (60.7%) cases of complete uterine rupture, 13 cases were in previous scarred uterus as depicted in table 5. The anterior wall of lower segment of uterus was the most common site of uterine rupture. The anterior wall rupture was seen in 75% of cases.

The other sites were lateral wall, posterior wall and fundus of uterus as displayed in figure 1. The associated injuries observed in the patients of rupture uterus were broad ligament hematoma, cervical laceration, bladder injury. There were 5 cases of broad ligament hematoma and 2 cases of bladder injury. Management consisted of simultaneous resuscitation of the patient with blood and blood components and an emergency laparotomy.

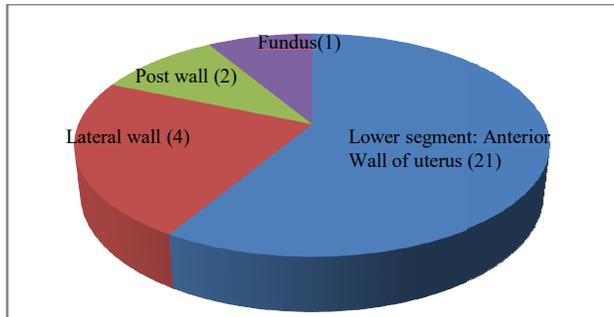


Figure 1: Different sites of uterine rupture

Surgical management included either a primary repair of uterus plus tubal ligation in 6 cases (21.42%), primary repair of uterus without tubal ligation in 12 cases (42.8%), and emergency hysterectomy in 10 cases (35.7%) as described in table 6. Primary repair was possible in 18 cases because anterior wall of lower segment of the uterus was the most common site of rupture, which was relatively less vascular compared to other sites of rupture and with clean edges.

Table 6: Obstetric history and management of patients

Parity	Number of cases	Hysterectomy	Repair
1	2	-	2
2	12	2	10
3	9	4	5
4	4	3	1
>4	1	1	-
Total	28	10	18

The complications in the study group were massive blood loss requiring blood transfusion, paralytic ileus, altered renal function tests, prolonged hospital stay. Sixteen patients required blood transfusion (table 7). Maternal mortality was seen in 2 cases (7.14%) and perinatal mortality was seen in 18 cases (64.2%) in the study group. The live birth rate was 10(35.8%).

Table 7: Maternal complications

Complications	No of patients (n=28)
Massive blood loss requiring transfusion	16
Paralytic ileus	2
Bladder rupture repair	2
Broad ligament hematoma	5
Cervical laceration	3

## Discussion

Uterine rupture still remains a serious obstetric complication. It is mainly due to lack of health information, illiteracy, poor antenatal care, poverty, and delay in referrals and poor health services in rural areas. The incidence is inversely proportional to the level of expert obstetric care. Incidence in developed countries is 5-10 times lower i.e.0.086% in Australia, 0.014% in USA. The incidence in our study was 0.43% comparable to observations by Malik et al (0.5%)<sup>11</sup>, Nahushaba et al (0.7%). Incidence was lower when compared to study by Alam et al 1.14%<sup>12</sup>. The incidence is high compared to other studies, like Nath J (0.1%)<sup>6</sup>, because our hospital is a tertiary care centre catering to many rural areas.

Incidence of rupture uterus was high in multipara which can be attributed to the increasing incidence of caesarean sections. The most common cause of rupture uterus in our study was previous caesarean scar rupture (60.7%) which was comparable to study conducted by Malik et al (53.3%), but was in contrast to other studies. In study by Ezechi et al<sup>13</sup> and Nahum et al<sup>14</sup>, the most common cause was obstructed labour 91.8% and 53.3% respectively. Out of 17 cases of previous caesarean scar rupture, 5 women laboured at home or non-specialist units, all were referred after uterine rupture. 8 cases of previous caesarean were monitored and allowed for vaginal birth (TOLAC), but because of early recognition of premonitory signs of rupture all were taken up for LSCS.

The clinical features were extremely variable. We observed that classical signs of rupture uterus were seen in 39.5% cases, similar to that of findings in the study by Ibha K et al<sup>15</sup>.

Four women had silent rupture (scar dehiscence or incomplete rupture) which was diagnosed during caesarean section. Therefore, a careful study of the indications for previous caesarean section, integrity of the scar, possible cephalopelvic disproportion is paramount. During TOLAC, constant vigilance and monitoring of foetal heart rate and early impending signs of rupture is important. Recurrent late and variable decelerations on the electronic foetal tracing are the most important signs. Most cases had lower segment rupture except one with fundal rupture which was due to oxytocin accelerated labour in multigravida. Routine use of partogram should be stressed which can prevent prolonged labour and inadvertent use of prostaglandins and oxytocin.

Three cases of rupture uterus were made out after delivery. They were multipara patient with unscarred uterus who presented with shock, who had vaginal delivery outside

and were referred to our hospital. There was no response to blood transfusion. Lateral wall rupture /broad ligament hematoma was suspected and confirmed on laparotomy. It was due to the mismanaged use of oxytocics in 2<sup>nd</sup> stage of labour/instrumental delivery from the referral centres resulting in traumatic uterine rupture. These partial thickness rupture or uterine tears are usually not visible on vaginal examination and are found at the time of hysterectomy for intractable uterine bleeding despite a contracted uterus. Haemorrhage with this type of tear can be torrential, and bleeding is usually not slowed down until the uterine artery pedicles are clamped bilaterally<sup>5</sup>.

There were two cases of posterior uterine wall rupture which was the rarest site of rupture. Therefore, it is important to examine the posterior wall too for dehiscence or else one might miss it. The maternal mortality rate in our study was 7.14% comparable to study by Malik et al 7.76%<sup>11</sup>, but was in contrast with other studies which had higher mortality rate, Nahum GG et al (20%)<sup>14</sup>, Ezechi et al (23.3%)<sup>13</sup>. The perinatal mortality rate in our study was 64.2%. With quick surgical intervention and resuscitation most women survive a uterine rupture. The maternal mortality rate associated with the rupture of an unscarred uterus is higher (10%) than the mortality rate associated with the rupture of a scarred uterus (0.1%)<sup>16, 17</sup>. The incidence of foetal and maternal morbidity, mortality depends on the site and type of rupture as well as the timing of surgical intervention. Lateral ruptures are associated with worse outcomes than midline ruptures because of increased vascularity of the lateral uterine wall. A delay in surgical intervention is associated with maternal blood loss, increased risk of coagulopathy, and foetal mortality.

In order to decrease the likelihood of uterine rupture during the subsequent pregnancy, the uterine incision should be closed in two layers, which may be helpful if the women are undergoing TOLAC in next pregnancy according to few studies<sup>5</sup>. Closure of uterus with continuous nonlocking sutures in two layers reduces the incidence of isthmocele/caesarean scar defect<sup>18</sup>. Proper documentation of type and site of scar, indication of caesarean section in the discharge summary is important.

### Conclusions

Uterine rupture still happens and remains as a serious obstetric complication. Leading causes of rupture uterus is changing from obstructed labour to caesarean scar rupture. It is mainly due to lack of health information, illiteracy, poor antenatal care, poverty, and delay in referrals and poor health services in rural areas. Special counselling of patients after

caesarean delivery /repair of uterine rupture is needed to stress the importance of regular antenatal care and institutional delivery in successive pregnancies to avoid complications. A multidisciplinary team approach is important to manage the complications of uterine rupture. Regular drills, simulation models, training programmes should be conducted for healthcare workers to identify and treat this life threatening complication. Prevention strategies are important. Women with higher risk of uterine rupture like multiple pregnancy, multipara should receive oxytocin judiciously. All deliveries should be classified according to Robson's classification and we should identify the causes of caesarean sections and try to reduce the primary C-section rates.

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

### References

1. Cunningham FG, Leveno KJ, Bloom SL, Dashe JS, Hofman BL, Brian M, et al. Williams Obstetrics. 25<sup>th</sup> ed. New York: McGraw-Hill; 2018. p.765-6.
2. Justus HG, Lale S, Gülmezoglu AM. WHO systemic review of mortality and morbidity: the prevalence of rupture uterus. BJOG. 2005; 172: 1221-8.
3. Getahun BS, Yeshe MM, Roberts DJ. A 27-year old woman in Ethiopia with severe pain, bleeding, and shock during labor. N Engl J Med. 2012; 367:1839.
4. Porreco RP, Clark SL, Belfort MA, Dildy GA, Meyers JA. The changing specter of uterine rupture. Am J Obstet Gynecol. 2009; 200: 269.
5. Yeomans ER, MD, Hoffman BL, Gilstrap LC, Cunningham FG. Cunningham and Gilstrap's Operative Obstetrics. 3<sup>rd</sup> ed. New York: McGraw-Hill; 2017. p.488-90
6. Nath J, Karmakar S. Rupture uterus - a cause of concern in rural medical college hospital in Assam. The New Indian Journal of OBGYN. 2019; 5(2): 79-82
7. Chawre ES, Mehendale M, Sarmalkar M. Uterine rupture: A Retrospective analysis. International journal of biomedical and advance research. 2019; 10(4): e 51-55.
8. Prajapati SS, Goswami KD, Kavita M. Dudharejia KM, Kannar AN, Parmar PH, et al. Rupture uterus; A Retrospective analytical study. International Journal of Reproduction, Contraception, obstetrics and gynecology. 2018; 7(3): 845-7.
9. Guguloth K, Sivaranjani BSV. A Retrospective study of maternal and perinatal outcome in obstetrics

- emergencies at Government General Hospital Guntur. IOSR Journal of Dental and medical Sciences. 2016; 15(12): 26-31.
10. Dwivedi S, Kumar A. Uterine rupture a retrospective analysis of referral cases at a tertiary care centre Kanpur city. *Int J Reproduction, Contraception, Obstetrics and Gynecology*. 2015; 4(4): 1148-52.
  11. Malik HS. Frequency, predisposing factors and fetomaternal outcome in uterine rupture. *J Coll Physicians Surg Pak*. 2006; 16: 472-5.
  12. Alam I, Khan A, Ahmed R, Begum N. A two-year Review of Uterine Rupture at Gynaecology Unit A - Ayub Teaching Hospital. *J Ayub Med Coll Abbottabad*. 2000;12: 21-2.
  13. Ezechi OC, Mabayoje P, Obiesie LO. Ruptured uterus in South Western Nigeria: a reappraisal. *Singapore Med J*. 2004; 45:113-6.
  14. Nahum GG, Pham KQ. Uterine Rupture in Pregnancy. *Drugs & Diseases*. 2018. (Cited 2020 Nov 10). Available from: <http://emedicine.medscape.com/article/275854>
  15. Ibha K, Poonam G, Sehgal A. Rupture of the gravid uterus: Experience at an urban medical centre in Northern India. *J Obstet Gynaecol India*. 2003; 53: 558-62.
  16. Kapoor DS, Sharma SD, Alfirevic Z. Management of unscarred rupture uterus. *J Perinat Med*. 2003; 31(4): 337-9.
  17. Chauhan SP, Martin JN, Henrichs CE, Morrison JC, Magann EF. Maternal and perinatal complications with uterine rupture in 142,075 patients who attempted vaginal birth after caesarean delivery: A review of the literature. *Am J Obstet Gynecol*. 2003;189(2): 408-17.
  18. Brook AJ, Clarke FR, Bhatia K. Gynaecological morbidity associated with caesarean niche: increasing awareness, prevention and management. *The Obstetrician & Gynaecologist*. 2020; 22: 122-30.
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