# Uterine Rupture: A Two-Year Review at a Teaching Institution.

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## ABSTRACT

**Background:** To determine the socio-demographic and obstetric causes of uterine rupture, the case fatality rate and association of these factors with maternal mortality among patients of uterine rupture. **Methods:** A retrospective study between January 2010 to December 2011. **Result:** During the study period, 18637 deliveries were conducted and 69 cases of uterine rupture were admitted giving the incidence of 0.37% of deliveries. Of the 69 women 53.5% had spontaneous uterine rupture. Among these the most frequent factor (40.5%) was mismanaged labour leading to prolonged & then obstructed labour. The case fatality rate was 10.1%. Factors like age, parity, status of antenatal care, site of rupture & presence of shock did not show any statistically significant association with maternal mortality from uterine rupture. **Conclusion:** A more vigilant approach to prevent prolonged and obstructed labour in delivery units around SCB medical college is required to reduce the incidence of this condition. Strengthening emergency obstetric care at all level of health care delivery system can help in anticipation, early diagnosis and resuscitation to reach the referral centre safely, thereby reducing the case fatality rate of uterine rupture.

*Keywords:* Obstructed labour, Uterine rupture.

## INTRODUCTION

Maternal mortality Ratio (MMR) is extensively accepted as a key indicator of the overall health of a population, status of the women in the society & functioning of health care system. World's average MMR is 216/1 lakh live births & MMR of India is 174/1 lakh live births by 2015.[1] More than 87% of maternal death from global MMR is attributed to Sub. Saharan Africa & South Asia.[2]

Our nation has experienced a 4.7 % annual decline in MMR from 2000 to 2015 but it has not achieved the millennium Development goal-5 & challenges remain.[1] Recognition of both magnitude & causes, technical knowledge & expertise & accessibility to emergency obstetric care, all are advancing on the track towards the goal of reducing MMR. Even then there are many preventable obstetric emergencies ending up in maternal death & perinatal death. Uterine rupture is one such preventable obstetric emergency.

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Uterine rupture refers to complete non surgical disruption of all uterine layers.[3] In a WHO systematic review of uterine rupture worldwide, the median incidence was 5.3 per 10,000births.[4] Incidence varies from 0.3 /1000 to 7/1000 deliveries in India accounting for 5% to 10% of maternal deaths.[5]

Uterine rupture is common in women with a scarred uterus, including prior cesarean section and myomectomy. Cesarean section deliveries has been steadily increasing from 6.7% in 1999 to 19.1% in 2014 globally.[6] Consequently, the number of deliveries by mothers with prior cesarean section (CS) is also on the rise.[7] The reported incidence of uterine rupture among women with prior CS ranged from 0.2% in high human development index (HDI) countries to 1% in low HDI countries and in India the incidence is 1.69%.[8,9]

Rupture of an unscarred uterus may be either traumatic or spontaneous. Traumatic factors include mid to high operative vaginal deliveries, assisted breech delivery, internal podalic version, abdominal trauma, labour induction and in particular the unmonitored usage of oxytocin or prostaglandins. There have been reports of uterine rupture when misoprostol was used in dosage above 25 µg vaginally.[10] Spontaneous rupture is usually observed with cephalopelvic disproportion, delivery of a macrosomic or grossly anomalous fetus or

malpresentation. Rupture may also develop spontaneously in grand multiparas, congenitally abnormal uterus & abnormal placental implantation.[11,12]

Uterine rupture is associated with both fetal and maternal clinical manifestation. Obstetrician should have a high clinical suspicion for uterine rupture in the presence of maternal clinical manifestations like abdominal pain or tenderness, vaginal bleeding, change in uterine contour, cessation of contractions, hematuria and signs of hemodynamic instability. Fetal bradycardia followed by fetal death and loss of fetal station are the fetal manifestations.[13]

This obstetric complication is associated with maternal morbidities & mortality. Bladder rupture, major puerperal infections, severe post hemorrhagic anemia, vesicovaginal fistula, rectovaginal fistula, psychological trauma & in long term because of the surgical intervention, the woman may be sterilized which can lead to divorce and loss of economic support.[14] Perinatal outcome includes increased rate of low 5 minute APGAR score, umbilical artery PH <7, admission to NICU, hypoxic ischemic encephalopathy & neonatal death.

This study was undertaken to find out the different socio-demographic and obstetric risk factors associated with uterine rupture and the association of these factors with maternal mortality among the patients with uterine rupture.

## MATERIALS AND METHODS

This was a retrospective study of patients with uterine rupture attending SCB medical college hospital, a tertiary care hospital, done over two years from January 2010 to December 2011. All patients with clinical diagnosis of rupture uterus during the study period were included in the study.

From the case records informations were collected regarding demographic and clinical characteristics viz. Maternal age, parity, number of previous abortions, status of antenatal care, risk factors, site of rupture, treatment given & associated maternal & neonatal morbidities & mortality.

The data were entered in Microsoft excel 2013 and analysed in SPSS version 20. All the categorical variables were expressed in terms of number and percentages and continuous variables in mean and standard deviation. Association between different categorical variables were determined by chi-square or fischer exact test as applicable. Unadjusted odds ratios with 95% confidence interval (CI) were also calculated to show the associations. P-Value less than 0.05 was considered statistically significant.

## RESULTS

Record based review of cases found that during the specified time period there were a total of 69 cases of uterine rupture. During this period there were a total of 18,637 deliveries giving an incidence of 0.37% (1 in 270 deliveries). The mean age of study

participants was 28.09± 4.23 years. A little more than a quarter (26.1%) belonged to more than 30 years while rest (73.9%) belonged to ≤ 30 years. All of the uterine rupture patients had a gravidity of two or more which indicated no primigravida had ruptured uterus in this study. Half of the cases (50.7%) were primiparas while 4.34% of cases were grand multiparas (Parity ≥4). Previous obstetric history found that 87% has at least one live child and 21.7% had previous abortion history. Thirty four percent of patients were not registered for antenatal checkup.

**Table 1: Demographic & obstetric history of Study Population (N=69)**

| Variables Age (in years) | Number | Percentage |
|---|---|---|
| ≤ 25 | 26 | 37.7 |
| 26-30 | 25 | 36.2 |
| >30 | 18 | 26.1 |
| **Parity** | | |
| Primipara | 35 | 50.7 |
| 2&3 | 31 | 45.0 |
| ≥4 | 3 | 4.34 |
| **Previous live births** | | |
| Present | 60 | 87.0 |
| Absent | 9 | 13.0 |
| **Previous abortion** | | |
| Present | 15 | 21.7 |
| Absent | 54 | 78.3 |
| **ANC** | | |
| Registered | 45 | 65.2 |
| Not registered | 24 | 34.8 |

**Table 2: Obstetric Risk factors of uterine rupture (N=69)**

| Risk factors | Number | Percentage |
|---|---|---|
| Spontaneous rupture | | |
| Mismanaged labour in CPD | 28 | 40.57 |
| Grand Multiparity | 3 | 4.34 |
| Malpresentation | 3 | 4.34 |
| Fetal anomaly | 2 | 2.89 |
| Placenta percreta | 1 | 1.40 |
| Scar rupture | | |
| Cesarean section | 24 | 34.78 |
| Previous abortion | 15 | 21.73 |
| Traumatic rupture | | |
| Oxytocic Misuse | 3 | 4.34 |
| Instrumental delivery | 5 | 7.24 |

* In some cases there were more than one risk factors.

[Table 2] shows the obstetric risk factors associated with uterine rupture. Spontaneous rupture during labour occurred in 53.54% of patients due to underlying factors like mismanaged labour in CPD (40.57%) grand multiparity (4.34%), malpresentation (4.34%), fetal anomaly that is fetal hydrocephalus (2.89%) and placenta percreta (1.4%). Twenty-four (34.78%) of women had previous history of cesarean section and 15 (21.73%) had history of suction evacuation. Traumatic rupture accounted for 11.58% of cases. All the women having iatrogenic or traumatic rupture were either third or fourth gravida. Forceps & ventouse application in undiagnosed cephalopelvic

disproportion & injudicious use of oxytocin or prostaglandin were the causes of traumatic uterine rupture. All those inductions/ augmentations and instrumental deliveries were done at peripheral hospitals and referred to this institution all undiagnosed.

On analysing the sites of rupture it was anterior wall which was commonly involved (59.4%). Only 5.8% of rupture involved posterior uterine wall which resulted from obstructed labour and instrumental delivery in equal proportion. Out of 5 (7.2%) bladder injuries 2 were from previous cesarean section & 3 from obstructed labour due to cephalopelvic disproportion & malpresentation. Broad ligament hematoma was seen with lateral wall rupture. Out of 13 cases 8 were associated with obstructed labour and five with CS scar rupture. Out of 69 patients of uterine rupture, 3 cases died prior to laparotomy. From rest 66 patients, 24 (36.45%).xa patients were managed with repair of the ruptured site. Fifty eight percent of the repaired group had previous cesarean scar rupture. Nineteen (28.8%) patients were managed with total abdominal hysterectomy (TAH). TAH was done in cases with vaginal involvement. Rest 34.8% were managed by subtotal hysterectomy (STAH).

**Table 3: Management of uterine rupture (N=66)**

| Management | Number | Percentage |
|---|---|---|
| Repair | 24 | 36.4 |
| STAH | 23 | 34.8 |
| TAH | 19 | 28.8 |

Perinatal outcome among the study subjects showed that only 2 (2.9%) had live birth. One was rupture during instrumental delivery & the other was a case of placenta percreta where a live preterm baby was born. All but the one placenta percreta case had rupture during labour. Mean weight of the delivered babies was 2.93±0.50 Kilograms. Mean unit of blood requirement was 0.84 units which ranges from 0 to 6 units.
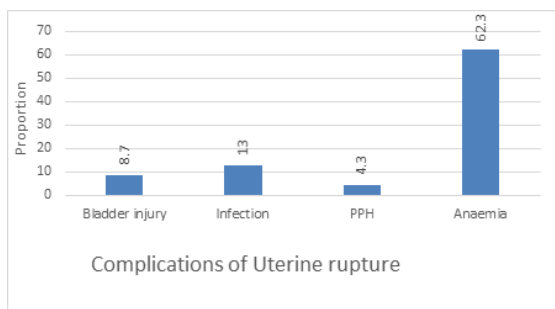


**Figure 1: Complications during / following uterine rupture**

Around two third (62.3%) of the study participants had anaemia. Infection/ puerperal sepsis occurred in 13 % of the subjects while 8.7% suffered from bladder injury and 4.3% suffered from Shock [Figure 1].

**Table 4: Association of demographic & obstetric factors with maternal mortality in uterine, rupture.**

| Variables | Maternal Death n (%) | No Maternal Death n (%) | Odds Ratio (95% CI) | P-Value |
|---|---|---|---|---|
| Age ( in Years) | | | | |
| ≤25 | 5 (19.2) | 21 (80.8) | 4.88 (0.87-27.3) | 0.095 |
| >25 | 2 (4.7) | 41 (95.3) | | |
| Parity | | | | |
| Primi | 4 (57.1) | 31 (42.1) | 1.33 (0.27-6.45) | 0.720 |
| ≥2 | 3 (50.0) | 31 (50.0) | | |
| ANC | | | | |
| Registered | 5 (11.1) | 40 (88.9) | 1.37 (0.24-7.68) | 1.00 |
| Not Registered | 2(8.3) | 22 (91.7) | | |
| Site of Rupture | | | | |
| Uterine wall | 2 (9.5) | 19 (90.5) | 2.21 (0.28-16.89) | 0.589 |
| Uterine wall with extension | 2 (4.5) | 42 (95.5) | | |
| Anemia | | | | |
| Present | 5 (11.6) | 38 (88.4) | 1.57 (0.28-8.79) | 0.703 |
| Absent | 2 (7.7) | 24 (92.3) | | |

[Table 4] shows the association of different obstetric parameters with maternal mortality in uterine rupture patients. Patients belonging to 25 years or less age bracket had 4.88 times (95% CI – 0.87-27.3) higher odds of maternal death as compared to above 25 years age group but this difference did not show any statistical significance (p value = 0.095). Parity (P value = 0.72) did not show any statistically significant association with maternal mortality. Similarly ANC, site of rupture and presence of anemia as factors for maternal mortality did not show any statistically significant association with maternal mortality.

The case fatality rate was 10.1% and uterine rupture shared 2.6% of total maternal deaths.

## DISCUSSION

Ruptured uterus is a serious complication of pregnancy & labour & it carries high risk of maternal & perinatal morbidity & mortality. The incidence of ruptured uterus in developed countries like Australia & Ireland is 0.08% & 0.02% respectively.[15,16] In Nigeria it is 0.83%.[17] Different studies from India showed incidence of 0.28% & 0.26%.[5,18] The incidence of 0.37% in this study is little higher than other Indian studies. Poor obstetric services, socio-economic factors like poverty, illiteracy, ignorance, aversion to abdominal delivery & non-utilisation of available services are the responsible factors for high incidence of uterine rupture in developing countries than developed countries.

Almost three fourth of uterine rupture patients were of ≤30 yrs in age. In the other Indian study by Sahu Latika, 73.12% were in the age group of 20-30

years.[5] In this study uterine rupture occurred mostly in women of low parity (≤3). They contributed to 95.7% of cases. This finding was comparable to other studies from India by Sahu Latika & K. Sunitha.[5,19] The trend of increased uterine rupture among women of low parity could be due to increased primary cesarean section rate and myometrial injuries incurred during previous abortions.

Nearly one third (34.8%) of study subjects were unbooked of which 33% were having a previous cesarean scar. This showed a major proportion of obstetric population is still not utilizing the available obstetric services due to social reasons.

Most common cause in our study was spontaneous uterine rupture resulting from mismanaged labour which ended up with obstructed labour (40.57%). It might be due to poor screening for high risk pregnancies & unsupervised labour conducted in poorly equipped centres. Still the peripheral health facilities must be inadequate in man power, skill & infrastructure so that recognition & management of prolonged labour from cephalo-pelvic disproportion, malpresantation & fetal anomalies was very poor.

**Comparison of Risk Factors with Other Studies**

| Causes (in %) | Present study | Rashmi etal20 | Jain R 21 |
|---|---|---|---|
| CS Scar rupture | 34.8% | 56% | 58.62 |
| Spontaneous | 53.6% | 32% | 41.38 |
| Traumatic | 11.6% | 12% | Nil |

Hysterectomy (TAH = 28.8%, STAH = 34.8%) was performed in 63.6% of uterine rupture & scar repair in 36.4% of cases. Repair of the rupture site is a logical approach with scar rupture and in those with a linear tear. Decision to perform uterine repair or hysterectomy is usually influenced by extent of rupture, condition of the tissues, parity & number of living children.

**Comparision of Management of With Other Studies.**

| Management | Present Study | Sunanda et al [18] | Sahu Latika [5] |
|---|---|---|---|
| Repair | 36.4% | 75% | 57.6% |
| STAH | 34.8% | 25% | 7.9% |
| TAH | 28.8% | - | 33.5% |

Case fatality rate in our study was 10.1%, Sixty eight cases had been referred from peripheral health centres,62% undiagnosed. Maternal mortality in our study was 2.6% of total maternal deaths. Out of seven deaths three died within one hour of arrival. This late presentation to the tertiary care centre had multiple attributable factors. These were low socio-economic status, literacy, & ignorance to avail health care, delayed diagnosis & referral poor initial rescuscitaion & poor life support backup on transit to the higher level of care.

**Comparision with other studies**

| Studies | G Amanacl et al [22] | Jain R [21] | Present study |
|---|---|---|---|
| Case fatality rate | 11.1% | 13.7% | 10.1% |

Factors like age, parity, ANC, site of rupture, presence of anemia did not show statistically significant association with maternal mortality from uterine rupture. Anticipating uterine rupture in patients having risk risk factors, timely diagnosis & minimizing the time from diagnosis to definitive treatment are the most critical aspects in minimizing the maternal mortality from this obstetric catastrophe.

## CONCLUSION

Magnitude of uterine rupture was higher than other centres of India in this study area. However almost all case were preventable. Strengthening emergency obstetric care at all levels of health care delivery system can go a long way to prevent this obstetric catastrophe.

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