

## Study of Risk Factors & Obstetrics Outcome in Rupture Uterus

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### Abstract

**Background:** Uterine rupture is the tearing of uterine wall and loss of its integrity through breach during pregnancy, delivery or immediately after delivery. It is a serious obstetric complication with a high risk of morbidity for both mother and fetus. It is one of the major obstetric complications associated with serious maternal complications like severe haemorrhage, hysterectomy, genitourinary injuries, sepsis and death. This study was done to determine the cumulative incidence, risk factors, fetal and maternal outcomes among women with uterine rupture.

**Methods:** We studied 92 cases of uterine rupture admitted at obstetrics and gynaecology department of MKCG Medical College between September 2019 and August 2021. The history & examination was done, and all patients were followed up regarding demographic characteristic, clinical presentation, risk factors, operative findings, maternal & fetal outcome and post op complication.

**Results:** The incidence of uterine rupture in our study period was 0.364%. 76.06% was in the age group of 20-30 yrs. 92.39% came from rural and low socio-economic areas. 94.57% had attempted delivery at health centres. 81.52% cases of rupture uterus belonged to term gestation. 84.78% presented with complete rupture and 15.21% presented with incomplete rupture.

Previous caesarean delivery is the most common cause of rupture uterus (73.91%) followed by obstructed labour (21.73%) and prolonged labour (18.47%). The three symptoms identified were abdominal pain (66.30%), cessation of labour (52.17%) and vaginal bleeding (46.73%). The commonest presenting sign of uterine rupture is uterine tenderness (82.6%). Fetal heart sounds were positive in 15.21% of cases.

Hysterectomy (TAH+STAH) was done in 63.03% cases and 22.8% uterine rent repair was done. There were 8 maternal deaths (8.69%) with most common cause being septicaemia (5 cases) followed by ARF (3 cases). Anaemia is the commonest complication (68.47%) followed by wound infection. Bladder injuries and repair was done in 5.43%. The perinatal mortality in cases of rupture uterus was 84.78%. 14 cases were live birth among the 92 cases.

**Conclusion:** Studies on uterine rupture reveal that common causes are obstructed labour, previous caesarean section especially if associated with use of oxytocin or prostaglandin

without proper monitoring. We should aim to decrease the absolute rate of caesarean section by using a more cautious approach in choosing indications for abdominal deliveries. Early diagnosis based on awareness about signs and symptoms, high index of suspicion, good anaesthetic care, well equipped ICU, blood bank and NICU and availability of an experienced surgeon on floor, decrease the diagnosis to delivery interval and help in decreasing the associated maternal and perinatal morbidity and mortality.

**Keywords:** Rupture, Uterus, Cesarean section.

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## Introduction

Uterine rupture is the tearing of the uterine wall and the loss of its integrity through breaching during pregnancy, delivery or immediately after delivery. It is a rare but serious obstetric complication with a high risk of morbidity for both mother and fetus. It can lead to severe maternal blood loss and extensive damage to the uterus, often necessitating a hysterectomy. Beyond this, it may expose the women have harmful sequel such as permanently infertility secondary to hysterectomy. [1] Prior caesarean section (C/S) has long been considered the major risk factor for uterine rupture. Uterine rupture was defined as a complete tear through the uterine wall, including myometrium and the serosa, with or without expulsion of the fetus

WHO systematic review of maternal mortality and morbidity secondary to uterine rupture showed that the prevalence of uterine rupture tends to be lower in developed countries than developing countries with a prevalence rate of 0.006%. Uterine rupture in developed countries mostly occurs secondary to prior caesarean section and use of uterotonics.[1] One of the risk factors of uterine rupture in developing countries is prolonged obstructed labor with high incidence of rupture of unscarred uterus [2]. Improved quality of obstetric care explains the difference observed between developed and developing countries in the incidence, type as well as outcomes of uterine rupture [3]. Other risk factors for

uterine rupture include multiparity, use of uterotonic drugs for induction or augmentation of labor, placenta percreta and manipulations such as internal podalic version and breech extraction. Uterine rupture is also associated with poor fetal/neonatal outcomes including low Apgar scores and perinatal deaths of over 80% in studies done in developing countries [4]. Therefore, this study was done to determine the cumulative incidence, risk factors, fetal and maternal outcomes among women with uterine rupture at MKCG Medical College, Berhampur.

## Aims and Objectives

- a) To estimate the incidence of uterine rupture
- b) To identify the risk factors and associated maternal and perinatal morbidity and mortality due to rupture uterus

## Materials and Methods

The current study was a prospective observational study, conducted over 92 cases of rupture uterus in the Department of Obstetrics and Gynaecology, MKCG Medical College, Berhampur, Odisha from September 2019 to August 2021. Exclusion criteria: All cases of rupture uterus admitted or occurred in the hospital and exclusion criteria: (a) women with uterine rupture managed at other health facility and refer to MKCG MCH for complications (b) rupture uterus from MTP in second trimester.

The history & examination was taken for all mothers diagnosed with rupture uterus. All patients were followed regarding demographic characteristic, clinical presentation, risk factors, operative findings, maternal & fetal outcome and post op complication. The charts of the identified patients were reviewed. The rupture was confirmed at caesarian section, postpartum laparotomy or with antepartum/postpartum imaging (ultrasound or MRI). Both symptomatic and asymptomatic ruptures were included in the analysis. Uterine dehiscence, or partial rupture, was defined as a tear through the myometrium with intact serosa. Only cases of complete rupture were regarded for this study. Statistical analysis was done using SPSS software. Stepwise analysis was done to identify possible confounders for each outcome in current study which includes gestational age, parity, age, obesity (BMI>40) and co-morbidities during pregnancy (diabetes,

pre-eclampsia, hypertension, smoking, leiomyomas, congenital uterine anomaly.

### Results

The incidence of uterine rupture in this study was 0.364 % (92 cases out of 25246 deliveries) and most of the cases were in the age group of 20-30(76.06%). Most of the cases, 86 cases were multipara (93.47%) and were from rural and low socio-economic areas in 85 cases (92.39%). Out of all most cases of rupture uterus belong to term gestation in 75 cases (81.52%). In accordance to source of admission, most cases were referrals from health institutions in 72 cases (78.26%). Out of 92 cases, 78 cases (84.78%) presented with complete rupture whereas 14 cases (15.21%) presented with incomplete rupture.

Out of all cases, hypothyroidism (9.98%) was the most common co morbidity associated with rupture uterus in 9 cases followed by diabetes in 6 cases(6.52%) and anemia in 6 cases(6.52%)(Table-I).

**Table 2: Associated Co morbidities with Rupture Uterus**

| Co morbidities   | No of Cases | Percentage |
|------------------|-------------|------------|
| Diabetes         | 6           | 6.52       |
| Pre-Eclampsia    | 3           | 3.26       |
| Hypertension     | 2           | 2.17       |
| Hypothyroidism   | 9           | 9.78       |
| Anemia           | 6           | 6.52       |
| Thrombocytopenia | 2           | 2.17       |

Among all cases of rupture uterus studied, maximum number of cases i.e 68 cases (73.91%) have previous CS followed by 10 cases (10.86%) of D & E and 8 cases (8.69%) of laparotomy(abdominal myomectomy)(Table-II)

**Table 2: Previous Surgeries Associated with Rupture Uterus**

| Sl No |             | Previous Procedures | No of Cases | Percentage |
|-------|-------------|---------------------|-------------|------------|
| 1     | Previous CS | One Previous CS     | 65          | 70.65      |
|       |             | Two Previous CS     | 3           | 3.26       |

|   |                                       |    |       |
|---|---------------------------------------|----|-------|
|   | Total                                 | 68 | 73.91 |
| 2 | Laparotomy (Abdominal Myomectomy)     | 8  | 8.69  |
| 3 | Laparoscopy/Hysteroscopy (Myomectomy) | 2  | 2.17  |
| 4 | D & E                                 | 10 | 10.86 |
| 5 | Cerclage Operation                    | 4  | 4.34  |

Among the cases of uterus rupture attributing due to uterine abnormalities, 10 cases (10.08%) were due to leiomyomas followed by 8 cases of endometriosis (8.69%) and 3 cases (3.26%) of congenital uterine anomaly. Among the obstetric factors contributing to rupture uterus, obstructed labor was seen in 20 cases

(21.73%), prolonged labor in 17 cases (18.47%), CPD in 16 cases (17.39%) and malpresentations in 2 cases (2.17 %). The adjuvant use of oxytotic's and instrumental deliveries constituted in 8 cases (8.69%) and 5 cases (5.43%) respectively (Figure-I)

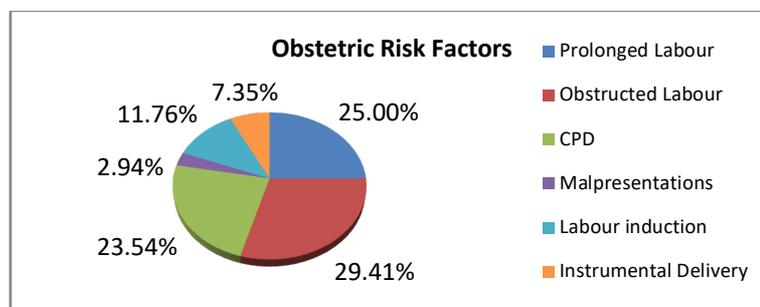


Figure 1: Obstetric Risk Factors associated with Rupture Uterus

Duration of labor status of most rupture uterus is less than 24 hr in 74 cases (80.43%) followed by 24-48hrs in 14 cases (15.21%) and more than 48hrs in 4 cases (4.34%).

labour followed by 17 cases (18.47%) of prolonged labour, 15 cases (16.30%) in 2<sup>nd</sup> stage of labour, 11 cases (11.95%) of uterine rupture, 8 cases (8.69%) of IUFD and 5 cases (5.43%) of no referral (Figure-II).

On examination of diagnosis on referral, 36 cases (39.13%) were due to obstructed

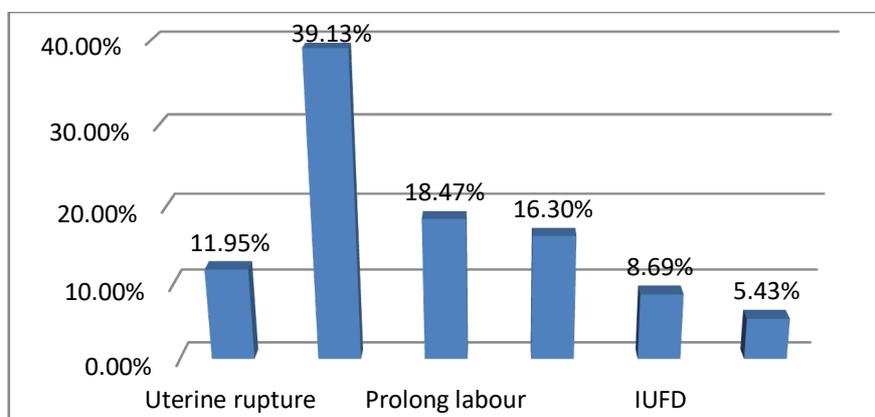


Figure 2: Diagnosis on Referral

Of the 92 uterine rupture 68(73.91%) occurred in patients with scarred uterus (previous CS). 10 had prior myomectomy (10.8%). Out of all cases of rupture uterus, 84 cases (91.30%) were due to

spontaneous labor and 8 cases (8.69%) were due to augmented or induced labour which included prostaglandin gel followed by oxytocin, prostaglandin gel alone and oxytocin alone (Table-III).

**Table 3: Rupture uterus according to Labor Status**

| Sl No | Labour Status            | No of Cases                                 | Percentage |      |
|-------|--------------------------|---|------------|------|
| 1     | Spontaneous Labour       | 84  | 91.30      |      |
| 2     | Augmented Labour/Induced | 8   | 8.69       |      |
| 3     | Induced                  | With Prostaglandin Gel followed by Oxytocin | 4          | 4.34 |
|       |                          | With Prostaglandin Gel alone                | 2          | 2.17 |
|       |                          | With Oxytocin alone                         | 2          | 2.17 |

The commonest presenting sign of uterine rupture is uterine tenderness in 76 cases (82.6%) followed by abdominal pain in 61 cases (66.30%), easily palpable fetal parts in 52 cases (56.52%), cessation of labor pain in 48 cases (52.17%), shock 45 cases

(48.9%) vaginal bleeding in 43 cases (46.73%). The three symptoms identified were abdominal pain (66.30%), cessation of labor (52.17%) and vaginal bleeding (46.73%). Fetal heart sounds were positive in 14 cases (15.21%) only (Table-IV)

**Table 4: Clinical Presentations of Rupture Uterus**

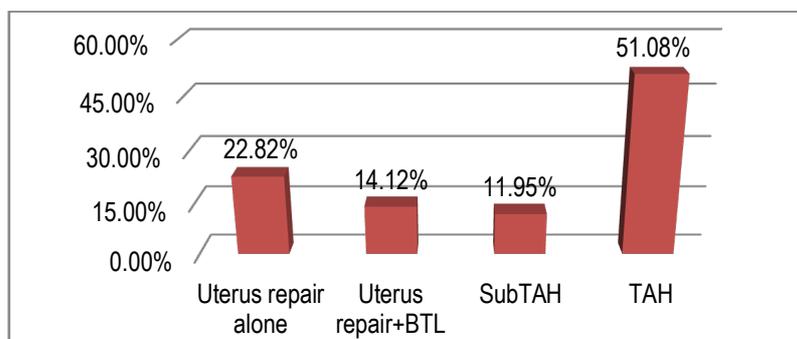
| Sl No. | Clinical presentation       | No of cases    | Percentage |       |
|--------|-----------------------------|----------------|------------|-------|
| 1      | Abdominal pain              | 61             | 66.30      |       |
| 2      | Cessation of labour pain    | 48             | 52.17      |       |
| 3      | Vaginal bleeding            | 43             | 46.73      |       |
| 4      | Tenderness                  | 76             | 82.60      |       |
| 5      | Easily palpable fetal parts | 52             | 56.52      |       |
| 6      | Uterine contraction present | 14             | 15.21      |       |
| 7      | FHS present                 | 14             | 15.21      |       |
| 8      | Palpable defect on uterus   | 22             | 23.91      |       |
| 9      | BP on arrival               | Not recordable | 11         | 11.95 |
|        |                             | <90/60         | 34         | 36.95 |
|        |                             | >90/60         | 47         | 51.08 |

In majority of cases, hysterectomy i.e total abdominal hysterectomy (TAH) and

Subtotal abdominal hysterectomy were done in 58 cases (63.03%), as these cases

showed badly infected uterus, with ragged fibers. In 21 cases (22.8%) uterine rent repair was done alone whereas tubal ligation was added to uterine repair in 13 cases (14.13%)(Figure-3) The most common site of rupture of uterus noted was in the anterior wall in 91 cases

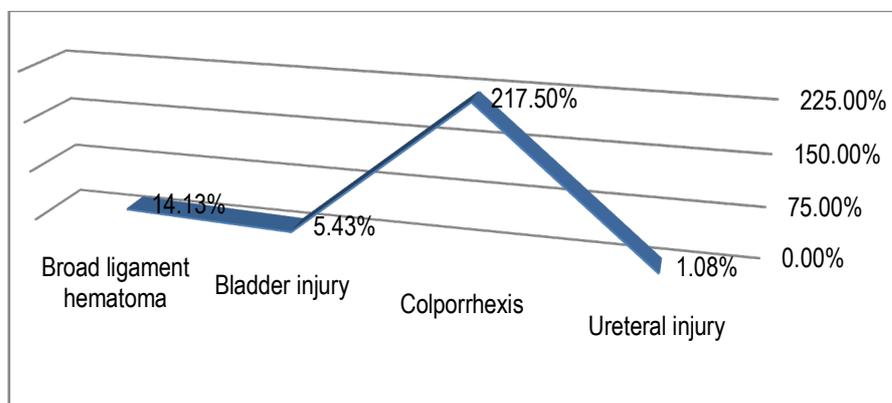
(98.9%) whereas posterior wall was involved only in one case (1.08%). Lower segment of uterus was involved in majority of cases i.e 88 cases (96.70%) but lower segment involved in 3 cases (3.26%). Both upper and lower segment was involved in one case (1.08%) only.



**Figure 3: Surgical management of Rupture Uterus**

Most common complications noted were broad ligament hematoma in 13 cases (14.13%), followed by bladder injury in 5 cases (5.43%), colporrhexis in 2 cases (2.17%) and ureteric injury in one case (1.08%) among 20 cases presented with

intraoperative complications (Figure-4). Total 8 cases (8.69%) of maternal deaths were seen among 92 cases studied which included 5 cases (62.5%) of septicemia as most common cause and 3 cases (37.5%) of ARF.



**Figure 4: Intra Operative findings of Rupture Uterus**

Out of all 69 cases (75%) were stable and discharged from hospital in average time period whereas 23 cases (25%) were critical who needed ICU support. Among the cases admitted to ICU 8 cases (8.69%) died and 15 cases (16.30%) improved and discharged.

Among the postoperative complication, anaemia is the commonest one in 63 cases

(68.47%) followed by wound infection leads to febrile morbidity in 6 cases (6.52%), UTI and paralytic ileus in 27 cases(29.34%) each, shock and septicemia in 18 cases(19.56%) each, respiratory tract infection in 24 cases(26.08%), peritonitis in 9 cases(9.78%), acute renal failure in 4 cases, burst abdomen and vesico vaginal fistula in 2 cases(2.17%) each.(Table-V)

**Table 4: Postoperative Complications**

| Post op complications       | No of cases | Percentage |
|-----------------------------|-------------|------------|
| Anaemia                     | 63          | 68.47      |
| Shock                       | 18          | 19.56      |
| Febrile morbidity           | 60          | 65.21      |
| Paralytic ileus             | 27          | 29.34      |
| Septicaemia                 | 18          | 19.56      |
| Peritonitis                 | 9           | 9.78       |
| Burst abdomen               | 2           | 2.17       |
| UTI                         | 27          | 29.34      |
| Respiratory tract infection | 24          | 26.08      |
| Acute renal failure         | 4           | 4.34       |
| Vesico vaginal fistula      | 2           | 2.17       |

The perinatal mortality was very high in 78 cases (84.78%) whereas live birth in 14 cases (15.21%) among the 92 cases of rupture uterus studied. Out of 14 cases delivered live, 6 cases (42.85%) have APGAR score at one min >5 and 8 cases (57.14%) have APGAR score at one min <5 and admitted to SNCU. Among all babies born, majority of babies i.e 72 babies (78.26%) were having weight 2.4 to 4 kg followed by 12 babies were having weight > 4kg and 8 babies were having <2.5 kg.

### Discussion

This is a study of risk factors and obstetrics outcome in 92 patients of rupture uterus admitted into the labour room of MKCG Medical College, Berhampur during the period from September 2019 to August 2021.

The incidence of rupture uterus was 0.364% which is concurrent to that of Nishita et al.[2019] having 0.57% [5]. Majority of the study population (76.06%) was in the age group of 22-30 which is similar to that of Malik HS et al (2006) who showed that most of the patients presented between the ages of 26-30 years

(42.71%) [6]. Among them only majority of cases were multipara and only 6.52% are primigravida. This is compared to that of Mbamara SU et al. [2015] in the Southern region of Nigeria having 6.52% of cases being nulliparous [7]. Most of them were referred from health a centre (78.26%) which is similar with the study in Dar selam, Tanzania where most patients were referrals from municipal hospitals [8]. Most of the patient belongs to low socio-economic status (92.39%) from tribal pockets of Kandhamal and Gajapati districts and 58.69% had more than 4 antenatal visits. Hypothyroidism (9.98%) and diabetes (6.52%) are most common co morbidities associated with patients with rupture uterus which is concurrent to the study done by Stefanía Katrín J et al [2018] [9].

Of the 92 uterine rupture 68(73.91%) occurred in patients with scarred uterus (previous CS). 10 had prior myomectomy(10.8%). Prior low transverse hysterotomy was the most common of the uterine scar with classical hysterotomy, the second most common, according to Stefanía Katrín J. et al [2018] which is comparable to present study [9]. Most

common risk factor was Previous CS (73%) followed by obstructed labor (21.73%) and prolonged labor (18.47%) which is similar to that of Study by Malik HS et al (2006) having previous caesarian scar in 53.39% cases of rupture uterus [6]. Previous CS with obstructed labour (19.56%) is the most common cause of rupture uterus in current study whereas study done by Guiliano M et al (2014) showed most ruptured (89%) occurred in women with a previous caesarean delivery which is not concurrent and needs further study [10]. The commonest presenting sign of uterine rupture is uterine tenderness in 76 cases (82.6%) in present study. The three common symptoms identified were abdominal pain (66.30%), cessation of labor (52.17%) and vaginal bleeding (46.73%). The study done by Guiliano M et al. 2014 the classic symptoms described for uterine rupture include acute onset abdominal pain, vaginal bleeding, a non-reassuring fetal heart rate tracing, and a change in the contraction pattern on tocodynamometry [10]. Fetal heart sounds were positive in 14 cases (15.21%) only which are not concurrent to that of Chibber R et al (2010) where fetal heart abnormalities were observed in 100% cases of ruptured uterus [11]. Most patients of rupture uterus undergone hysterectomy (TAH+STAH) [63.03%] followed by uterus repair alone (22.82%) and uterus repair + BTL (14.12%) which is similar to that of Ahmed et al [2018] [12]. In study conducted by Malik HS et al (2006) repair of uterus was done in 76.69% cases, hysterectomy was performed in 23.30% cases. In 66.01% cases, the tear was located in lower uterine segment and in 90.29% cases, anterior uterine wall was involved. Rupture was complete in (76.69%) cases which are quite similar to present study.

Most common complications noted were broad ligament hematoma in 13 cases (14.13%), followed by bladder injury in 5 cases (5.43%), colporrhexis in 2 cases (2.17%) and ureteric injury in one case

(1.08%) among 20 cases presented with intraoperative complications. These findings are consistent with the finding by Abidjan-Cote d'Ivoire et al [2009] (62% hysterectomy) which shows more conservative surgeries by uterine suture in women from the communes of Abidjan and its suburbs leads more uterine repair only as compared to hysterectomy (71%) [13]. There were 8 maternal deaths (8.69%) as a result of uterine rupture in the study period, the most common cause being septicaemia (5 cases) followed by ARF (3 cases). This is slightly more as compared with study done by Rashmi et al and Nishita et al [2018] (5.17%) [5, 14]. Anaemia was most common post-op complication (68.47%) followed by wound infection leads to febrile morbidity. Vesico Vaginal fistula (VVF) affected less proportion of mothers (2.17%) because of immediate laparotomy of patient diagnosed at this hospital with skilled obstetrician and better post op management. One study from Ethiopia shows VVF of 11.6% [15]. The perinatal mortality was very high in 78 cases (84.78%) whereas live birth in 14 cases (15.21%) among the 92 cases of rupture uterus studied which is quite similar to that of Malik HS et al (2006) having 81.73% perinatal deaths. Most of the babies (57.14%) have APGAR score at one min <5 and admitted to SNCU and most of the babies (78.28%) belonged to weight of 2.5 to 4 kg [6].

### Conclusion

The causes of uterine rupture are complex, reflecting a combination of medical, reproductive, health services, nutritional and socio-economic factors. We should aim to decrease the absolute rate of caesarean section by using a more cautious approach in choosing indications for abdominal deliveries. Women with previous scar and multiparity opting for trial of labour 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. Improvements are needed in antenatal care and counseling of patients for institutional deliveries especially after previous caesarean section. More vigilant approach to prevent obstructed and prolonged labor, use of partograph, high index of suspicion and quick referral to well-equipped centres is some of the factors that can help in reducing the incidence of rupture uterus

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