IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 14, Issue 3 Ver. VI (Mar. 2015), PP 39-45
www.iosrjournals.org

Clinical Study of Rupture Uterus - Assessment of Maternal and Fetal Outcome

K.Sunitha [1], I.Indira[2] and P.Suguna[3]
[1] Assistant Professor, [2] Assistant Professor and Associate Professor (Rtd)[3]
(Department of Obstetrics and Gynecology, Sri Venkateswara Medical College, NTR University of Health Sciences, Andhra Pradesh, India)

Abstract: *A uterine rupture is an obstetric catastrophe accounting for as many as 9.3% of maternal deaths[1]. A uterine rupture typically occurs during labor, but can also occur during antenatal period. There has been an observed shift in etiology from obstructed labour and multiparty towards rupture of cesarean section scar. Hence, we felt the need to study the rupture uterus in the hospital population, its etiological factors, complications, and treatment strategies, maternal and fetal outcome. All cases of rupture uterus managed in the Government Maternity Hospital (GMH), S.V. Medical College, Tirupati were studied during 2007-2009. Both complete and incomplete rupture uterus are included in the study. The incidence was 1 in 435 (0.23%) of all hospital deliveries. It was more in the Unbooked cases, those belonging to low socio economic status and in women with scarred uteri. The most common etiology was rupture of previous Lower Segment Cesarean Scar Lower Segment Cesarean Scar (LSCS) scar, followed by spontaneous and traumatic rupture. The most common form of management was rent repair with or without bilateral tubectomy (BT), followed by subtotal hysterectomy (STH) and total hysterectomy (TH). A Perinatal mortality of 58% with no maternal deaths was observed. The commonest cause of rupture was separation of previous cesarean scar in 62% of all rupture uterus cases. The incidence of rupture uterus in previous cesarean section deliveries was 1.4%. Early diagnosis and active surgical management will go a long way in reducing maternal and fetal mortality.*

Key words: *Lower Segment Cesarean Scar (LSCS), Rupture Uterus, Rent repair, Sub Total Hysterectomy (STH) and Unscarred Uterus*

I. Introduction

Uterine rupture is one of the serious complications encountered in obstetrics, threatening the pregnant women and her fetus; more so in the developing countries. In developing countries, the incidence is high due to a greater number of unbooked obstetric emergencies, often originating from rural areas with poor antenatal care. with progress in obstetric care the incidence of rupture uterus has not changed much over the past few decades in developing countries, though there is a shift of etiology from spontaneous group to post cesarean section group. Incidence of rupture uterus varies from 0.3/1000 to 7/1000 deliveries in India accounting for 5% to 10% of all maternal deaths[2]. The incidence in developed and developing countries varies from 1 in 250 to 1 in 5000 deliveries depending upon standard of obstetric care and the population dealt with. In a WHO systematic review of maternal mortality and morbidity, the prevalence of uterine rupture in cases of previous caesarean section was found to be 1%[3]. Identifying the high risk pregnancies for rupture uterus and their timely referral from grass root level is an important step in secondary prevention. An early diagnosis and prompt treatment of the rupture uterus is the most important factor in improving maternal and perinatal outcome.

As rupture uterus is one of the leading causes of maternal mortality and morbidity, this study was carried out for analyzing the incidence of uterine rupture along with various etiological factors, clinical aspects, maternal and fetal morbidity/mortality.

Aims and Objectives

This study was carried out in Government Maternity Hospital, Tirupati during November 2007 to October 2009 for a period of 24 months with the following objectives:

- To evaluate the incidence of rupture uterus, the etiology, risk factors, complications, treatment strategies, maternal and fetal outcome.
- To test the association between cause of rupture and Gravidity, Gestational age and fetal outcome.
- To test the influence of cause of rupture on surgical management
- To detect neglected factors in a particular case to prevent its occurrence in other pregnancies

II. Review Of Literature

The term rupture uterus is used to denote a breach in the continuation of a gravid uterine musculature from any cause after fetal viability [4].Uterine rupture is defined as a full thickness separation of the uterine wall

and the overlying serosa. Uterine rupture is associated with clinically significant uterine bleeding, fetal distress, expulsion or protrusion of the fetus, placenta or both into the abdominal cavity and the need for laparotomy and prompt delivery of the baby, uterine rent repair or hysterectomy. The majority of cases of uterine rupture occur either as a result of a previous cesarean section scar giving way or as a result of obstructed labors. Myomectomy scar in the uterus often evoke rupture, but this disaster is rare. Direct trauma to uterus is another rare cause of uterine rupture. The uterine wall may be weakened by previous procedures like manual removal of placenta, curettage with (or) without perforation for retained products of conception following abortion. Concealed ante partum hemorrhage is very rarely associated with uterine rupture. Pregnancy in a rudimentary horn or an angular pregnancy may result in with uterine rupture. Myercough has considered rupture of the uterus in three different circumstances viz., 1. Rupture of uterus during pregnancy. 2. Rupture of the uterus during labor without dystocia.3.Rupture of the uterus following obstructed labor or difficulty delivery[5]. Rupture of uterus may be spontaneous, traumatic or rarely due to unknown causes. The great enigma of diagnosis is the absence of any universal clinical features applicable to all varieties of uterine rupture. Diagnosis becomes easy when there is a history of prolonged or obstructed labor, a previous cesarean section and when a woman has collapsed after a difficult vaginal delivery. The best chance of detecting uterine rupture lies in careful and continuous monitoring of uterine contractions and fetal well being during labor. Continuous cardiotocography with intra uterine pressure measurements may help to identify scar rupture early and may be of value especially in those who have an oxytocin infusion[6] .Ultrasound abdomen demonstrates uterine lacerations and intra abdominal dislocation of placenta and fetus during labor. At present, maternal death as a consequence of uterine rupture occurs at a rate of 0-1% in developed nations and 5-10% in developing countries[7]. Current studies cite a maternal mortality rate of $\leq$1% and perinatal mortality rate of approximately 50% in uterine rupture following post cesarean pregnancy. Maternal outcome mainly depends on the cause and site of rupture, the interval between rupture and surgery, availability of blood, degree of associated sepsis and nature of surgery. In scar
rupture or clean cut rent in lower uterine segment, repair with sterilization gives better chances of survival. Perinatal mortality is 80-100% in spontaneous rupture following obstructed labor or rupture of classical cesarean section scar.

III. Methodology

This study of rupture of gravid uterus was carried out in Government Maternity Hospital, Tirupati attached to Sri Venkateswara Medical College, Tirupati, Andhra Pradesh from November 2007 to October 2009.
Source of data: All cases of rupture of uterus treated in the Government Maternity Hospital, Tirupati during the period from November 2007 to October 2009.
Inclusion criteria: All Patients of rupture of uterus treated in the GMH, Tirupati from November 2007 to October 2009 were included. The following cases were included in the present study

1. Complete , incomplete rupture and scar dehiscence
2. Cases of rupture uterus occurring during Ante partum and Intrapartum period.
3. Iatrogenic rupture uterus both in scarred and unscarred uterus.`
4. Pregnancy in anomalous uterus leading to uterine rupture.

Procedure of the study: All cases of rupture uterus managed in the Department of Obstetrics and Gynaecology, Government Maternity Hospital, Tirupati were studied. Patient's demographic variables like age, place of residence (rural/urban), socio economic status, parity, antenatal care in present pregnancy, clinical presentation, previous detailed obstetric and surgical history including previous cesarean sections, the type and indications for cesarean sections, myomectomy, dilatation and curettage were recorded. Physical examination including the vital signs, obstetric examination, details of labor in present pregnancy (in cases managed in the hospital prior to rupture of uterus), blood group, hemoglobin estimation and urine examination were done in all the cases. The site and type of the rupture, nature of surgery performed, duration of hospital stay, number of units of blood transfused, maternal and fetal outcome were documented. Rupture was labeled as complete when the entire thickness of uterine wall along with visceral peritoneum had given way, irrespective of extrusion of fetal parts. All other types were grouped under incomplete rupture. Incidence of rupture was calculated from total number of deliveries that had occurred in the hospital during the study period. All babies delivered were followed up until the time of discharge for signs of intrapartum asphyxia and other problems. Mothers were followed throughout the post operative period for evidence of sepsis, abdominal distension, temperature, abdominal wound healing and six weeks after discharge for remote complications like vesico vaginal fistula etc.

Different operations done in this study:

1. Uterine wound repair with (or) without sterilization
2. Subtotal hysterectomy
3. Total abdominal hysterectomy

Statistical Analysis:

Information of cases under study is arranged in a systematic manner in MS-Excel sheet. Appropriate Statistical Analysis viz., frequencies, cross tabulations, percentages, Chi-square test is carried out using SPSS version.20 and the conclusions made as per the respective levels of significance.

IV. Results And Discussion

Among pregnant women, the prevalence of uterine rupture is considerably lower for community based than for hospital based studies. A total of 21,750 deliveries were conducted during the two year study period in the Government Maternity Hospital, Tirupati. In this period, there were a total of 50-cases of rupture uterus, giving an incidence of 1in 435 (0.23%). The incidence is lower for developed than the less developed countries. Among the developing countries, the incidence varied from 1 in 124 (0.8%) in Ghana[8] 0.76% in Uganda[9] 0.74% in Pakistan[10] 0.9% in Nepal[11] and 2.8% in Ethiopia[12]. Studies from developed countries showed incidences recorded as 0.035% [13]. This wide variation in incidence between developed and developing countries are due to socio economic factors, cultural practices and lack of access to antenatal and intrapartum care.

Table 1: Incidence of rupture uterus with regard to demographic variables

S.No	Demographic variables	Number of cases	Per cent
	Age		
	20-25	22	44
	26-30	25	50
	31-35	2	4
	36 and above	1	2
2	**Residence**		
	Rural	41	82
	Urban	9	18
3	**Antenatal care**		
	Booked cases	15	30
	Unbooked cases	35	70
4	**Socioeconomic status**		
	Low	45	90
	Middle	5	10
5	**Parity**		
	Para 0	1	2
	Para 1	26	52
	Para 2	19	38
	Para 3	4	8

Majority of the cases were in the 26-30 year age group. In one of the Indian study reported by Sahu latika, 73.12% of the women were in the age group of 20-30 years. The high incidence in primipara was comparable to the study by Sahu latika[2]. Most of the primiparas belonged to the post cesarean group.In this study 70% of the cases were unbooked which is comparable to 80% in the study by Rashmi et al [14] and 68% in a study done in Nepal[15]. Most of the booked cases were post cesarean, which came to the hospital after onset of labor pains at their homes. Majority of the patients came from rural areas (82%) and most of them had irregular antenatal checkups. 90% of the women belonged to the low socio economic group.

Table 2: Cause of Rupture in relation to gravidity

Chi-square value	p-value	Cause of rupture spontaneous/Oxy/ Prost/SR/Traumatic			Total
14.657**	0.005	Spontaneous	Scar Rupture(SR)	Traumatic Rupture(TR)	
Gravida	2	1	22	3	26
		10.0%	73.3%	30.0%	52.0%
	3	6	6	5	17
		60.0%	20.0%	50.0%	34.0%
	4	3	2	2	7
		30.0%	6.7%	20.0%	14.0%
Total		10	30	10	50
		100.0%	100.0%	100.0%	100.0%

** Significant at 1% level

The incidence of rupture is more in second gravida and 73.3% of them were scar ruptures. Spontaneous ruptures were more in third and fourth gravida and the difference is statistically significant at 1% level (p-value<0.01). The multiparous uterus in third and fourth gravida is more prone for rupture, especially in the presence of cephalopelvic disproportion and the use of oxytocics.

The significance of the demographic variables like age, hospital registration, area of residence and socio economic status cannot be inferred because most of the obstetric population attending the hospital had the same demographic profile.

Table 3: Cause of rupture versus Gestational age

Chi-square value	p-value	Cause of rupture spontaneous			Total
2.206^{NS}	0.332	Spontaneous	Scar Rupture(SR)	Traumatic Rupture(TR)	
Gestational Age	Below 37 weeks	2	9	5	16
		20.0%	30.0%	50.0%	32.0%
	Above 37 weeks	8	21	5	34
		80.0%	70.0%	50.0%	68.0%
Total		10	30	10	50
		100.0%	100.0%	100.0%	100.0%

^{NS} -Not significant

70% of cesarean scars ruptured after 37weeks whereas, 80% of spontaneous and 50%of traumatic ruptures also occurred after 37 weeks. There was no statistically significant association between gestational age and cause of rupture. The maximum number of ruptures (82%) occurred at 38-41 weeks of gestation. In a Nigerian study, the gestational age at rupture was similar[12]

In a cohort study by Hammoud et al[16] increasing gestational age of at least 41 weeks was associated with a significantly higher rate of rupture. In a Swedish population based study, the risk of uterine rupture was increased in woman with post-term pregnancy compared with term pregnancies[17].

Table 4: Etiology

	Etiology	Present study	Rashmi et al[14]	Diab AE[18]	Chuni N[15]
1	Scar Rupture(SR)	62%	63.40%	28.30%	29%
2	Spontaneous	12%	26.60%	71.70%	60%
3	Traumatic Rupture(TR)	18%	10%		11%

In the present study as well as other Indian studies[14], rupture of cesarean section scar was the leading cause of rupture uterus. In a review by M Manoharan et al ., frequency of Uterine rupture was <1% in women with a previously scarred uterus, with other retrospective studies quoting rates of approximately 0.65%[19]. The cause for high incidence of scar rupture is that most of these patients came to the hospital after establishment of labor pains.

In countries like Yemen[18] and Nigeria[12] where family size is more, obstructed labor due to multi parity and malpresentations is the leading cause of rupture uterus. Reports from Nigeria, Ghana, Ethiopia and Bangladesh indicated that about 75% of cases of uterine rupture were associated with unscarred uterus.

Traumatic rupture accounted for 18% of the cases in the present study. Most of the traumatic ruptures are due to injudicious use of oxytocin or prostaglandin for induction/augmentation of labor, in the presence of cephalopelvic disproportion. As ours is a tertiary referral centre, most of these cases were referred from the peripheral hospitals. In the study by Rashmi et al,10%of the ruptures were traumatic.

In the present study, 88% of the ruptures were complete, 6% were incomplete and 6% were cases of scar dehiscence. In the study by Sahu latika,66% of the ruptures were complete and 44% were incomplete.[2] Coffie et al from Ghana reported that 80.5% were complete ruptures and 19.5% were incomplete[8] . The difference may be due to the fact that we have taken scar dehiscence as a separate category, unlike other studies.

Table 5: Method of Surgical Management in comparison with other studies

S.No	Treatment	Present study	Rashmi et al[14]	Diab AE[18]
1	Uterine rent repair with or without sterilization	68%	54%	45%
2	Subtotal/ total hysterectomy	32%	46%	55%

From table-5, we can see that it was possible to repair the uterine rent in 68% of cases, while in 32% of cases subtotal/total hysterectomy was done. This is because most of the cases were cesarean scar ruptures which were amenable to repair.

In other studies, hysterectomy was done in more number of cases when compared to rent repair. The difference may be due to more number of obstructed labor cases in those studies. The decision to perform uterine repair or hysterectomy in cases of uterine rupture is influenced by the parity, number of living children, extent of uterine rupture, condition of the tissues and the general condition of the patient. Repair of the uterine rupture is a logical approach and should be performed in women with scar rupture and in those with a linear tear.

Table 6: Surgical Management vis a vis cause of rupture

Chi-square value	p-value	Cause of rupture spontaneous/Oxy/ Prost/SR/Traumatic			Total
19.028**	0.004	Spontaneous	Scar Rupture(SR)	Traumatic Rupture(TR)	
Surgical Management RRWT/RRWOT/STH /TH/Bladder repair/colporrhexis repair	Rent repair without tubal ligation(RRWOT)	1	4	0	5
		10.0%	13.3%	0.0%	10.0%
	Rent repair with tubal ligation(RRWT)	2	22	5	29
		20.0%	73.3%	50.0%	58.0%
	Subtotal hysterectomy(STH)	5	1	5	11
		50.0%	3.3%	50.0%	22.0%
	Total hysterectomy(TH)	2	3	0	5
		20.0%	10.0%	0.0%	10.0%
Total		10	30	10	50
		100.0%	100.0%	100.0%	100.0%

** Significant at 1% level

In the present study, rent repair with or without tubal ligation was possible in 86.6% of the scar ruptures, 30% of the spontaneous ruptures and 50% of traumatic ruptures. The need for subtotal /total hysterectomy was significantly higher in the spontaneous and traumatic group when compared to the scar rupture group.

Table7: Post-operative complications

Complications	**No. of cases**	**Percentage**
Febrile morbidity	11	22
Urinary tract infection	8	16
Respiratory tract infection	3	6
Paralytic ileus	2	4
Acute renal failure	1	2
Vesico-vaginal fistula	1	2

Major complications like acute renal failure (2%) and VVF (2%) were less in the current study. A 2005 study from Yemen reported a 3.3% incidence of VVF[18]. The other complications reported in the literature are bilateral adnexectomy to control intraoperative bleeding and DIC (disseminated intravascular coagulation).

Minor complications like febrile morbidity, urinary and respiratory infections and paralytic ileus were comparable to those in other studies[20].

Table 8: Maternal and Fetal Mortality in comparison with other studies

Type	Present study	Chuni N[15]	Diab AE[18]	Rashmi et al[14]
Maternal deaths	Nil	13.5%	1.7%	3.33%
Fetal deaths	58%	83.3%	87.7%	78.66%

Further, in the present study no maternal deaths were recorded. This could be because of the predominance of cesarean scar ruptures which were amenable to early diagnosis and repair. The main causes of maternal mortality in rupture uterus are failure to diagnose the condition at the first referral centre and arrival at the tertiary centre in a moribund condition [13].The perinatal mortality is high in all the studies, including the present study. Many studies also found an increased risk of low APGAR score for infants who survived a uterine rupture[21]. But in the present study all the surviving infants had good APGAR scores except for one infant which had a low APGAR necessitating NICU admission.

Table 9: Fetal outcome in relation to cause of rupture

Chi-square value	p-value	Cause of rupture spontaneous/Oxy/ Prost /SR/Traumatic			Total
24.952**	.000	Spontaneous	Scar Rupture(SR)	Traumatic Rupture(TR)	
Fetal outcome LB/SB/IUD	IUD	8	2	5	15
		80.0%	6.7%	50.0%	30.0%
	LB	1	19	1	21
		10.0%	63.3%	10.0%	42.0%
	SB	1	9	4	14
		10.0%	30.0%	40.0%	28.0%
Total		10	30	10	50
		100.0%	100.0%	100.0%	100.0%

** Significant at 1% level

Fetal outcome was better in cases of scar rupture than in the spontaneous and traumatic rupture group and the difference was significant at 1% level with p value<0.01. The reason being that in scar ruptures, the fetus and placenta remained in utero, whereas in the other two groups the fetus was extruded into the peritoneal cavity.

In the present study, 58% of patients needed blood transfusion . Blood transfusion rate was as high as 100% in a few studies by Abdul Khadir Tugut[20]. The absence of maternal deaths and low incidence of major complications in present study is due to more number of scar ruptures, prompt diagnosis, blood transfusion whenever necessary and immediate laparotomy.

V. Conclusions

Rupture uterus is a devastating situation, has claimed innumerable lives of both the mother and the fetus. But, over the years, with improved obstetric care there is decrease in number of cases resulting from obstructed and unattended labors. At the same time, there is a significant raise in rupture of previous cesarean scar. Reducing the primary cesarean section rate and optimizing care for women with previous cesarean section will go a long way in decreasing the incidence of rupture uterus. What needs to be emphasized is the education of the pregnant women and her relatives about the need for a carefully supervised and planned delivery in a well equipped hospital during her subsequent pregnancy. Great caution should be exercised when managing a trial of labor in women with a previous uterine scar, especially if labor has failed to progress. A more vigilant approach to prevent prolonged and obstructed labor, training of health workers in the use of partograph, along with high index of suspicion and quick referral to a well equipped centre with 24-hour blood bank facility, availability of experienced obstetricians, anesthesiologists and neonatologists will reduce the incidence of uterine rupture. Women from remote areas may be admitted two weeks before the expected date of delivery.

References

[1]. P. Rajaram, A. Agarwal and S Swami.. Determinants of maternal mortality: a hospital based study from South India. Indian J Matern Child Health 6(1),1995, 7–10.
[2]. Sahu Latika A. 10 year analysis of uterine rupture at a teaching institution. J Obstet Gynecol India . 56 (6), 2006, 502-506.
[3]. G.Justus Hofmeyr, L. Say and Metin Gülmezoglu. A. Systematic review: WHO systematic review of Maternal mortality and morbidity: the prevalence of uterine rupture. BJOG: An International Journal of Obstetrics & Gynaecology. 112, 2005, 1221–1228.
[4]. Ian Donald. Practical obstetric problems, BI publications Pvt Ltd, New Delhi 5th ed , 795 – 804 , (1996).
[5]. P.R Myercough. Munroker's Operative Obstetrics,441-52.
[6]. S. Arul Kumaran, S. Chua and S.S. Ratnam. Symptoms and signs with Scar rupture – Value of uterine activity measurements. Aust N Z J. Obstet. Gynecol, 32 (3),1992, 208-12.
[7]. G.G. Nahum, Pham krystle Quynh. Uterine rupture in pregnancy, e medicine obstetrics and Gynecology. http://emedicine. Medscape.com/article/275854-overview
[8]. CO Fofie and P Baffoe. A Two-Year Review of Uterine Rupture in a Regional Hospital. Ghana Med J , 44(3), 2010, 98–102.
[9]. Peter K Mukasa, Jerome Kabakyenga, Jude K Senkungu Joseph Ngonzi, Monica Kyalimpa and Van J Roosmalen. Uterine rupture in a teaching hospital in Mbarara, western Uganda, unmatched case- control study. Reprod Health..10: 29, 2013.
[10]. N. Rizwan, R.M. Abbasi and S.F. Uddin. Uterine rupture, frequency of cases and fetomaternal outcome. J Pak Med Assoc. 61(4), 2011, 322-4.
[11]. S.M. Padhye: Rupture of the pregnant uterus: a 20 year review. Kathmandu Univ Med J., 3, 2005, :234 – 238.
[12]. Omole-Ohonsi and Attah,. Uterine rupture: risk factors and pregnancy outcome. Gynecol Obstetric., 1, 2011, 1.
[13]. K. Ofir, E. Sheiner, A. Levy, M. Katz and M. Mazor. Uterine rupture: differences between a scarred and an unscarred uterus. Am J Obstet Gynecol 19,12004, 425–9.
[14]. Rashmi, .G Radhakrisknan, N.B. Vaid, N. Agarwal. Rupture uterus--changing Indian scenario., J Indian Med Assoc. 99(11), 2001,634 – 7
[15]. N Chuni. Analysis of uterine rupture in a tertiary center in Eastern Nepal : Lessons for obstetric care, J.Obstet Gynaecol. Res, 32 (6), 2006, 574-579.
[16]. A. Hammoud, I. Hendler, R.J. Gauthier, S. Berman, A. Sansregret and E.J. Bujold The effect of gestational age on trial of labour after caesarean section Matern Fetal Neonatal Med 15, 2004, 202–6.
[17]. M Kaczmarczyk, P.Sparen, P. Terry and S. Cbattubgius. Risk factors for uterine rupture and neonatal consequences of uterine rupture: a population – based study of successive pregnancies in Sweden. An International Journal of Obstetrics Gynaecology, 2007,1208-1214
[18]. AE Diab. Uterine rupture in Yemen. Saudi Medical Journal, 26(2),2005, 264-269.
[19]. M. Manoharan., R .Wuntakal. and K..Erskine. Uterine rupture: a revisit. The Obstetrician & Gynaecologist, 12, (2010, 223–230.
[20]. Abdulkadir Turgut,Ali Ozler, Mehmet Siddik Evsen, Hatice Ender Soydinc, Neval Yaman Goruk, Talip Karacor, and Talip Gul, Uterine rupture revisited: Predisposing factors, clinical features, management and outcomes from a tertiary care center in Turkey, Pak J Med Sci. 29(3), 2013, 753 – 757.
[21]. Miriam Martínez-Biarge, Alfredo García-Alix, Fátima García-Benasach Francisco Gayá, Ana Alarcón, Antonio González and José Quero . Neonatal neurological morbidity associated with uterine rupture. Journal of Perinatal Medicine. (6), 2008, 467-554.