



A 10 year analysis of uterine rupture at a teaching institution

Sahu Latika

Department of Obstetrics and Gynaecology JIPMER, Pondicherry - 605 006.

OBJECTIVE(S) : To evaluate risk factors, type and site of rupture, management, and maternal and perinatal outcome of uterine rupture at a teaching institution.

METHOD(S) : The details of 253 cases of uterine rupture managed between January 1995 and December 2004 were reviewed.

RESULT(S) : The incidence of uterine rupture was 1 in 346 deliveries; 70 % were unbooked cases. One hundred twenty eight (50.60%) cases of uterine rupture occurred in a scarred uterus (127 had previous cesarean section scar and one had a scar of previous uterine perforation repair) while 125 (49.40%) occurred in unscarred uterus, with cephalopelvic disproportion as predisposing factor in 69 (27.25%), malpresentation in 20 (7.90%), labor induction in 14 (11.46%), instrumental delivery in two, and multiparity in 20 (7.90%). Repair of uterus was done in 147 (58.33%) cases and hysterectomy in 105 (41.51%). Bladder injury was present in 11 (4.34%) cases. Sixty-six percent had postpartum hemorrhage. Blood transfusion was required in 210 (83%) cases. There were seven (2.76%) maternal deaths and perinatal mortality was 94.07 %.

CONCLUSION(S) : Uterine rupture, is a major risk factor for maternal and perinatal morbidity and mortality. Proper antenatal care, early referral of women at risk, and repeat cesarean section in parturients with a previous uterine scar, especially when labor fails to progress, would improve maternal and perinatal outcome.

Key words : uterine rupture, cesarean section, maternal mortality, perinatal mortality

Introduction

Uterine rupture is a major obstetric hazard. In India it still accounts for 5-10 % of all maternal deaths¹. The perinatal mortality ranges from 80 to 95 %. 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. As there is increase in the incidence of previous cesarean section deliveries in teaching and referral hospitals^{1,2}, the commonly seen uterine rupture in these centers are those involving a previous uterine scar. Rupture of an

unscarred uterus may be either traumatic or spontaneous. Traumatic factors include abdominal trauma, labor induction, and in particular the usage of oxytocin or prostaglandins. Internal podalic version, assisted breech delivery, and instrumental delivery also have been linked to traumatic rupture. Spontaneous rupture is usually observed with cephalopelvic disproportion, malpresentation, and delivery of a macrosomic or a grossly anomalous fetus. Rupture may also develop spontaneously in grand multiparas, in congenitally abnormal uteri (eg. unicornuate or bicornuate) which lack the normal uterine ability to expand, in abnormal placental implantation, and in women with a history of an invasive mole.

Uterine rupture occurs in 1 : 200 to 1 : 3000 deliveries^{2,4} depending upon standard of obstetric care and the population dealt with. Complete rupture involves the entire uterine wall and results in a direct connection between the peritoneal space and the

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Correspondence :

Dr. Latika Sahu

Qr. No. E/3, JIPMER Campus,

Pondicherry - 605006.

Tel. (0413) 2271272

E-mail :edl_drksahoo@sancharnet.in

uterine cavity. In incomplete rupture vesicouterine peritoneum is intact.

An early diagnosis and prompt treatment of the condition is the most important factor in the maternal and perinatal outcome. This retrospective study was undertaken to evaluate and analyze various aspects of uterine rupture.

Methods

Clinical records of 253 cases of uterine rupture managed between January 1995 and December 2004 were reviewed. Our hospital gets most of the referrals from our area and from surrounding areas also. From the case records, information was collected regarding demographic and clinical characteristics viz., maternal age, gestational age,

gravity, parity, birth weight, and neonatal sex. Following obstetric risk factors were also recorded—previous cesarean section, labor induction, malpresentation, cephalopelvic disproportion, and instrumental delivery. The following maternal and neonatal outcomes were evaluated—maternal morbidity and mortality, peripartum hysterectomy, postpartum hemorrhage, blood transfusion, length of hospitalization, apgar score of less than 5 at 1 and 5 minutes, and perinatal mortality.

Results

A total of 87,537 deliveries were conducted and 253 cases of uterine rupture managed during the 10 year study period. The incidence of uterine rupture was 1:346 deliveries. The yearly trend in incidence is shown in (Figure 1).

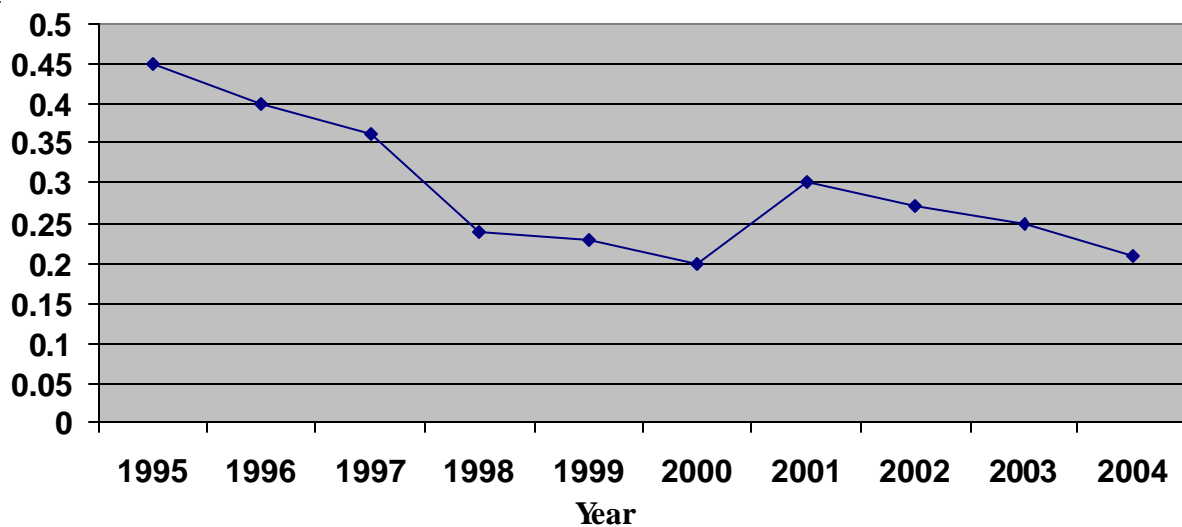


Figure 1. Trend in the incidence of uterine rupture.

73.12% or 185 women were in the age group of 20-30 years. Only 5 (1.97%) were primigravidas, and 7 (2.71) were of parity 5 or more. Ninety percent or 228 were unbooked. Only 7.11% or 18 delivered babies weighing more than 3.5 kg (Table 1). Table 2 shows the risk factors in the series, 50.60% or 128 women had rupture of the scarred uterus, of whom two had two scars each and one had a repair of uterine perforation. All women ruptured the uterus during labor. Out of 125 cases of rupture of the previous one lower segment cesarean section scar, 19 had induction of labor. In our institution selective cases with previous one cesarean scar with expected good scar integrity and without any other maternal medical, surgical or obstetrical complication are induced at 41 weeks of gestation with intraamniotic Foley's catheter (bulb inflated with 30-50mL saline) or intracervical PGE₂ or both. In addition spontaneous or induced labor is augmented with oxytocin if necessary.

Table 1. Demographic and clinical characteristics (n=253).

Characteristics	Number	Percentage
Maternal age (years)		
20-30	185	73.12
31-40	68	26.88
Parity		
0	5	1.97
1 to 3	241	75.25
? 4		7.27
Antenatal care		
Booked for delivery	228	90.1
Not booked for deLlivery	25	9.9
Birth weight (kg)		
<2.5	37	14.63
2.5-3.5	198	78.26
>3.5	18	7.11
Neonatal sex		
Male	143	56.52
Female	110	43.48

Table 2. Risk factors (n=253).

Risk factors	Number	Percentage
Spontaneous rupture	109	43.08
Cephalopelvic disproportion	69	27.27
Multiparity	20	7.90
Malpresentation	20	7.90
Inatrogenic rupture	16	6.32
Instrumental delivery	2	0.79
Labor induction	14 ^a	5.52
PGE ₂ ?	6	2.37
Extraamniotic Foley's catheter	2	0.79
Oxytocin	12	4.73
Scar rupture	128 ^{b,c}	50.60
Previous one LSCS	125	49.40
Previous two LSCS	2	0.79
Previous repair of uterine perforation	1	0.39

LSCS – Lower segment cesarean section.

^a combination of methods or more than one method used in some women

^b Three cases of previous LSCS had inverted –T incision.

^c Nineteen of these had induction of labor.

During the study period 8,316 (9.5%) women had delivered with previous cesarean section scar and of them 127 (1.53%) had scar rupture. Of these 8316 women 285 had induction of labor and of them 19 (6.6%) had scar rupture.

In 109(43.08%) cases rupture had occurred spontaneously due to cephalopelvic disproportion, malpresentation, and multiparity (Table 2). In 16 (6.32%) cases rupture was due to iatrogenic causes - two cases ruptured following instrumental delivery and 14 followed use of oxytocics (Table 2). All spontaneous rupture cases were diagnosed as rupture uterus at the time of admission. The two cases of traumatic rupture following instrumental delivery resulted from forceps delivery after cephalocentesis for hydrocephalus. Out of 14 cases of oxytocic induction eight were induced outside our hospital and six in our hospital.

Table 3 gives site and type of rupture seen intraoperatively. Sixty-six percent or 167 had complete uterine rupture. Out of 86 incomplete ruptures, 46 (53.49%) occurred in uteri with previous cesarean scar. All cases of complete rupture presented with maternal shock and vaginal bleeding. Cases of incomplete rupture were diagnosed by uterine tenderness, vaginal bleeding, and nonreassuring fetal heart rate patterns.

Table 3. Site and type of rupture (n=253).

Site and type of rupture	Number	Percentage
Complete rupture	167	66.00
Incomplete rupture	86	44.00
Lower segment rupture	227	89.72
Upper segment rupture	3	1.18
Both segment rupture	23	9.09
Broad ligament hematoma	36	14.22
Colporrhexis	19	7.51

The site of rupture was lower uterine segment in 227 (89.72%) cases. Both upper and lower uterine segment were involved in 23 (9.09%) cases. Broad ligament hematoma was present in 36 (14.22%) cases.

One woman died undelivered and 252 women underwent exploratory laparotomy. Uterine scar repair was performed in 147 (58.33%). In 105 (41.51%) cases hysterectomy was done (total hysterectomy in 85). Internal iliac artery ligation was done in 17 cases for postpartum hemorrhage. Bladder was injured in 11 cases (4.34%) (Table 4).

Table 4. Management (n=253).

Management	Number	Percentage
Scar repair	147	58.33
With sterilization	102	40.31
Without sterilization	45	17.39
Hysterectomy	105	41.51
Subtotal hysterectomy	20	7.90
Total hysterectomy	85	33.59
Associated surgeries	47	5
Bladder repair	11	4.34
Colporrhexis repair	19	7.50
Internal iliac artery ligation for post partum hemorrhage	17	6.61
Blood transfusion	207	81.81
Died undelivered	1	0.39

Table 5 gives maternal and perinatal outcome. Maternal death occurred in seven cases (2.76%), in one before laparotomy. Six died in postoperative period due to disseminated intravascular coagulopathy and multiorgan failure. Maternal morbidity is shown in Table 5 and included bladder injury in 11 and sepsis in 33. Perinatal mortality was 94.07% and only 15 babies survived.

Table 5. Maternal and perinatal outcome.

Outcome	Number	Percentage
Maternal morbidity		
Anemia	253	100
Puerperal sepsis	14	5.52
Bladder injury	11	4.34
Infectious morbidity	19	7.50
Postpartum hemorrhage ^a	207	81.81
Maternal mortality ^b	7	2.76
Perinatal outcome		
Stillbirths	210	83.00
Live births	43	17.00
Apgar <5 at 1 minute	43	17.00
Apgar <5 at 5 minute	28	11.06
Perinatal mortality	238	94.07

^a Of the 207, 17 needed internal iliac artery ligation.

^b One died undelivered before laparotomy

Discussion

In the present study, the incidence of uterine rupture is 1:346 deliveries. Yearly trend shows that there is about 50% reduction in incidence over the 10 year period. This could be due to increase in number of referral hospitals in nearby places. Our hospital caters to rural as well as urban areas and is one of the referral centers for complicated cases in and around the city. Our incidence is similar to that reported by other studies from developing countries^{2,3,5-7,9}. In 50%, uterine rupture occurs at the previous lower segment cesarean section (LSCS) scar and our observation is similar to that of others^{4,7}. Rupture of LSCS scar most often takes place when the women are allowed to labor. Rupture of a previous LSCS scar is a matter of great concern. There is a lack of awareness in our population about the need for antenatal care and supervised hospital delivery, especially in those women who have had previous cesarean section. Out of 128 women with scar rupture, 60% had not received any antenatal check up and came to us after the rupture while 15% had rupture following induction (6.6% of the total induced cases). Forty percent of the 128 had antenatal check up but did not get admitted in proper time and came with rupture. Women with previous LSCS and induction of labor are more prone to rupture than those who undergo spontaneous labor⁶. Therefore these women should be closely monitored during labor for early signs of impending uterine rupture, and development of recurrent late decelerations of fetal heart rate is helpful in diagnosis⁷.

Grandmultiparity is another important risk factor for uterine

rupture^{3,5,7,9}. In grandmultiparas violent uterine contractions against obstruction lead to uterine rupture. But in our study paras 1 to 4 had rupture due to obstruction. This probably could be due to the poor nutritional status and poor body built of the patients. In our study only 2.78% were grand multiparas and 75.25% were paras 1 to 4. Dare and Oboro³ reported rupture in grandmultiparas in 12.7/1000 deliveries, and rupture in paras 1-4 in 3.1/1000 deliveries. In Ezechi et al's⁵ series 50.8 % were grandmultiparas and in Ibha et al's⁷ series 32% were grandmultiparas.

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. In our study there were seven (2.76%) maternal deaths. This low maternal mortality could be attributed to early presentation, availability of blood transfusion, and round the clock services of competent anesthetist and obstetrician enabling prompt management.

Our perinatal mortality was 94.07%. Babies of only those women who rupture in the hospital, can hope for survival.

Conclusion

In most of the cases, uterine rupture must be viewed as a potentially preventable complication. Great caution should be taken when managing a trial of labor in women with a previous uterine scar, especially if labor has failed to progress. Proper antenatal and intranatal care, identification of high risk cases, and education of people about supervised pregnancy and delivery will reduce the occurrence of uterine rupture.

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