Uterine Rupture: An Analysis of Risk Factors and Complications

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ABSTRACT

Objective — *To analyze the factors responsible for uterine rupture and associated feto-maternal outcome.*

Study design — *Cross sectional study.*

Place & Duration of study — *Department of Obstetrics & Gynecology, Civil Hospital / Dow University of Health Sciences Karachi, from January 2021 to December 2022.*

Methods — *Women of any age group and parity who were admitted and managed with the diagnosis of uterine rupture after 24-weeks pregnancy were included in the study. Data were collected on a pre designed form and entered into SPSS version 20. Descriptive statistics were used to present the data in frequencies and percentages.*

Results — *During the study period a total of 6240 deliveries were conducted. A total of 53 (0.84%) patients of uterine rupture were managed in this period. Majority of the patients were un-booked (n= 39 - 73.5%) and multiparous (n=31 - 58.4%). Risk factors for uterine rupture included previous cesarean deliveries (n=38 - 71.6%), prolonged/obstructed labor (n=14 - 26.4%), use of oxytocic agents (n=7 - 13.2%), fetal macrosomia (n=3 - 5.6%) and delivery by traditional birth attendants at home (n=10 - 18.8%).*

Maternal complications associated with uterine rupture included blood loss >2000 ml in 17 (32%), hysterectomy in 13 (24.5%), and ICU admission in 29 (54.7%) patients. Sepsis occurred in 07 (13.2%), and urinary bladder injury in 02 (3.7%) patients. There were 05 *(9.4%) maternal deaths. This included three patients with unscarred uterus. The rupture sites involved anterior lower uterine segment in 36 (67.9%), the lateral segment in 11 (20.7%), posterior wall in 3 (5.6%), fundus in 2 (3.7%) and more than one sites in one (1.8%) patient. Fetal complications included fresh stillbirth (FSB) in 39 (74.0 %), APGAR <7, in 09 (17.0%) and NICU admission needed in 13 (24.5%) babies.*

Conclusion — *Uterine rupture was associated with maternal and perinatal morbidity and mortality. Patients with previous cesarean delivery, multiparity, overuse of uterotonic drugs with prolonged and difficult labor were important factors noted in this study.*

Key words — *Uterine rupture, Maternal morbidity, Obstetric hysterectomy, Fetal demise.*

INTRODUCTION:

Uterine rupture is one of the most serious obstetric emergencies associated with high maternal and perinatal morbidity and mortality. Uterine rupture is defined as a full thickness separation of uterine wall including all layers during pregnancy, labor or immediately after labor. Though this is a rare condition in developed countries but still reported in developing countries like Pakistan. A rising cesarean section rate has also resulted in increased frequency of uterine rupture.[1] Uterine rupture may cause damage to the urinary bladder and there is always a risk of performing hysterectomy in uncontrolled situations.[2]

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The classical features of uterine rupture include unusual abdominal pain during labor, vaginal bleeding, fetal distress, pathological CTG, loss of uterine contractions and contour.[2,3] Worldwide, rupture of previously scared uterus is more common than un-scarred uterus.[4] The predisposing factors for uterine rupture also include cephalopelvic disproportion (CPD), previous uterine surgery like myomectomy.[5] In low income developing countries reproductive services are not available to many patients. In addition, family related issues and cultural practices add to the risk.[6-8]

Different studies have shown that uterine rupture is one of the leading causes of adverse perinatal and maternal outcome.[9,10] Data on the risk factors of uterine rupture is available. However, it is important to conduct frequent audits so as to find out any change that occurs over-time and identify risk factors that may be still prevalent in the communities. This study was conducted to determine the frequency and various risk factors of uterine rupture along-with associated feto-maternal complications in contemporary times. This may be an indicator of the quality of reproductive health facilities available to the pregnant women in the country.

METHODS:

Study design, place & duration: This cross sectional study was conducted in the Department of Obstetrics & Gynecology Unit II, Civil Hospital / Dow university of Health sciences Karachi, from January 2021 to December 2022.

Ethical considerations: Approval of the study was taken from the institution review board (IRB-3022/DUHS/EXEMPTION/2023/203). Informed consent was taken from all the women where applicable, or family members.

Inclusion / exclusion criteria: All women of reproductive age group diagnosed and managed for uterine rupture after 24-weeks of gestation period, were included. Patients were referred from other hospitals and those brought directly, were enrolled. Patients with the rupture of the uterus due to other causes were excluded.

Study protocol: A complete uterine rupture was defined as breach in all layers of the uterus, including the serosa and amniotic membranes. The study variables included clinical data related to the age, gestational age, parity, booking status, risk factors including prolonged trial of labor, obstructed labor, CPD, uterine instrumentation, previous uterine surgery, excessive use of oxytocic agents and application of uterine pressure. Maternal outcome variables included blood loss of more than 1000 ml, hysterectomy, sepsis, and injury to the urinary bladder, presence of anemia, need of blood transfusion, ICU admission and maternal deaths. Fetus and newborn related variables included presence of APGAR score < 7, NICU admission and perinatal death.

Statistical analysis: Data were entered into SPSS version 22. Descriptive statistics were used to present data as frequency and percentages for categorical variables and as numbers with percentages for quantitative data.

RESULTS:

During the study period a total of 6240 deliveries were conducted. In the same duration 53 (0.84%) patients of uterine rupture were managed. Mean age of patients was 31±3.94 years. Majority of the patients (n=47 – 88.8%) were between 25 to 35 years of age and non-booked (n=39 - 73.5%). Mean parity was 3.6±2.15 and mean gestational age was 36±3.47 weeks. Details of the maternal characteristics are given in table I. Risk factors are shown in table II. Most (n=38 - 71.6%) of the patients presented with previous cesarean deliveries followed by the prolonged / obstructed labor (n=14 - 26.4%). Feto-maternal outcome is given in table III.

Operative procedures for uterine rupture included repair of the uterus (n=40 - 75.5%) and hysterectomy (n=13 - 24.5%). Majority (n=12) of the patients with unscarred uterus needed hysterectomy and two of them also required repair of the urinary bladder due to the extension of uterine tear involving bladder. Two patients with severe sepsis required re-laparotomy for peritoneal toilet. Blood loss was more than 1000 ml in 44 (83%) patients, and massive blood loss of more than 2000 ml was observed in 17 (32%) patients. This required transfusion of multiple blood products including packed cells, FFPS, cryoprecipitate and platelets.

All patients received broad spectrum antibiotics. Mortality rate was very high among patients with unscarred uterus (n=3 - 20%). The most common site of rupture was anterior lower uterine segment (n=36 - 67.5%) followed by the lateral segment (n=11 -20.7%). Other sites included posterior segment rupture (n=3 - 5.6%), fundus of uterus (n=2 - 3.7%) and in one (1.8%) patient the rupture was at more than one place.

Table I: Maternal Characteristics

Variables	Frequency	Percentage
Booking status		
Booked	14	26.4%
Un-booked	39	73.6%
Age of the patients		
<25 years	02	03.7%
25-30 years	19	35.9%
31-35 years	28	52.9%
>35 years	04	07.5%
Parity		
1-3	28	52.9%
4-5	16	30.2%
>5	09	16.9%
Gestational Age		
<36 weeks	12	22.7%
>36 weeks	41	77.3%

Table II: Risk Factors

Risk Factors	Frequency	Percentage
Previous LSCS	38	71.6%
• Previous 1 CS	27	
• Previous 2 CS	04	
• Previous 3 CS	05	
• Previous 4 CS	02	
Multiparity	31	58.4%
Excessive use of uterotonics	07	13.2%
Prolonged and obstructed labor	14	26.4 %
Fetal macrosomia	03	05.6%

Table III: Feto-maternal Complications

Complications	Frequency	Percentage
Maternal Complications		
Blood loss > 1000 ml	44	83.0%
Massive hemorrhage (blood loss >2000ml)	17	32.0%
Hysterectomy	13	24.5%
Sepsis	07	13.2%
Urinary bladder injury	02	03.7%
ICU admission	29	54.7%
Maternal death	05	09.4%
Fetal Complications		
Stillbirth	39	74.0%
APGAR < 7	09	17.0%
NICU admission	13	24.5%

ICU admission was required in 29 (54.7%) patients. All of them suffered from major obstetric hemorrhage of more than 2000 ml and required transfusion of multiple blood products. Mortality rate in this series was 9.4%, as five patients expired. This included three cases of unscarred and two patients of scarred uterus with previous 3 and 4 cesarean deliveries.

DISCUSSION:

Uterine rupture is a catastrophic obstetric emergency causing high feto-maternal morbidity and mortality as reported in our study. It affects the future reproductive potential of the women as hysterectomy is required in some patients.[10,11] Uterine rupture is more prevalent in areas where adequate obstetric care is not available. In low income countries many deliveries are either un-supervised or conducted by unskilled traditional birth attendants at home.[12] The uterine rupture is a rare complication of pregnancy but it is frequently reported from developing countries.[7,8] According to WHO, the average incidence of uterine rupture is 5.3/10,000. Globally the rate of uterine rupture is 0.07%, being lower in the developed countries. In a study conducted by Wan et al the rate of uterine rupture was 0.019% consistent with the rate in developed countries.[11]

Rizwan et al in their study observed uterine rupture in 0.74% patients mostly due to obstructed labor.[9] In this study 0.84% cases of uterine rupture were observed in two-years study period. There are many etiological factors predisposing to uterine rupture in pregnancy. Different studies have observed that multiparity, unsupervised and prolonged labor, excessive use of uterotonics, multiparity and previous cesarean scars are the major risk factors for the uterine rupture. Majority of the women in our study with scarred uterus had previous one cesarean pregnancy. In our study previous cesarean delivery was the common variable observed in 71.6% patients. This pattern is also reported in other studies.[13-15]

Many patients in this study had multiple risk factors. In these women labor was either managed at home or at a small set up with non-availability of feto-maternal monitoring. Trial of labor after cesarean section must be conducted at an appropriate place where electronic fetal monitoring, blood products availability and emergency surgery services are present. In a study by Wan et al 92.7% cases of uterine rupture were in women with scarred uterus.[11] In this study the most common site of rupture was anterior wall in lower uterine segment in patients with previous cesarean scar. Similar observations were noted in other studies.[11,13]

Uterine rupture is an important cause of maternal and perinatal morbidity and mortality.[14,16,17] Al Zirqi et al in their study identified 35.6% healthy mothers, 43.3% cases of severe postpartum hemorrhages without hysterectomy, 20.6% cases of peripartum hysterectomies, and 1.2% maternal deaths.[13] It Is also observed that unscarred uterine rupture significantly increased the risk of peripartum hysterectomy compared with the scarred uterine rupture which is similar to results of our study.[18]

Number of maternal complications were observed in this study. In a study by Astatikie et al 98.3% babies were stillborn.[14] In this study perinatal complications included intrauterine deaths of 73%. All alive babies were born in patients with scarred uterus and majority of them required admission to NICU and one of them expired on second day of life.

Limitations of the study: This study is from one of the units of obstetrics and gynecology department from a tertiary care hospital. This may not be a true representative of the overall morbidity and mortality data on an important subject. A well-structured population based study design is therefore suggested that can help in compiling evidence based report on the subject of obstetrics related uterine rupture.

CONCLUSION:

The frequency of uterine rupture was high among study population. Previous uterine scar, prolonged labor and excessive use of oxytocic agents were the major risk factors for uterine rupture.

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Received for publication: 20-06-2023

Sent for revision: 25-07-2023

Accepted after revision: 30-07-2023

Authors' contributions:
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All authors approved the final version of the manuscript and are in agreement to be accountable for its content.

Ethics statement: Institution review board permission was taken prior to the study and informed consent obtained.

Competing interest: The authors declare that they have no competing interest.

Source of funding: None

How to cite this article:
Nasrullah FD, Batool Z, Husnain FS, Jalil R, Shaikh S. Uterine rupture: an analysis of risk factors and complications. J Surg Pakistan. 2023;28(3)::67-72.