

Identified Risk Factors and Etiological Factors of Uterine Ruptures

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Abstract

Background: Uterine rupture is an Obstetric emergency that contributes significantly to maternal mortality and morbidity, as well as perinatal mortality. Uterine rupture is a serious obstetric complication, where the uterus tears. Most often during pregnancy, labor or immediately after delivery, with associated severe hemorrhage. It is commoner in low-resource countries like Nigeria, with incidence ranging from 0.3% - 1.2% (1 in 333 to 1 in 83 deliveries) compared to developed countries (1 in 5,000 to 7,000 deliveries).

Objective: The aim of this study is to highlight the risk factors and predisposing factors of uterine rupture, in order to increase awareness and then reduce the incidence of uterine rupture.

Materials/Method: This was a retrospective study of patients with uterine rupture at the Rivers State University Teaching Hospital within a 5-year period, January 2020 to December 2024. The folders of patients were retrieved from the medical records department of the hospital. With the help of a pre-designed proforma, relevant data were collected from the patient's folders. Data were analyzed using IBM SPSS (Statistical Product and service solution) version 26 for Windows®.

Result: A total of 5,779 deliveries took place within the study period. Of these, 34 patients had uterine rupture. The prevalence of uterine rupture from this study was 0.59%. There were 4 maternal deaths out of the 34 cases reviewed, giving a case fatality rate of 11.8%. Perinatal mortality was 94.1%. The identified major risk factors and predisposing factors for uterine rupture were: unbooked status, 22 (64.7%), injudicious use of uterotonic drugs in labor, 21 (61.8%), previous uterine scar, 20 (58.8%) and management of labour by unskilled attendants (especially in the presence of a previous scar). The lax abdomen and lax uterus in grand multiparous women also predisposes them to ruptured uterus especially with injudicious use of oxytocics.

Conclusion: Increased awareness of these risk factors, and necessary pro-active measures taken to prevent these risk factors, will eventually reduce the incidence of uterine rupture of our women.

Keywords: Uterine Rupture; Uterine Scar; Uterotonic; Unbooked Status

Introduction

Uterine rupture is an obstetric emergency. It is a relatively catastrophic event especially during childbirth, in which the integrity of the myometrial wall is breached. It could be complete rupture, in which all the three layers of the uterus i.e. the serosal lining, the smooth muscle layer and the endometrial layer are breached. It is said to be partial uterine rupture if the serosal lining is still intact.

Usually occurs when the uterus is gravid, in the setting of a trial of labour after cesarean section (TOLAC). Trial of labour after cesarean section is aimed at reducing CS rate. However, a complication of TOLAC is uterine rupture. It is estimated that the rate of uterine rupture is approximately 15-30 times higher when women undergo a TOLAC compared to a scheduled repeat cesarean section [4,5]. Rarely, congenital uterine anomalies can predispose to uterine rupture. For pregnancies that implant in a rudimentary horn of a uterus, a particularly high risk of uterine rupture is associated with the induction of labor [3].

The prevalence of uterine rupture is high in low- and middle-income countries like Nigeria, with incidence ranging from 0.3% - 1.2% (1 in 333 to 1 in 83 deliveries) compared to developed countries (1 in 5,000 to 7,000 deliveries) [2-5]. Reported incidences are 1 in 106-273 deliveries in Enugu, Lagos, Ilorin, and Ife [1,5-8]. An incidence of 1 in 124 deliveries has however been reported in Accra, Ghana [3,5]. In high-income countries, there is more access to advanced obstetric care and good health seeking behavior which minimizes the incidence of uterine rupture. Poor socio-economic status, labour supervision by unskilled personnel, prolonged obstructed labor, reluctance to accept care in the hospital, ignorance, some cultural beliefs, refusal to adhere to counsel given by skilled personnel and prior uterine rupture are risk factors for uterine rupture [1,5-7]. Rarely, uterine rupture may occur in a non-gravid uterus when the uterus is exposed to trauma, infection and cancer [8,10].

The consequences of uterine rupture are increased maternal morbidity and mortality, and perinatal morbidity and mortality. The identified predisposing risk factors in our facility were factors that can be prevented or markedly reduced, if the populace had increased awareness of the causes of uterine rupture.

Materials and Methods

This study was done at the Rivers State University Teaching Hospital (RSUTH), Port Harcourt, Nigeria. The Hospital provides tertiary level care across multiple disciplines. It serves as a referral hospital for other health facilities within and outside the Rivers State. The hospital also serves as a training center for resident doctors and medical students of the Rivers State University and Pamo University of Medical Sciences. The department of Obstetrics and Gynaecology is one of the major clinical departments of the hospital.

Study design and population

This was a retrospective study of all cases of ruptured uterus that were managed in this facility between January 2020 to December 2024. The study population were women between ages 25 years and 49 years who delivered in this facility (booked and unbooked) or delivered elsewhere, who were brought into this facility with diagnosis of uterine rupture.

Data collection

Data were collected from case notes of each patient, having been retrieved from the medical records department of the hospital. Data was imputed into a pre-designed proforma.

Analysis was done using IBM Statistical Product and Service Solution (SPSS) version 26 for Windows®. Categorical variables were summarized in frequencies and percentages, while continuous variables were summarized using mean and standard deviations, with 95% confidence interval and *P* value of 0.05.

Results

A total of 5779 deliveries took place within the study period. Of these, 34 patients had uterine rupture. The prevalence of uterine rupture from this study was 0.59%. There were 4 maternal deaths out of the 34 cases reviewed, giving a case fatality rate of 11.8%.

Year	2020	2021	2022	2023	2024	Total
No of Delivery	1067	1161	1281	984	1286	5779
No of Ruptured Uterus	6	7	6	5	10	34
Prevalence of Rupture						58%

Table 1: Total delivery.

Age (Years)	n = 34	%
25-29	5	14.71
30-34	7	20.58
35-39	15	44.13
≥40	7	20.58
Mean Age: 35.8yrs		
Parity	n = 34	%
Nullipara (P = 0)	3	8.82
Primipara (P = 1)	8	23.52
Multipara (P = 2 - 4)	15	44.13
Grand multipara (P ≥ 5)	8	23.53
Religion	n = 34	%
Christian	26	76.48
Moslem	4	11.76
Others	4	11.76
Booking status	n = 34	%
Booked for ANC	12	35.3
Unbooked for ANC	22	64.7
Place of initial management before rupture		
Attendant	n = 34	%
Skilled attendant	10	29.41
Unskilled attendant	24	70.59
Use of uterotonic drugs		
Uterotonic drugs	n = 34	%
Oxytocin	9	26.47
Misoprostol	12	35.29
Non-usage	13	38.24
Scarred and unscarred uterus		
Type of uterine scar	n = 34	%
1 Previous cesarean section (C/S)	6	17.64
2 previous C/S	10	24.42
Previous myomectomy	4	11.76
No scar on uterus	14	46.18

Type of surgical intervention	n = 34	%
Uterine repair alone	11	32.36
Uterine repair + BTL	13	38.23
Subtotal Hysterectomy	7	20.59
Total Hysterectomy	3	8.82
Outcome/Case Fatality	n = 34	%
Outcome	Alive	Dead
Maternal	30	4(11.76%)
Fetal	2	32 (94.12%)

Table 2: Socio-demographic characteristics of patients (n = 34).

Perinatal mortality was 94.12% age range with highest prevalence of ruptured uterus was 35-39 years (44.13%). Mean age of the women was 35.8%. Multiparous women had the highest prevalence (44.13%). Christianity was the major religion of the women, 76.48%. Most of the women were unbooked (64.7%). Among the study group, 24 (70.59%) had been managed by unskilled attendants before being referred to our hospital. Administration of oxytocin or misoprostol had been given to 61.76% of them before rupture occurred. Most of the women had scarred uterus (53.82%) before present pregnancy. Types of surgical intervention were uterine repair and bilateral tubal ligation, followed by uterine repair alone.

Discussion

The nulliparous uterus has been described as being “virtually immune to rupture” [21], especially before the onset of contractions. In this study, 3 of the women who had uterine rupture were nulliparous (8.8%). This could be due to connective tissue disorder, previous scar on the uterus due to myomectomy, prolonged obstructed labor, undue application of fundal pressure. Other causes are chronic steroid use [22] and cocaine abuse [23]. In this study, 20 cases (58.8%) had a previous scar on the uterus. The use of uterotonic agents on both the scarred and unscarred uterus is an independent risk factor for uterine rupture, especially on the scarred uterus [24-27].

Unskilled personnel attending to women in labor and the application of fundal pressure in the second stage of labor, especially in the presence of a previous scar are risk factors for uterine rupture. In this study, 14 cases (41.17%) did not have a scar on the uterus. Unbooked status, prolonged obstructed labor, poor monitoring of the labor process by unskilled attendants, inappropriate application of fundal pressure in labor and injudicious use of uterotonic drugs may have contributed to their rupture.

Women with two previous cesarean sections (CS) constituted 24.4% of those with uterine rupture. One previous cesarean section constituted 17.64% of those that ruptured in this study. This is in agreement with previous studies which noted that uterine rupture is more common in women with previous CS. Any previous scar on the uterus can also predispose to uterine rupture in a present pregnancy [2-5].

Previous surgeries like wedge resection in a cornual ectopic pregnancy, myomectomy that breaches the endometrium, where there is evidence of prior trauma like uterine perforation, are predisposing factors to uterine rupture in a current pregnancy [10,11].

Induction or augmentation of labor with medications like oxytocin and misoprostol can increase the risk of uterine rupture when there is poor monitoring of the labor progress. Also rupture can occur when unskilled attendants use these medications. In this study, 61.76% of those with uterine rupture had uterotonic drugs.

The average cesarean section rate in this facility within the study period was 55.47%, against WHO recommended rate of 21%. This increase in CS rate means more women (in this locality) are having scars on their uterus, and by extension predisposes them to uterine rupture in future. Reduction in CS rates can help to reduce uterine rupture.

Although not identified in this study, other predisposing factors to uterine rupture are: uterine manipulations in pregnancy, like external cephalic version, internal podalic version, breech extraction, shoulder dystocia and manual removal of placenta. Others include Instrumentation like forceps delivery, violence like gun-shot wound, blunt blow to abdomen and road traffic accident [15-18].

The highest type of surgical intervention in this study was uterine repair and bilateral tubal ligation (BTL). This was because most of the unbooked cases were referred to tertiary facilities late in the night when consultants had gone home. Depending on the skill of the senior registrar on ground, the woman is offered the best possible care. Ideally, what determines the type of surgical intervention are the site of rupture, the extent of the rupture (e.g. a rupture that extends to the cervix will require Total Abdominal Hysterectomy to achieve hemostasis), the parity of the woman, the number and nature of lacerations, the skill of the surgeon, time of the day or night that surgery is done, and the availability of blood.

The case fatality rate in this study was 11.76%. This was because most of the women have been managed elsewhere by unskilled attendant (70.59%), and have lost a lot of blood before being referred to our center. Most of them were in hypovolemic shock at presentation. Those that died had irreversible shock, despite all resuscitatory measures. Similar to other studies [20-22], the perinatal mortality was very high 94.12%

Conclusion

The identified predisposing, risk factors and etiological factors of uterine rupture in this study are factors or problems that can be solved or reduced to a large extent if there is conscious effort on the part of individuals, groups, communities, non-governmental organizations and the Federal Government. Education of the girl child, empowerment of women, reduction in poverty rate, awareness creation by advocacy, free medical care by government for all pregnant women, improvement of infrastructure, training and employment of more doctors, capacity building by training and retraining of health workers, will go a long way to improve the health indices of uterine rupture in Nigeria.

Conflicts of Interest

There are no conflicts of interests.

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