

Original Research Article

Predisposing factors and outcome of uterine rupture in Jos, North-central Nigeria

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Received: 06 June 2020

Accepted: 31 July 2020

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ABSTRACT

Background: Uterine rupture has continued to be an obstetric catastrophe with tragic maternal and foetal outcomes particularly in Nigeria.

Methods: an institutional, cross sectional retrospective study was carried out at Jos University Teaching Hospital, North-Central Nigeria. Case files of mothers with uterine rupture managed at the hospital from 1 January 2011 to 31 December 2019 were retrieved and included in the study. Data extracted from case files included maternal age, parity, gestational age, booking status, presence of uterine scar, obstetric interventions prior to rupture, site of rupture, type of surgery, units of blood transfused, intensive care unit admission and duration of hospital stay and maternal or foetal death.

Results: the incidence of uterine rupture was 1 in 497 deliveries (0.2%). The mean age of the patients was 30.1 ± 5.1 years. About 75% of the patients were para 1-4. Seventeen (70.8%) patients were unbooked while fourteen (58.3%) had unscarred uterine rupture. Eight out of 14 (57.1%) patients with unscarred uterus had uterotronics for induction or augmentation of labour. Fourteen (58.3%) patients had rupture involving anterior lower uterine segment. Over half of the patients had uterine repair only (58.3%), 29.2% had uterine repair with bilateral tubal ligation while 12.5% had subtotal hysterectomy. Twenty-two (91.7%) required blood transfusion, five patients had 5 or more units of blood transfused. The perinatal mortality was 69.6%, there was no maternal death.

Conclusions: the major predisposing factors to uterine rupture in our facility were lack of antenatal care, presence of previous caesarean section scar and injudicious use of uterotronics.

Keywords: Jos, Nigeria, Outcome, Predisposing, Rupture, Uterine

INTRODUCTION

Uterine rupture is an obstetric catastrophe sometimes leading to tragic maternal and fetal outcome. It is the tearing of the uterine wall during pregnancy or delivery. It is complete when a full thickness disruption of the uterine wall involving the uterine visceral peritoneum, and incomplete when the disruption does not involve the overlying visceral peritoneum.¹

The incidence of uterine rupture in developed countries is low due to availability and access to quality obstetric

services, most cases occurs in women with uterine scar following previous caesarean section.^{2,3} The incidence of complete uterine ruptured in the UK was estimated to be 1.9 per 10,000 maternities, with an estimated incidence of 11 and 0.3 per 10000 maternities in women with and without previous caesarean section respectively.³ A study in Norway shows that complete uterine rupture occurs in 21.1 and 0.38 per 10000 in women with and without previous caesarean section respectively.⁴

In developing countries, the incidence of uterine rupture remains high and it remains an important cause of

maternal morbidity and mortality.² This is linked to childhood marriage and malnutrition leading to high incidence of cephalo-pelvic disproportion, coupled with poor access and utilization of emergency obstetric care services. These results in increased incidence of ruptured uterus with resulting high maternal morbidity and mortality.⁵⁻⁸ Incidences of between 0.36 to 2.44% were reported in Nigeria, Ethiopia, Pakistan and from a study in Senegal and Mali.⁹⁻¹³ Reports from some developing countries also show that majority of cases are rupture of unscarred uterus,¹⁴ unlike in developed countries. The perinatal outcomes following uterine rupture are even worse.² Associated causes of uterine rupture are obstructed labor, use of uterotronics, presence of scarred uterus and obstetric procedures like breech extraction, forceps delivery and manual removal of placenta.

Our study aims to determine the incidence, predisposing factors, management, maternal and fetal outcome of complete uterine rupture at Jos University Teaching Hospital, North Central Nigeria.

METHODS

It is an institutional, cross-sectional retrospective study. The Jos University Teaching Hospital (JUTH) is located in Plateau state, the North Central part of Nigeria. It provides both secondary and tertiary level obstetric care to patients with varying socio-economic background, they are usually attended to even without a referral. We included all cases of complete uterine rupture, defined as a rupture involving the full thickness of the uterine wall and the overlying visceral peritoneum. Cases of asymptomatic scar dehiscence which were incidental findings at the time of repeat caesarean section were excluded, including any rupture that did not involve the full thickness of the uterine wall to the visceral peritoneum even in patients without uterine scars.

The labor ward is managed by a senior registrar supported by the registrar under the supervision of a consultant. Case files of mothers with complete uterine rupture who delivered and managed in the hospital from 1st January 2011 to 31st December 2019 were retrieved and included in the study. The data extracted from the case files included maternal age, parity, gestational age, booking status, presence or absence of uterine scar, any obstetric intervention prior to uterine rupture. Variables about the management included the site of rupture, the type of surgery, the number of units of blood transfused, duration of hospital stay and need for intensive care unit (ICU) admission. Any other complication of management was also noted. The fetal outcome variables extracted included fetal weight, whether the fetus was delivered alive or death, for fetus delivered alive we also took note of fetuses that were delivered alive but died before discharge and those who were alive at discharge of the mother. We regard a patient as booked if she had antenatal care at JUTH, and as unbooked if she did not have antenatal care at JUTH, she is referred from a

private clinic, maternity home, any other health institution or presented without referral.¹⁵ The data was entered in excel and then exported to IBM SPSS Statistics version 26 and analyzed. Results were reported as frequencies and percentages.

RESULTS

There were 30 cases of uterine rupture identified from the theatre and delivery register over the period of review and a total of 14910 deliveries over the same period. This gives an incidence of 1 in 497 deliveries (0.2%). We were able to retrieve 24 case files with sufficient record for analysis (80%). The review is based on data from these 24 cases.

The mean age of the patients was 30.1±5.1 years, range 20-42 years and the mean parity was 3.0±2.2, with a range of 1-9. There was no case of uterine rupture among primigravida, 75% of the patients were within Para 1-4. Four patients (16.7%) were ≤32 weeks gestation while twenty (83.3%) were 36 weeks and above. Seventeen (70.8%) of the patients were unbooked.

Fourteen (58.3%) patients had rupture of unscarred uterus. All uterine scars were previous caesarean section (CS) scar. More patients with unscarred uterine rupture had uterotronics (either misoprostol or oxytocin) for induction or augmentation of labor compared with those with unscarred uterine rupture. This was however, not statistically significant, $p=0.069$ (Table 1).

Table 1: Presence of uterine scar versus use of uterotronics for induction or augmentation of labour in women with uterine rupture.

	No utero- tonic use	Uterotonic used	Total
No uterine scar	6	8	14
Uterine scar	8	2	10
Total	14	10	24

$\chi^2=3.311$, $P=0.069$

Among patients with scarred uterus ($n = 10$, all CS scars), two had 2 previous caesarean section, one had 3 previous CS with major degree placenta praevia which ruptured at 28 weeks gestation. Eight out of ten ruptured while attempting vaginal delivery with no history of use of oxytocin, two had uterotronics used: one was being induced with misoprostol at 23 weeks due to intra uterine fetal death, while the second had oxytocin to augment labor at a private health facility and referred with clinical features of uterine rupture.

In fourteen (58.3%) patients, the rupture occurred at the anterior lower uterine segment, three (12.5%) occurred at the upper segment. There was extension into the bladder in one patient and an associated cervical laceration in another (Table 2).

Table 2: Site of uterine rupture.

Site of rupture	Number (%)
Anterior lower segment	14 (58.3)
Lateral/broad ligament	4 (16.7)
Anterior and posterior uterine wall	3 (12.5)
Upper uterine segment	3 (12.5)
Total	24 (100.0)

Fourteen patients (58.3%) had uterine repair only, seven (29.2%) had uterine repair with bilateral tubal ligation (BTL), while 3 had subtotal hysterectomy, all 3 women that had subtotal hysterectomy had unscarred uterine rupture (Table 3).

Table 3: Type of surgery for uterine rupture.

Type of surgery	Number (%)
Uterine repair only	14 (58.3)
Repair and BTL	7 (29.2)
Subtotal hysterectomy	3 (12.5)
Total	24 (100.0)

Twenty-two (91.7%) patients had blood transfusion, five (20.8%) had 5 or more units of blood transfused, out of which four of them required intensive care unit admission. The median duration of hospital stay was 6 days (range 4-30 days). Five patients required prolonged hospital admission (over 10 days), mainly due to wound breakdown, bladder injury and complication related to obstetric palsy. There was no maternal death recorded.

The perinatal mortality was 69.6%. We excluded the fetus that had died in utero before being induced. Over half (54.2%) of the fetuses were stillborn, 3 were delivered alive but died within 24 hours of delivery, seven babies (29.2%) were alive and discharged home with their mothers (Table 4). Four out of seven of the babies that survived were of mothers with scarred uterine rupture, this was not statistically significant when compared with babies of mothers with unscarred uterine rupture, $p=0.29$. The mean birth weight was $2.71\pm0.87\text{kg}$, none of the babies were macrosomic.

Table 4: Perinatal outcome following uterine rupture.

Perinatal outcome	Number (%)
Alive	7 (29.2)
Stillbirth	13 (54.2)
Died within 24 hours of delivery	3 (12.5)
IUFD* being induced	1 (4.2)
Total	24 (100.0)

*IUFD intra uterine foetal death.

DISCUSSION

In our study, the incidence of uterine rupture was 0.2% (1 in 497 deliveries). This is lower than the incidence reported in various parts of Nigeria, for instance, Kano in

North East reported 0.36%, Nnewi in South East 0.84%, it was also lower than 0.6% reported in Lagos, south western Nigeria.^{9,10,16} This wide variations in incidence observed in Nigeria may be due to a number of factors. These include variations in obstetric risk factors in different parts of the country such as previous caesarean section scar, availability and accessibility of obstetric care services.¹⁰ Socio-demographic factors also influenced the utilization of these services in different parts of the country. The presence of other facilities that can manage the condition in the region may have influence the incidence observed in our facility. In Jos, North central Nigeria, the city where our facility is located, there are two other health facilities that offer tertiary level obstetric care. Distribution of cases among these facilities and industrial action (strikes) by health workers during the study period may also be some non-obstetric factors that contributed to the low incidence observed. The incidence of uterine rupture may actually be lower in our part of the country, or this may be highlighting a declining incidence of uterine rupture in the country. This remains to be validated by other studies in the future.

Studies in other developing countries have reported high incidences of 0.67% in Senegal and Mali, 1.05% in Parkistan, and 2.44% in Ethiopia.¹¹⁻¹³ Much lower values have been reported in developed countries like UK (0.2 per 1000 deliveries), Norway (0.38/10000 in women without previous caesarean section and 21.1/10000 in women with previous CS).^{3,4} This reflects the wide gap in accessibility and quality of obstetric services between developing and developed countries.

Our findings also shows that the major factors associated with uterine rupture were use of uterotonics for induction or augmentation of labour, this was responsible factor in 57% (8 out of 14) of unscarred uterine rupture; the presence of previous caesarean section scar (8 out of 10 scarred uterine rupture had no history of uterotonic use) and unbooked pregnancies (70.8%). Women who have not had antenatal care missed the opportunity of being informed of any risk to the pregnancy, including any identifiable risk factor for uterine rupture. These findings are similar to observations in other studies within Nigeria.^{10,16,17} There is need for training and retraining of health workers on the safe use of uterotonics for induction or augmentation of labor, especially with the increasingly easy accessibility to misoprostol in the country. Caesarean section rates are rising globally,¹⁸ the socio-cultural aversion to caesarean section in most parts of Nigeria may be responsible for the high rate of uterine rupture in women who had previous caesarean section, some seeking for care in religious centres and primary care centres just to avoid a repeat CS and only present after they developed uterine rupture. The decline in the economy of the country may also contribute to the high number of unbooked women and women avoiding delivery in our tertiary facility and seek delivery elsewhere due to economic reasons.

Most of our patients had rupture of the anterior lower uterine segment similar to previously reported studies.^{10,15,19-21} We, however, observed three cases of rupture involving the upper segment. Obstetric manipulations or interventions such as breech delivery, forceps or vacuum delivery, may be responsible for uterine rupture. As most of our patients were unbooked and presented after the rupture had occurred, we could not get any history of such manipulations in our series.

Severe maternal morbidity requiring intensive care unit admission was observed in five patients and all were unbooked patients. This is most likely due to delayed diagnosis and referral, further worsened by additional time taken to transport these patients to the facility. Four out of the five patients that required intensive care unit admission had unscarred uterine rupture. This support the finding in other studies that shows a higher morbidity in unscarred compared with scarred uterine rupture.²⁰⁻²³ Delayed diagnosis and severe hemorrhage from more vascular unscarred myometrium compared with scarred myometrial tissue among others are possible explanation.²²

Majority (58.3%) of our patients had uterine repair only, while 3 had subtotal hysterectomy. The fact that most of the patients were of low parity may have influenced the surgical decision, furthermore, our facility is a tertiary center and this means that these patients were able to get optimal care by skilled surgeons with adequate supporting services. It is generally accepted that the type of surgery depends on considerations like the clinical state of the patient, the nature of injury, the skill of the surgeon and future reproductive need of the woman.

There was no maternal death reported in our series, unlike reports from other studies within Nigeria and other developing countries.^{5,7,15,16,21} Possible explanation may be the small size of our sample, secondly, our institution have a long standing policy of providing all emergency care, including surgery and blood transfusions for the first 24 hours and patients are then made to pay later or upon discharge. There was however, a high perinatal mortality similar to other studies within Nigeria,^{15,24} and other developing countries.^{12,21,25} For any possibility of fetal survival, surgical intervention is required within 10-37 minutes of uterine rupture,²⁶ this is usually a challenge because of poor availability and accessibility to quality emergency obstetric care services in the country.

CONCLUSION

We conclude that the major factors associated with uterine rupture are presence of caesarean section scar, injudicious use of uterotonics for augmentation or induction of labour and poor utilization of antenatal and delivery care services. We recommend continuous public education on the importance of antenatal care and hospital delivery; there is also a need for retraining of health workers on the risk associated with uterotonics and

how it could be safely used to avoid obstetric catastrophe. Regular audit of caesarean sections both locally within institutions and nationally could reduce the increasing rate in the country. Improving access to quality emergency obstetric care services will significantly improve the outcome in women with ruptured uterus.

ACKNOWLEDGEMENTS

We sincerely acknowledge all the consultants in the department who were actively involved in the management of the patients. The untiring assistance of staff of the medical records department in retrieving the patients case files is also acknowledged.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

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Cite this article as: Kahansim ML, Nyango DD, Oyeboode TA, Egbodo CO, Anyaka CU, Pam VC. Predisposing factors and outcome of uterine rupture in Jos, North-central Nigeria. *Int J Res Med Sci* 2020;8:3198-202.