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Research Article

Maternal and perinatal outcomes of uterine rupture in Lubumbashi, Democratic Republic of Congo

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Abstract

Introduction: Uterine rupture is one of the peripartum complications, which cause nearly about one out of thirteen maternal deaths. This study aimed to assess the prevalence and associated factors of mortality among women with uterine rupture in referral hospitals of Lubumbashi, in the south east part of the Democratic Republic of Congo.

Methods: Institution based cross sectional study was conducted from December 1st, 2012 to 31st, 2016 on uterine rupture. During the study selected 158 women were included by using exhaustive sampling method. Data were checked, coded and analyzed into STATA version 12. Chi-square test was used to identify the predictors of maternal and perinatal mortalities in women with uterine rupture and 95% Confidence Interval of odds ratio at *p* - value less than 0.05 was taken as a significance level.

Results: The overall prevalence of uterine rupture was 0.49%. The average age of the patients was 29.5 ± 6.2 years and 71.52% of them were between 20 and 34 years old; more than 60% had a parity ≥4 (average parity: 4.7 ± 2.5). 81.17% of the cases had a fully ruptured uterus and 51.17% of the uterine ruptures were located in the lower segment. Repair of the pregnant ruptured uterus was performed in 93.04% of the cases and hysterectomy in 5.06%. Maternal and perinatal mortalities were 8.86% and 72.04% respectively. Regarding maternal mortality, no parameter showed a significant association with maternal death. As for perinatal mortality, parity ≥4, complete rupture and segmento-corporeal lesion were significantly associated with perinatal death ($p < 0.05$).

Conclusion: Uterine rupture remains one of the causes of maternal and perinatal mortality in Lubumbashi. The place occupied by uterine ruptures in obstetric activity requires joint and urgent action by all stakeholders in the health system in order to combat this scourge, witness to poor quality obstetric care.

More Information

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Keywords: Uterine rupture; Prevalence; Mortality; Lubumbashi

Introduction

Uterine rupture is defined as a non-surgical continuity solution of the pregnant uterus reaching the uterine fundus and/ or the lower segment. It can be spontaneous or provoked [1]. It occurs most often during labor, but it can also occur during pregnancy, on a healthy or scarred uterus. Anatomically, there are two forms of uterine rupture: complete rupture (or intraperitoneal rupture) and incomplete rupture (or disunity when it occurs on a scar uterus) [1]. The frequency of the occurrence of uterine rupture varies in different regions of the world. It is rare in developed countries but remains a public health problem in developing countries, particularly in Africa where it occurs mainly as a result of prolonged or obstructed labor [2,3]. Uterine rupture is one of the major obstetric complications that contribute significantly to maternal and perinatal mortality and morbidity [2], especially in our under-equipped countries where accessibility to quality health care is a problem. Its prevalence in Africa is between 0.3 and 2.4% [2,4] while in Europe and industrialized countries in general it is below 0.1% [5,6]. The majority of the cases in these countries occur in women with a history of cesarean section while in developing countries it is rather prolonged labor on non-scarred uterus [2,7]. In the Democratic Republic of Congo (DRC), in Lubumbashi, Kakudji, et al. [8] reported 12 (0.41%)

cases of uterine rupture out of a total of 2,911 deliveries recorded in 10 reference maternities. Mwilenyi, et al. [9], in their study at Jason Sendwe Hospital in Lubumbashi, found a frequency of 1.1% and the maternal and perinatal mortalities were 15.1% and 76.1% respectively.

However, there are very few studies on this subject in DRC despite the observation made about the existence of this pathology and its consequences in our obstetric practice. In view of the situation described above, it is imperative to know the situation in our country and particularly in Lubumbashi city.

This study aimed to assess the prevalence and associated factors of mortality among women with uterine rupture in referral hospitals of Lubumbashi, in the south east part of the Democratic Republic of Congo.

Materials and methods

Study setting

The study setting was Lubumbashi city, which is located in the south east part of the Democratic Republic of Congo. We selected 9 public referral maternities funded by Government of DRC through the Ministry of Health. (Provincial General Reference Hospital Jason Sendwe, University Clinics, Gécamines-Sud Hospital, SNCC Hospital, General Reference Hospital of Katuba, General Reference Hospital of Kamalondo, General Reference Hospital of Kampemba, General Hospital Reference of Rwashi and General Reference Hospital of Kenya). Lubumbashi is a city with a population of more than 2 million people.

Institution based cross sectional study was conducted from December 1st, 2012 to 31st, 2016 on uterine rupture.

Case definition and selection

Uterine rupture was defined as tearing of the uterine wall either partially or complete during pregnancy and labor, diagnosed either clinically and later confirmed at laparotomy. The cases were retrospectively collected from the maternity ward and operating theatre registers as well as from the patients' case files at the hospital medical records office.

In total, we included by using exhaustive sampling method 186 cases of uterine rupture which allowed us to calculate the frequency. But of the 186 cases, we excluded 28 cases in the statistical analyzes due to an incomplete record missing most of the study variables.

Data collection

Data was abstracted from the maternity ward and operating theatre registers as well as from the patients' case files at the hospital medical records office using a pre tested case report form. Information on the patients' age, parity, previous caesarean section, antenatal care attendance, modality of admission at the hospital, gestational age, type of uterine rupture, site of uterine rupture, type of treatment, maternal and fetal outcomes, length of postoperative hospital stay and other relevant information were collected.

The data collectors were midwives who were trained to collect data from women's obstetric files or charts and to validate the diagnosis of obstructed labor using admission, delivery and theatre registers. Thought the data collection period which lasted 4 weeks, the first author was providing oversight and supervision to prevent under reporting.

Statistical analysis

The data were entered and analyzed using STATA software, version 12.0. Descriptive statistics were obtained through frequencies and cross tabulations. Chi square test or Fisher exact test when appropriate were used to identify the predictors of maternal and perinatal mortalities in women with uterine rupture and 95% Confidence Interval (95% CI) of odds ratio (OR) at p-value less than 0.05 was taken as a significance level.

Ethical considerations

Ethical approval was obtained from the Ethical Medical Committee of the University of Lubumbashi. Permission to access obstetric records was obtained from the medical director of the hospital and these were anonymously entered into the database.

Results

Among the 37,641 deliveries carried out during this period, we identified 186 cases of uterine rupture, i.e. a prevalence of 0.49% (95% CI: 0.42 - 0.57%).

The ages of mothers who got uterine rupture ranged between 15–44 years, with an average age of 29.5 ± 6.2 years. The average parity was 4.7 ± 2.5 with (range: from 1 to 11). Most of the cases 132 (83.54%) were referred from peripheral maternities, and 57 (36.06%) mothers had not performed any antenatal care (ANC) visit. The major part of uterine ruptures had occurred in term pregnancies (82.17%). The average gestational age was 38.23 ± 2.65 weeks (range: from 28 to 42 weeks).

Sixty-eight (43.04%) cases had occurred on a scarred uterus (history of the previous caesarean section) and 90 (56.96%) cases on a healthy uterus.

The rupture site was essentially the lower segment in 51.27% of the cases, and the rupture was complete in 81.17% and incomplete in 18.83%.

All women received a blood transfusion and surgical treatment. Repair of the ruptured uterus was performed in 147 (93.04%) mothers; 8 (5.06%) underwent an emergency obstetric hysterectomy (Table 1). The average length of

hospital stay was 15.6 days (ranges: from 1 to 36 days). We recorded 14 cases of maternal death, i.e a mortality rate of 8.86%. These maternal deaths occurred following a hemorrhagic shock, including 3 preoperatively. Nineteen (15.82%) newborns weighed ≥4000 grams and 115 (68.99%) between 2500 and 3999 grams. One hundred sixteen 116 (72.04%) newborns died in perinatal period and 45 (27.96%) survived.

No parameter studied was associated with maternal death (Table 2). As for perinatal death (Table 3), we found that parity ≥4 was significantly associated with perinatal death, indicating that newborns of mothers with parity ≥4 had 3.5 times the risk of dying compared to those of mothers having a parity <4 (OR = 3.5 [1.7-7.2]). Similarly, for newborns of mothers who had a complete rupture, they were 13.9 times more likely to die compared to those whose mothers had an incomplete rupture (OR = 13.9 [5.3-36.5]). As for the site of the rupture, the segmento-corporeal lesion was significantly associated with perinatal death (OR = 6.4 [1.9-21.3]).

Discussion

Prevalence

The frequency of uterine rupture varies according to hospital statistics. We recorded an overall prevalence of 0.49%. This frequency is comparable to that recently reported in Lubumbashi (DRC) by Kakudji, et al. [8] which was 0.41%. It seems to be higher than that reported in 1994 in Nyankunde (in the north east part of the DRC) by Ahuka, et al. (0.35%) [10].

In the literature review, we found that the prevalence of uterine rupture in African countries varied between 0.29% and 2.44% [4,11-15], and those found in Asian countries, varying between 0.2% and 1.6% [3,16-19]. These frequencies recorded in African and Asian countries are much higher than those observed in the European continent where frequencies were lower than 0.1% [5,6,20], and that observed in Australia where it was 0.17% [21].

We think that these frequencies reported in African countries could be underestimated because few studies have been carried out in rural areas (where home deliveries have so far been noted), and most of the data come from urban centers, where the incidence of uterine rupture may be lower because services are more easily accessible [22].

This high frequency of uterine ruptures in developing countries is probably linked to lack of equipment, low number of qualified and trained caregivers in obstetric and neonatal emergency care in maternities and high number of makeshift maternities (where diagnosis, management and timely referral of obstetric emergencies remain a serious problem) which are constantly emerging in some large African cities. To these are added the problem of lack of ANC visits in our settings where less than 30% of pregnant women reach 4 or more ANC [8,23].

Table 1: Types of operations done.

Operation procedure	Number	Percentage
Repair of the uterus	147	93.04
Total abdominal hysterectomy	8	5.06
None	3	1.90
Total	158	100

Type and site of the uterine rupture

In our study, 81.17% of uterine ruptures were complete

Table 2: Factors associated with maternal mortality in uterine rupture.

Variable	Total (*n* = 158)	Maternal outcome				OR [95% CI]	*p* - value
		Died (*n* = 14)		Survived (*n* = 144)			
	N	*n*	%	*n*	%		
Age							
<35 years	125	10	8.0	115	92.0	1.0	
≥35 years	33	4	12.1	29	87.9	1.6 [0.4-5.4]	0.6916
Parity							
<4	64	4	6.3	60	93.7	1.0	
≥4	94	10	10.6	84	89.4	1.8 [0.5-8.1]	0.5043
Referral							
Yes	132	13	9.9	119	90.1	2.7 [0.3-21.8]	0.5439
No	26	1	3.8	25	96.2	1.0	
Previous caesarean section							
Yes	90	11	12.2	79	87.8	3.0 [0.8-11.3]	0.1533
No	68	3	4.4	65	95.6	1.0	
Attended antenatal care							
Yes	101	6	5.9	95	94.1	1.0	
No	57	8	14.0	49	86.0	2.6 [0.8-7.9]	0.1533
Rupture based on the extent							
Incomplete	29	1	3.5	28	96.5	1.0	
Complete	125	13	10.4	112	89.6	3.3 [0.4-25.9]	0.4152
Site of the uterine rupture							
Lower segment	81	7	80.5	74	19.5	1.0	
Segmento-corporeal	60	7	11.7	53	88.3	1.4 [0.5-4.2]	0.7573
Fundus	16	0	0.0	16	100.0	0.0 [0.0-3.5]	0.5957

Table 3: Factors associated with perinatal mortality in uterine rupture.

Variable	Total (N = 158)	Perinatal outcome				OR [95% CI]	*p* - value
		Died (*n* = 113)		Survived (*n* = 45)			
	N	*n*	%	*n*	%		
Age							
<35 years	125	88	70.4	37	29.6	1.0	
≥35 years	33	25	75.8	8	24.2	1.3 [0.5-3.2]	0.6967
Parity							
<4	64	36	56.3	28	43.7	1.0	
≥4	94	77	81.9	17	18.1	3.5 [1.7-7.2]	0.0008
Referral							
Yes	132	98	74.2	34	25.8	2.1 [0.9-5.0]	0.1411
No	26	15	57.7	11	42.3	1.0	
Previous caesarean section							
Yes	90	64	71.1	26	28.9	1.0	
No	68	49	72.1	19	27.9	1.0 [0.5-2.1]	1.000
Attended antenatal care							
No	57	43	79.8	14	20.2	1.0	
Yes	101	70	94.4	31	5.6	0.7 [0.4-1.5]	0.5244
Rupture based on the extent							
Complete	125	102	85.1	23	14.9	13.9 [5.3-36.5]	<0.0001
Incomplete	29	7	24.1	22	75.9	1.0	
Site of the uterine rupture							
Lower segment	81	56	80.5	25	19.5	2.9 [0.96-8.6]	0.0973
Segmento-Corporeal	60	50	93.6	10	6.4	6.4 [1.9-21.3]	0.003
Fundus	16	7	43.8	9	56.2	1.0	
Gestational age							
Preterm	28	22	78.6	6	21.4	1.6 [0.6-4.2]	0.4818
Term	129	90	69.8	39	30.2	1.0	
Fetal weight							
<2500 grams	24	18	75.0	6	25.0	1.3 [0.5-3.6]	0.7756
2500-3999 grams	115	80	69.6	35	30.4	1.0	
≥4000 grams	19	15	79.0	4	21.0	16 [0.6-5.3]	0.5744

and 18.83% were incomplete. This predominance of complete uterine ruptures over incomplete ones is also found in several studies [3,4,24,25]. Contrary to our observation, Guyot, et al. [7] (in France) found a higher proportion of incomplete ruptures (69.44%) than complete ruptures.

We noted that in only 10% of the cases did the uterine rupture sit in the fundus; 51% had involved the lower segment alone and nearly 38% of the uterine ruptures were segmento-corporeal. Kouakou, et al. [26], Astatikie, et al. [4] and Diallo, et al. [14] found that many uterine ruptures were located in the lower segment with 77.48%, 71.5% and 70.41% of the cases, respectively.

Fouedjio, et al. [24] had found 50% of segmento-corporeal lesions. In these segmento-corporeal lesions, the uterine breach would certainly have started in the lower segment and would have spread to the uterine fundus because of the delay in management. Because of its fragility, it is the lower segment which is the choice's site for rupture, thus constituting the starting point for most uterine ruptures [6]. Also, we must add the important role of low segment caesarean section as provider of segmental and segmento-corporeal ruptures. Corporeal ruptures are often secondary to corporeal caesarean sections which are rare, but also to myomectomies.

Management

Repair of the ruptured uterus (conservative surgery) was the most common (93.04%) in our series; it was performed whenever state of the uterus, site and extent of lesions had permitted it. This conservative tendency is found in several studies from African countries [14,27,28] because the procreative function is an important element in the balance of African households [14].

In our series the proportion of hysterectomy was 5.06%. Guyot, et al. [7] had not reported any hemostasis hysterectomy in their series. The rate of hemostasis hysterectomies varies in the literature between 5.6 and 61.5% in the event of complete ruptures [6,14,29-32]. Mukasa, et al. [2], in their series of 83 Ugandan women, recorded 28.6% total hysterectomy and 37.7% subtotal hysterectomy. Astatikie, et al. [4], in their series of 242 Ethiopian women, reported 73.9% hysterectomy (57% total hysterectomy and 16.9% subtotal hysterectomy). These not very homogeneous rates seem to be linked to the difference in attitude adopted taking into account certain parameters, namely age, parity, extent of lesions, involvement of vascular pedicles, state of the uterine muscle, desire of the patient's subsequent pregnancy and presence or absence of infection.

Maternal outcome

Out of 158 cases of uterine rupture, we observed 14 (8.86%) maternal deaths or approximately one death for 11 cases of uterine rupture. This result could be explained by

the delay in referral women from the first level health centers to the reference hospitals and also by the delay in diagnosis and treatment. Nayama, et al. [31], in their series of 195 Niger women, no maternal death was recorded. The literature review shows that the maternal mortality found in African countries varies between 4.8 and 21.4% [11,12,14,27], and between 5 and 12.5% in Asian countries [3,16,17-25]. It is still largely extended to that observed in the United States, which is 0.29% [33], to that observed in Europe, which is less than 1.5% [5,7,20,34,35].

Our study shows that none of the variables studied were associated with maternal death. Eze and Ibekwe noted that the maternal deaths recorded in their study were due to hypovolaemia secondary to massive hemorrhage and septicemia [27]. Astatikie, et al. [4] found that women whose birthing was done at home, those who developed hypovolemic shock or severe postoperative anemia were more likely to die from the uterine rupture. For Ahmed, et al. [30], maternal death was significantly associated with duration of surgery greater than 2 hours and they pointed out that this would be attributed to the complexity of the uterine lesion and the poor general condition of the patient. As Ahmed, et al [30], we believe that early admission of pregnant women to hospital, timely diagnosis of uterine rupture, adequate resuscitation of patients, availability of a blood transfusion, short delay between diagnosis and management as well as presence of an experienced surgeon have a reducing effect on maternal death after uterine rupture. Osemwenkha and Osaikhuwuomwan [36] emphasize that late admission to the hospital is a major cause of this poor outcome and is due to poverty, delays in referral, poor transport network and lack of ambulance services.

Perinatal outcome

Perinatal death rate in our study was 72.04%. The feticidal nature of uterine ruptures had been found in numerous African studies where the perinatal mortality linked to uterine rupture varied between 61.29% and 98% [4,13,36-38]. These figures are comparable to those found in Asian countries where it varies between 61.90% and 87.50% [25]. It is very much higher than that observed in Europe, varying between 0% and 15.72% [7,34,35], and in the United States where it is 1,44% [33].

In our study, complete and segmento-corporeal uterine lesions were significantly associated with perinatal death. This could be explained by the fact that these lesions would be more hemorrhagic and therefore likely to quickly cause death of the newborn because maternal antepartum hemorrhage is a risk factor for perinatal death. The delay in diagnosis and management (most of patients being admitted after rupture) and an under-equipped neonatal resuscitation structure are believed to be the cause of this high rate of stillbirths in developing countries.

Conclusion

Uterine rupture is a devastating condition that carries grave risks to the newborn and the mother as well. Uterine rupture is an obstetric condition with catastrophic consequences. The resulting high perinatal mortality suggests a synergy of action between political decision-makers, health caregivers and the community itself to promote antenatal care, family planning, to improve the health system through periodic refresher courses. Likewise, the provision of medical transport at each health center is necessary to speed up medical referrals, in order to eliminate delays in management.

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