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Original Research Article

## Epidemiological profile, maternal and neonatal issue of uterine rupture at the Befelatanana Obstetrics and Gynecology University Hospital

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### ABSTRACT

**Background:** Uterine rupture is an obstetric emergency. It involves the life of the mother and the fetus. The main objective of this study was to describe the epidemiological-clinical profile of uterine rupture in Befelatanana Obstetrics and Gynecology University Hospital from January 2016 to April 2018.

**Methods:** This is a retrospective and descriptive study conducted from January 1, 2016 to April 30, 2018 at the Befelatanana Hospital Centre of Gynecology-Obstetrics. All pregnant patients with uterine rupture were included.

**Results:** We recorded 35 cases of uterine rupture in 13184 deliveries with a prevalence of 2.65%. The average age was 27.69±6.21 years old. More than half of the pregnant women attended at least four prenatal care consultations. Uterine rupture occurred after a vaginal delivery attempt outside the centre in 62.86%. There were 77.14% cases occurring on non-scarred uterus and 14.29% on mechanical dystocia. A case of fetal macrosomia has been reported. There were 28.57% maternal deaths and 51.43% perinatal deaths, half of which were fetal deaths in utero and the other half were early neonatal deaths.

**Conclusions:** Uterine rupture remains high in Madagascar. Quality antenatal care and training of the personal would be needed.

**Keywords:** Epidemiology, Maternal mortality, Perinatal mortality, Uterine rupture

### INTRODUCTION

Uterine rupture is defined as a solution of continuity of the uterine wall that occurs during pregnancy or labour. It corresponds to two different prognosis entities: the complete uterine rupture affects all the tissue layers of the uterine wall, including the peritoneal serosa (peritoneum, myometrium and endometrium). In contrast to incomplete uterine rupture (or subserous), often referred to a dehiscence uterus, it only concerns the endometrium

and the myometrium and respects the visceral peritoneum.<sup>1</sup>

The prevalence of uterine rupture tends to decrease in developed countries with a frequency of 1% delivery.<sup>2</sup> However, this major obstetric and surgical emergency still has a high rate in developing countries. In Nigeria, in 2010, the prevalence of uterine rupture was 11.6%.<sup>3</sup> In developed countries, uterine rupture mostly occurs on the scarred uterus. In developing countries, it is often

associated with obstructed labor, lack of prenatal care, high multi-parity, poor socio-economic status, illiteracy, distracted pelvis, congenital abnormality and insufficient access to obstetric care emergency.<sup>4,5</sup> In Madagascar, maternal and neonatal mortality remains high. Uterine rupture is one of the main causes. Our centre is the national reference in Obstetrics Gynecology with 7,000 deliveries per year. This allows us to analyze maternal fetal complications related to uterine rupture.

Through this study, we want to know the prevalence, the socio-demographic characteristics and the maternal and neonatal issue of patients with uterine rupture at the Befelatanana University Hospital of Gynecology and Obstetrics.

## METHODS

This is a retrospective and descriptive study conducted between January 2016 and April 2018 in the Befelatanana University Hospital of Gynecology and Obstetrics (BUHGO). It is a reference hospital in the capital and its surroundings in the Gynecology and Obstetrics field. The study includes all cases of uterine rupture admitted to BUHGO from 22 weeks of amenorrhea regardless of the route of delivery. Uterine rupture in patients who died before admission was excluded from this study. The data was collected by consulting the medical records, the operating theater and admission registers.

The searched maternal parameters were the following: age, gestation, parity, distance between the residence and BUHGO, the number of prenatal care consultations. Concerning obstetric parameters, the following data were studied: delivery interval, previous cesarean section, labor time, attempted vaginal delivery in the out-of-city, whether on the scarred uterus or not, and the use of oxytocin. Finally, we looked at both maternal and fetal morbidity and mortality. The maternal complications searched were: hysterectomy, bladder injury, postpartum hemorrhage and maternal death. Regarding fetal morbidity, the following items were searched: occurrence of FDIU, neonatal asphyxia, transfer to the neonatology department and postnatal death.

We used Microsoft Excel 2013 software for statistical analysis of the results.

## RESULTS

During the study period, we had 13,184 deliveries at BUHGO. Among these, 35 patients were diagnosed with uterine rupture, which represented 2.65% of deliveries.

The average age of the onset of uterine rupture was  $27.69 \pm 6.21$  years. There were two cases of uterine rupture occurring in adolescent girls and 3 cases in older parturients aged over 35. The average parity of the patients was  $2.34 \pm 1.23$ . Uterine ruptures occurred on primiparous women in 22.86%. There were two cases of

uterine rupture in multiparas. More than half of the cases of uterine rupture occurred in patients living near to the centre, with a distance of less than 15 kilometers. The average distance was  $17.31 \pm 16.21$  km ranging from 1.5 to 65.1 km. On average, the number of antenatal visits (ANC) was  $3.17 \pm 1.90$ . There were 34.29% of patients who performed less than four ANCs, including 14.29% without any ANC. Patients working in the primary sector are predominant, with a rate of 37.14% (Table 1).

**Table 1: Maternal characteristics.**

Variables	Number	Percentage	
Age	<18 years	2	5.71
	18- 35 years	30	85.71
	>35 years	3	8.57
Parity	1	8	22.86
	2-4	25	71.43
	> 4	2	5.71
Distance from hospital (km)	$\leq 15$	22	62.86
	16-29	7	20
	$\geq 30$	6	17.14
Number of prenatal consultation	0	5	14.29
	<4	12	34.29
	$\geq 4$	18	51.43

**Table 2: Distribution of patients by history of previous cesarean section.**

Variables	Number	Percentage	
Gestational age (Weeks of amenorrhea)	<37	7	20
	37-41	26	74.29
	>41	2	5.71
Number of previous cesarian section scar	0	27	77.14
	1	6	17.14
	2	2	5.71
Inter-delivery interval (month)	12-23	7	20
	24-60	22	62.86
	>60	6	17.14
Vaginal birth attempting in a peripheral hospital or traditional birth attendants	Pelvic disproportion	7	14.29
	Normal pelvic	15	42.86
	Scared uterus	5	14.29
Duration of labour (h)	<12	17	48.57
	>12	18	51.43
Use of oxytocic drugs	Cephalic anterior	15	42.86
	Céphalic posterior	11	31.43
	Shoulder	8	22.86
	Breech	1	2.86

The incidence of uterine rupture on unscarred uterus was 77.14%. The average gestational age of the onset of uterine rupture was  $37.71 \pm 3.09$  weeks of amenorrhea (WA) with one case at 24 WA (the minimum) and a case

at 42 WA (maximum). On average, patients had  $43.03 \pm 30.17$  months of delivery interval, of which 17.29% in less than 24 months. Patients were referred after a failed attempt to deliver by vaginal route outside the centre with a rate of 62.86%. Seven cases were in contracted pelvis and five cases of attempted of vaginal route delivery outside the hospital. Prolonged labor was associated with uterine rupture in 51.43% of the cases. There was a case of uterine rupture on breech presentation associated with fetal macrosomia. The shoulder presentation was found in 22.86% (Table 2).

**Table 3: Maternal outcomes.**

Variables	Number	Percentage	
Site of rupture (n=32)	Lower segment	17	53.13
	Anterior wall	7	21.87
	Posterior wall	8	25
	Extension to lateral wall with uterine artery section	12	34.29
Incomplete uterine rupture	20	57.14	
Complete uterine rupture	15	42.86	
Hysterectomy	11	31.43	
Postpartum hemorrhage	17	48.57	
Maternal death	10	28.57	

Regarding the type of uterine rupture, almost half of the cases were complete uterine rupture with a rate of 42.86%. Uterine rupture was complicated by postpartum hemorrhage in 48.57%. The uterine artery was affected in 34.29%. Hemostasis ended with hysterectomy in 31.43% of cases. The maternal mortality rate for uterine rupture was 28.57% (Table 3).

**Table 4: Neonatal outcomes.**

Variables	Number	Percentage
Transfer to NICU	19	54.29
Perinatal death	18	51.43
Intra-uterine fetal death	9	25.71
Precoce neonatal death	9	25.71

The average birth weight was  $2974 \pm 504$ g. Only one case was macrosomia. In more than half of the cases, a rate of 54.29%, babies were transferred to the neonatology intensive unit care. There were 51.43% perinatal deaths, half of which were fetal deaths in utero and the other half were early postnatal deaths (Table 4).

## DISCUSSION

In present study, we had a prevalence of uterine rupture of 2.65%. Eze and al. found 11.6% in Nigeria.<sup>3</sup> In Ethiopia, this rate is much higher (0.3%-2.4%).<sup>6</sup> Jain and al has found a frequency of 0.84% in India.<sup>7</sup> On the other hand, this rate largely exceeds studies conducted in Taiwan (0.017%).<sup>8</sup> Present result tends to match those of the developed countries whose prevalence is 1% according to Desai and al.<sup>2</sup> This could be explained by

the underestimation of the accurate number of cases of the uterine rupture because of cases not recorded in the centre or died before admission. We only recorded uterine rupture after 22 weeks. In our context, cases of uterine rupture were preventable if the patient's care was correct. 14% of the generally contracted pelvis who had attempted to deliver vaginal route at home was observed. Dystocic presentations were poorly managed, with cross-sectional presentation observed in 24% of cases. These patients should have had a scheduled cesarean section. An attempt to deliver by vaginal route would be life-threatening. Prenatal care follow-up and identification of risk factors for uterine rupture should be mandatory. A scheduled cesarean section would prevent the occurrence of uterine rupture.

The average maternal age was  $27.69 \pm 6.21$  years old in present study. In Israel and Ethiopia, the age of the onset of uterine rupture was similar.<sup>6,9</sup> In the literature, age is not associated with the occurrence of uterine rupture.<sup>10,11</sup>

In three-quarters of the cases, the patients were pauciparous. Ofir et al had observed that uterine rupture mainly developed in pauciparous patients.<sup>9</sup> Indeed, these patients have a history of scarred uterus. For some studies, uterine rupture most often occurred in multiparas especially for incomplete uterine rupture. It is reported that the uterus of multiparas is fragile.<sup>12</sup> In contrast to the literature, present study showed a rate of 22.86% uterine ruptures occurring in primiparous women, that is to say 6 per 10,000 deliveries, of which three cases were objectified as contracted pelvis. According to Sweeten and al., the prevalence in developed countries is 1 per 10,000 deliveries.<sup>13</sup> This big difference could be related to the lack of the evaluation of maternal pelvis during prenatal care consultations.

In present study population, 62.86% lived near to the reference centre, so with access to care. Unlikely to Workie and al in Canada, where uterine rupture occurred among women living in more distant rural areas in 94.2%.<sup>6</sup> The prevalence of traditional delivery practices (by matrons) in Madagascar may explain this difference. Some patients only come to the hospital in case of complications.

In 51.43%, patients in present study had 4 or more antenatal care consultations. In the literature, according to Kadowa and al. in Uganda, 67% of the cases of uterine rupture occurred in patients who had an insufficient number of prenatal care consultations.<sup>14</sup> This would mean that the quality of PNC services is to be improved in Madagascar.

In present study, the uterine rupture rate on non-scarred uterus was 77.14%. It is contradiction to what the literature reports. Gibbins and al. in the USA, Kwee in the Netherlands found respectively 4.54% and 7.1% of uterine ruptures occurring on healthy uterus.<sup>15,16</sup> In Taiwan, Wang reported a 48% of uterine rupture rate

with a history of Cesarean section.<sup>8</sup> Indeed, patients with a history of cesarean section have a higher risk of uterine rupture (OR = 6-13,60).<sup>6,9</sup> This disparity could be explained by the delay of reference to patients after attempted vaginal route delivery outside the hospital, knowing that we found that this situation is responsible for 62.86% of uterine rupture.

In the literature as in present study, prolonged labour is found in most cases of uterine rupture. The rate is 51.43% in present study. Eze et al in Nigeria found 88.2%<sup>3</sup> and Workie and al in Canada, 76.2%.<sup>6</sup> In present case, it is mainly because of the predominance of the referred cases.

From our practice, emergency laparotomy will be performed as soon as the diagnosis is suspected. The type of intervention will depend on maternal hemodynamic status, topography of rupture, parity and extent of injury. If conservative treatment has been performed, a cesarean will be performed routinely for the next pregnancy. Our therapeutic attitude is identical to that of Wang in Thailand.<sup>8</sup> We had a hysterectomy rate of 31%. This is higher than Wang's (10%) in Taiwan, Ofir in Israel, Jain in India found a similar result (31.7%).<sup>7-9</sup> it shows the hemodynamic instability of our patients at the time of the discovery of uterine rupture. In fact, half of our patients had a state of shock at admission. For some authors, hysterectomy was the main treatment.<sup>17,18</sup> In Ethiopia, hysterectomy was performed in 75% of the cases. Among the patients, 38% were in hypovolemic shock.<sup>19</sup>

In present study, as in some developing countries, uterine rupture still leads to high maternal mortality. This rate is 28.57% in our case. Umeora and al in Nigeria found 38%.<sup>20</sup> In India, this rate was between 2.2-6.89%.<sup>7,17</sup> In developed countries, maternal mortality is almost nil.<sup>9,21,22</sup> The reference delay could still explain this high rate. Patients are seen in the hemorrhagic shock stage in most cases.

The perinatal mortality rate was 51.43% in present study. This is lower than the literature data with a 94.7% fetal death rate in India in 2011 according to Gupta and al.<sup>23</sup> Jain and al found 82.6% of deaths in utero.<sup>7</sup> In this study, more than half was an incomplete rupture and serous. The fetus was not directly intra-abdominal. These incomplete uterine ruptures are often better prognosis; Beck found a frequency of 96.25% complete uterine rupture with 97.5% fetal loss rate.<sup>1,18</sup> In contrast, Zeteroglu and al found only 65% complete uterine rupture. In this same study, the fetal mortality rate was 28.6% for incomplete form versus 38.5% for complete rupture. But this difference is not significant.<sup>24</sup> Guiliano and al, found no significant difference between the two groups. In contrast, the fetal deaths reported were in the complete rupture group.<sup>25</sup>

Uterine rupture is still a public health problem in Madagascar. It is a source of high maternal-fetal mortality. Its prevalence remains high despite access to

healthcare. The prevalence of traditional delivery practices is one of the likely causes of uterine rupture. Updating the knowledge of the antenatal consultation care providers would also be necessary.

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