

DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20150696>

Research Article

Management and prognosis of uterine rupture during labor in an under-medicalized country: about 513 cases collected at the Cocody University Hospital Center (Abidjan-Cote d'Ivoire)

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Received: 27 August 2015

Accepted: 09 September 2015

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ABSTRACT

Background: Even today, uterine rupture is necessary as an indicator of health status in developing countries, like Cote d'Ivoire. The objective of this study was to describe the factors influencing the management and the prognosis of this pathology in a level III maternity of a third world country.

Methods: The study was made in Cocody University Hospital Center (Abidjan-Cote d'Ivoire). A retrospective descriptive study of all women with ruptured uterus during labor managed between January 2002 and December 2014 was conducted. It covered 513 cases of uterine ruptures collected in 13 years.

Results: The overall incidence of uterine ruptures was 0.95% or 1 in 105 deliveries. Most cases occurred in women with unscarred uterus (76.8%) and 23.2% of women had a scarred uterus. Surgical treatment was radical by hysterectomy in 35.3% of all women. Treatment was more conservative by uterine suture in women from the communes of Abidjan and its suburbs (71%) versus 25% of women who came from inland towns ($p=0.000$). Maternal mortality rate was 5.8% and was significantly influenced by the type of surgery ($p=0.000$), by the time of uterine rupture ($p=0.000$) and by the transportation distance ($p=0.000$). Fetal mortality was 94.1% for all women.

Conclusions: Uterine rupture still poses a major public health problem in under-developed countries. The multiplication of obstetric surgical units but also the availability of blood products and the effectiveness of free care will be a vital contribution to effectively and sustainably improve the prognosis of this serious pathology when just constituted.

Keywords: Obstetric labor complications, Uterine rupture, Hemostatic hysterectomy

INTRODUCTION

Uterine rupture (UR) is a paroxysmal obstetric labor complication that can lead to severe prognosis for the mother and her child if not immediately diagnosed and treated. It is much rarer in developed countries and it is observed there more often on scarred uterus.¹ But in sub-Saharan Africa and others under-developed countries, it is still a major public health problem, mostly observing during parturition on unscarred uterus.^{2,3} It has therefore

become imperative to master the various factors that may delay its care and cause obstetric drama. Indeed uterine rupture is rarely spontaneous, rarely without signs of pre-rupture and exceptional without risk factors and these risk factors are well known in the African context.^{4,7} In reality this aspect of the pathology should allow effective preventive care. However in a sub-Saharan African region weakened by wars, by the unfavorable socio-economic conditions, by illiteracy and especially by the under medicalization, "it appears that a significant

proportion of pregnant will always escape to this prevention." If prevention has failed and that uterine rupture occurred, its management in terms of quality should be able to improve maternal and fetal prognosis.

The general objective of this study was to contribute to reduce perinatal mortality by optimizing the management of parturition. The specific objectives were to analyze the surgical management of uterine rupture in a level III maternity hospital in a third world country like our country by presenting the case of our service, to describe the factors influencing this management and to assess its impact on the maternal and fetal prognosis.

METHODS

We conducted a retrospective descriptive study over a period of thirteen years in the University Hospital Center of Cocody (UHCC) in Abidjan-Cote d'Ivoire, from January 2002 to December 2014. During this period, 513 Women having uterine rupture during labor were identified. In Abidjan, economic capital of our country numbering about 4 million people, there are three level III maternities which the UHCC. The UHCC aims to receive and manage all gynecological and obstetric emergencies in the northern sector of Abidjan (about 22 maternity hospitals and peripheral health centers) and surrounding towns within a radius of about 200 kilometers.

For each woman, an epidemiological sheet was elaborated. In the study, keys factors studied include women characteristics (origin, mode of admission, uterine antecedent, and moment of the uterine rupture), surgical modalities depending on the transportation distance, delay between admission and surgical care and the feto-maternal prognosis. Statistical analysis of the studied variables was compared using the Chi-square test and Fisher's exact test, the result being significant for $p < 5\%$.

RESULTS

Frequency of uterine rupture

From January 2002 to December 2014, over of a period of 13 years, there were recorded 53,639 deliveries (all deliveries) in our department which 513 were complicated of uterine ruptures. The overall incidence of uterine rupture over this period was then 0.95%; or 39 uterine ruptures per year or 1 in 105 deliveries.

Women characteristics

Origin and mode of admission

Most of parturients came from the districts of Abidjan (76.2%). Seventy one (71) parturients (13.9%) had been transported from more than 50 kms to access our service.

Depending on their mode of admission, the parturients came by themselves accounted for 8.7% ($n = 45$) and were evacuated in 91.3% of cases ($n = 468$). Among the evacuated women, 25% ($n = 128$) were in shock at admission, including 50 of 71 (or 70%) women who came from the inland cities (Table 1).

Uterine antecedent and moment of uterine rupture

In total, about 513 parturients having ruptured uterus, 119 (23.2%) had a scarred uterus and 394 (76.8%) had a unscarred uterus.

The majority of women, or 72.9% ($n = 374$), had ruptured their uterus in our maternity versus 27.1% ($n = 139$) who had ruptured outside our service before admission. For uterine ruptures occurred in our unit, there was no significant difference between the rate of unscarred and scarred uterus (27.7% vs 25.5 %, $p=0.681$) (Table 2).

The 71 parturients evacuated from inland cities have all ruptured their uterus before admission to our unit.

Specials features of management

Surgical treatment was radical by hysterectomy in 35.3% of cases ($n = 181$) and conservative by uterine suture in 64.7% of cases ($n = 332$). The treatment was more conservative in women from the communes of Abidjan and its suburbs (71%) versus 25.3% of women who came from inland towns ($p = 0.000$) (Table 3).

Gestures associated with treatment: bilateral tubal ligation resection in 51 women (9.9%) and 5 suture of the bladder (0.9%), ligation of the internal iliac arteries in 24% of cases ($n = 123$), ureteral anastomosis end to end in 7 cases (1.3 %). Blood transfusion has affected 95% of parturients ($n=487$) of which 100% of patients from the inland cities and 87% of parturients from Abidjan and suburbs.

The "operative indication-surgery" average time was 135 minutes (2h15) with extremes of 23mn and 895mn (14h55mn). Among 443 women or 86.4%, surgery was made more than 60 minutes after the surgical indication.

The surgical kit has been honored by the parents in 41.8% of cases ($n = 214$) and provided by the administration of UHCC in 58.2% of cases ($n = 299$). The operating room was not available in 57.06% of cases while the operating kit was available.

Materno-fetal prognosis

Maternal Prognosis

Maternal death rate was 5.8%, or 30 deaths. There were fewer deaths for the conservative treatment (7/332) or 2.1% versus 12.7% or (23/181) for radical treatment ($p = 0,000$).

Table 1: Parturients' origin, transportation distance and mode of admission.

Parturients' origin	Transportation distance (kms)	Mode of admission				Total	
		Evacuated		Non- evacuated		n	%
		n	%	n	%		
Abidjan' municipalities	≤ 20	360	70.2	31	6	391	76.2
Abidjan' suburbs	20-50	37	7.2	14	2.7	51	9.9
Inland towns	>50	71	13.9	-	-	71	13.9
Total		468	91.3	45	8.7	513	100

Table 2: Unscarred and scarred uterus and place of uterine rupture.

Place of uterine rupture	Unscarred uterus		Scarred uterus		Total	
	n	%	n	%	n	%
Outside UHCC	109	27.7	30	25.5	139	27.1
In UHCC	285	72.3	89	74.8	374	72.9
Total	394	100	119	100	513	100

Tables 4 and 5 summarize the influence of the moment of uterine rupture and the transportation distance on the maternal prognosis. It was noted fewer deaths in the group of women in labor whose rupture occurred in our unit (2.4%) versus 15.1% for those whose rupture occurred outside (p = 0.000) (Table 4).

Table 3: Women's origin and surgical care.

Surgery	Women's origin				Total	
	Abidjan and suburbs		Inland towns		n	%
	n	%	n	%		
Hysterectomy	128	29	53	74.7	181	35.3
Rent repair	314	71	18	25.3	332	64.7
Total	442	100	71	100	513	100

Maternal death rate increased from 2.3% before 20 kms distance of transportation to 18.3% beyond 50 kms with a significant difference (p = 0.000) (Table 5). The identified causes of maternal death were: 11 cases of hemorrhage, 3 anesthetic accidents, 7 cases of postoperative persistent anemia and 9 cases of severe infection (postoperative peritonitis).

Fetal prognosis

There were a total of 529 newborns from 8 twin pregnancies, 2 triple pregnancies and 507 singleton

pregnancies. Of the 529 newborns, 498 or 94.1% died, 31 newborns remained alive.

Table 4: Influence of the place of uterine rupture on maternal prognosis.

	Place of uterine rupture		Total
	In UHCC	Outside UHCC	
Number of women	374	139	513
Deaths	9	21	30
Death rate (%)	2.4	15.1	5.84

Table 5: Influence of transportation distance on maternal prognosis.

Transportation distance (kms)	Number of parturients	Deaths	Death rate (%)
<20 km	391	9	2.3
20-50 km	51	8	15.6
>50 km	71	13	18.5

DISCUSSION

Frequency

The frequency of uterine rupture is variable and the reasons for this variability are numerous. Indeed the analysis and observation protocols are different: some establish this frequency over the number of caesarean and other relative to the number of delivery. But also it is important to clarify that the definition of uterine rupture may be responsible for variation in a study to another: some authors consider only the complete uterine rupture; others also include incomplete ruptured forms. Some studies are only about women with scarred uterus, others about unscarred uterus and/or both, and finally during pregnancy and / or during obstetric labor.⁸⁻¹¹

A review of the literature, however, indicates that in developed countries, the incidence of uterine rupture is less than 0.1% of all births and increases significantly in women with a previous caesarean section but remains between 0.2 and 0.8%.^{7,12-14} These low rates in developed countries are linked to the organization of maternities networks by enabling rapid transfer, early and optimal management of dystocia.¹

Growing poverty in developing countries and their populations, the lower level of medical supervision, accumulation and persistence of uterine risk factors seem to be major factors in the significant elevation of uterine rupture frequency. The literature of black sub-Saharan Africa shows that over the past decade, the incidence of uterine rupture varies between 0.3% and 2.44%.^{2,3,15-17} The frequency observed in our service, reflecting developing countries' statistics is 0.95% of all deliveries with a majority of unscarred uterine rupture (76.8%).

Given the literature, the incidence of uterine rupture is inversely proportional to the stage of development of a country. The variability of uterine rupture rate in African countries result from the same source of data, usually hospital, in reference centers at different levels of recruitment. In addition, the lack of health coverage, combined with the low density of management boards, reflects the low level of prevention of this complication. However the introduction of obstetric and neonatal emergencies care and free of certain services in the field of reproductive health (contraception, prenatal care, delivery and cesarean section) in most developing countries gives a real ray of hope to the significant reduction of obstetric complications in the coming years.

Management

The treatment of uterine rupture is surgical in order hemostatic purpose framed by hematological, fluid and electrolyte resuscitation. The therapeutic abstention difficult to observe in our context, is an option possible under cover of a very close monitoring of postpartum bleeding; in particular cases of dehiscence of asymptomatic segmental caesarean scar (or bleeding or pain, good uterine retraction) discovered after a uterus revision.

In this study, treatment was more conservative than radical (64.7% against 35.3%), as in many African studies with uterine conservation rate from 60% to 91%.^{2,3,17} But some authors have reported a more radical than conservative treatment with hysterectomy rates of up to 78%.⁶

In general, the type of surgical care, radical or conservative with or without tubal ligations considers many factors that underlie the disparities in uterine conservation rates observed in different studies.^{1,2,10,16,18}

In our study, the treatment was more radical in the parturients came from inland cities (75%) against 29% for parturients came from Abidjan and suburbs with a significant difference. Indeed, these parturients came from inland towns were all evacuated and they have been transported more than 50 kms to access our service, bloodless in the majority of cases (100% blood transfusion in this group, 70% in shock at admission), with local aged lesions and a sphacelus uterus or marked by significant dilacerations. They had a precarious hemodynamic status in a service where we noted a chronic lack in blood and derivatives and where the average time of the effectiveness of the surgery was 2h15mn. This waiting period could sometimes reach 14h because the acquisition of surgical emergency kit was very difficult (only 41.85% of the parents were able to honor their kits) and because the emergency operation room that was one at the time could be unavailable (57.06%) for already busy despite the availability of surgical kits. The hemostatic hysterectomy in these conditions was deemed necessary and should be practiced early before it installs major bleeding disorders. Also the efficiency of the management of these patients in intensive care requires perfect hemostasis. When uterine conservation opportunities exist, a simple uterus suture was practiced with tubal ligations in some cases because of the extreme fragility of the uterus.

Maternal and fetal prognosis

The maternal mortality was 5.8%. This is a very high rate but lower than most sub-Saharan African Studies.^{3,6,11,15,18} In Africa, the Maghreb, more medicalized, offers a better prognosis with case fatality rates of between 2.4% and 4.10% and in countries with high socio-economic level, maternal mortality is estimated at less than 1% of uterine rupture.^{2,19} In our study, maternal prognosis was significantly influenced by the moment of uterine rupture (Table 4) and by the transportation distance (Table 5). In this study, the majority of parturients have ruptured their uterus after admission to UHCC (91.2% versus 8.8%). This sad fact that is probably not due to the quality of care at UHCC is mostly secondary to abusive and too late evacuations of parturients, already about to rupture. These excessive admissions result in long waiting hours and pose the problem of re-evacuation or evacuation of a level III structure to other medical centers. These parturients have often ruptured even before the start of their obstetric management or pending emergency caesarean kit. This is related to an inconsistency in the current reference-use system and that any delay at this level has a dramatic impact.^{2,5-7,18} However it was found less maternal death in the group of women in labor who ruptured in our unit (2.4% versus 15.1% for ruptures out UHCC, $p = 0.000$). The management of women who ruptured at UHUC seems easier because it is generally an incomplete uterine rupture or recent ruptures with limited lesions, explaining a less severe maternal prognosis among these parturients. But also beyond 20 kms of transportation distance before admission to our unit, the

maternal mortality rate was multiplied by 7. So a transportation distance of up to 20 kms could be considered as a safety perimeter, beyond which the emergency medical evacuation will be associated constantly with darker maternal and fetal prognosis. Then a harmonious distribution of obstetric and surgical units in the country should take into account this distance.

The prognosis was also influenced by the type of treatment because more deaths were noted in the group of hysterectomies versus uterine conservation (12.7% versus 2.1%, $p = 0.000$) mainly due to the combination of more severe lesions in hysterectomies. Besides these factors, the prognosis was also influenced by the conditions of admission of our patients (25% evacuated in shock), so by the late admission, by the inadequate resuscitation equipment, and by the constant lack of blood products and derivatives. This maternal mortality remains high throughout black sub-Saharan Africa.^{3,6,15,17} The identified causes of maternal death in this study included bleeding, persistent anemia and infection, secondary to poor compensation of blood loss, the aseptic faults in extreme emergency, then to the noncompliance antibiotic related to poverty of our patients.

Fetal outcome was catastrophic in all. About 529 newborns, 498 or 94.1% died. The thirty one living newborns are from women who came from themselves from suburban municipalities of Abidjan and whose rupture was diagnosed after delivery. These were the cases of uterine recent rupture or uterine rupture discovered after uterine revision in the postpartum immediate period. This dark fetal prognosis is associated with delayed care, the inadequate resuscitation of newborns, confirming the general trend noted in African literature.^{3,6,11,19,20}

CONCLUSIONS

Uterine rupture still poses a public health problem in developing countries. The prognosis remains still dark. However it is a preventable disease because risk factors in our context and means of prevention are well known. The proliferation of obstetric surgical units well distributed on the territory with a qualified human resource and conscious but also the availability of blood products and the effectiveness of free care will be a vital contribution to effectively and sustainably improve the prognosis of this serious condition if just constituted.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Loue VA, Dia JM, Effoh DN, Adjoby RC, Konan JK, Gbary EA, Abauleth RY, Kouakou F, Boni SE. Management and prognosis of uterine rupture during labor in an under-medicalized country: about 513 cases collected at the Cocody University Hospital Center (Abidjan-Cote d'Ivoire). *Int J Reprod Contracept Obstet Gynecol* 2015;4:1277-82.