

Risk Factors for Uterine Rupture in Suhul General Hospital Case Control Study

Solomon Gebre^{1,*}, Ataklti Negassi²

1 Meary General Hospital, Emergency Surgical Department, Dansha, West Tigray, Ethiopia

2 Mygaba Primary Health Unit, Emergency Surgical Department, Mygaba, West Tigray, Ethiopia

*Corresponding author. Tel: +251911366834; E-mail: solomunika@yahoo.com

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Research Article

Abstract

Background: Uterine rupture refers to the complete nonsurgical disruption of all uterine layers. This obstetrics hazard is also associated with short term maternal morbidities such as bladder rupture, foot drop, psychological trauma, anemia and infertility and neonatal morbidity and mortality. The common risk factors include CPD, malpresentation, previous C/S, obstructed labor, retained second twin and hydrocephalus.

Aim: The objective of this study were to assess the risk factors contribute for ruptured uterus at Suhul general hospital, northwest Tigray, Ethiopia.

Method: This is a case control study over the period of five year from 2009 to 2014.

Findings: The main risk factors of uterine rupture were distance >10 km increased risk of rupture fivefold compared to mothers who live <10 km (AOR 4.9 95% CI 1.8 13.5). Obstructed labor increased the risk of rupture by 4 fold compared to control group with no Obstructed labor (AOR 4.4 95% CI 1.4 13.5). Lack of ANC is significantly associated with uterine rupture compared to mothers who have ANC follow up (AOR 37.8 95% CI 10.4 137) and labor duration above 18 h increase risk of rupture by tenfold compared to labor duration <18 h (AOR 10.595% CI 3.8 29). Instrumental delivery found to increase the risk of uterine rupture eight times compared to control delivered without instrument (AOR1.02 95% CI 1.02 67.8). Hydrocephalus and retained second twin are also associated with risk of getting uterine rupture significantly compared to controls with no hydrocephalus and retained twin. In our study risk factors like distance >10 km from hospital, Lack of ANC and partograph, Labor duration above 18 h, obstructed labor, instrumental delivery, hydrocephalus and retained second twin are identified for uterine rupture.

Conclusion: Distance above 10 km from hospital, Lack of ANC and partograph, Labor duration above 18 h, obstructed labor, instrumental delivery,

hydrocephalus and neglected retained second twin are identified as risk factor for uterine rupture.

Keywords: Ruptured uterus; Tigray; Ethiopia.

1. Introduction

Uterine rupture refers to the complete nonsurgical disruption of all uterine layers the terms “uterine dehiscence” and “incomplete uterine rupture” are often used to describe the latter type of disruption [1]. The prevalence of uterine rupture reported was lower for community-based (median 0.053, range 0.016-0.30%) than for facility-based studies (0.31, 0.012–2.9%). The prevalence tended to be lower for developed than the less or least developed countries [2].

Rupture of previously unscarred uterus is usually catastrophic event resulting death of the baby, and maternal death due to blood loss. This obstetrics hazard is also associated with short term maternal morbidities such as bladder rupture, foot drop, psychological trauma, anemia and infertility [2,3].

Ethiopia is one of the less developed countries where maternal and prenatal mortality rates are still very high. The maternal mortality ratio in Ethiopia is one of the highest in sub-Saharan African, 676/100,000 deaths per live births according to 2011 DHS Data and the prenatal mortality is also high [4-6].

Maternal mortality due to uterine rupture is increasing except in two studies conducted in TAH and ambo hospital [7].

Over all uterine rupture is less prevalence but it is associated with catastrophic condition on fetal and maternal outcome. In many studies show socio-demographic condition like age, residence obstetric factor like parity, CPD malpresentation and other labor and delivery factors are associated with rupture of uterus. The most significant risk factor is a trial of labor after a prior caesarean delivery, induction of labor, multiple prior caesarean deliveries maternal age, multiparty, malpresentation, obstructed labor, multiple gestation, mid- to high-operative vaginal delivery, trauma, inter-delivery interval less than 18 months and one-layer closure of a prior uterine incision [8-10].

2. Materials and Method

2.1 Study period and study design

This analysis was done using data from one teaching hospital in Tigray regional state Ethiopia (Suhul General Hospital in northern Ethiopia) from 2009 to 2014. During this period there were a 5622 total number of vaginal deliveries and 93 mothers with ruptured uterus. A retrospective case control study design was used.

2.2 Sampling technique

All cases of uterine rupture in the 5 year of study period had been counted it was 93 cases and for 1 case of uterine rupture 4 controls was included which is 372 controls. Controls are sampled by systemic random sampling method. The sampling interval (k) was determined by dividing the total number of vaginal deliveries (5622) to the sample size of the study (93). Any number between 1 and 15 was randomly selected. Every 15th sample from the sampling frame was selected and included in the study from table registration book.

2.3 Data collection and quality control

The data extraction tool was prepared after referring different studies conducted in different countries and it was prepared based on their finding. Information on the patients socio-demographic like age, estimated distance of residence to hospital, obstetric history like gravidity, gestational age, ANC follow up, previous obstetric history and labor CPD, malpresentation, fetal weight, fetal hydrocephalus, retained twin, instrumental delivery and use of Oxytocin was included. The data collectors were M.Sc. 2nd year students who were trained to collect data from women's obstetric files or charts and to validate the data of diagnosed of uterine rupture using admission, delivery and theatre registers. Validity of the data was reassured by cross checking the filled check list and patient file.

2.4 Data processing and analysis

The collected data was checked, coded and entered and analyzed using SPSS version 20 software. Out of the 93 cases, 9 cases (9.6%) from the data were rejected. Out of the 9 patients 5 patients (5.3%) had insufficient information and remaining 4 (4.3%) had lost their patient cards. From the control group 34 cases (9.6%) were rejected due to incomplete

information. Finally 84 cases with 338 controls were used for study.

2.5. Logistic regression

All variable were analyzed by bivariate regression to identify the candidate by using p value and cruds odds ratio to be analyzed for multivariate logistic regression. Multivariate logistic regression was used to establish the strength of association between risk factor and uterine rupture. All association presented as adjusted odds ratio with 95% confidence interval. Adjusted Odds ratio greater than 1 represents increase risk of uterine rupture, less than 1 represent protective and adjusted odds ratio equal to one represent that have no association with p value above 0.05.

3. Results and Discussion

3.1 Socio-demographic data

The mean age of case and control subjects was 28.5 ± 5.7 and 25.1 ± 5.7, respectively. In this study Only 4 subjects (4.8 %) of Age less than 20 year had uterine rupture compared to 88 (26%) control. Seventy-five (89.3%) mothers develop uterine rupture who live 10 km far from Suhul hospital found having an association compared to control 156 (46.2) (p0.00). according to controls only 96 (28.4) live 10 km far from Suhul General Hospital the rest are live within 10 km of the Hospital (Table 1).

3.2 Obstetric condition

Grand multiparas 70 (83.3%) and mothers who have no ANC follow up 76 (90.5%) are associated with uterine rupture when compared with control (p 0.007 and 0.001), respectively.

11 (13.1%) Mothers who had previous history C/S found to have uterine rupture and association has found between uterine rupture and history of C/S when it is compared to controls (P, 0.01) (Table 2).

3.3 Labor and delivery

Mothers who had been stayed in labor for more than 18 hours 56 (66.6%) are associated with uterine rupture when compared to control mothers (P 0.001) and compared to control group 80 (95%). Cephalo pelvic disproportion 34 (40.5%), malpresentation 22 (26.2%) and obstructed labor are associated with uterine rupture when they compared to controls (P 0.000, 0.001 and 0.000), respectively (Table 3).

Table 1. Sociodemographic, obstetric history and its association.

Variables	Value of Variables	Case		Control		OR	COR At 95% CI	P-value
		Frequency	%	Frequency	%			
Age	<20	4	4.8	88	26	1		
	21-35	35	41.6	222	65.7	0.2	0.1, 0.8	0.02
	Above 35	45	53.6	28	8.3	0.02	0.01, 0.08	0.00
Distance	<10 km	21	25	242	71.6	0.1	0.07, 0.2	0.00
	>10 km	63	75	96	28.4	7.5	4.3, 13.2	

Table 2. Labor condition and its association.

Variables	Value	Case		Control		OR	COR at 95% CI	P value
		Count	%	Count	%			
Gravidity	1-5	43	51.2	282	83.4	0.1	0.1, 0.3	0.007
	Above 5	41	48.8	56	16.6	5.2	3.1, 8.8	0.007
GA	Preterm	2	2.4	8	2.4	0.8	0.05,11.2	
	Term	81	96.4	325	96.2	0.09	0, 6.9	
	post term	1	1.2	5	1.5			
ANC	Yes	8	9.5	261	77.2	0.03	0.01, 0.06	0.00
	No	76	90.5	77	22.8	32	14, 69	
Previous C/S	Yes	11	13.1	17	5	2.8	1.2, 6.3	0.01
	No	73	86.7	321	95	0.3	0.15, 0.7	

Table 3. Labor and delivery condition.

Variable	Value	Case		Control		OR	OR at 95% CI	P value
		Frequency	%	Frequency	%			
Duration of labor	<18 h	28	33.3	281	83.1	0.1	0.05, 0.17	0.001
	>18 h	56	66.6	57	16.9	9.8	5.7, 16	
Use of partograph	Yes	4	4.9	124	36.7	0.08	0.03, 0.2	0.001
	No	80	95.1	214	63.3	11.5	4, 32	
Fetal weight	<4 kg	75	89.3	331	97.9	0.01	0.06, 0.4	0.01
	>4 kg	9	10.7	7	2.1	5.6	2, 15.4	
CPD	Yes	34	40.5	61	18	4.2	2.4, 7.3	0.000
	No	50	59.5	227	82	0.2	0.1, 0.4	
Malpresentation	Yes	22	26.2	37	10.9	2.8	1.5, 3.2	0.001
	No	62	73.8	301	89.1	0.34	0.1, 0.6	
OL	Yes	31	35.7	41	12.1	4.2	2.4, 7.3	0.000
	No	53	64.3	297	87.9	0.23	0.13, 0.4	
Instrumental delivery	Yes	3	3.5	17	5	0.6	0.2, 2.4	-
	No	81	96.5	321	95	1.4	0.4, 4.9	
Oxytocin use	Yes	3	3.5	12	3.6	1.006	0.2, 3.6	-
	No	81	96.5	326	96.4	0.9	0.27, 1.17	
Hydrocephalus	Yes	6	7.1	13	3.8	1.9	0.7, 5.2	-
	No	78	92.9	325	96.2	0.5	0.1, 0.4	
Retained second twin	Yes	5	6	4	1.2	5.2	1.3, 20	0.01
	No	79	94	334	98.8	0.1	0.05, 0.7	

3.4 Risk factors associated with uterine rupture

Maternal age between 21-35 years is found to have less likelihood of getting uterine rupture compared to maternal age less than 20 years (AOR 0.02 95% CI 0.002 0.07). Mothers who live 10 km away from Suhul hospital are five times more likely of getting uterine rupture when compared to control mothers who live less than 10 km (AOR 4.9 95% CI 91.8 13.5) Lack of ANC follow up likely increases the risk of uterine rupture significantly when compared to controls who have routine ANC follow up (AOR 37.8 95% CI 10.4 137.1).

In this study period mothers who stay in labor for above 18 h are at increased likelihood of uterine rupture by tenfold when compared with controls (AOR 10.4 95% CI 3.8 29).

Lack of partograph to follow maternal and fetal

condition during labor and delivery increase the likelihood of getting uterine rupture by eight times when it compare to controls (AOR 7.7 95% CI 1.9 30.8). Mother who faced obstructed labor is associated with getting rupture by four fold when compared with control group (AOR 4.4 95% CI 1.4, 13.5).

In this study instrumental delivery (vacuum and forceps) are associated with increase the risk of uterine rupture by eight fold compared to mothers who delivered without instrument (AOR 8.3 95% CI 1.02 67.8).

Hydrocephalus is found to increase the risk of rupture by seven fold compared to controls mothers with non-hydrocephalus fetus (AOR 6.9 95% CI 1.02 46.6).

A neglected retained second twin has a significant association with uterine rupture compared to mothers

Table 4. Risk factors with adjusted odds ratio.

Variable	Value	Case		Control		COR	COR 95% CI	AOR	AOR 95% CI	P-Value
		Freq.	%	Freq.	%					
Age	<20	4	4.8	88	26	1		1		
	21-35	35	41.6	222	65.7	0.2	0.1, 0.8	0.15	0.03, 0.67	0.01
	>35	45	53.6	28	8.3	0.02	0.01, 0.08	0.012	0.002, 0.07	0.01
GA	Preterm	2	2.4	8	2.4	0.8	0.05, 11.2	*	*	*
	Term	81	96.4	325	96.2	0.09	0, 6.9	*	*	*
	Post term	1	1.2	5	1.5	1		*	*	*
Distance	<10 km	21	25	242	71.6	0.1	0.07, 0.2	0.26	0.07, 0.5	0.002
	>10 km	63	75	96	28.4	7.5	4.3, 13.2	4.9	1.8, 13.5	0.002
Gravidity	1-5	43	51.2	282	83.4	0.1	0.1, 0.3	*	*	*
	>5	41	48.8	56	16.6	5.2	3.1, 8.8	*	*	*
ANC	Yes	8	9.5	261	77.2	0.03	0.01, 06	0.02	0.007, 0.09	0.000
	No	76	90.5	77	22.8	32	14, 69	37.9	10.4, 137.1	0.000
Previous C/S	Yes	11	13.1	17	5	2.8	1.2, 6.3	*	*	*
	No	73	86.7	321	95	0.3	0.15, 0.7	*	*	*
Duration of labor	<18 h	28	33.3	281	83.1	0.1	0.05, 0.17	0.09	0.03, 0.2	0.000
	>18 h	56	66.6	57	16.9	9.8	5.7,16	10.5	3.8, 29	0.000
Oxytocin use	Yes	3	3.5	12	3.6	1.006	0.2, 3.6	*	*	*
	No	81	96.5	326	96.4	0.9	0.27, 1.17	*	*	*
Use of partograph	Yes	4	4.9	124	36.7	0.08	0.03, 0.2	0.12	0.03, 0.5	0.004
	No	80	95.1	214	63.3	11.5	4, 32	7.7	1.9, 30.8	0.004
Fetal weight	<4 kg	75	89.3	331	97.9	0.01	0.06, 0.4	*	*	*
	>4 kg	9	10.7	7	2.1	5.6	2, 15.4	*	*	*
CPD	Yes	34	40.5	61	18	4.2	2.4, 7.3	*	*	*
	No	50	59.5	227	82	0.2	0.1, 0.4	*	*	*
Malpresentation	Yes	22	26.2	37	10.9	2.8	1.5, 3.2	*	*	*
	No	62	73.8	301	89.1	0.34	0.1, 0.6	*	*	*
OL	Yes	31	35.7	41	12.1	4.2	2.4, 7.3	4.4	1.4, 13.5	0.009
	No	53	64.3	297	87.9	0.23	0.13, 0.4	0.2	0.07, 0.6	0.009
Instrumental delivery	Yes	3	3.5	17	5	0.6	0.2, 2.4	8.3	1.02, 67.8	0.04
	No	81	96.5	321	95	1.4	0.4, 4.9	0.1	0.01, 0.9	0.04
Hydrocephalus	Yes	6	7.1	13	3.8	1.9	0.7, 5.2	6.9	1.02, 46.6	0.04
	No	78	92.9	325	96.2	0.5	0.1, 0.4	0.14	0.02, 0.9	0.04
Retained 2 nd twin	Yes	5	6	4	1.2	5.2	1.3, 20	13.9	1.02, 190.8	0.04
	No	79	94	334	98.8	0.1	0.05, 0.7	0.07	0.005, 0.9	0.04

who do not had retained second twin (AOR 13.9 95% CI 1.2 190) (Table 4).

4. Discussion

Mothers who live 10 km far from Suhul Hospital increase the likelihood of ruptured uterus by fivefold compared to who live below 10 km (AOR 4.9 95% CI 1.8-13.5). Data from developing countries support this finding two study in Adigrat, Sudan and Uganda hospital [3,11-15].

Mothers who have no ANC follow up have significant association with uterine rupture compared to mothers who have routine ANC follow up (AOR 37.9 95% CI 10.4 137.1) similar comparative finding was found in Uganda and Nigeria [12,16]. This may indicate primary delay that there is decreased of maternal health seeking behavior in the community. It may also indicate there is weakness on the community health promoters including health extension workers,

community health providers and the woreda health office that promote the need of ANC follow up.

Obstructed labor increase the likelihood of rupture by four times compare to control who have no obstructed labor (AOR 4.4 95% CI 1.4-13.5) similar with comparative finding in Nigeria [16]. This indicates to the presence of three delays in the study area. Mothers who do not followed by partograph are at increased risk of rupture by nine times when compared to control group (OR 8.7 CI 95% 2.4-30.7) this is similar with study in Uganda [11]. This indicate there is third delay because by using this tool (partograph) health provider can detect problem on mother, fetus and labor condition and prevent obstructed labor and uterine rupture. Instrumental delivery is associated with increased risk of rupture by eight fold compared to control. Similar finding were observed in study of Adigrat, Saudi and Bahrain [3,17,18]. This may indicate failure on instrumental delivery in hospital.

In this study even though previous C/S and grand multi parity has no stastically significance but previous C/S and grand multi parity account for 13.1% and 48.8%, respectively.

5. Conclusion

In our study risk factor like distance above 10 km from hospital, Lack of ANC and partograph, Labor duration above 18 h, obstructed labor, instrumental delivery, hydrocephalus and neglected retained second twin are identified and most of the risk factors have significant association when compared with controls cases and they are a good indicator for the complication.

6. Recommendation

Almost all the risk factors of uterine rupture are totally preventable. This serious complication calls integrated preventive approaches like:

1. Government should implement on road working to reach health facility early for mothers who live above 10 km.
2. The community health promoters should work on need of ANC to avoid delays. Health provider should identify risks early like, twin pregnancy, hydrocephalus, previous C/S during ANC follow up.
3. Preventing obstructed labor and prolonged labor by using partograph.
4. A written protocol should be present at the hospital how, who and when to use the instrumental deliver to prevent management failure.
5. Provision of family planning for mothers who have above five children is mandatory.

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