

RISK FACTORS FOR RUPTURED UTERUS AMONG PATIENTS AT KHYBER TEACHING HOSPITAL PESHAWAR

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ABSTRACT

Objective: To determine the risk factors for ruptured uterus among patients in our local population.

Materials and Methods: This descriptive cross sectional study was carried out at Gynaecology and obstetrics department of Khyber Teaching Hospital Peshawar, on a sample size of 134, over a period of two years from 01-05-2016 to 31 April 2019.

Results: Mean age of patients was found to be 27 years. Mean period of gestation was almost 38 weeks. Mean parity was found to be more than 4. Scarred uterus was found to be the main factor for uterine rupture, contributing for 70 % of the total patients with uterine ruptures. Obstructed labor was the next main factor making 15% of all the patients, whereas the rest of 15 % patients had uterine rupture because of injudicious use of prostaglandins and oxytocin.

Conclusion: Scarred uterus is the main causative factor for rupture of a gravid uterus.

Keywords: Ruptured Uterus, Caesarean Section, Obstructed Labor, Oxytocin, Prostaglandins

INTRODUCTION

According to World Health Organization, 810 women died every day from preventable causes related to pregnancy and child birth in the year 2017. Among these 94% of the deaths occurred in women of lower middle and low income countries of African and South Asian population.¹ Maternal mortality in Europe and America is 12/100,000 live births while in Pakistan maternal mortality is very high 178 deaths/100,000 live births.²

Uterine rupture is a complication of pregnancy associated with severe maternal and fetal morbidity and mortality.³ The term uterine rupture refers to

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interruption of the integrity of uterine wall after fetal viability has been established.⁴ This complication is unlikely to occur silently during pregnancy; however it can occur silently in patients with previous classical cesarean scar usually from the early first trimester.⁵ Uterine rupture (UR) has two types, Complete UR involves the entire thickness of the uterine wall, resulting in connection between uterine and peritoneal cavity. Fetus and sometimes the placenta are discharged into the peritoneal cavity. The Incomplete UR is the one where the serosal coat is intact.⁶ According to WHO systemic review, the incidence of uterine rupture in general population is 5.3/10,000 births.⁷ The prevalence is variable, being rare in developed countries due to increased antenatal and intra-partum care.⁸ However this grave problem is more common in developing countries and countries in transition mostly because of ignorance, quackery,

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mal-distribution, maladministration, non-availability of essential medical supplies and lack of access to antenatal and intra-partum care.⁹

In high income countries, ruptured uterus occurs because of poorly supervised labor in scarred uterus.¹⁰ Reported rates of uterine rupture in women with previous lower segment cesarean section in United Kingdom depend upon whether the trail of labour is spontaneous (0.15–0.4%), induced (0.54–1.4%) or augmented (0.9–1.91%).¹¹ Risk after classical cesarean section is found to be 1-12%.¹² Other risk factors include gynecological uterine surgeries, e.g. Myomectomies, resection of uterine anomalies (Metroplasty), or uterine cornual resection. In low income countries, it mostly occurs in unscarred uterus from obstructed labour.⁸ However, in most of cases, there is a combination of risk factors including induction of labor, maternal age, height, body mass index, education, smoking, gestational age, instrumental vaginal delivery, decreased inter-pregnancy interval, abnormal placentation, invasive mole and chorio-carcinoma.¹³

A very common event in the past, its incidence has greatly decreased in the recent years. Complete rupture with irreversible loss is rarely seen except in primitive communities which lack modern facilities of health care.¹⁴ Consequences of uterine rupture depend on the time that elapses from rupture until the institution of definitive treatment. The sooner the treatment is started; the better is the maternal as well as fetal outcome.¹⁴

Pakistan like many other developing countries of the world is struggling with poor indicators of reproductive health. In Pakistan, maternal mortality is 178/100,000 live births. Uterine rupture accounts 1-13% of maternal and 74-92% of perinatal deaths.¹⁵

Uterine rupture is a serious happening in the life of a woman. It may not only endanger her life but may even affect her future fertility.¹⁶ Uterine rupture accounts for peri-partum hysterectomy in 42% of the cases in a study conducted in Pakistan.¹⁷

The escalating caesarean section rate in developing countries, inappropriate use of oxytocin / instrumentation and obstructed labor due to unsupervised process of labor has led to emergence of this grave obstetrical problem. This has compelled me to carry out this study to identify risk factors associated with

uterine rupture as studies on the subject are scarce in our setup. The results are shared with gynecologists and obstetricians and suggestions are made for timely and proper management of patients who are exposed to the risk factors for ruptured uterus.

MATERIALS AND METHODS

A descriptive cross-sectional study was conducted in Obstetrics and Gynecology Department, Khyber Teaching Hospital, Peshawar, over a period of two years from 01-05-2016 to 31 April 2019. A total of 134 patients were included in the study, using 14.7%2 of previous uterine surgery, 95% confidence interval and 6% margin of error, under WHO software for size determination. Non probability purposive sampling technique was used. All patients with ruptured uterus confirmed on ultrasonography and patients with a period of gestation of ≥ 28 weeks were included in the study. Uterine ruptures resulting from direct uterine trauma like motor vehicle accidents or falls or violence like gunshot wounds were excluded. These were the confounders and made the study results biased were excluded from the study.

Permission was taken from the hospital ethical committee. Data was collected from all those patients who were received with uterine rupture. An informed written consent was taken from all the patients or their relatives. A detailed history about the age, parity, and period of gestation, booking status, obstetrical and past surgical and medical history were taken. Other details like history of mishandling by unskilled persons like over use of oxytocin or prostaglandins were noted. Examination including general physical examination, abdominal and vaginal examination was done. Friendly environment was provided to collect the accurate data.

All the ultrasounds were done through expert sonologist and strictly exclusion criteria was followed so that to control confounders and bias in our study results.

All collected information was analyzed via software SPSS version 10. Means +standard deviations were calculated for continuous variables e.g. age, parity. Proportions and frequencies were calculated for categorical variables like previous uterine surgeries, injudicious use of oxytocin and prostaglandins, and obstructed labor. Results were presented in the form of tables.

RESULTS

The study was conducted on 134 patients, who presented to us with ruptured uterus, and various risk factors for the uterine rupture were found. The patients were categorized in different groups on the basis of various factors like age in years, parity and gestational age in weeks as shown in Table No I. The mean age of the patients in the study was 27.14 years \pm 5.91SD from the mean. The eldest patient was 41 years old and the youngest was 16 years old. The parity of the patients ranged from 0 – 11 with an average parity of was 4.56 \pm 3.19SD. The average gestational age of the patients was 37.9 weeks with minimum of 28 weeks and the maximum of 42 weeks \pm 2.58SD.

Table No II shows the frequency of the various risk factors of the rupture of uterus. The factors shown in the table are history of previous uterine surgery, use of oxytocin and prostaglandin, and obstructed labor. In the table, the most common risk factor for uterine rupture appears to be history of previous uterine surgery, which was found to be in 94(70%) of the patients. Oxytocin and prostaglandin use and obstructed labor were found to be in equal number of patients i.e. 20(14.9%) in each group.

Frequencies of patients with ruptured uterus in various age groups are shown in Table-III. The patients were divided in six groups according to age. Each group had a range of five years, with the first group starting from 16 years and ending at 20 years. Similarly, rest of the patients were divided as 21 – 25 years, 26 – 30 years, 31 – 35 years, 36 – 40 years and patients aged more than 40 years were grouped as one. Most of the patients were between 21 – 25 years with 53 (39.6%) patients in this age group. The frequencies of patients with history of previous uterine surgery in various age groups are displayed in Table-III. Different age groups show quite varied frequency of uterine surgery with maximum number of patients in age group 21-25 i.e. 53 (39.2% of the total 134 patients) of which 51(96.2%) had history of previous uterine surgery and only 2(3.8%) had intact uteri.

Frequencies of patients with history of oxytocin or prostaglandin use in different age groups are displayed in Table-III. Major number of the patients (96.2%) was in age groups 21 – 25 years.

Frequencies of patients with history of obstructed labor in various age groups are shown in Table III. Only age group 31 – 35 had significant number of patients with history of obstructed labor i.e. 11(37.9%) but most of the patients 18 (62.1%), even in this group had no history of obstructed labor.

Grouping of the patients according to their parity is shown in Table IV. In this table the patients are divided as nulliparous, with parity 1 – 3, 4 – 6, 7 – 9, and more than 9. Parity group of 1 – 3 had most number of patients i.e. 53 (39.6%). There were 7 (5.2%) nulliparous patients. Parity group 4 – 6 and 7 – 9 had significant number of patients, 36 (26.9%) and 27 (20.1%) respectively. 11 (8.2%) had parity of more than 9. Frequencies of patients with uterine surgery in the different parity groups are shown in Table V. The majority of the patients who had uterine surgery before this pregnancy were having parity of 6 or less. Of the 7 nulliparous patients, 5(71.4%) had history of previous uterine surgery and 2(28.6%) had intact uteri. Parity group 1 – 3 had highest number of patients i.e., 53(100%) and all of them had the history of previous uterine surgery. Most of the patients in Parity group 4 – 5 had positive history of uterine surgery i.e. 32(88.9%). In the remaining two parity groups 7 – 9 and more than 9, most of the patients had no previous history of uterine surgery i.e. 20(74.1%) and 11(100%) respectively.

Cross-tabulation of parity groups with respect to frequency of patients with history of oxytocin or prostaglandin use is shown in Table IV. Only 2(28.6%) out of 7 nulliparous patients had the history of oxytocin or prostaglandin use. In the parity group 1– 3, none of the 53(100%) patients, had history of oxytocin use. Parity groups 4 – 6 and 7 – 9, had 32(88.9%) and 19(70.4%) respectively had no history of oxytocin or prostaglandin use. Only parity group more than 9 had a greater fraction of patients who had the history of oxytocin and prostaglandin use.

The frequencies of patients with history of obstructed labour in different parity groups are displayed in Table IV. Among the 7 nulliparous patients, 3(42.9%) patients had the history of obstructed labour and 4(57.1%) didn't. All the patients in parity group 1 - 3 and 4 – 6 i.e. 53(100%) and 36(100%) respectively, were negative for the history of obstructed labor. In Parity group 7 – 9, 12(44.4%) of

the 27 patients had the history of obstructed labor but 15(55.6%) were negative for it. Similarly in parity group more than 9, 5(45.5%) patients had obstructed labor and 6(54.5%) had no history of obstructed labor.

Classification of the patients on the basis of their gestational age in weeks is displayed in Table V. Patients were classified into 3 groups with gestational age of 28 – 32 weeks, 33 – 36 weeks and more than 36 weeks. The first two groups had equal number of patients i.e. 7 (5.2%). Most of the patients were in the third group, which had 120 (89.6%) patients.

The frequencies of patients with history of previous uterine surgery in different gestational age groups are displayed in Table V. The majority of the patients i.e. 120, were in the gestational age group more than 36, of which 84(70%) had previous uterine

surgery whereas 36(30%) had intact uteri. The frequencies of patients with the history of oxytocin and prostaglandin use in various gestational age groups are displayed in Table V. In gestational age group 28 – 32, 1(14.3%) out of the 7 patients had the history of prostaglandin and oxytocin use. All the 7(100%) patients in the gestational age group 33 – 36, did not have the history of oxytocin and prostaglandin use. In the gestational age group more than 36, out of the 120 patients, only 19(15.8%) had the history of oxytocin and prostaglandin use and 101(84.2%) didn't. The frequencies of patients with the history of obstructed labor in the various gestational age groups are shown in Table V. Gestational age groups 28 – 32 and 33 – 36, had same number of patients i.e. 7, but the frequency of obstructed labor was different with 3(42.9%) had history of obstructed labor in the former while later had none i.e. 0(0%).

Table: 1 Descriptive Statistics (n=134)

	Age in years	Parity of the Patient	Gestational Age of the Patient
Mean	27.1418	4.5597	37.9104
Std. Deviation	5.91437	3.19189	2.58237
Minimum	16.00	.00	28.00
Maximum	41.00	11.00	42.00

Table: 2 Risk Factors of Uterine Rupture

	History of Previous Uterine Surgery		Oxytocin and Prostaglandin use		Obstructed Labour	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
No	40	29.9	114	85.1	114	85.1
Yes	94	70.1	20	14.9	20	14.9
Total	134	100	134	100	134	100

Table: 3 Risk Factors in Different Age Groups

Age Groups (Years) (Percentages)			History of Previous Uterine Surgery		History of Oxytocin and /or Prostaglandin use		History of Obstructed Labour	
			No	Yes	No	Yes	No	Yes
16 – 20	8.2%	Count	3	8	11	0	8	3
		% within age Groups	27.3%	72.7%	100.0%	.0%	72.7%	27.3%
21 – 25	39.6%	Count	2	51	51	2	53	0
		% within age Groups	3.8%	96.2%	96.2%	3.8%	100.0%	.0%
26 – 30	20.9%	Count	5	23	25	3	26	2
		% within age Groups	17.9%	82.1%	89.3%	10.7%	92.9%	7.1%

31 – 35	21.6%	Count	20	9	20	9	18	11
		% within age Groups	69.0%	31.0%	69.0%	31.0%	62.1%	37.9%
36 – 40	8.2%	Count	8	3	6	5	8	3
		% within age Groups	72.7%	27.3%	54.5%	45.5%	72.7%	27.3%
Above 40	1.6%	Count	2	0	1	1	1	1
		% within age Groups	100.0%	.0%	50.0%	50.0%	50.0%	50.0%
Total	100%	Count	40	94	114	20	114	20
		% within age Groups	29.9%	70.1%	85.1%	14.9%	85.1%	14.9%

Table: 4 Risk Factors in Different Parity groups

Parity groups (Percentages)			History of Previous Uterine Surgery		History of Oxytocin or Prostaglandin Use		Obstructed Labour	
			No	Yes	No	Yes	No	Yes
Nulliparous	5.2%	Count	5	5	2	4	4	3
		% within Parity groups	71.4%	71.4%	28.6%	57.1%	57.1%	42.9%
1 – 3	39.6%	Count	0	53	0	53	53	0
		% within Parity groups	.0%	100.0%	.0%	100.0%	100.0%	.0%
4 – 6	26.9%	Count	4	32	4	36	36	0
		% within Parity groups	11.1%	88.9%	11.1%	100.0%	100.0%	.0%
7 – 9	20.1%	Count	20	19	8	15	15	12
		% within Parity groups	74.1%	70.4%	29.6%	55.6%	55.6%	44.4%
More than 9	8.2%	Count	11	5	6	6	6	5
		% within Parity groups	100.0%	45.5%	54.5%	54.5%	54.5%	45.5%
Total	100%	Count	40	114	20	114	114	20
		% within Parity groups	29.9%	85.1%	14.9%	85.1%	85.1%	14.9%

Table: 5 Risk Factors in Different Gestational groups

Gestation Age Groups (Percentages)			History of Previous Uterine Surgery		History of Oxytocin or Prostaglandin		History of Obstructed Labour	
			No	Yes	No	Yes	No	Yes
28-32	5.2%	Count	4	3	6	1	4	3
		% within gestation groups	57.1%	42.9%	85.7%	14.3%	57.1%	42.9%
33-36	5.2%	Count	0	7	7	0	7	0
		% within gestation groups	.0%	100.0%	100.0%	.0%	100.0%	.0%
More than 36	89.6%	Count	36	84	101	19	103	17
		% within gestation groups	30.0%	70.0%	84.2%	15.8%	85.8%	14.2%
Total	100%	Count	40	94	114	20	114	20
		% within Parity groups	29.9%	70.1%	85.1%	14.9%	85.1%	14.9%

DISCUSSION

Though uncommon in developed countries, uterine rupture is still among one of the major obstetrical emergency dealt in labor wards of developing countries. The incidence and pattern of uterine rupture reflect the standard of existing maternal health care system. The incidence of rupture of a gravid uterus is particularly high in developing countries because of inadequate public health education and health services, failure to seek medical advice either due to ignorance and poverty and poor obstetrical care in combination with intrinsic factors like contracted pelvis and high parity.

There is a relatively high risk of uterine rupture with increasing maternal age. Most of the patients in my study were in the age ranging from 21-25 years and mean age of 27 years. Surprisingly very young mothers had ruptured uterus showing the severity of the problem. This is comparable to the study carried out in Uganda where most of the patients with uterine rupture had an age of 20-24 years.¹⁸ Similarly a study carried out in Angola showed most of the patients being 28 years old facing the disaster of ruptured uterus.¹⁹ Younger mothers fronting the dilemma of ruptured uterus may be an indicator of unique socio-cultural barriers faced by these young females in accessing skilled care.

Multi-Parity is considered as a risk factor for uterine rupture. Most of the patients in my study had a parity of 4 or more. This is comparable to studies carried out in Pakistan where average parity was 4.08. Most of the patients were multipara and grand multipara.⁷ This may be because of the reason that increasing parity may be giving a sense of false security to these patients in view of previous uneventful deliveries and they are mostly unaware of the problems that they can face because of increasing parity. This is contrary to the state in developed countries. A study in United Kingdom showed that majority of the patients had a parity of,^{1,2} which may be due to increased rate of caesarean section in primi-gravida in developed nations.²⁰

In my study scarred uteri constituted a substantial number of uteri that ruptured, thus replicating findings in other studies. Scarring of uterus can be because of myomectomy, deep cornual resection for cornual pregnancy, trauma and previous caesarean sections. Scarred uterus was found as the main cul-

prit in 70% of patients in my study. Studies reported from Saudi Arabia showed almost similar results with uterine rupture at the site of previous caesarean scar was 70%.¹³

In my study prior caesarean scar has been found to be the main contributing factor. This may be due to the escalating rate of caesarean section by private practitioners due to commercial reasons and extra caution. In small clinics and centers, most of the sections are being done without legitimate indication by people who do not possess the adequate surgical skill or in a setting poorly compliant with aseptic operational techniques, both leading to poor scar integrity. In addition to that poor judgment allowing trial of labor in presence of uterine scar is another contributing factor. My results are contrary to National Institute of Child Health and Human Development (NICHD) study conducted in United States of America, where risk of uterine rupture was 0.7%.¹¹ This shows that planned vaginal birth after caesarean section with careful selection of patients and meticulous monitoring; the rate of uterine rupture can be significantly reduced. So trial of labor in scarred uterus should only be allowed when close monitoring is available and possible.

The second most important factor in my study was obstructed labor which constituted 15% of the causative agents responsible for uterine rupture. All these cases were those who had prolonged labor dealt by untrained health personnel and traditional birth attendants in the far flung areas of the province and were then referred to Khyber teaching hospital. These patients secondly couldn't reach in hospital in time and with a resultant rupture. The results from a study conducted in India showed similar results with 15% of the patients ending up in rupture because of obstructed labor.¹⁶ A study conducted in Ethiopia shows prolonged labour in 52% of the cases.¹⁴ Such high risk group patients would have been identified had they received antenatal care and had labored in hospitals. Since most of these patients are seen by Dias and they don't have any idea about the use of partogram and so prolonged and obstructed labor and at the end a disastrous obstetrical emergency of uterine rupture.

In my study, 15% had uterine rupture due to injudicious use of oxytocin and prostaglandins. This finding is in concordance with the reports from

other authors. Almost 23% of patients in India had uterine rupture mainly with the use of uterine stimulants.¹⁶ A study conducted in USA, uterine rupture occurred in 29% and 47% of the patients following use of Prostaglandin and oxytocin for induction and augmentation of labour in previously scarred uterus respectively.²¹ uterine rupture was found more in term pregnancies with mean gestational age of 37 years. This is similar to a study conducted in Karachi where uterine rupture was found in 62% of the patients at 37 weeks of gestation.⁷

Ruptured uterus continues to be a recurring obstetrical disaster in our part of the world with its associated mortality and morbidity. Very rigorous efforts at upgrading the standard of obstetrical care at the primary level are required to stem this tide.

CONCLUSION

The most common cause of uterine rupture in my study was found to be scarred uterus mainly because of previous caesarean sections, followed by obstructed and neglected labor because of overuse of uterine stimulants and mismanagement by local untrained birth attendants. Relatively younger maternal age, grand multiparity was the other risk factors added to the increased rates of uterine rupture. More women seek care at primary health centers, Traditional birth attendants and home deliveries which are affordable but more risky. It is essential that all efforts should be made to prevent the occurrence of this complication in the first place. Maternal prognosis may improve if antenatal, intra-partum care is available near women's home and are affordable. Continued education should be provided to the staff providing care so that they are able to recognize the problem in time and refer to tertiary care centers.

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