

Risk factors of Uterine Rupture

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ABSTRACT

Objectives: To determine the incidence of uterine rupture in Ministry of Health Hospitals in Bahrain and to find the risk factors associated with this obstetrical tragedy.

Methods: A case control study was conducted on all the cases of uterine rupture in Ministry of Health Hospitals in Bahrain during the period 1st of January 1990 until 31st of December 1999. The following risk factors which, were studied, included parity, gestational age, previous cesarean delivery, previous cesarean section for cephalopelvic disproportion, previous evacuation of the uterus, induction and or augmentation of labor, malpresentation, duration of the labor, type of the delivery and birth weight.

Results: Forty-five uterine ruptures were reported during the study period with an incidence of 1 in 2213 deliveries. Previous cesarean delivery, prior cesarean section for

cephalopelvic disproportion, malpresentation, induction and augmentation of labor were found to be significant risk factors for uterine rupture. While high parity, previous evacuation of the uterus, duration of labor, type of the delivery, birth and weight were not associated with uterine rupture.

Conclusion: An Obstetrician should be careful in monitoring the progress of labor in women with previous cesarean delivery to avoid the occurrence of a ruptured uterus. Oxytocin or prostaglandin or both should be used judiciously to prevent catastrophic uterine rupture.

Keywords: Uterine rupture, risk factors.

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Rupture of the gravid uterus constitutes a grave hazard to the mother and the fetus. It is unexpected and a potentially devastating complication. Uterine scar separations included a spectrum of problems ranging from asymptomatic scar dehiscence to overt uterine rupture with complete fetal extrusion from the uterus into the peritoneal cavity.¹ The clinical picture of uterine rupture has changed considerably since Ame's report² in 1881. Historically, the most common predisposing factors were grandmultiparity and obstetric trauma resulting from prolonged or neglected labor, fetal macrosomia, internal podalic version, breech extraction and instrumental deliveries. Today, fetal macrosomia and malpresentation are detected more reliably with ultrasound and prolonged labor and difficult vaginal deliveries have been replaced largely by cesarean section (CS). As a result, obstetric

trauma is less and rupture of unscarred uterus has become relatively rare. On the other hand, previous cesarean is a recognized risk factor.² The common contributing risk factor to spontaneous rupture of unscarred uterus is injudicious use of a uterine stimulant such as oxytocin and prostaglandin.³ The aim of this study was to determine the incidence of uterine rupture in Ministry of Health hospitals in Bahrain and to find the risk factors of this calamity to help in reducing its occurrence in the future.

Methods. This study was conducted in the Salmaniya Medical Center and peripheral units in Bahrain during the period from 1st of January 1990 until 31st of December 1999. All cases of uterine rupture during the study period were identified from labor room registers and annual statistics in Ministry

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of Health Hospitals. Each case of a ruptured uterus was matched in nationality and age with a control woman who delivered on the same day. The records of the patients and controls were reviewed. The risk factors which, were studied were parity, gestational age, previous CS, previous CS for cephalopelvic disproportion (CPD), previous evacuation of the uterus, induction of the labor, augmentation of the labor, malpresentation, type of the delivery and birth weight. All data was entered into the computer and statistical analysis was carried out by social science software programmer (SPSS). Fisher's exact test was used to calculate the odds ratio (OR), 95% confidence interval (CI) and P value for categorical data. The unpaired T test was used to compare the difference in means between both groups. P value was calculated and a value of < 0.05 was considered to be statistically significant.

Results. There were 45 uterine ruptures reported during the study period. Out of these, 17 were scar dehiscence and 28 were complete uterine rupture. There were 99,598 deliveries during the study period which, makes the incidence of uterine rupture to be 1 in 2213 deliveries and the incidence of complete uterine rupture 1 in 3556 deliveries. The nationality of both groups were the same as 39 were Bahraini and 6 were non-Bahraini. There was no statistical significant difference between the means of age, parity, gestational age and birth weight of both groups (Table 1). The mean duration of first stage of labor was comparable in both groups (8.05±4.5 hours for uterine rupture and 8.3 ± 5.4 hours for controls). The mean duration of the 2nd stage of labor was longer amongst women with uterine rupture (38.4± 41.1 minutes in ruptured uterus and 14.3±17.6 amongst controls). The significant difference between the means of the duration of the first and 2nd stage of labor was not calculated as the data was

Table 1 - Demographic variables of women with uterine rupture and controls.

Variable	Ruptured uterus	Control	2 tailed significance
Age (years) Mean (SD)	31.8 (6.2)	31.0 (5.6)	0.38
Parity Mean (SD)	3.5 (2.8)	2.8 (2.1)	0.15
Gestational Age mean (SD)	38.8 (2.6)	38.7 (2.6)	0.67
Birth Weight Mean (SD)	3.2 (0.7)	3.2 (0.5)	0.97
SD=standard deviation N.B=Significance was calculated by T test			

Table 2 - Statistical analysis of risk factors associated with uterine rupture.

Risk Factor	Ruptured Uterus (n=45)	Control (n=45)	P value	OR	95% CI
Multiparous (1-4)	45	42	0.24	7.5	0.4-149.5
Grand multi ≥5	16	9	0.16	2.2	0.85-5.7
Previous education	10	7	0.6	1.55	0.5-4.5
Previous CS	28	3	*0.0001	23.1	6.2-86.1
Previous CS for CPD	10	2	*0.027	6.1	1.3-29.9
Induction of labor	15	5	*0.02	4.0	1.3-12.2
Augmentation of labor	10	1	*0.007	12.6	1.5-103
Mal - presentation	9	1	*0.015	11.0	1.3-91
Second stage > 1 hour	2	1	1.0	2.04	0.2-23.4
Second stage > 2 hours	2	0	0.5	5.2	0.2-112.1
Instrumental delivery	2	3	1.0	0.65	0.1-4.1
Assisted breech delivery	2	1	1.0	2.05	0.2-23.4
Birth weight > 4 kg	5	3	0.8	1.8	0.4-7.9
Birth weight > 4.5 kg	3	0	0.24	7.5	0.4-149
OR=odds ratio, CS=cesarean section, CI=confidence interval, CPD=cephalopelvic disproportion N.B. P-value was calculated by Fischers exact test.					

missing in many cases and controls. Out of a total of 45 uterine ruptures, 28 (62%) were associated with previous CS. It has been found that trial of labor with previous CS was a significant risk factor of uterus ruptures (P value=0.0001 & OR= 23). There was a significant association of uterine rupture when CPD was the indication of previous CS. The other risk factors which, were statistically significant amongst women with ruptured uterus were induction or augmentation of labor, or both, and malpresentation of the fetus. (Table 2). Multiparity, a history of previous evacuation of uterus, prolonged first and 2nd stage of labor, mode of delivery and fetal macrosomia were not found to be significant risk factors. (Table 2)

Discussion. The true incidence of uterine rupture may never be known as many cases hide among the statistics of maternal deaths due to obstetric shock, postpartum hemorrhage and other diagnoses.⁴ However, the reported incidence has varied from 1 in 200⁵ to 1 in 5882 deliveries.⁶ The observed incidence of complete uterine rupture in this study was one per 3556 deliveries which, is comparable with the incidence reported in other developed countries.⁷⁻⁹ The incidence of uterine rupture in women who had trial of labor after previous lower segment cesarean delivery has been reported to be between 0.6 and 0.87%^{1,7,10} and 1% after vertical lower segment incision.¹¹ However the risk of complete uterine rupture after classical CS was 6% and scar dehiscence 13%.¹² Although it was stated that labor after CS is reasonably safe, there is a definite risk of uterine rupture that is potentially devastating for both the mother and the fetus.¹³ Lao and Lung had stated that patients with scarred uterus had 30 times higher incidence of uterine rupture.¹⁴ Forty-four per cent of ruptured uterus in Alsakka's study occurred in women with previous CS.⁶ In this series women with previous cesarean delivery had a very high risk of uterine rupture. In a case control study of risk factors associated with uterine rupture during trial of labor after caesarean delivery by Leung et al, a history of CS for CPD was not associated with uterine rupture.¹³ While in this study, we found that previous CS for CPD was a significant risk factor of uterine rupture. Oxytocin stimulation of labor is an associated factor in half or more of the cases of spontaneous rupture of the intact uterus.^{8,14,15} The risk of uterine rupture was increased among women who had trial of labor after cesarean delivery when Oxytocin was excessive (OR=2.7).¹³ This study confirmed that augmentation of labor with Oxytocin is a significant risk factor of uterine rupture. Oxytocin should be used with great care in multiparous women and in those with scarred uterus as it predisposes to complete and incomplete rupture.^{8,14} Induction of labor with prostaglandin was found to be a significant risk factor. Many women in different reports experienced uterine rupture following administration of prostaglandin vaginal pessary.^{2,6} Prostaglandin should be used with caution particularly in multiparous women in combination with Oxytocin. Ruptured uterus was increased with malpresentation which, is in agreement with a study of Rahman et al.¹⁶ Grandmultiparity was a significant risk factor of uterine rupture in developing countries.^{5,6,16} In this series, multiparity and grand multiparity were not found to be associated risk factors. Historically uterine rupture of an intact uterus has been mainly due to a long and obstructed labor. Fedorkow et al and Golan et al in their studies did not find any evidence of obstructed labor among women

with a ruptured uterus.^{6,17} In fact most patients had a relatively short labor. In this study prolonged labor was not an associated risk factor, though this data was missed in this retrospective study in many cases and controls. Similarly as described by Leung et al, macrosomia was not associated with an increase of uterine rupture.¹³ Two women out of 15 uterine ruptures in the study of Fedorkow et al gave a history of dilatation and curettage. It was proposed that the cause of uterine rupture in these cases was the damage to the uterine wall at the time of the procedure.⁷ Our study did not show that prior evacuation of uterus was a significant risk factor.

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