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Analysis of Uterine Rupture Cases at a Tertiary Referral Center: A Retrospective Study

Üçüncü Basamak Bir Referans Merkezin Uterin Rüptür Vakalarının Analizi: Bir Retrospektif Çalışma

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ABSTRACT

Objective: To determine the risk factors, peri-operative maternal-fetal outcomes and management modalities in patients diagnosed with complete or incomplete uterine rupture retrospectively.

Materials and Methods: Twenty-eight patients diagnosed as uterine rupture were investigated retrospectively in our obstetric clinic between 2012 and 2016. The demographic data, details of risk factors, rupture type, the management modality and perioperative maternal-fetal outcomes were taken into consideration for analysis. Data was analysed using SPSS (ver: 20) statistical program.

Results: There were 28 cases of uterine rupture during the study period giving an incidence of 0.86%. Twenty of the cases were incomplete rupture (71%) and eight were complete rupture (29%). Only eight patients developed rupture in our clinic and the others were referred patients. Common cause of uterine rupture was previous uterine surgery in 22 cases (78.5%). Of these patients, 18 cases had 2 or more cesarean section scars. Grand-multiparity was the other common risk factor as seen in eight cases (28.5%). The primary repair of uterine rupture site was the main surgical management in 25 (89.2%). The main perioperative complication was bladder injury occured in 4 patients (14.2%). No maternal death was occured. The need for blood transfusion, the mean hospitalization time, prior cesarean section, fetal death and bladder injury were higher in the complete uterine rupture ($p<0.05$).

Conclusion: This study confirms that obstetricians should be alerted about the occurence of uterine rupture in cases with predisposing factors such as previous uterine scar or grand multiparity. Prompt diagnosis, early transport, adequate blood products transfusion and an experienced surgical team are very important in the management of uterine rupture.

Key Words: Uterine rupture, scarred uterus, hysterectomy, maternal complication

ÖZET

Amaç: Komplet veya inkomplet uterin rüptür gelişen vakaların risk faktörlerini, perioperatif maternal-fetal sonuçlarını ve yönetim şekillerini retrospektif olarak belirlemektir.

Gereç ve Yöntem: Bu çalışmada 2012 ile 2016 yalları arasında kliniğimizde uterin rüptür tanısı alan 28 hasta retrospektif olarak incelendi. Analiz için demografik bilgileri, risk faktörlerinin detayları, rüptürün tipi, yönetim şekli ve perioperatif maternal-fetal sonuçları ele alındı. Verilerin analizi için SPSS (ver: 20) istatistik programı kullanıldı.

Bulgular: Çalışma döneminde %0.86 oranında 28 uterin rüptür vakası olduğu görüldü. Vakaların yirmisi (%71) inkomplet rüptür iken sekizi (%29) komplet rüptür idi. Vakalardan sadece 8'i kliniğimizde gelişen rüptür vakaları iken geri kalan 20 vaka kliniğimize dışarıdan refere edilen hastalardan oluşmaktaydı. Önceki uterus cerrahisi 22 hastada (%78.5) en sık görülen sebep idi. Bu hastalardan 18'inde 2 yada daha fazla geçirilmiş sezeryan öyküsü vardı. Grand-multiparite ikinci en sık görülen sebep idi(8 hasta). Uterin rüptür bölgesinin primer onarımı en sık yapılan cerrahi girişim idi (28 hastanın 25'inde, %89.2). Ana perioperatif komplikasyon 4 hastada (%14.2) görülen mesane yaralanması idi. Maternal mortalite görülmedi. Komplet rüptür grubunda kan transfüzyon ihtiyacı, ortalama hastanede kalış süresi, önceki sezeryanla doğum fetal ölüm ve mesane yaralanması inkomplet rüptür grubuna göre daha fazla görülmekteydi ($p<0.05$).

Sonuç: Bu çalışma obstetrisyenlerin geçirilmiş uterin cerrahi yada grand multiparite gibi risk faktörleri olan hastalarda uterin rüptür gelişebileceği konusunda dikkatli olmaları gerektiğinin doğrulamaktadır. Uterin rüptür yönetiminde hızlı tanı, erken transport, yeterli kan ürünü transfüzyonu ve tecrübeli cerrahi ekibin varlığı çok önemlidir.

Anahtar Kelimeler: Uterin rüptür, skarlı uterus, histerektomi, maternal komplikasyon

Introduction

Uterine rupture is a rare and catastrophic event during pregnancy and characterized by the breaching of uterine muscular layer's integrity (1). It has a high potential for maternal and fetal morbidity and mortality (2). The incidence of uterine rupture is reported to be varying between

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1:2500 to 1:5000 in generally (3). The incidence is varying among the countries and also cities of the same country. Several and well-known risk factors that predisposing the uterine rupture are identified and these are previous uterine scar including mainly cesarean section which was the mostly seen, obstructed labor, grand multiparity, prolonged-induced labor and lack of antenatal care (4).

The prompt diagnosis and appropriate treatment are crucial to improve the fetomaternal outcomes. Surgical treatment is the sole option in case or suspicion of uterine rupture either during labor or during pregnancy. This surgical technique can be modified according to the type and localization of rupture, hemodynamic stability of the patient and fertility status (5).

The aim of this retrospective study was to assess the uterine rupture cases and to identify the documented risk factors and report maternal-fetal outcomes. And the study also aimed to propose the preventive measures.

Materials and Methods

This retrospective study was conducted over a period from January 2012 to January 2016 in the department of Obstetrics and Gynecology of a tertiary medical center. The institutional Ethics Committee approved the study. The medical records of the patients who were undergone surgery due to uterine rupture of diagnosed as incomplete or complete uterine rupture during surgery were retrospectively reviewed and enrolled into the study. All the diagnoses were confirmed during the surgery and recorded on the operation data of the patients in the hospital's automation system. In our institution, the complete uterine rupture is diagnosed when there is a full thickness separation of uterine wall and overlapping serosa and also incomplete rupture is defined as the separation of uterine muscle with intact visceral peritoneum. The exclusion criteria were as follows: Patients with iatrogenic rupture during the curettage procedure, patients with already known congenital uterine anomaly, patients with lack of recorded data.

The data of patients including demographic variables such as age, parity, gravidity, weeks of gestation, antenatal follow-up data of the patients, prior uterine scar and the clinical presentation, type of surgery, the type of rupture either complete or incomplete were reviewed. And also, maternal and fetal outcome including any complication during surgery, need for blood product transfusion, postoperative length of hospital stay, surgical site infection, maternal mortality and fetal outcomes including birth weight, apgar scores, admission to neonatal intensive care unit and fetal death were recorded and analyzed. The medical records were surveyed for the presence of maternal-fetal tachycardia or bradycardia just before or during surgery.

The data was analyzed using the statistical package for social sciences for Windows version 20 (SPSS Inc, Chicago, IL, USA). Mean and standard deviations were used for descriptive analysis. Mann-Whitney U test was used for statistical comparisons between the two groups. p value <0.05 was considered statistically significant.

Results

A total of 3240 deliveries were occurred during the study period of which 28 were cases of uterine rupture with a frequency of 0.86%. Of these, 20 patients (71%) had incomplete uterine rupture and 8 patients (29%) had complete uterine rupture. 20 of these 28 rupture cases were referred to our clinic from the other cities or local districts either with the suspicion of uterine rupture or the patients having predisposing factor such as grand multiparity or previous second, third or fourth cesarean section. The other 8 patients were under our control during the whole pregnancy follow up period. The mean age of the patients was 30.5±4.6 and the range was between 20-39 years. The mean gestational ages were 37.5±2.6 weeks. 16 of these 28 patients (57%) did not received any antenatal care.

When analyzed the predisposing factors for developing of uterine rupture as shown in Table 1, we found that the most significant risk factor as twenty-two of the cases (78.5%) had previous uterine surgery due to cesarean section and myomectomy.21 cases had previous cesarean section and of them, 3 cases had one previous cesarean and 18 cases had 2 or more sections. Only one woman was para one (3.5%). Eight cases (28.5%) were grand multiparous. Other observed predisposing factors were as follows: labour induction with prostoglandin or oxytocin (17.8%), obstructed and prolonged labour (3.5%), polyhidramniosis (3.5%), multiple pregnancies (7.1%) and assisted fundal pressure (3.5%).

Table 1. Demographic and predisposing factors in uterine rupture cases

Age(year), Mean±SD	30.5±4.6
Parity, Mean±SD	3.32±1.92
Gestational age at delivery, weeks, Mean±SD	37.5±2.6
Previous uterine surgery	
Previous one cesarean section (n, %)	3(10.7%)
Previous two or more cesarean (n, %)	18(64.2%)
Myomectomy(n, %)	1(3.5%)
Grand multiparity (n, %)	8(28.5%)
Obstructed labour (n, %)	1(3.5%)
Labour induction (n, %)	5(17.8%)
Fundal pressure (n, %)	1(3.5%)
Multiple pregnancy (n, %)	2(7.1%)
Polyhidramniosis (n, %)	1(3.5%)

SD:Standard deviation, n:Number

Table 2. Maternal and fetal-neonatal outcomes

Intraoperative bladder injury, (n, %)	4 (14.2%)
Blood transfusions (n, %)	14 (50%)
Subtotal hysterectomy (n, %)	2(7.1%)
Total Hysterectomy (n, %)	1(3.5%)
Primary repair (n, %)	25(89.2%)
Balloon tamponad (n, %)	1(3.5%)
Maternal deaths (n, %)	0
Fetal deaths (n, %)	6(21.4%)
Birth weight, gr, Mean±SD	3240.14±689.21

SD:Standard deviation, n:Number

The maternal and fetal-neonatal outcomes are shown in Table 2. 14 patients (50%) received blood transfusion during or in postoperative period. Bladder injury was occurred in 4 patients (14.2%) during surgery and 3 of these cases were complete ruptures and one was incomplete rupture. In one case, the left ureter was ligated during repair of uterine rupture which extended to the lower uterine segment and this patient was successfully managed within the same operation with urological intraoperative consultation and J catheter insertion. Two subtotal hysterectomies (7.1%) and one total hysterectomy (3.5%) were performed. The total hysterectomy case was a complete rupture case with abundant bleeding who had 2 previous cesarean sections and placenta previa totalis. Primary repair of uterus was performed in 25(89.2%) of the patients. Intrauterin balloon tamponad was applied to one patient due to the uterin atony with incomplete rupture and this case had prolonged induction of labour. No maternal death was occurred. There were 6 fetal death. Of them, five deaths were seen in complete rupture patients and one with incomplete rupture case.

When analysed and compared the complete and incomplete rupture cases, we found that majority of complete rupture cases had previous uterine scar as shown in table 3. The need for blood transfusion, the mean hospitalization time, prior cesarean section, fetal death and bladder injury were higher in the complete uterine rupture ($p<0.05$).

Table 3. Comparison of the variables between complete and incomplete uterine ruptures

Variables	Complete	Incomplete	p value
Number (n, %)	8(29%)	20(71%)	p <0.05
Age (n, %)	29.68±6.26	30.42±7.04	NS
Parity (n, %)	4.62±2.21	4.14±1.66	NS
Gestational week at delivery, Mean±SD	38.42±5.28	37.41±4.38	NS
Birth weight, gr, Mean±SD	3460±480	3308±520	NS
Scarred uterus (n, %)	7(87.5%)	15(75%)	p<0.05
Length of hospital stay, day, Mean±SD	5.75±2.45	2.24±1.36	p<0.05
Hysterectomy, (n, %)	1(12.5%)	2(10%)	NS
Bladder injury, (n, %)	3(37.5%)	1(5%)	p<0.05
Fetal death, (n, %)	5(62.5%)	1(5%)	p<0.05
Maternal death, (n, %)	0	0	

NS: non-significant SD: Standard deviation, n: number of observation, p<0.05: indicates statistical significance.

Discussion

Uterine rupture is an ominous obstetric emergency and remains with a high maternal and perinatal morbidity-mortality. Its incidence varies according to the countries and also the regions within the same country. The highest incidence was reported in 1987 by Maslek R as 1.07% (6). The incidence of uterine rupture cases in the present study was 0.86%. Our incidence was similar to the study done by Rizwan et al (7), however this rate was higher when compared to the studies from our country reported by Yılmaz et al (5), who had a result of 0.12%. And also, the frequency of uterine rupture in our study was higher than World Health Organization hospital based studies data of which the reported incidence was 0.31% (8). In another study from our institution which revealed the uterine rupture cases between 1995 to 2007 found the incidence as 1/287 which was lower than the present study as 1/115 (9). These different rates from the same country depend on many factors such as the economical status, educational-cultural level of living people and reaching to the health facilities.

It is reported that the risk factors may differ in developing and developed countries. The most important predisposing factor in developed countries is previous uterine scar, whereas in developing countries obstructed labour, prolonged and injudicious use of oxytocin are seen as the main predisposing factors (5,10). In our study, the most common risk factors were prior uterine surgery and followed by grand multiparity. Interestingly, when we compared our study's results with the previous study from our institution, we found that the predisposing factors have changed from grand multiparity and patient with no antenatal care to the prior uterine surgery (9). This may be associated with the global increase in cesarean section rates despite of the preventive measures to reduce this rate. The other important and mostly preventable risk factor that we want to emphasize from the present study is the assisted fundal pressure in which mostly performed in the last period of second stage of labour. So the physicians should be alert and avoid such a maneuver. Because this maneuver is an uncontrollable force on the uterine wall and may cause uterine rupture in the different sites of uterus.

Although the scarred uterus is the main risk factor for developing uterine rupture, there are also uterine ruptures in patients with unscarred uterus and this is somehow a rare entity (5). The rupture in unscarred uterus may arise from the presence of obstructed labour, multiple gestatitons, abnormal fetal presentation within uterine cavity and importantly women with grand multiparity (11). It is reported that grand multiparity is the major predisposing factor in unscarred uterus as 69.2% (5). Like this in our study, 6 out of 28 cases (21.4%) of uterine rupture occurred in unscarred uterus and the major predisposing factor was grand multiparity. However, in studies from developing and low income countries, it is reported that obstructed and prolonged use of oxytocin may be a cause for rupture in unscarred uterus (7, 10).

It is obvious that maternal-fetal morbidity and mortality increase in case of uterine rupture. In our study we found no maternal mortality, however in the study by Flamm et al. (12) reported maternal mortality rate as 4.2% and also in another study by Chuni (13) reported that maternal mortality rate was as high as 13.5%. We think that the no maternal death in our study can be explained by the awareness, prompt delivery of patient to the operation room, rapid blood product transfusion and experienced team about the catastrophic obstetric emergencies due to that our hospital is a referral center in eastern region of our country. In the study by Yılmaz et al (5), reported that all the fetal mortality occurred in the complete rupture cases in which studied on 61 rupture cases from our country. In the present study, 5 out of 6 fetal death occurred in complete rupture. The perinatal mortality can be minimized by the rapid delivery of baby in case of suspicion of uterine rupture and availability of a proper intensive neonatal care management.

The surgical treatment is the sole option in case of uterine rupture but the operation technique depends on the site of rupture, the hemodynamic stability of the patient and the possible future fertility of the patient. In the current, there is a trend toward increase in the primary repair of rupture site instead of hysterectomy as a fertility preserving option. In the literature search, the hysterectomy rates are different with range from 53.33% to 70.6% (7, 14). In contrast to these data, our hysterectomy rate was lower as 10.6%. The other patients underwent primary repair succesfully and we informed them about the possible rupture in the following pregnancy. These patients should be encouraged about elective cesarean section before the labour pain starts. In the previous report from our clinic by Sahin et al (9) found that the rate of hysterectomy significantly higher than the present study (42.42%

vs 10.6%). We can explain this by increasing the experience of operators about rupture cases, the amelioration in health services and emergency patient transport, the change in the predisposing factors and also the low number of complete rupture cases.

In conclusion, despite to its low incidence, the uterine rupture is an ominous event for both the mother and the baby. This study shows that obstetricians should be alerted about the occurrence of uterine rupture in cases with predisposing factors such as previous uterine scar or grand multiparity. It should be remembered that the patients who are under risk of uterine rupture is not only the pregnants with scarred uterus but also the unscarred uterus can be ruptured. Primary uterine repair should be kept in mind in case of uterine rupture as a first line surgical option. Prompt diagnosis, early transport, adequate blood products transfusion and an experienced surgical team are very important in the management of uterine rupture.

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