
Uterine Rupture in Early Pregnancy - A Tertiary Centre Experience

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Abstract

Background: Rupture uterus is a life-threatening complication, with high maternal and fetal morbidity and mortality. Rupture uterus is more commonly encountered during labour. Rupture uterus during early pregnancy is rarer.

Methodology: Prospective Observational study in a tertiary center collecting data on the rupture of the uterus in early pregnancy (before 28 weeks). Demographic and clinical data were collected from case files to investigate predisposing factors, diagnose, and evaluate the outcome of these cases to obtain learning lessons.

Results: We encountered 17 cases of rupture uterus in early pregnancy. Eleven cases had a previous cesarean delivery. Three cases had a prior history of rupture uterus, 2 cases had a congenital uterine anomaly, and one case had a previous history of laparoscopic resection of corneal ectopic pregnancy.

Conclusion: No trimester is immune from rupture uterus. Careful use of prostaglandins for induction of miscarriage is required in patients with previous cesarean delivery even in early pregnancy. Previous history of rupture uterus requires more attention as the risk of repeat rupture is high and it recurs at an earlier gestation. Diagnosis of the ruptured uterus in early pregnancy can be challenging.

Keywords: Rupture uterus, early pregnancy, previous CS, induction of miscarriage.

INTRODUCTION

Rupture uterus in the early stages of pregnancy is extremely rare however; it is one of the catastrophic events in obstetrics. This could happen spontaneously or on top of preexisting pathology (e.g. uterine scar, uterine anomaly).(1)

Diagnosis of early rupture of the uterus is clinically challenging because its remote potential elevates the threshold of clinical suspicion, vague symptoms in the beginning, especially

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in the scarred wombs, and lack of ultrasound diagnostic consensus.(2)

Clinicians should be vigilant when using ecobolic for induction of miscarriage in the scarred uterus and avoid the false sense of security when using them especially when the repeated dosage is required.(1)

In this work we highlight the predisposing factors, the clinical picture, sonographic finding, and the possible management of pregnant ladies with uterine rupture in the early gestational age aiming to enhance the outcome of such a unique catastrophe.

METHODOLOGY

This was a prospective observational study in which we collected data on cases that had rupture uterus before the age of viability (28 weeks of gestation) over one year in a university hospital from the first of August 2017 till the end of July 2018. Total admission of pregnant cases during this year: 18,666 cases. We collected data on cases that had ruptured uteri in the first and the second trimester and looked for possible risk factors, diagnosis, management, and outcomes of these cases. This study was approved by the Research Scientific and Ethical Committee of the Department of Obstetrics and Gynecology – Cairo University Hospital with ethical approval number (O-170013).

Statistical analysis:

The statistical analysis was done using Microsoft Excel 2016. The data were statistically described in terms of mean \pm standard deviation (\pm SD), or frequencies (number of cases) and percentages when appropriate. All statistical calculations were done using SPSS for IBM (IBM Corp., Armonk, NY, USA).

RESULTS

During the period of the study, we managed 17 cases of ruptured uterus in early pregnancies (before 28 weeks) who were admitted to the Emergency Unit at the Department of Obstetrics and Gynecology at Cairo University Hospital. The mean age of the patients was 30.4 ± 5.3 with a mean BMI of 30.2 ± 3.9 . All cases were parous, none were nulliparous. The mean gestational age at which rupture of the uterus occurred was 20.6 ± 5.47 weeks, with ruptures reported as early as 12 weeks. Two cases had rupture uterus near the end of the first trimester, and 15 cases occurred in the second trimester. Table 1, shows the baseline characteristics of women who had ruptured uterus in early pregnancy.

The rupture of the uterus occurred spontaneously in 9 cases and was provoked by induction of miscarriage in 8 cases. Eleven cases had previous CS, three cases had a previous history of ruptured uterus, in 2 of these cases the rupture occurred in the rudimentary horn, and one case had laparoscopic resection of corneal ectopic pregnancy.

Table 1: The baseline characteristics of women who had ruptured uterus in early pregnancy

Variable	Mean \pm SD	Range	N	%
Age (years) :	30.4 \pm 5.3	25- 46	17	100
• 20-30			10	58.8
• 30-40			6	35.3
• >40			1	5.9
BMI (kg/m²)	30.2 \pm 3.9	24.25 - 37.48	17	100
• Normal weight 18.5 to 24.9			3	17.6
• Overweight 25 to 29.9			5	29.4
• Obese (>30)			6	53
- Class I 30-34.9			3	
- Class II 35-39.9			0	
- Class III >40				
Gravidity	2.8 \pm 1.07	1 – 5	17	100
Parity	2.47 \pm 0.94	1 – 4	17	100
• P1			2	11.8
• P2			8	47.0
• P3 or more			7	41.2
Gestational age (weeks)	20.53 \pm 5.32	12 - 27		
• First trimester 2/17			2	11.8
• Second trimester 15/17			15	88.2
Associated co-morbidity:				
• No morbidity			15	88.2
• Severe early onset pre-eclampsia			1	5.9
• Diabetes Mellitus and hypertension			1	5.9
Number of fetuses:				
• Singleton			16	94.1
• Twins			1	5.9
Interpregnancy interval (years)	2.5 \pm 0.9	1-4		
Mode of previous deliveries:				
• NVD			1	5.9%
• CS			16	94.1%
Mode of ruptured uterus:				
• Spontaneous rupture			9	52.9
• Provoked by Induction of miscarriage			8	47.1
Risk factor for rupture uterus				
• Rupture rudimentary horn			2	11.8
• Previous rupture uterus			3	17.6
• Resection of corneal ectopic			1	5.9
• Previous Cesarean section			11	64.7

We divided patients into four groups according to the main predisposing factor for rupture uterus:

- Cases with a previous cesarean deliveries (11 cases)
- Cases with a previous history of uterine rupture (3 cases)
- Cases with a rudimentary uterine horn (2 cases)

- Case with a previous laparoscopic resection of corneal ectopic pregnancy (one case)
- Cases that had induction of miscarriage (8 cases).

Cases with previous Cesarean deliveries (11 cases)

We encountered 3 cases with one prior CS. In these three cases, the rupture was provoked by

the induction of miscarriage. Regarding patients with previous 2 CS, we had 5 cases (three cases had a spontaneous rupture and two cases had rupture provoked by miscarriage induction). There were three cases with previous 3 CS scars one happened spontaneously and the other two had induction of miscarriage. See table 2 for the summary.

Table 2: The characteristics of previous Cesarean delivery cases

number of previous CS	Spontaneous	Provoked (induction of evacuation)
Previous 1CS	none	One case at 14 weeks. Two cases at 22 weeks
Previous 2 CS	One case at 20 weeks One case at 24 weeks One case at 27 weeks	One case at 25 weeks One case at 26 weeks
Previous 3 CS	One case at 24 weeks	One case at 12 weeks. One case at 15 weeks.

Cases with previous ruptured uterus:

Three cases had previous rupture of the uterus. In these cases, rupture of the uterus occurred spontaneously and at a gestational age earlier than the previous incident of rupture of uterus. The first case had a history of previous ruptures of the uterus 3 times at 39, 35 , and 24 weeks respectively, the last one was 2 years ago before subsequent pregnancy. This case had a spontaneous rupture of the uterus at 12 weeks. The second case had a history of a previous rupture uterus at term and had a spontaneous rupture at 14 weeks at subsequent pregnancy. The third one had a previously perforated uterus during surgical evacuation followed by a ruptured uterus at 36 weeks, and this case had spontaneous rupture at 25 weeks gestation.

Cases with a rudimentary uterine horn (2 cases)

The first case had rupture in the rudimentary horn at 18 weeks took induction of miscarriage by PG presented with vaginal bleeding and maternal shock .laparotomy was done the products of conception found outside the horn. The second case had spontaneous rupture at 27 weeks gestation presented to our center by abdominal pain ultrasound picture of the fetal body and placenta

outside the contour of the rudimentary horn.

Case with previous laparoscopic management of corneal ectopic

One case was delivered vaginally but had a previous history of laparoscopic management of ectopic pregnancy (corneal). This case had spontaneous rupture at 22 weeks of gestation.

Cases that had induction of miscarriage

The rupture uterus was provoked by induction of miscarriage in eight cases. 7 cases had previous CS. One case had an undiagnosed rudimentary horn. One case had improper dosing of misoprostol outside our tertiary center; however rupture uterus occurred in the remainder despite proper dosage.

Clinical presentation of uterine rupture

Table 3 shows different clinical presentations for cases with a ruptured uterus. The diagnosis was confirmed pre-operatively by ultrasound by seeing the fetus or parts of the products of conception outside the uterus. The diagnosis was established preoperatively in 13 cases by ultrasound finding the fetus/parts of products of the conception outside the uterine cavity. However, in 4 cases, the diagnosis was established intra-operatively.

Table 3: Clinical presentations of ruptured uterus

Symptoms	N	Percentage
Abdominal pain	3	17.6%
Vaginal bleeding	2	11.8%
Abdominal pain and vaginal bleeding	5	29.4%
Failure to progress	2	11.8%
Hypovolemic Shock due to internal hemorrhage	5	29.4 %

Intraoperative findings:

Site of rupture occurred at the site of the previous uterine scar in cases with ruptured uterus, at the site of CS scar in cases with previous CS (Fig.1), at the rudimentary horn (Fig.2) and at the lateral wall in the case with a previous resection of corneal ectopic pregnancy (Fig.3). Pfannenstiel incision was done in 15 cases (88.2%) while midline incision was done in two cases only (11.8%). In cases of pregnancy in a rudimentary horn, the horn was excised. Repair of uterine body was achieved in 13 cases (76.4%). Hysterectomy was done for two cases (11.8%) (Fig.3) as repair was not surgically possible and the patients suffered a major obstetric hemorrhage. See table 4 for details.

Eight ladies (47%) received blood transfusion; five patients (29.4%) had massive transfusion as these cases suffered massive obstetric hemorrhage. Five cases (29.4%) were admitted to postoperative ICU.

Table 4: Outcome of cases with early ruptured uterus:

Outcome	Mean \pm SD (Range)	Number	Percentage
Incision:			
1. Midline incision		2	11.8
2. Pfannenstiel incision		15	88.2
Surgical management			
• Repair of rupture uterus		13	76.4
• Excision of Rudimentary horn		2	11.8
• Hysterectomy		2	11.8
Estimated blood loss (ml)	1682.4 \pm 1597.3 (300 – 6400)		
Blood transfusion		8	47
Massive blood transfusion		5	29.4
ICU admission		5	29.4
Hospital stay (days)	3.3 \pm 1.7 (2-7)		
Readmission		0	
Mortality		0	

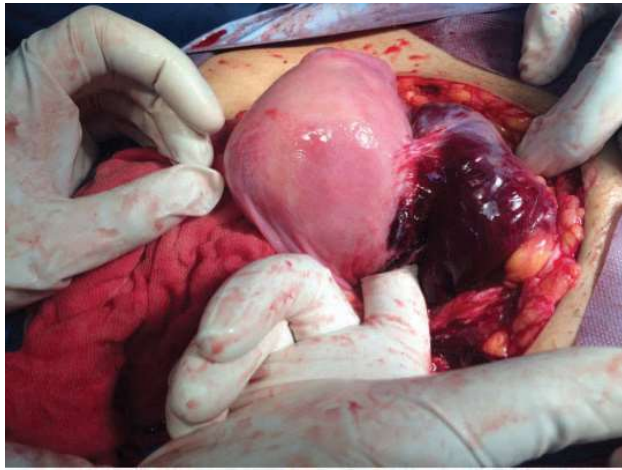


Figure 1: Ruptured uterus at site of previous cesarean scar

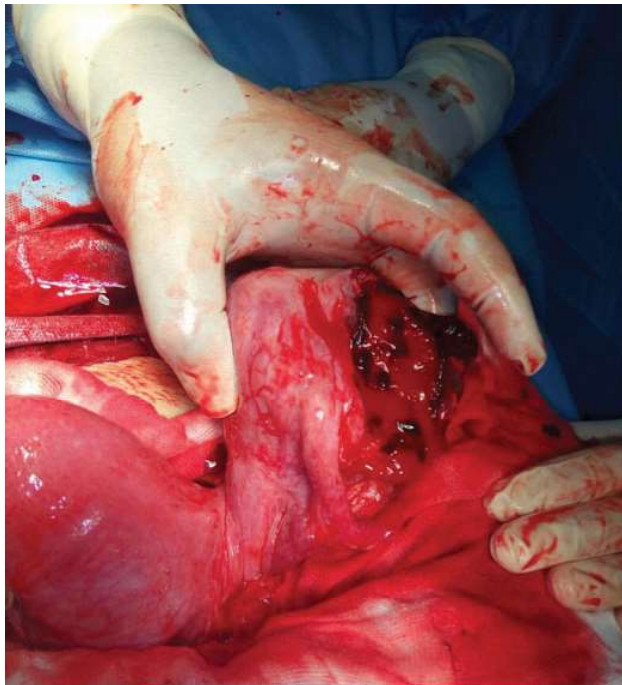


Figure 2: Ruptured uterus in a rudimentary horn (the rudimentary horn enlarges with pregnancy giving the appearance of a bicornuate uterus)



Figure 3: Hysterectomy specimen showing rupture of the lateral wall in a patient who had a previous resection of corneal ectopic pregnancy

DISCUSSION

Rupture uterus is a rare however critical obstetric complication that means interruption of the uterine wall integrity whether partially or completely. It is associated with high maternal and fetal morbidity and mortality.(3)

The incidence of uterine rupture is 5.1/10,000 deliveries in a previously scarred uterus, while in an unscarred uterus it is 1/17,000-20,000.(4, 5)

Uterine rupture is usually observed in association with uterine scarring either in late pregnancy or during labour (6).First and early second-trimester uterine ruptures are very rare, and there are only a few cases in the literature describing first and early second-trimester uterine rupture.(6-9)

According to our study, we encountered 17 cases of ruptured uterus in early pregnancy (before 28 weeks) per 18,666 annual admissions to the Emergency Unit at the Department of Obstetrics and Gynecology at Cairo University Hospital.

Uterine rupture could happen without any prior trauma (8)or could occur on top of underlying risk factors. Previous uterine scars (e.g. CS, myomectomy, and excision of tubal ectopic pregnancy) take the biggest share, followed by uterine malformation, abnormal placentation, improper use of ecboic and uterine manipulations.(8, 10-13)

Regarding our finding, eleven out of the seventeen cases had prior Caesarean deliveries (3 ladies with prior three Caesarean sections, five with prior two Caesarean sections, and three with a previous one CS). Three cases had prior uterine rupture; their uteri had ruptured during our study at an earlier gestational age than their previous incidents. This raises the alertness that disruption of uterine integrity is not a serious situation of its own but it raises the possibility of recurrence in subsequent pregnancies.

The other risk elements encountered in our work were two cases of rupture in a

rudimentary horn at 18 weeks and at 27 weeks, one of which was only discovered intraoperative. The use of prostaglandins is known as a risk factor for uterine disruption, eight out of the eleven cases during the study duration had PG induction of miscarriage. One case had prior normal vaginal delivery but had a history of laparoscopic excision of ectopic tubal pregnancy. Rupture may be attributed to excessive cautery at the uterine cornu.

In the setting of labour, especially after cesarean section, the diagnosis of a rupture uterus can be reached by any of the following: abnormal labour progress, abnormal abdominal pain, vaginal bleeding, and loss of the presenting part, maternal tachycardia, and fetal distress.(14)However, in early pregnancy, especially without the presence of any predisposing risk factors, the diagnosis may occur with latency or may never be detected except intraoperative; leading to life-threatening complications. Furthermore, signs and symptoms of uterine rupture in the early trimester are non-specific and the contour of the small uterus is difficult to be assessed compared to the term uterus. (15-17) .This is because most of the rupture involved a scarred uterus, that scare tissue (ischemic tissue) doesn't elicit a classical picture of pain in uterine rupture.

In our study, the majority of the cases were presented with abnormal abdominal pain or/ and vaginal bleeding (10 cases) with a blood loss range of 300cc up to 6400cc massive hemorrhage. Two were presented by failure of progress of cervical dilatation and five of the seventeen cases had a hypovolemic shock caused by internal bleeding into the peritoneal cavity.

Ultrasound imaging may not fully confirm the diagnosis of uterine rupture especially if incomplete.(18) Eleven of our cases demonstrated definitive ultrasound sign of rupture as the fetal body was seen outside the couture of the uterus. However, in 6 of our cases, the rupture was suspected clinically

but the definite diagnosis was established after the laparotomy was done.

The rate of maternal death due to uterine rupture is 0–1 % in developed nations, but it could be raised to ten folds in developing countries.(19) Owing to early referral to our tertiary Centre, availability of senior obstetricians and availability of blood transfusion facilities, no maternal deaths were encountered in our study. Regarding morbidities, eight cases had received a blood transfusion, five cases had a massive transfusion and five cases were admitted to postoperative ICU.

CONCLUSION

Rupture uterus can occur during any trimester. Notrimesterisimmune. Mostimportantcauses include: Previously scarred uterus (CS, and prior rupture), Rudimentary horn pregnancy (which can occur even with a previous history of a normal pregnancy), improper use of ecbolics, and excessive coagulation of cornu at laparoscopic salpingectomy. The commonest presentation is lower abdominal pain but may present with vaginal bleeding only, or both. Ultrasonography is diagnostic when it shows pregnancy outside the uterine cavity. Diagnosis can be established preoperatively however, high clinical suspicion is required. The final confirmation of the diagnosis is usually established intra-operatively. In most cases repair is possible however, hysterectomy can be life-saving. Bleeding is the major morbidity of these cases. Early accessibility to a tertiary facility, availability of a skillful obstetrician and early clinical suspicion improve the maternal outcome. We need further studies to evaluate the reproductive outcome of these cases.

REFERENCES

1. Gardeil F, Daly S, Turner MJ. Uterine rupture in pregnancy reviewed. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 1994;56(2):107-10.
2. Amro B, Lotfi G. Spontaneous rupture of an unscarred uterus in early pregnancy: A rare but life-threatening emergency. *BMJ Case Reports CP*. 2019;12(5):e228493.
3. Cunningham FG, Leveno KJ, Bloom SL, Spong CY, Dashe JS. *Williams obstetrics*, 24e: Mcgraw-hill New York, NY, USA; 2014.
4. Al-Zirqi I, Stray-Pedersen B, Forsén L, Daltveit AK, Vangen S. Uterine rupture: trends over 40 years. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2016;123(5):780-7.
5. Guèye M, Mbaye M, Ndiaye-Guèye MD, Kane-Guèye SM, Diouf AA, Niang MM, et al. Spontaneous uterine rupture of an unscarred uterus before labour. *Case reports in obstetrics and gynecology*. 2012;2012:598356.
6. Ijaz S, Mahendru A, Sanderson D. Spontaneous uterine rupture during the 1st trimester: a rare but life-threatening emergency. *Journal of Obstetrics and Gynaecology*. 2011;31(8):772-.
7. Biljan M, Cushing K, McDicken I, Garden A. Spontaneous uterine rupture in the first trimester of pregnancy. *Journal of Obstetrics and Gynaecology*. 1996;16(3):174-5.
8. Singh A, Jain S. Spontaneous rupture of unscarred uterus in early pregnancy:-a rare entity. *Acta obstetrica et gynecologica Scandinavica*. 2000;79(5):431-2.
9. Dibbs KI, Ball RH, Huettner PC. Spontaneous uterine rupture and hemoperitoneum in the first trimester. *American journal of perinatology*. 1995;12(06):439-41.
10. KAHYAOĞLU S, Turgay İ, Kaymak O, Kalyoncu Ş, Mollamahmutoğlu L. Onyedı haftalık nonkomunike rudımenter uterin horn gebeliđi ve uterin rüptür: Olgu sunumu. *Perinatoloji Dergisi*. 2005;13(3):179-82.

11. Morken N-H, Henriksen H. Placenta percreta—two cases and review of the literature. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 2001;100(1):112-5.
12. LeMaire WJ, Louisy C, Dalessandri K, Muschenheim F. Placenta percreta with spontaneous rupture of an unscarred uterus in the second trimester. *Obstetrics & Gynecology*. 2001;98(5):927-9.
13. Ofir K, Sheiner E, Levy A, Katz M, Mazor M. Uterine rupture: differences between a scarred and an unscarred uterus. *American Journal of Obstetrics and Gynecology*. 2004;191(2):425-9.
14. Revicky V, Muralidhar A, Mukhopadhyay S, Mahmood T. A case series of uterine rupture: lessons to be learned for future clinical practice. *The Journal of Obstetrics and Gynecology of India*. 2012;62(6):665-73.
15. Sun HD, Su WH, Chang WH, Wen L, Huang BS, Wang PH. Rupture of a pregnant unscarred uterus in an early secondary trimester: a case report and brief review. *Journal of Obstetrics and Gynaecology Research*. 2012;38(2):442-5.
16. Ho W, Wang C, Hong S, Han H. Spontaneous uterine rupture in the second trimester: a case report. *Obstet Gynecol Int J*. 2017;6(4):00211.
17. Abbas AM, Hussein RS, Ali MN, Shahat MA, Mahmoud A-R. Spontaneous first trimester posterior uterine rupture in a multiparous woman with scarred uterus: A case report. *Middle East fertility society journal*. 2018;23(1):81-3.
18. Vaknin Z, Maymon R, Mendlovic S, Barel O, Herman A, Sherman D. Clinical, sonographic, and epidemiologic features of second- and early third-trimester spontaneous antepartum uterine rupture: a cohort study. *Prenatal Diagnosis: Published in Affiliation With the International Society for Prenatal Diagnosis*. 2008;28(6):478-84.
19. Batra K, Gaikwad HS, Gutgutia I, Prateek S, Bajaj B. Determinants of rupture of the unscarred uterus and the related fetomaternal outcome: current scenario in a low-income country. *Tropical Doctor*. 2016;46(2):69-73.