

Prelabour Uterine Rupture In Two Patients With A Previous Caesarean Section For Placenta Previa

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Research

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Abstract

Background Spontaneous uterine rupture is a severe pregnancy complication. Several risk factors have been described, especially for women with a previous caesarean section.

Method We reported two cases of uterine rupture (UR) occurred outside of labour in patients with a history of caesarean section for placenta previa were reports.

Results The current study evaluates how a higher hysterotomy, combined with some risk factors, can increase the prevalence of UR in the next pregnancy.

Conclusion These cases presentation provide a supplement to over-all knowledge about UR showing that a careful evaluation of risk factors could promote the early UR management and consequently, improve the maternal-fetal outcome.

Plain English Summary

Uterine rupture (UR) during pregnancy is a rare but critical obstetric emergency. Many factors are correlated with UR during labour, in women with cesarean section (CS) as longitudinal incision, time from the last CS, fetal situation. On the other hand, about the level of low uterine segment (LUS) section, in case of previous CS for low placental insertion, literature presents limited evidences. Therefore, this study reports, two cases of pre-labor UR, in women with previous CS, performed for placenta previa and has examined all known risk factors for RU in these scarred uteri. Consequently, this assessed factor could represent a potential risk factor of UR in the next pregnancy. Nevertheless, larger studies are needed to validate if it represents a real risk factor, because the early screening would allow the rapid detection of UR and could improve he maternal and fetal outcome.

Background

Uterine rupture (UR) is a discontinuity area inside the uterine wall, including its serosa (overlying peritoneum) that most commonly involving a previous uterine scar and sometimes bladder and wide ligament. [1] The uterine dehiscence often precedes the UR but it does not involve the serosa, so keeping umbilical cord, placenta and fetus inside the uterus with a lower rate of maternal-fetal complications [2]. The UR is an obstetric emergency that can be related to an adverse outcome both for the newborn (neonatal or intrapartum death, low Apgar score, ICU admission) and the mother (severe anaemia, ICU admission, blood transfusion, repeated laparotomy, hysterectomy) [3]. In the last few years, the incidence of UR has significantly increased both in women without a previous hysterotomy (due to labour management, especially when medically induced) and in those with a previous CS, mostly when combined with characteristic features[4].Indeed, despite conflicting opinions, literature reports specific risk factors for UR [5].Considering the increasing rate of CS (from 6.7% in the 90's to 19.1%) and related complications, we easily understand how the incidence of UR among women with a previous CS moved from 0.22 to 0.5% in developed countries[6].We report two cases of spontaneous UR outside of labour in

patients with a history of CS for placenta previa. Due to the lower placental insertion, in both cases the hysterotomy was performed more cranially and far from the (low uterine segment) LUS. Maternal characteristics and fetal outcome are summarised in **Table 1**.

We informed both patients about the use of their personal data for scientific purposes, under the protection of the Privacy Act and they accepted and signed a related informed consent.

Cases

CASE 1

A 35 years old patient with no relevant medical history, parity 0/1/0/1. Her previous pregnancy (December 2017) terminated with an emergency-CS for a central placenta previa abruptio at 32 weeks of gestational age (Robson classification group X); a placental flap was extending anteriorly over the LUS for 3 cm and a transverse hysterotomy was performed more cranially than usual. On April 2019 the patient, 19 weeks pregnant, presented to the obstetric emergency unit complaining of a severe abdominopelvic pain: she was conscious, pale and asthenic with BP: 100/60 mmHg, HR: 100 bpm, rhythmic pulse and obstetric shock index (OSI): 0.9 (normal value < 1).

There was evidence of generalised tenderness, but no vaginal bleeding or amniotic fluid leakage; the evaluation of vaginal fornices was very painful, preventing a complete obstetric visit. Both a transvaginal and a transabdominal scan was performed and thus reported: cervical length of 3 cm, single pregnancy, normal heart activity, fetal movements and amniotic fluid level, anterior and normally implanted placenta, free fluid into the Morison's pouch and heterogeneous material both into the Douglas and the recto-uterine pouch. The hemoperitoneum had an unknown source and it was impossible to exclude an extra-pelvic aetiology; therefore, an emergency-CS with lower midline incision was performed in the presence of a general surgeon. When opening the abdomen, after the drainage of 1000 ml of blood, the diagnosis was immediately clear: the gestational sac was outside the uterus, bulging through a dehiscence hysterotomic breach with sclerotic edges, partially removed and sent for histological examination. (**Figure A**). After removing the gestational sac and placenta, which was almost totally detached from the uterine wall, the breach was sutured with interrupted stitches and a good haemostasis was obtained, thus supporting the choice of a conservative approach. The haemoglobin level moved from 9.6gr/dL before surgery to 8.5gr/dL after surgery and finally to 7.8gr/dL the first post-operative day: two units of packed red blood cells (pRBC) were administered, together with intravenous iron. The patient was discharged on day fifth, prescribing home therapy with antibiotic, antithrombotic, iron and uterotonic. The histological examination confirmed the presence of scar tissue over the breach edges, the fetus reported no abnormalities and the growth was found to be consistent with the gestational age; placenta was normal as well.

CASE 2

A 34 years old patient with no relevant medical history, parity 1/0/1/1. On September 2017, she had an elective-CS at 39 weeks of gestational age for an anterior placenta previa (Robson classification group V) and, because of that, a transversal hysterotomy was performed above the LUS.

An ultrasound assessment performed during the next pregnancy, at 7 weeks of gestational age, shows the higher CS-scar location (**Figure B**). On May 2019, pregnant at 36 weeks and 6 days, the patient presented to the obstetric emergency unit after three hours of severe and increasing abdominopelvic pain. From the clinical point of view, she was conscious, nervous, asthenic and pale with BP: 95/50 mmHg, HR: 85 bpm, rhythmic pulse and obstetric shock index (OSI): 0.8 (normal value < 1).

The superficial and deep abdominal palpation revealed a generalised tenderness and the digital evaluation of vaginal fornices was painful, especially when exploring the area close to the pouch of Douglas; the cervix was closed and no vaginal bleeding or amniotic fluid leakage was observed.

A CTG examination pointed out fetal bradycardia (FHR: 80 bpm for 8 minutes) and no uterine contractions; a transabdominal scan could just confirm the fetal bradycardia, without providing any further information. The next step was an emergency-CS with a Pfannenstiel laparotomy over the previous scar. When opening the abdomen and after draining 1500 ml of blood, the fetus was found outside of the uterus; he was immediately extracted and given into the care of neonatologists. The newborn was a male of 2500 g (Apgar 3/5) and the umbilical artery blood gas analysis resulted as follow: PH 6.8 - Lactate 12.8 mmol/L - BE 20 mmol/L. After removing the placenta, almost totally detached from the uterine wall and bulging into the abdomen, a large breach over the middle third of the anterior wall was sutured with interrupted stitches. Obtaining a good haemostasis, a conservative approach was chosen as the best option. Three units of pRBC and two units of plasma were infused during the surgery to balance the huge amount of blood collected into the abdomen and the low haemoglobin level (8.5gr/dL). Straight after the CS, the value was stable (9.5 g/dL) but the following day it decreased to 7.8gr/dL, so requiring another administration of pRBC. The patient was discharged on day fourth, prescribing home therapy with antibiotic, antithrombotic and iron. About the fetal outcome, an MRI performed 30 days after birth diagnosed a hypoxic-ischemic encephalopathy with severe neurological sequelae.

Discussion

The UR usually occurs during the late gestational age and commonly involves the LUS area (scarred uterus 92.1% - unscarred uterus 63.63%), less resistant than the uterine corpus and fundus [7]. In most of cases, the UR is an intraoperative diagnosed pregnancy complication; it may be suspected by performing a detailed gynaecological and ultrasound examination, but only a surgical evaluation can usually confirm the diagnosis [8]. Moreover, the clinical onset is often nonspecific, only later becoming more typical with abdominal pain, haemorrhagic shock and absence of fetal heart activity [9]. The first case is not characterized by specific symptoms and the ultrasound examination was not supportive as well. On the other hand, the prompt surgery reduced the risk of maternal complications but the fetal outcome was

sealed by the early gestational age (19 weeks). For our second case, the clinical evaluation was delayed of about three hours since the patient hesitated to undergo medical examination. Despite the unclear preoperative diagnosis, clinicians wisely decided to carry out a surgical treatment in a short time. Nevertheless, the patient's late presentation finally resulted in a worse maternal and fetal outcome (intraoperative blood transfusion and hypoxic-ischemic fetal encephalopathy). According with our experience and other Authors' opinion, in order to improve the maternal-fetal outcome, high-risk patients (previous CS, abdominal pain, sickness, signs of peritoneal irritation and pelvic effusion) should be promptly identified and referred to adequate obstetric emergency units for an urgent surgical treatment [10]. Several papers describe a statistically increased prevalence of UR following a fundic hysterotomy for myomectomy, metroplasty or fetal surgery; the relative weight of every risk factor is not defined, but in case of fetal surgery it is 14% for both uterine dehiscence and UR [11]. A previous T or J uterine incision moves the risk of UR from 4–9%, the double of a previous vertical incision over the LUS and the quintuple of a transverse one. Actually, a "low" transverse uterine incision over the LUS is related to a low risk (0.4–0.7%), while the consequences of a "high" transverse incision over the LUS are not well detailed. Some Authors give it no relevance, someone else states that every incision of the uterine contractile tissue increases the risk of UR [12]. So, the importance of detailing the height of a CS-scar into the patient's discharge letter becomes clearly evident, necessary to plan a proper management of the next pregnancy. This is the case of both our patients, with a previous CS for placenta previa and a hysterotomy performed more cranially than usual, involving the uterine contractile tissue and possibly increasing the risk of UR [13]. Moreover, an ultrasound measurement of the distance between the CS-scar and the internal uterine orifice may screen the patients with a high risk of UR, both during the preconception counselling and the early pregnancy. All the possible risk factors for UR should be investigated when counselling these patients. About our cases:

- the first patient had a 32 weeks CS for placenta previa abruption, thus statistically increasing the risk of UR, even in case of LUS hysterotomy (1.8% pre-term Vs 0.4% term-pregnancy) [14].
- the second patient had an elective-CS at 39 weeks that should be taken in account as well; also, in these cases the risk of UR is increased, related to a suboptimal scar healing [15].

The last statement has two possible explanations: firstly, an incision over a less developed LUS can be related to a deeper myometrial damage; secondly, without a cervical dilatation and a full uterine drainage, there is a higher risk of post-partum infection, abnormal scar healing and UR[16]. The amount of time from the last CS is another important risk factor; in our cases, it was of 16 and 21 months respectively. By reviewing the current literature, the importance of this detail is clear but a standard 'safe' range of time is not reported. Some studies suggest a 6 to 19 months period, other Authors prefer an interval of 12 or 18 months, an observational study by Bujold focuses on 1500 women and, removing all the biases (type of stitches, oxytocin induction, and epidural anaesthesia) but still preserving an odds ratio for UR of 2.65 (95% CI 1.08–6.46), suggests a period of 24 months as the best one [17]. Finally, literature confirms the higher risk of UR for patients with a recent CS and the period of 18–24 months results to be the safest

one [18]. This evidence points out another risk factor for our patients, probably contributing to the final outcome and confirming again the importance of a detailed pre and post-delivery counselling.

Conclusions

When counselling patients with a previous CS, detailed information about the short and long-term related risks factors should be investigated and collected, including the distance of time (less than 18–24 months) since the last CS and the type of hysterotomy performed. Ultrasounds can measure the distance between the CS-scar and the internal uterine orifice or the vesico-vaginal pouch, useful for patients who had an incision higher than usual: this parameter is not yet standardized but it could detect the height of the CS-scar to assess the risk of UR[19].Ongoing pregnancies should be investigated for all the possible anamnestic risk factors: reason for CS ,type of hysterotomy, other uterine surgeries, gestational age at the time of CS, emergency or planned surgery, range of time from the last pregnancy, and height of the incision (also assessable by ultrasounds). Through this approach, we can perform a proper risk assessment and schedule serial follow-ups to early detect and treat a possible UR. This could make shorter the step between diagnosis and surgery, thus having more time to manage safely the emergency (expert clinician, promptly available blood products, and well-equipped facilities). Consequently, the early screening of potentially at-risk pregnancies would allow to plan a periodic follow-up of these patients and the rapid detection of UR symptomatology. This could be extremally important, since a preventive diagnosis and early intervention may significantly improve maternal and fetal outcome. Therefore, this experience could represent a cornerstone for further discussion about this topic, and may provide useful recommendations for national and International Gynaecological-Obstetric society.

Declarations

Ethical Approval and consent to participate

There is no formal approval of the Ethics Committee, but the procedures were carried out in accordance with the Helsinki Declaration, as revised in 2013.

Informed consent was obtained from the patients through a dedicated form containing study design.

Consent for Publication

Written informed consent for the anonymous publication of information relating to the disease was regularly obtained from all individual participants included in the study, during the medical interview with the patient prior to the surgical treatment.

Availability of data and materials

The datasets used during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests

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Author’s contributions

MD conceived of the study, **FMC** approved the submitting version, **XH** did the literature search, **AV** drafting the word and revising it. Both authors collaborated in the preparation of the manuscript, read and approved the final manuscript.

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References

1. Soltsman S, Perlitz Y, Ben Ami M, Ben Shlomo I. Uterine rupture after previous low segment transverse cesarean is rarely catastrophic. *J Matern Fetal Neonatal Med.* 2018;31(6):708-712
2. Habeš D, Střecha M, Kalousek I, Kestřánek J. Uterine rupture during pregnancy. Ruptura dělohy v graviditě. *Ceska Gynekol.* 2019;84(5):345-350.
3. Eshkoli T, Weintraub AY, Baron J, Sheiner E. The significance of a uterine rupture in subsequent births. *Arch Gynecol Obstet.* 2015;292(4):799-803.
4. Baron J, Weintraub AY, Eshkoli T, Hershkovitz R, Sheiner E. The consequences of previous uterine scar dehiscence and cesarean delivery on subsequent births. *Int J Gynaecol Obstet.* 2014;126(2):120-122.
5. Lannon SM, Guthrie KA, Vanderhoeven JP, Gammill HS. Uterine rupture risk after periviable cesarean delivery. *Obstet Gynecol.* 2015;125(5):1095-1100.
6. Al-Zirqi I, Stray-Pedersen B, Forsén L, Daltveit AK, Vangen S. Uterine rupture: trends over 40 years. *BJOG.* 2016;123(5):780-787.
7. Pavlović M, Zudenigo D, Kerner M, Mikuš M, Matak L. The management of unusual uterine rupture: new aspects [published online ahead of print, 2020 Jul 28]. *J Obstet Gynaecol.* 2020;1-2.
8. Nagao Y, Osato K, Kubo M, Kawamura T, Ikeda T, Yamawaki T. Spontaneous uterine rupture in the 35th week of gestation after laparoscopic adenomyomectomy. *Int Med Case Rep J.* 2015; 9:1-4.

9. Date S, Murthy B, Magdum A. Post B-lymph uterine rupture: case report and review of literature. *J Obstet Gynaecol India*. 2014;64(5):362-363.
10. Vimercati A, Del Vecchio V, Chincoli A, Malvasi A, Cicinelli E. Uterine Rupture after Laparoscopic Myomectomy in Two Cases: Real Complication or Malpractice? *Case Rep Obstet Gynecol*. 2017; 2017:1404815.
11. Vogel JP, Betrán AP, Vindevoghel N, et al. Use of the Robson classification to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. *Lancet Glob Health*. 2015;3(5): e260-e270.
12. Tomczyk KM, Wilczak M, Rzymiski P. Uterine rupture at 28 weeks of gestation after laparoscopic myomectomy - a case report. *Prz Menopauzalny*. 2018;17(2):101-104.
13. Wu X, Jiang W, Xu H, Ye X, Xu C. Characteristics of uterine rupture after laparoscopic surgery of the uterus: clinical analysis of 10 cases and literature review. *J Int Med Res*. 2018;46(9):3630-3639.
14. Chao AS, Chang YL, Yang LY, et al. Laparoscopic uterine surgery as a risk factor for uterine rupture during pregnancy. *PLoS One*. 2018;13(5): e0197307.
15. American College of Obstetricians and Gynecologists' Committee on Practice Bulletins—Obstetrics. ACOG Practice Bulletin No. 205: Vaginal Birth After Cesarean Delivery. *Obstet Gynecol*. 2019;133(2):e110-e127.
16. Lannon SM, Guthrie KA, Vanderhoeven JP, Gammill HS. Uterine rupture risk after periviable cesarean delivery. *Obstet Gynecol*. 2015;125(5):1095-1100.
17. Chen Y, Han P, Wang YJ, Li YX. Risk factors for incomplete healing of the uterine incision after cesarean section. *Arch Gynecol Obstet*. 2017;296(2):355-361.
18. Brahmakshmy BL, Kushtagi P. Variables influencing the integrity of lower uterine segment in post-cesarean pregnancy. *Arch Gynecol Obstet*. 2015;291(4):755-762.
19. Tanos V, Toney ZA. Uterine scar rupture - Prediction, prevention, diagnosis, and management. *Best Pract Res Clin Obstet Gynaecol*. 2019; 59:115-131.

Table 1

Due to technical limitations Table 1 is available as a download in the Supplementary Files.

Figures

Figure



Figure A: CASE 1 - gestational sac outside the uterus, expelled through the dehiscent hysterotomic breach and immediately visible when opening the abdomen.



Figure B: CASE 2 – (gestational age: 7wks) the ultrasound assessment shows the previous CS-scar located above the lower uterine segment

Figure 1

(captions are in Figure)

Supplementary Files

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- TABLE.jpg