CASE REPORT

Antepartum uterine rupture at 29 weeks gestation following unilateral salpingectomy and review of literature

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Accepted 3 March 2017

SUMMARY

Antepartum uterine rupture following salpingectomy is a rare condition and is associated with high fetal and maternal mortality and morbidity. We illustrate a 33-year-old primigravida who presented with abdominal pain at 29 weeks of gestation. Her previous obstetric history included a ruptured right ectopic pregnancy for which she underwent laparoscopic salpingectomy with no breach of uterine cavity. Her antenatal care had otherwise been unremarkable. Following admission for undetectable fetal heart, ultrasound and CT demonstrated an extrauterine fetus at the right adnexal region with free fluid consistent with intra-abdominal haemorrhage. An exploratory laparotomy was performed which revealed a uterine rupture at the right cornua with the extruded fetus en caul. The fetus was delivered and the uterus repaired in three layers. The patient made an uneventful postoperative recovery and was discharged 5 days following surgery. We review the current literature including the evaluation and management of this rare condition.

BACKGROUND

Uterine rupture is defined as a disruption of the integrity of the uterine myometrium, often with catastrophic maternal and fetal consequences.

Spontaneous uterine rupture is a rare obstetric event, usually associated with prior surgical or traumatic disruption to myometrium, including labour. In the absence of labour, the risk after one lower segment caesarean section has been described as 1.6 per 1000 deliveries. The risk rises at the onset of labour (5.2–24.5 per 1000 deliveries),^{1 2} depending on the nature of the labour. The risk of uterine rupture after a classical caesarean section is significantly higher (40–90 per 1000 deliveries).^{1 2}

Many obstetricians have viewed myomectomy to be associated with an increased risk of uterine rupture. However, there is still paucity of high-level data regarding this complication. One study by Gyamfi-Bannerman showed that there were no differences in rupture rate compared to a patient who had had a previous lower segment caesarean section.³ However, in that study, all women with a prior myomectomy delivered by repeat caesarean section (with or without labour) and were significantly more likely to be delivered at an earlier gestational age. Another study reported a rupture rate of 2 per 1000 births.⁴ However, a small Canadian survey showed obstetricians were more likely to draw parallels between a myomectomy where there has been a breach of the uterine cavity during the

procedure with a classical caesarean section and therefore recommended repeat caesarean section for the increase perceived risks.⁵

Thus far, there have only been three case reports of uterine rupture after a salpingectomy. Inovay reported one such case of a corneal dehiscence in a patient after salpinectomy.⁶ This follows reports of the same by Lizan in 1986.⁷

CASE PRESENTATION

A 33-year-old gravida three nulliparous woman of Southeast Asian decent with a history of first trimester spontaneous miscarriage, complete without intervention. Subsequent pregnancy was a ruptured right ectopic pregnancy at 5 weeks gestation at the right tubal isthmus requiring emergency laparoscopic right salpingectomy bipolar energy. Ectopic pregnancy was excised and uterine cavity was not breached. Bipolar energy source was used. The third pregnancy was essentially uncomplicated apart from gestational diabetes that was well controlled by diet alone. Her pregnancy ultrasound scans including nuchal translucency, morphology and 27-week growth scan were all unremarkable.

At 29 weeks, she presented to hospital overnight with non-specific lower abdominal pain with one in 10 minutely contractions. There was no history of premature rupture of membranes, antepartum haemorrhage or trauma. She had reported normal fetal movements. Cardiotocography was reassuring. Examination revealed a soft abdomen; cervix was long and closed with a negative fetal fibronectin test result. Patient was discharged home but represented a few hours later with worsening abdominal pain and antepartum haemorrhage. No fetal movements were felt since discharge. Examination on this presentation revealed a rigid and tender abdomen, cervix was 1 cm dilated with bulging membranes and pooling of fresh blood in the posterior fornix. Fetal heart sounds were not detected on Doppler and fetal death in utero was confirmed on bedside ultrasound. Given her haemodynamic stability, the patient was admitted for a formal ultrasound the next day. The ultrasound revealed an empty uterus (figures 1 and 2) with the extrauterine pregnancy in the right adnexal region, and confirmed fetal demise. There was considerable free fluid in the pelvis suggestive of intra-abdominal haemorrhage. A CT abdomen and pelvis was also performed to obtain more information regarding bowel and placental involvement (figure 3). The CT examination revealed an intra-abdominal

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To cite: Huang Y-T, Yim SL-Y, Kapurubandara S, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2015-211359

Figure 1 USS image demonstrating the empty uterine cavity.

Figure 2 Free fluid in the pouch of Douglas, with an empty uterus.

Figure 3 CT demonstrating extrauterine location of fetus, placenta and amniotic sac.

pregnancy secondary to uterine rupture in the mid-upper abdomen in the transverse oblique plane. Gas bubbles were noted within the fetus consistent with fetal demise. Placenta was anterior, centred at the level of the umbilicus. Patient was transferred to a tertiary centre for explorative laparotomy. Laparotomy findings:

- ▶ fetal demise
- ▶ intra-abdominal fetus delivered en caul, 1340 g (figures 4 and 5)

Figure 4 The ruptured uterus.

- ▶ ruptured uterus at the right cornua
- ▶ haemoperitoneum 200 mL
- ▶ placenta complete
- ▶ normal ovaries bilaterally
- ▶ normal left fallopian.

Postoperative recovery was uneventful. Postmortem was declined by the patient.

OUTCOME AND FOLLOW-UP

Histopathology findings of the placenta were unremarkable and chromosome microarray of the umbilical cord revealed a normal fetal karyotype. Patient was discharged day 5 with follow-up at first and sixth week to debrief events and counsel regarding future pregnancies.

DISCUSSION

Traditionally, uterine rupture refers to the disruption of all uterine layers including the serosa. Dehiscence of the uterine scar, on the other hand, refers to the separation of all uterine layers except the serosa. The most common cause of such disruption of uterine integrity is a history of uterine surgery, including caesarean sections (lower segment or classical incision) and/or myomectomies with or without breach of the uterine cavity. Surgical technique, operator experience and suture material used are all factors that can contribute to such disruption of the uterine scar.⁷ Other predisposing factors to uterine rupture include anatomical uterine anomalies and abnormal implantation of pregnancies such as those within the rudimentary horn of uteri.⁶

Less commonly are other non-uterine gynaecological surgeries that can affect the integrity of the uterine tissue, such as salpingectomies. Our literature review has only identified three other case reports of uterine rupture post salpingectomy.^{6–8} One case reported a previous elective laparoscopic bilateral salpingectomy without cornual resection prior to in vitro fertilisation (IVF) as

Figure 5 The fetus, membranes and placenta were delivered en caul.

treatment for bilateral hydrosalpinx.⁷ This patient subsequently became pregnant through IVF. At 14 weeks gestation, the patient presented with lower abdominal pain with vaginal spotting. Ultrasound revealed oligohydramnios with a non-viable fetus whose lower limbs were protruding outside the uterus. Laparotomy revealed a uterine rupture at the right cornual region with fetal lower limbs within the amniotic sac protruding through the rupture, as well as a 1-cm dehiscence at the contralateral cornual region. The two latter cases, which were reported in French and Danish by Inovay in the 1980s, also described cases of uterine rupture postsalpingectomy.^{6–8}

This case presented challenges of detecting uterine rupture in the early third trimester with only slight abdominal symptoms. The knowledge of previous salpingectomy without breach of the uterine cavity had been overly reassuring. Despite clear documentation to state that the uterine cavity was not breached, one can only speculate if lateral diathermy injury incurred to weaken and scar the right cornual region inadvertently.

With such high maternal and fetal morbidities and mortalities at stake, the existing literature was explored to determine preventative and management pathways, which can be instigated on obstetric patient with previous gynaecological surgeries. Inovay *et al*⁶ made the suggestion of partial salpingectomy in an attempt to avoid injury to uterine muscle with the disadvantage of increasing the risk of recurring ectopic pregnancies. Contrary to this minimally invasive and conservative option, this group also proposed salpingectomies with cornual resection and subsequent uterine reconstruction. The obvious disadvantage of this approach being the need for laparotomy may arise.

The current use of imaging to detect uterine dehiscence and the role of diathermy in salpingectomy was explored. Clinical symptoms can be often non-specific and a high index of clinical suspicion is essential. Ultrasound features can be non-diagnostic unless specific attention is paid to the location of the myometrium with respect to the gestational sac. The typical features demonstrate a uterine wall defect with a fetus outside the

uterine cavity, with other associated symptoms suggestive of pelvic free fluid, bulging membranes and placenta previa or percreta.^{9–11}

CT scanning has also been used in the diagnostic process of uterine rupture especially in the context of maternal trauma in order to identify the extent of fetal and maternal injuries.¹² The limiting factor with the use of CT scan is maternal and fetal exposure to radiation. MRI is another imaging modality that has been mentioned in the literature which has the advantage of demonstrating soft tissue contrast, the ability to highlight myometrial defect along with spatial relations of the placenta, uterus, fetus and pelvic structures.¹³ MRI can be used to diagnose or confirm suspicion of uterine rupture and thereby assist with counselling and meticulous surgical planning of this potentially life-threatening emergency.

Current practice is at the discretion of the specialist to monitor myometrial thickness and integrity in patients at risk of uterine rupture using ultrasound or MRI in the absence of robust evidence to support their use. To date there is no reliable data of what the benchmark ‘norm’ of myometrial thickness should be or how thin the myometrium can become to prompt early delivery.^{14 15}

Current salpingectomy techniques can be performed by laparoscopic or laparotomy approach. Laparoscopic salpingectomy can be described by using surgical loop, surgical clips, carbon dioxide laser or electrosurgical excision. Laparotomy techniques mainly involve ‘clamp, cut and tie’ of the pedicle. Resection of the fallopian tube can be partial or complete. The techniques used are at the discretion of the surgeon.

The discussion lies whether the use of electrocautery is ideal in salpingectomies when there are known potential lateral diathermy injuries to the myometrium, which is avoidable considering there are other techniques available to achieve the same result. However, as uterine rupture post salpingectomy is a rare obstetric event, there is insufficient data to support this conclusion to justify change in practice. Mindfulness is recommended when using electrocautery to perform the salpingectomy in order to prevent inadvertent lateral thermal tissue damage particularly to the myometrium. A prospective randomised control trial looked at the outcomes of using pretied surgical ligatures (ENDOLOOP, Ethicon) versus electrocautery techniques for salpingectomy, which demonstrated comparable surgical outcomes; however, long-term implications were not reviewed in this study.¹⁶ A prospective or retrospective cohort study comparing laparoscopic salpingectomy performed using pretied surgical ligatures versus electrosurgery to explore the short-term and long-term outcomes further. This will be challenging given the rate of complications are so small; a very large sample size is required to adequately power such a study.

Learning points

- ▶ Uterine rupture post salpingectomy is a very rare adverse obstetric event.
- ▶ Currently there is insufficient evidence to recommend one laparoscopic salpingectomy technique over others.
- ▶ This case raises the need to be attentive when performing salpingectomy using electrosurgery especially near myometrium of the uterus.

Acknowledgements We would like to thank the patient for allowing us to publish this case so that the wider community may benefit from our findings.

We would also like to thank Dr Imad Mahmoud who was involved in the clinical management of this patient for his guidance and expertise.

Contributors All authors have contributed to the design, data collection and analysis of this article. Namely, Y-TH, SL-YY and SK were the contributors to literature review and the writing of the piece including technical support in editing the piece as required by publisher. AA oversaw the process and provided guidance in putting the above together.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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