**Case Report**

**“Showercap” Sign: Spontaneous Uterine Rupture in a Primiparous Woman**

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**ABSTRACT**

A 32-year-old primiparous woman presented with severe abdominal pain at 21 weeks' gestation. Background history of laparoscopy for chronic pelvic pain and a spontaneous miscarriage was noted. On examination, she was peritonitic and tachycardic with low grade fever and anemia. MRI abdomen demonstrated a uterine rupture with a large cap of clotted blood overlying the uterine fundus with the appearance of a “shower cap” and large volume haemoperitoneum, the presumptive diagnosis was uterine rupture with placental extrusion. Emergency laparotomy confirmed a two litre haemoperitoneum due to a 3cm defect at the uterine fundus through which a portion of placenta and membrane were extruding. Hysterotomy and delivery of the non-viable fetus was performed. The defect was repaired. It is important to remember that there are many causes of acute abdominal pain in pregnant patients, obstetric and other. Uterine rupture is a rare but life-threatening cause. An underlying risk factor is usually identified.

**INTRODUCTION**

Uterine rupture is a serious obstetric complication with high risk of feto-maternal morbidity and mortality. It is defined as separation of the entire thickness of the uterine wall with extrusion of fetal parts and intra-amniotic contents into the peritoneal cavity¹. This rare complication has an incidence of <1% in women with scarred uteri, however it is extremely rare in the unscarred uterus with a suggested incidence of only 0.006%²-³. Non-contrast MRI is being increasingly used in pregnant patients in the emergency setting for rapid and accurate identification of aetiology of abdominal pain⁴. Our case is of a 32-year-old primiparous patient, 21 weeks gestation with severe abdominal pain without any clearly defined risk factors for rupture on initial enquiry.

**CASE REPORT**

At 21 weeks gestation, our patient, gravida 2 para 0, presented to her maternity unit with a two hour history of sudden onset severe abdominal pain and two episodes of diarrhoea. No vaginal bleeding was noted. Background history included a spontaneous complete miscarriage 5 months previously. Past medical history included a diagnostic laparoscopy for chronic pelvic pain, peptic ulcer disease, and depression.

Maternal observations were notable for intermittent tachycardia, a brief hypotensive episode, responsive to fluids and a temperature spike to 38.1°C. Haemoglobin at presentation was 11.6 g/dL. Fetal assessment ultrasound was unremarkable, the fetal heartbeat was present. There was a clinical suspicion of appendicitis. Septic screen was performed and empiric antibiotics were given before transfer to tertiary general hospital for general surgical review.

On examination, her abdomen was tender, with rebound and signs of peritonitis. The haemoglobin had been slowly trending downwards from initial 11.6g/dl to 8.9g/dl.

![Fig 1. T2 weighted sagittal and coronal images of the defect at the fundus of the uterus with placental extrusion (white arrows).](image)

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a “shower cap” and was thought to represent clotted blood or extensive placental extrusion or percreta (Fig 2). The appendix was unremarkable.

An emergency laparotomy was performed. The MRI findings clearly correlated with 3cm defect at the uterine fundus through which a portion of placenta and membrane were extruding (Fig 3), and large volume haemoperitoneum with a cap of clotted blood over the uterus corresponding to the “shower cap” sign seen on MRI. Hysterotomy via a linear extension of the uterine defect was performed, the non-viable fetus was delivered and the uterus was repaired. The course of her physical recovery as an inpatient was uncomplicated.

It emerged on retrospective review that there had been inadvertent uterine rupture at the time of prior laparoscopy for chronic pelvic pain, this had not previously been disclosed to the patient.

DISCUSSION

Uterine rupture is rarely seen in modern radiology practice. The majority of uterine ruptures occur intrapartum in the third trimester. It classically presents when a previously scarred uterus (most commonly caesarean section) is further stressed by labour, and patients are transferred directly to the operating room without preoperative imaging.

Other predisposing factors include induction of labour or oxytocin augmentation, uterine anomalies, grand multiparity among others. Third trimester uterine rupture classically involves the lower segment, regardless of whether the uterus is scarred or not. First and second trimester ruptures occur typically at the fundus. Nulliparous women have been described as “virtually immune to rupture”, especially before the onset of contractions. This case was especially confounding as it occurred in the second trimester, in a primiparous patient, with no apparent uterine scar or anomalies, although this was later found not to be the case.

Magnetic resonance imaging (MRI) is commonly used for the assessment of the acute abdomen in pregnant women as a second line imaging modality after ultrasound. In our institution, we use a rapid sequence multiphasic T2 weighted protocol, imaging in the axial, coronal and sagittal planes. The protocol takes approximately 15 minutes to complete.

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Appendicitis often needs to be excluded and MRI has been proven to be accurate in the diagnosis of appendicitis, while also giving information regarding other relevant structures such as the kidneys, bowel, gallbladder and pelvic organs. MRI is not routinely used for imaging abdominal emergencies as it is less available out of hours and imaging can take considerably longer than an equivalent CT study. However, during pregnancy, the gravid uterus causes anatomical distortion of the abdomen and pelvis which decreases the sensitivity of ultrasound.

The absence of ionising radiation renders MRI relatively safe in pregnancy. There are some concerns of the heating effect on the placenta during prolonged image acquisition, so rapid sequence multiphasic T2 sequences with high soft tissue resolution are acquired and the patient is removed from the magnetic field as quickly as possible. Rapid sequence acquisition also minimizes any delay in diagnosis and treatment - hugely advantageous in the setting of an acute abdomen. Despite concerns, there has been no documented teratogenic effect. Gadolinium based contrast agents cross the placenta and hence its administration is not recommended in pregnant patients unless the benefit outweighs the risk.

A gravid young woman in a hyperdynamic circulatory state can lose 2.5L of her circulating volume before becoming symptomatic. The importance of a thorough history and attention to the physical examination cannot be overemphasised. The initial differential diagnosis in a pregnant woman with abdominal pain always includes the most obvious obstetric causes: constipation, urinary tract infections, uterine contractions, musculoskeletal pain, and,
less commonly, placental abruption, as well as non-obstetric causes including cholecystitis and appendicitis. On MRI, the diagnosis of uterine rupture became readily apparent and the appearance clearly correlated with the intraoperative findings, without delaying intervention. We wish to describe the novel “showercap” sign on T2 weighted MRI corresponding with clotted blood products overlying the point of uterine rupture.

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