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## A diagnostic challenge: spontaneous hemoperitoneum in pregnancy *versus* uterine rupture

Stefano Restaino<sup>1</sup>, Ginevra Battello<sup>2\*</sup>, Sara Olivola<sup>1</sup>, Martina Arcieri<sup>1</sup>, Lorenza Driul<sup>2</sup>, Giuseppe Vizzielli<sup>2</sup>

<sup>1</sup> ASUFC – Udine, Department of Gynecology and Obstetrics, Udine, Italy.

<sup>2</sup> DMED Department of Medicine, University of Udine, Udine, Italy.

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\*Corresponding author: Ginevra Battello,  
M.D. DMED Department of Medicine,  
University of Udine, via Colugna 50, 33100  
Udine, Italy.

Email: battello.ginevra@spes.uniud.it.

ORCID: 0000-0001-8429-5317.

### ABSTRACT

**Background.** Spontaneous hemoperitoneum in pregnancy (SHiP) is a rare but life-threatening complication. SHiP typically presents with abdominal pain, hypovolemia, and decreased haemoglobin in later pregnancy.

**Case presentation.** A 38-year-old woman with a history of one prior caesarean section, and otherwise in good health, presented at 29 weeks of gestation with sudden onset of abdominal pain. Ultrasound revealed free fluid in her abdomen, raising concern for uterine rupture due to the previous caesarean section. However, a dedicated ultrasound examination ruled this out. Laparoscopy confirmed the absence of uterine involvement. The lower uterine segment was intact and was not the source of bleeding; indeed, the source of bleeding was identified as a 2-cm clot in the left fallopian tube resulting on histology an endometriosis foci.

**Conclusions.** This case highlights the importance of considering SHiP in the differential diagnosis of acute abdomen during pregnancy, even in the absence of known risk factors because a high index of suspicion for SHiP is crucial for prompt diagnosis and intervention, aiming for optimal maternal and fetal outcomes.

### BACKGROUND

The differential diagnosis of pain and sonographic findings of intra-abdominal effusion during pregnancy or in the hours immediately following birth is complex and requires careful consideration of various potential causes. Uterine rupture [1], a life-threatening obstetric emergency, must

be promptly excluded. However, other conditions such as spontaneous hemoperitoneum in pregnancy (SHIP), bladder rupture [2], and ascites [3] can present with similar clinical features. A thorough evaluation, including imaging studies, laboratory tests, and clinical assessment, is essential to differentiate between these conditions and ensure appropriate management.

In particular, spontaneous hemoperitoneum in pregnancy (SHiP) is defined as a sudden non-traumatic intraperitoneal bleeding in pregnancy and up to 42 days postpartum [4]. SHiP typically presents during the latter stages of pregnancy, accompanied by a combination of abdominal pain, signs of hypovolemia, a decrease in haemoglobin levels, and foetal distress. This condition carries a significant risk of maternal and perinatal mortality and morbidity [5]. Due to the absence of comprehensive global surveillance, estimating the exact incidence of SHiP remains challenging. However, a study conducted by the Italian Obstetric Surveillance System (ItOSS) between 2013 and 2017 documented seven maternal deaths attributed to SHiP and calculated a specific maternal mortality rate (MMR) of 0.2 cases per 100,000 live births [6]. While the precise aetiology of SHiP remains unclear, advanced maternal age, endometriosis [7], multiple pregnancies and assisted reproductive technologies (ART) have been suggested as potential risk factors [8, 9].

The case we are about to present is unique in its kind, as it is a case of spontaneous hemoperitoneum in pregnancy in a patient with previous caesarean section. This case underlines the importance of making a correct differential diagnosis, because in a pregnant patient with previous uterine surgery, the onset of abdominal pain and the presence of intra-abdominal fluid do not necessarily mean uterine rupture.

## CASE PRESENTATION

We present the case of a 38-year-old woman, G3P1, with a previous obstetric history of a full-term caesarean section for arrested labour, pregnant at 29 weeks of gestation with a sudden onset of acute abdominal pain.

Ultrasound performed upon admission showed a moderate amount of free fluid collection in both the hepatic and splenic recesses, extending into the pelvis. At the level of the lower uterine segment, in the site of a previous caesarean section scar, there are no apparent signs of dehiscence or rupture of the uterine wall. Blood tests revealed a haemoglobin level of 9.2 g/dL.

Twelve hours after the previous tests, a blood sample was repeated and attested a sudden drop of the haemoglobin level at 8.3 g/dL. A repeated ultrasound revealed diffuse abdominal free fluid

collection, increased in volume compared to the previous imaging documentation, with echogenicity compatible with a haemorrhagic type of fluid collection.

It was decided to administer antenatal corticosteroid prophylaxis and foetal neuroprotection with magnesium sulphate. Due to persistent acute abdominal pain, anaemia with signs of initial hemodynamic instability in a suspected case of hemoperitoneum, an urgent surgical intervention was decided. A diagnostic laparoscopy was performed to investigate intra-abdominal bleeding. Blood clots were found in the parietocolic gutters, hepatic lodge, and splenic lodge and about 1,300 mL of blood in the abdominal cavity was evacuated. No active bleeding from the upper abdomen seemed to be present. However, the gravid uterus impeded adequate visualization of the lower abdomen, preventing identification of the bleeding source.

Therefore, a decision was made to convert to laparotomy based on the haemodynamic instability of the patient and the confirmed significant hemoperitoneum (> 1,000 cc) found on laparoscopic approach. Upon open exploration, no active upper abdominal bleeding was confirmed. While the pelvic cavity was thoroughly examined, no signs of uterine rupture or bleeding from previous scar sites were detected. The laparotomic surgical approach allowed for a complete visualization of the pelvis, leading to the identification of the active bleeding focus: a 2-cm firm clot with surrounding inflammation and active bleeding in the middle third of the left fallopian tube. Additionally, a secondary bleeding site was found on the omentum. Due to the patient's deteriorating hemodynamic status, an emergency caesarean section was decided.

A transplacental transverse corporal incision was performed, and a female newborn was extracted. The neonate weighed 1,237 grams and had an APGAR score of 1/4/7, umbilical cord pH was 7.30 with a BE of -2.3 mMol/L. The newborn required intubation and ventilation, and surfactant was administered. The newborn was subsequently extubated at 6 hours of life with a good neonatal outcome. After the caesarean section, a salpingectomy and a partial omentectomy were therefore performed. No other sources of bleeding were evident. The histological results were unexpected, demonstrating foci of endometriosis in the fallopian tube, even though there was no previous medical history suggestive of endometriosis.

## DISCUSSION

Hormonal changes during pregnancy can exert a substantial impact on the endometriotic tissue, in a process termed “decidualization” of ectopic endometrium, ultimately increasing the likelihood of bleeding from endometriotic lesions [10].

This phenomenon of decidualization explains why endometriosis is a major risk factor for SHiP. Unfortunately, endometriosis is still an underdiagnosed and underestimated condition, as evidenced by the case presented of an incidental diagnosis of endometriosis following a case of spontaneous hemoperitoneum of pregnancy.

In our case, the most obvious differential diagnosis was the previous caesarean section scar rupture but that was ruled out by a sonographic evaluation of the lower uterine segment. In our Clinic we routinely perform an ultrasound evaluation of the lower uterine segment (LUS) in pregnant women with a history of caesarean delivery. We use state-of-the-art ultrasound equipment and highly trained sonographers to perform LUS evaluations. Acquiring a high level of expertise in ultrasound evaluation of the lower uterine segment is essential for optimal maternal and foetal care in pregnant women with a previous caesarean section. Our team has extensive experience in interpreting ultrasound images and can identify even subtle abnormalities [11]. The expertise in sonographic LUS evaluation allows to accurately assess the thickness and integrity of the LUS and identify or rule out potential complications such as uterine rupture and dehiscence of a previous caesarean scar.

## CONCLUSIONS

Spontaneous hemoperitoneum of pregnancy (SHiP) is a critical differential diagnosis in cases of acute abdominal pain during pregnancy. It should be considered especially in women with risk factors like endometriosis or those who have undergone assisted reproductive technologies (ART). However, as this case demonstrates, SHiP can occur even in the absence of known risk factors, and therefore, it should always be considered as a possible cause of acute abdominal pain in pregnant women, regardless of their medical history, and even if other conditions, like a ruptured caesarean scar, seemed more likely.

Early and accurate differential diagnosis is essential, as the therapeutic approach differs significant-

ly from SHiP to uterine rupture. While with uterine rupture always necessitates a caesarean section, in cases of SHiP, in the presence of maternal hemodynamic stability and after identifying and controlling the bleeding site, it is possible, in some cases, to continue the pregnancy [12].

## COMPLIANCE WITH ETHICAL STANDARDS

### Authors' contribution

S.R.: Conceptualization. S.O.: Data curation. L.D., G.V.: Supervision. G.B.: Writing – original draft. M.A.: Writing – review & editing.

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### Disclosure of interests

The authors declare that they have no conflict of interests.

### Ethical approval

IRB approval was obtained (RIF. Prot IRB: 42/2024).

### Informed consent

Patient's consent to publication was obtained.

### Data sharing

N/A.

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