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# Abdominal apoplexy in late trimester of pregnancy: Case reports

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## Abstract

**Background:** Abdominal apoplexy or Idiopathic Spontaneous Intraperitoneal Hemorrhage (ISIH) is rare and refers to intra-abdominal hemorrhage caused by spontaneous rupture of blood vessels in the abdominal cavity or retroperitoneum. The clinical diagnosis of abdominal apoplexy during pregnancy is rarer, and often made only after emergent exploratory laparotomy is performed for unstable vital signs and severe anemia. Affected by an enlarged uterus during pregnancy, the symptoms and signs of acute abdomen may be confused with placental abruption or other more common complications of pregnancy. **Case presentation:** Both cases in the study showed that the main symptoms were abdominal pain, hypotension, nausea, vomiting, and other associated blood loss symptoms of varying degrees. Due to its sudden onset, this dangerous condition with no typical symptoms and signs can be easily misdiagnosed, two cases were given urgent surgery finally. At a 12-month follow-up, no abnormalities were observed during medical examinations of both mother and child. **Conclusions:** The clinical diagnosis of abdominal apoplexy during pregnancy usually needs emergent exploratory laparotomy to find the hemorrhagic spot. We analyzed and summarized two cases of abdominal apoplexy in the late third trimester of pregnancy in and aims to provide certain clinical reference for surgeons when seeing the abnormal sustaining abdominal pain during pregnancy so that adverse pregnancy outcomes can be avoided.

**Keywords:** Abdominal apoplexy; late trimester of pregnancy; emergency

## 1. Introduction

Abdominal apoplexy refers to intra-abdominal hemorrhage caused by the spontaneous rupture of blood vessels in the abdominal cavity or retroperitoneum. The main manifestations are sudden onset of abdominal pain and hypovolemic shock, excluding abdominal aortic

aneurysm rupture, traumatic visceral vascular rupture, ectopic pregnancy, and spontaneous liver, spleen, kidney rupture, etc. [1] It is clinically rare and has no typical symptoms and signs, making it difficult to distinguish from other surgical and obstetrical causes of acute abdomen; thus, the misdiagnosis rate is high. Due to its sudden onset, intense symptoms can lead to hemorrhagic shock and end-organ failure in a short time, making the prognosis poor. According to previous studies, its non-surgical treatment mortality rate is 100% [2]. Abdominal apoplexy in pregnant women is even rarer. Two cases of abdominal apoplexy diagnosed by abdominal exploration in the third trimester of pregnancy in Department of Obstetrics, Shenzhen Hospital of Southern Medical University in 2017 and 2020 are reported as follows.

Case 1: 36-year-old female patient, G2P0, was admitted to the hospital on June 26, 2017, due to “menopause for 37 weeks + 5 days, and hypogastralgia for three days, which worsened during the last half-day”. Past history showed that the patient underwent IVF-ET due to “bilateral fallopian tube obstruction” on October 31, 2016, and previously underwent “laparoscopic pelvic lysis of adhesions, left fallopian tube resection, and right fallopian tuboplasty” on November 18, 2016, due to “twins: one intrauterine pregnancy, one ectopic pregnancy”. Regular birth check-ups were performed during the pregnancy. Gestational diabetes was diagnosed at 26+ weeks of gestation. The patient experienced intermittent right lower quadrant pain without obvious cause 3 days before admission, which was aggravated in the standing position while being relieved in the supine and lateral position, and increased on the day of admission. Body temperature: 36.5°C, pulse: 80 bpm, respiration: 20 bpm, blood pressure: 115/67mmHg, no abnormalities found on cardiopulmonary auscultation, right lower abdomen tenderness and rebound pain were obvious, mobile dullness was negative, percussion pain in both kidneys were negative and intermittent uterine contractions could occasionally be palpated, that were of low to moderate intensity. Fetal ultrasound indicated that the fetus was 36+ weeks with a posterior placenta. The ultrasound of the appendix indicated that there was a hypoechoic mass with a diameter of about 15mm that correlated with the pain point in the right lower abdomen. The emergency blood tests on admission showed that white blood cell count was (WBC)  $13.07 \times 10^9/L$ , neutrophil percentage (NEUT%) 78.9%, hemoglobin (HGB) 127g/L, platelet count (PLT)  $191 \times 10^9/L$ , C-reactive protein (CRP) 46.0mg/L. Exploratory laparotomy with a lower uterine cesarean section was performed. During the operation, a large flame-like inflammatory hyperplastic piece of tissue was seen on the surface of the uterus. The texture was flimsy and friable. The omentum was densely adherent and wrapped around the fundus of the uterus. Scattered blood clots were seen with dark red blood accumulation in the intestinal space. The total amount of bleeding was about 100 ml. Active bleeding was seen in the venous plexus on the right corner of the uterus. The greater omentum had undergone a torsion of 720 degrees at the right corner of the uterus, and ischemic necrosis was seen. Considering abdominal apoplexy (hemorrhage of the venous plexus at the right corner of the uterus) and torsion of the greater omentum with appendicitis, a lower transverse uterine cesarean section was performed along with ligation of the right uterine venous plexus, partial omentectomy, and appendectomy. The newborn’s Apgar score was 9’-10’-10’. The patient was discharged after 8 days of hospitalization.

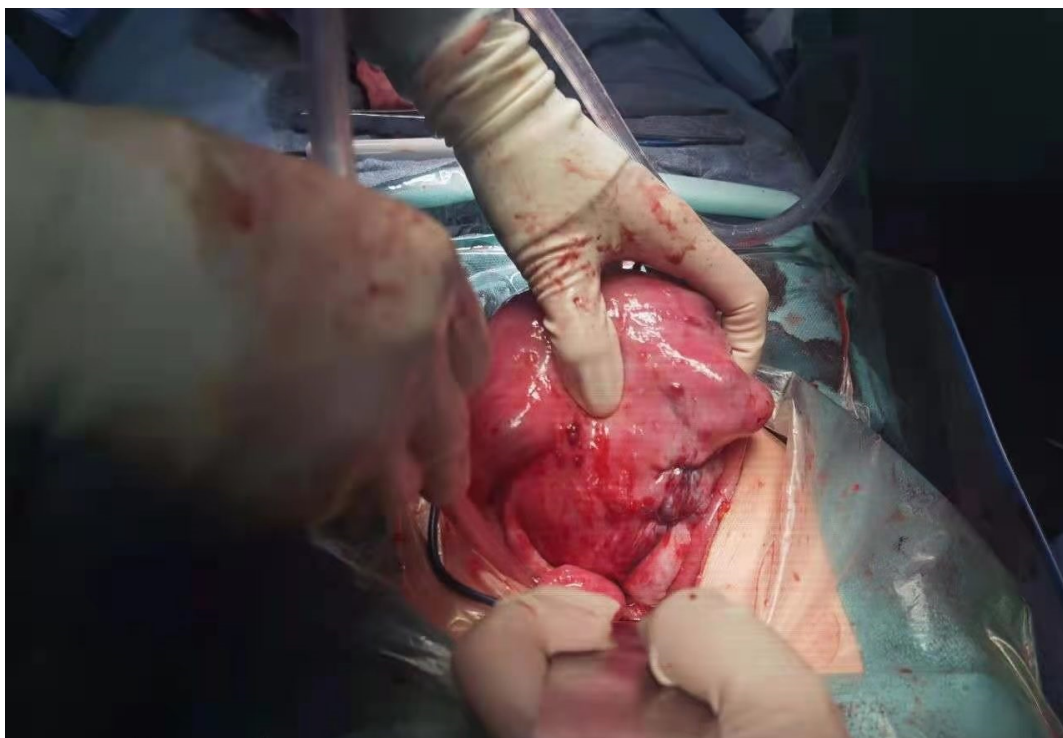
Case 2: A 28-year-old female patient, G3P0, was admitted to the hospital on October 24,

2020, due to “36 weeks + 2 days of pregnancy and three days of right lower abdominal pain”. The patient had no abortion history and previously complained of secondary dysmenorrhea for more than 3 years. Her pregnancy occurred by natural conception, and her obstetrical care was unremarkable with regular check-ups, normal blood pressures, and a normal one-hour glucose tolerance test. Three days before admission, the patient experienced dull and persistent pain in the right lower abdomen, with occasional contractions. There were no chills, fever, nausea, vomiting, abdominal distension, diarrhea, or vaginal bleeding. One day before admission, the pain acutely worsened. Admission examination: body temperature 36.5°C, pulse 98 bpm, breathing 20 bpm, blood pressure 102/64mmHg, fetal heart tones were 140–155bpm, and she was having mild contractions. Routine blood examination: HGB 108g/L, WBC  $6.89 \times 10^9$  /L, NEUT%. 76.6%, PLT  $228 \times 10^9$  /L; High-sensitivity C-reactive protein (hs-CRP) 28.00mg/L. The indicators on October 26, 2020, showed that the hs-CRP was 17.00mg/L, HGB 100g/L, WBC  $5.48 \times 10^9$  /L, neutrophil percentage (NEUT%) 72.6%, platelet count (PLT)  $231 \times 10^9$  /L and a recheck on October 29, 2020, showed a hs-CRP of 21.00mg/L, HGB 98g/L, WBC  $6.15 \times 10^9$  /L, NEUT% 68.7%, PLT  $241 \times 10^9$  /L. Fetal ultrasound showed that the size of the fetus was 36+ weeks of gestation. The placenta was attached to the right posterior lateral wall with a thickness of 41 mm. There was no obvious mass and abnormal liquid dark area in the appendix area of the right lower quadrant, and no obvious liquid dark area in the abdominal cavity. No abnormality was found in digestive system and urinary system by color Doppler ultrasound. Urine bacterial culture in the mid-segment showed no bacterial growth. We decided to have operation for the production conditions, continues unexplained abdominal pain, and progressively decreasing hemoglobin. On October 30, 2020, an exploratory laparotomy with a lower uterine cesarean section was performed.

## 2. Discussion

Abdominal apoplexy is a rare surgical acute abdomen characterized by spontaneous internal hemorrhage that could begin insidiously or acutely. It was first reported by Barber in 1909 when a spontaneous intra-abdominal hemorrhage was found on the second day after delivery. No obvious bleeding points and potential pathological changes were found in the parturient [3]. In 1931, Green et al. named the unexplained intra-abdominal vascular rupture and bleeding as abdominal apoplexy [4]. The condition occurs more frequently in women, and there are reports in the literature that the ratio of male to female is 1:2.5 abroad and 1:1.4 in China [5].

The prevalence of abdominal apoplexy tends to increase in the presence of hypertension, arteriosclerosis, congenital developmental defects of the abdominal vascularity, and pregnancy. Long-term chronic inflammatory changes, adhesion formation, secretory changes during pregnancy, elevated pelvic and abdominal venous pressure, changes in pelvic and abdominal pressure from uterine contractions, childbirth, and the rapid changes in hemodynamics during the puerperium are considered to be unique causes of abdominal apoplexy during pregnancy. The latest research shows that chronic inflammatory adhesions secondary to endometriosis are also one of the important factors leading to abdominal apoplexy during pregnancy [6,7]. Bleeding mainly comes from the venous system of the abdominal cavity,



**Figure 1.** Scattered bleeding spots

such as the uterine-ovarian venous system and pelvic-abdominal varicose veins [8]. Among the two cases in this article, one case underwent in-vitro fertilization-embryo transfer due to "double fallopian tube obstruction," laparoscopic pelvic lysis of adhesions, left fallopian tube resection, and right fallopian tuboplasty due to both an intrauterine pregnancy and ectopic pregnancy in the first trimester. The other case had a history of secondary dysmenorrhea for more than 3 years before pregnancy, and during the operation, a large number of flame-like inflammatory hyperplastic changes were found on the surface of the uterus, suggesting that the patient may have had a history of pelvic inflammatory disease or endometriosis before pregnancy. In the first case, her bleeding spot was located at the right corner of the uterus, where there were adhesions of the greater omentum with a 720-degree torsion causing avascular necrosis. In the second case, peeling traces splatter from the adhesions on the uterus and ovary, which may have been due to the huge uterine compression of the inferior vena cava in the middle and late stages of pregnancy, which would increase pelvic venous pressure and lead to vascular swelling and stasis. The past chronic inflammation of the pelvic cavity had caused the pelvic tissue to be congested, flimsy, and friable. Dislocation of the original omental and ovarian adhesions occurred, resulting in blood vessel damage and bleeding under the stimulation of contractions in the third trimester.

The enlarged uterus during pregnancy stretches the para-uterine tissues and ligaments, causes the abdominal wall to stretch and expand, reduces its flexibility, and increases squeezing in the surrounding pelvic and abdominal organs, which makes the symptoms and signs

of acute abdomen during pregnancy confusing. Abdominal apoplexy manifests in symptoms caused by different degrees of abdominal pain and blood loss, lacks typical clinical manifestations, and has a very low incidence, which makes misdiagnosis more common. Although non-coagulated blood from abdominal aspiration is the main method for diagnosing the disease, the effect of an enlarged uterus during pregnancy makes this procedure difficult, and aspiration-negative patients do not rule out the condition. So, the preoperative diagnostic rate of abdominal apoplexy during pregnancy is very low, and it is most often diagnosed during an exploratory laparotomy. Both cases were first considered to be appendicitis preoperatively. Abdominal apoplexy was not confirmed until exploratory laparotomy.

The severity of abdominal apoplexy is related to the location of the ruptured blood vessel in the abdominal cavity, the diameter of the vessel, and the size of the breach. Blumenstock *et al.* [9] divided it into three stages according to the characteristics of abdominal apoplexy: 1. In the early stage, abdominal pain occurs at the same time as hemorrhage. Because of the small amount of bleeding, the shock symptoms are mild, with tachycardia, mild hypotension, and hematocrit are within normal limits. The change may be due to tamponade of the peritoneum or mesentery; 2. The incubation period ranges from a few hours to a few days or even weeks, and the clinical manifestations are temporarily stable; 3. In the end, abdominal pain is sudden and sharp, with massive intra-abdominal bleeding, such that rescue is delayed, and the patient ultimately dies. Both cases in our hospital had abdominal pain as the main symptom. In case one, hemorrhage occurred in the superficial small plexus of veins on the right side of the uterus that was wrapped by the omentum, so the amount of bleeding was small. Since there was no significant change in hemoglobin, this case should be categorized in the early stage. Case two demonstrated bleeding in the right ovarian venous plexus, but because the right ovary and uterine adhesions were dense, it could tamponade bleeding to a certain extent. The patient had a slight progressive decline in hemoglobin during the preoperative observation. Still, the vital signs were stable, so it was speculated that this case was confined to the incubation period too. Fortunately, a timely exploratory laparotomy was performed to confirm the diagnosis and stopped bleeding in time to avoid the occurrence of a bad outcome.

Therefore, in pregnancy and during the puerperium, if sudden abdominal pain with shock and signs of intra-abdominal hemorrhage appears except for placental abruption, uterine rupture, ovarian tumor (corpus luteum) rupture, ectopic pregnancy, abdominal aortic aneurysm rupture, traumatic and spontaneous liver, spleen, kidney or other solid organs' rupture, and no other clear etiology, it is necessary to be highly vigilant for the possibility of abdominal apoplexy. However, patients with chronic bleeding may only present with varying degrees of abdominal pain and other symptoms. These patients should be carefully asked whether they have high-risk factors for vascular disease such as hypertension and diabetes, whether they have had prior abdominal or pelvic surgeries, a history of endometriosis, or chronic pelvic inflammatory disease. It is essential to monitor vital signs, pay close attention to changes in blood tests and coagulation function, and dynamically review ultrasound to see if there are any abdominal effusions. Consult a surgeon as soon as possible, perform angiography and abdominal MRI to further confirm the diagnosis if necessary. Once signs of hemodynamic compromise due to intra-abdominal bleeding are found, exploratory laparotomy should be performed as soon as possible to minimize the

possibility of misdiagnosis and adverse sequelae. During the operation, while dealing with an obstetric emergency, the surgeon must identify the source of bleeding. If necessary, cooperate with the vascular surgeon to secure hemostasis to save the life of mother and child.

### 3. Conclusion

In summary, unexplained persistent abdominal pain with a progressive decline in hemoglobin or shock. Obtain prompt surgical consultation, and exploratory laparotomy should be performed as soon as possible. The location of bleeding points should be identified and suture ligated for hemostasis. Based on gestational age and the fetal condition, a decision needs to be made whether immediate delivery is indicated by cesarean section. In cases of prematurity, delivery should be based on obstetrical indications if the patient is otherwise stable after the procedure. The awareness of abdominal apoplexy was still the key point in the management of this disease. Quick diagnosis by the imaging and immediate treatment were very important for pregnant patients with unexplained abdominal pain, exploratory laparotomy as soon as possible is a safe choice for both the patient and the infant. Although the current evidence is insufficient, we will continue to track the prognosis and outcomes of these patients to find possible underlying causes.

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