Case Report

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Interstitial Pregnancy, a Rare Ectopic Pregnancy: A Case Report

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Interstitial pregnancy is a rare form of ectopic pregnancy that usually leads to uterine rupture and results in life-threatening hemorrhage. It commonly occurs before 12 weeks of pregnancy and the mortality rate is 6 – 7 times higher than that of classical ectopic pregnancy. Herein, we report a case of 26 year-old female suffering from profuse hemoperitoneum and sudden onset of lower abdominal pain. She was finally diagnosed with interstitial pregnancy. Interstitial pregnancy is still a challenging condition to diagnosis and treat. Early diagnosis is critical in choosing a proper management and decreasing the mortality rate.

Key words: gInterstitial pregnancy, cornual wedge resection, β-HCG

Introduction

Interstitial ectopic pregnancy is defined as an ectopic gestation in the uterine part of the fallopian tube. It accounts for 2% – 6% of all ectopic pregnancies, but cause nearly 3% of maternal deaths in the United States.[1,2] The diagnosis and management of interstitial ectopic pregnancy remain challenging, largely because of the rarity of this condition.[3] First-line management depends upon many factors, including the hemodynamic stability of the patient, the time of diagnosis, symptoms, gestational age, and preservation of fertility.

Case Report

A 26-year-old gravida 4 para 0 artificial abortion 3 female visited our emergency room because of sudden onset of lower abdominal sharp pain for 1 day. All three previous abortions were induced by medication. Her last menstrual period was on July 7, 2021. A positive pregnancy self-test was demonstrated on August 12, 2021. No intrauterine pregnancy was detected by a local practitioner on August 19, 2021. The patient took mifepriston without a physician's prescription on August 23, 2021 followed by vaginal bleeding in the next few days. Bleeding subsided spontaneously but recurred with sudden onset of abdominal sharp pain on September 9, 2021. Hypotension (80/53 mmHg) with tachycardia (136 bpm) was noticed at emergency room. Physical examination showed diffuse abdominal tenderness with peritoneal signs. Complete blood count revealed leukocytosis (25,000/mL) and low

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hemoglobin (6.8 gm/dL). Elevated serum beta-human chorionic gonadotropin (β-HCG) levels (22,827 mIU/mL) was shown without a detectable intrauterine gestational sac under sonography. Computed tomography demonstrated hemoperitoneum and a right parametrial mass with active bleeding (Fig. 1).

Because of her unstable hemodynamic status, urgent exploratory laparoscopy was arranged immediately. During the surgery, hemoperitoneum with active internal bleeding of more than 3,000 mL was recorded. Engorgement of right cornual area of the uterus with persistent parametrial oozing was observed under laparoscope (Fig. 2). Cornual wedge resection was performed with the assistance of Ligasure® technology to reduce the blood loss. The patient received 8 units of packed red blood cell transfusion. After the surgery, the patient was hospitalized for 3 days and discharged in stable conditions. The final pathologic report showed fallopian tube tissue containing chorionic villi with hemorrhage. Interstitial ectopic pregnancy was confirmed by multi-focal Arias-Stella phenomenon in the endometrium (Fig. 3).

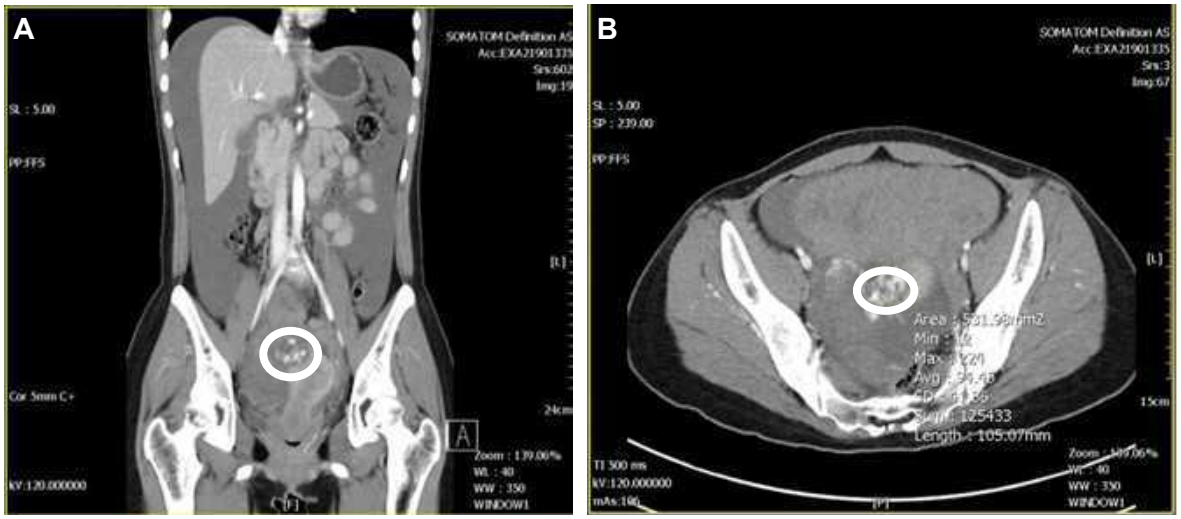

Fig. 1 Computed tomography with contrast. (A) Coronal view revealed a right parametrial mass about 3.5 cm in size with large volume of hemoperitoneum; (B) Transverse view showed a right parametrial mass 3.5 cm in size. Circle indicated ongoing bleeding.

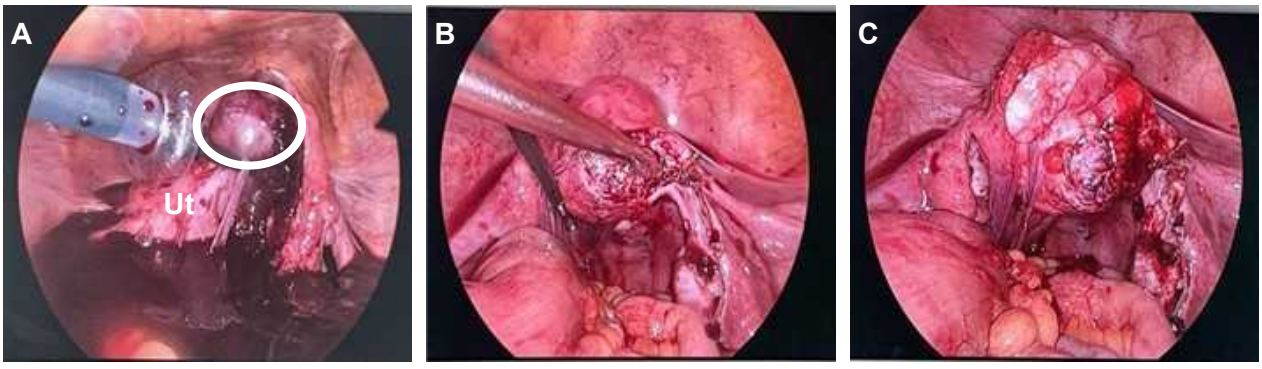

Fig. 2 Laparoscopic views of interstitial pregnancy. (A) Right tubal mass (circle) about 3.5 cm in size with profuse internal bleeding. (B) and (C) Right cornual resection was performed and anti-adhesive agent was applied.

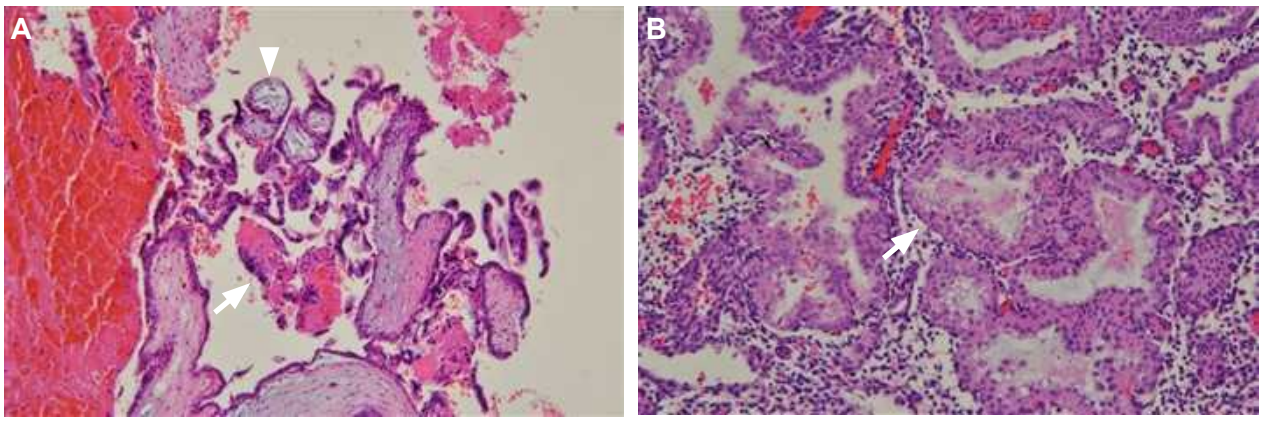

Fig. 3 The pathologic slides. (A) and (B) Arias-Stella reaction (arrow) with nuclear enlargement, rather normal nucleus-to-cytoplasm ratio (N/C) intense subnuclear and supranuclear vacuoles with absence of mitosis or apoptosis along with intraglandular papillary epithelial tufts. Chorionic villi were visualized (arrowhead). Magnification: 100x.

A 30-year-old female patient with no underlying disease was shot on her left forehead with a homemade handgun by her friend's husband at her home. She was sent to a nearby hospital with an initial Glasgow Coma Scale (GCS) of E1VeM3.

She was transferred to our emergency department (ED) with a GCS of E1VeM2, pupil size: 6.0-/-, and her vital signs were as follows: blood pressure (BP), 117/72; heart rate (HR), 86 bpm, and temperature, 34.8℃ (hypothermia). She had a small round open wound measuring approximately 2 cm × 2 cm over her left forehead, which was bleeding with the extrusion of brain tissue. Computed tomography (CT) revealed a comminuted fracture with several skull fragments within the left frontal lobe and a bullet in the right tentorium (Fig. 1). Right side subdural hemorrhage (SDH) with a midline shift of more than 5 mm to the left and diffuse pneumocephalus were also noted.

According to the CT image, the bullet passed through the left frontal lobe through the left lateral ventricle and right basal ganglion and stopped at the left tentorium just adjacent to the brainstem. However, SDH seems unrelated to the bullet's trajectory (Fig. 2). Due to the midline shift and pupillary dilation, mannitol (20 mg) and hyperventilation were applied owing to a high suspicion of increased intracranial pressure (ICP) and brainstem compression. Laboratory studies showed good hemoglobin levels, electrolytes count, coagulation profile, as well as renal and liver functions.

We performed emergent right-sided hemicraniectomy according to the image. However, when the dura was resected, the brain tissue swelled. The patient then became hypotensive (BP, 60/40 mmHg) in spite of hydration, transfusion, and administration of inotropic agents including norepinephrine and epinephrine, which was suggestive of brain stem failure. Although cardio-pulmonary-cerebral-resuscitation (CPCR) was performed, it was unsuccessful and the patient died 4 hours after the assault.

Discussion

Interstitial pregnancy is a rare form of ectopic pregnancy in which pregnancy occurs in the proximal end of the fallopian tube. It usually leads to uterine rupture with life-threatening hemorrhage.[1,4] Hemorrhagic shock due to uterine rupture occurs in almost one-quarter of cases, thus explaining its relatively high mortality rate.

The risk factors of interstitial pregnancy

include history of tubal surgery, in vitro fertilization, ectopic pregnancy, pelvic surgery, and pelvic inflammatory disease. RU486 is a common medication used for artificial abortion. This patient received RU486 for her 3 previous artificial abortions. In a meta-analysis of studies comparing the initiation of RU486 before versus after definitive evidence of an intrauterine pregnancy, performing the medical abortion before definitive evidence was obtained did not significantly increase the risk of missed ectopic pregnancy or the requirement for surgical intervention in patients without symptoms of ectopic pregnancy.[4]

The incidence of undetected ectopic pregnancy is approximately 7 to 20 cases per 100,000 RU486-induced abortions. The patterns of abdominal pain and vaginal bleeding of life-threatening ectopic pregnancy are different from those in RU486-induced abortion and spontaneous abortion. Therefore, in the absence of intrauterine gestational sac, the possibility of ectopic pregnancy should be immediately evaluated.

The timing of diagnosis is closely related to the success of management of interstitial pregnancy. Earlier diagnosis using antenatal sonography and quantitative β-HCG assay leads to lower morbidity and mortality. Nevertheless, diagnosing interstitial pregnancy may be challenging because of its non-specific symptoms and can be confusing with other ectopic pregnancies. Developing high-resolution sonography and highly sensitive β-HCG assay can enhance the accuracy and timely diagnosis of interstitial pregnancy. The diagnosis of interstitial pregnancy by sonography involves the evaluation of transverse plane using the following criteria: 1) an empty uterine cavity; 2) the gestational sac being outside the uterine cavity; 3) the presence of "interstitial line sign", which reflects lateral extension of the myometrial mantle to encircle the gestational sac.[3,5] Moreover, computed tomography and magnetic resonance imaging are also useful tools for the diagnosis of ectopic pregnancy in clinically stable patients when sonographic finding is uncertain. The diagnosis of this patient was ultimately confirmed by pathological examination demonstrating gestational tissue in the fallopian tube and specific features of the Arias-Stella phenomenon, which was characterized by nuclear enlargement and centronuclear vacuolization.

Since spontaneous abortion is a common outcome of both intrauterine or ectopic pregnancy, expectant management is an acceptable first-line management for patients who are hemodynamically stable. Patients with lower initial serum β-HCG level (< 9,000 mIU/mL), suggesting early diagnosis of ectopic pregnancy, usually have a higher success rate, while the β-HCG levels should be closely monitored at outpatient clinics. Methotrexate (MTX) is widely used to treat patients who meet the strict inclusion criteria, including β-HCG < 5,000 mIU/mL, no fetal cardiac activity, and gestation sac < 3.5 cm. Ectopic pregnancy can be treated with either systemic or local MTX injection. Systemic MTX is administered via intramuscular injection. Its side effects include transient peripheral neuropathy, severe constipation, and change in liver function that need to be closely followed up. Local MTX treatment is injected into the gestational sac under the guidance of sonography. It is more operator-dependent, less common, and more costly than systemic MTX. However, it entails less severe side effects than does systemic MTX. Other than medical treatments, surgery is an alternative management for ectopic pregnancy. Compared with more invasive laparotomic surgery, laparoscopic surgery is less invasive and however requires technical expertise. Interstitial pregnancy can be treated by cornualwedge resection which preserves patient's fertility, but may cause loss of myometrium, which increases the risk of uterine rupture. The rates of uterine rupture in the subsequent pregnancy after cornual wedge resection and cornuostomy are about 30%[6] and

31% – 33%[7], respectively. Cornuostomy, in which gestation tissue is removed and uterine architecture and fertility are preserved, is the preferred surgical procedure and entails little tubal damage.[8] Future fertility rates remain unchanged if the contralateral fallopian tube is intact. The risk factors of persistent interstitial pregnancy after cornuostomy include: 1) gestational sac < 2 cm that makes complete removal of the gestational sac during the procedure difficult; 2) rapidly increase of pre-operative β-HCG levels.[9]

Intra-operative bleeding can be controlled by various methods, including localized vasopressin injection, electrocauterization, endoloop application, and purse-string sutures around the cornu. Nevertheless, electrocauterization may disrupt the underlying myometrium and interfere with the revascularization. In order to preserve patient's fertility, conservative treatments should be given, such as minimally invasive management with laparoscopic surgery instead of laparotomy and cornuostomy instead of wedge resection. Also, anti-adhesive product can effectively prevent adhesion formation, which is the major cause of tubal factor infertility. Consequently, the risk of uterine rupture in future pregnancy is increased. Hysterectomy is a life-saving operation for uncontrollable bleeding. Patients receiving non-invasive treatments, such as expectant management, systemic or local injection of MTX, may have higher recurrence rate, particularly on the same side.[2]

Conclusions

Diagnosis and therapy of interstitial pregnancy are challenging. Interstitial pregnancy should be managed as soon as the diagnosis is confirmed. Non-invasive management should only be used for patients who are hemodynamically stable without obvious risk of immediate rupture (those without large gestational sac or rapidly increasing β-HCG levels). Expectant management should be the first-line approach for patients with declining serum β-HCG levels. Early diagnosis plays a critical role in choosing the proper management and preserving patient's fertility.

Author Contributions

Ho-Yan Chan did the literature search, interpreted the data and prepared the manuscript. Hung-Wei Liu performed the pathological examination and interpreted the data. Chun-Nan Chen collected the medical history. S. Joseph Huang edited the manuscript and acquired the funding.

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Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of the E-Da Hospital (protocol number EMRP65107N).

Informed Consent Statement

Informed consent was obtained from the subject involved in the study.

Data Availability Statement

Not applicable.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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