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Case Report

Ovarian torsion due to ovarian hyperstimulation syndrome diagnosed by sonographic whirlpool sign in the first trimester of pregnancy: A case report ☆

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ABSTRACT

Ovarian torsion during pregnancy is a rare condition that needs prompt diagnosis and detorsion in order to preserve ovarian function. Diagnosing ovarian torsion is a difficult procedure especially in pregnant cases since radiation exposure should be avoided. Detecting the whirlpool sign by ultrasonography is a highly useful technique as it is noninvasive, less time-consuming, and radiation-free. Here is a case of ovarian torsion due to ovarian hyperstimulation syndrome diagnosed solely by sonographic features and in which laparoscopic detorsion was promptly performed.

A 26-year-old woman in her sixth week of pregnancy visited a tertiary hospital with sudden onset lower abdomen pain. Transvaginal ultrasound detected an 8 cm left ovary and a whirlpool sign between the uterus and left ovary. Ovarian torsion was suspected and laparoscopic surgery was performed. Intraoperatively, an enlarged left ovary was twisted at 540° involving the left fallopian tube. After detorsion, bilateral ovaries were preserved and the postoperative course was uneventful. Ovarian torsion was suspected solely by ultrasonographic features which led to surgical detorsion quickly, resulting in the preservation of bilateral ovaries. Detecting the whirlpool sign when ovarian torsion is suspected is useful, especially in pregnant women.

Introduction

Ovarian torsion is a gynecology emergency in women of all ages [1–3]. Among all cases, about 10%-22% occur during pregnancy [3]. Ovulation induction is a risk of ovarian torsion since ovarian hyperstimulation syndrome (OHSS) can be triggered; studies revealed the estimated incidence of ovarian torsion is approximately 6%-16% in pregnant women with OHSS [4]. Prompt diagnosis and detorsion are essential since delayed

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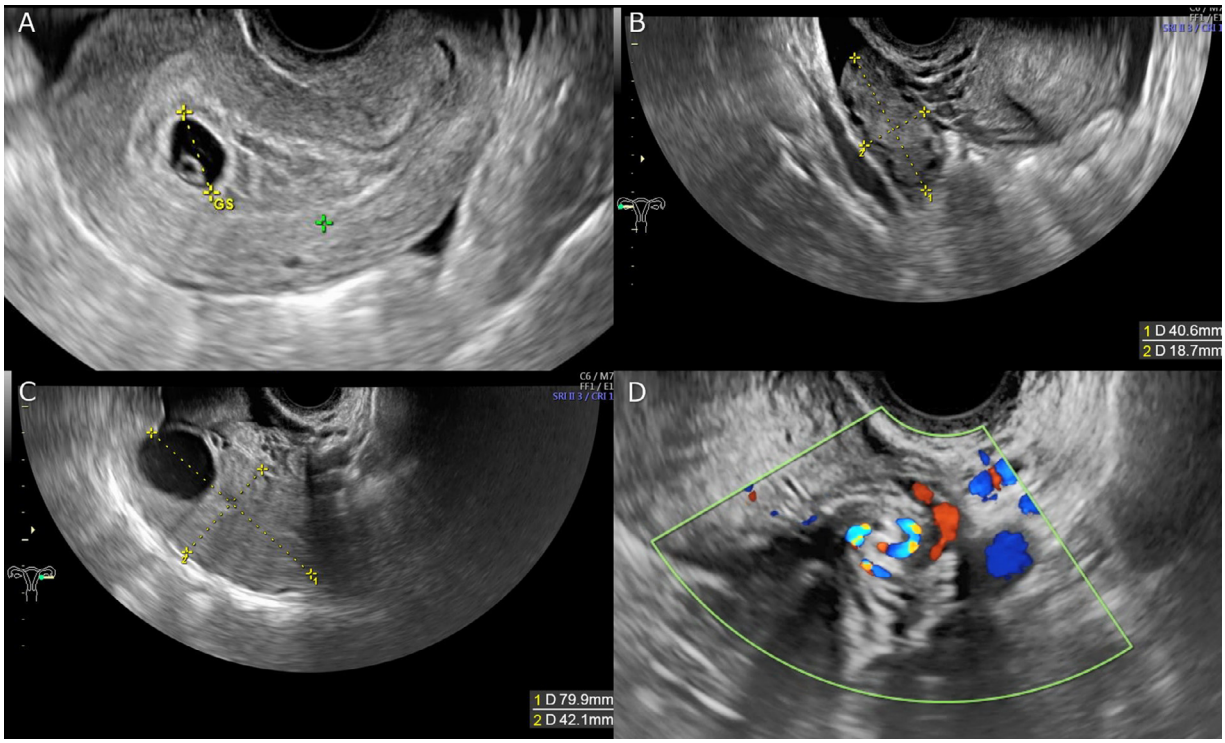

Fig. 1 – Preoperative transvaginal ultrasonography features. (A) A gestational sac was found in the uterus. (B) The right ovary was 4 cm in diameter. (C) The left ovary was 8 cm in diameter. (D) A whirlpool sign was detected between the enlarged left ovary and the uterus.

treatment can lead to ovarian dysfunction and peritonitis, and can be life-threatening to both the mother and the fetus [1,2].

The whirlpool sign refers to the sonographic appearance of the twisted pedicle formed by the ovarian ligament and the infundibulopelvic ligament in ovarian torsion [5]. Compared to other classical signs, the higher diagnostic performance of the whirlpool sign has been reported [6,7]. Detecting the whirlpool sign is useful especially in pregnant women since unnecessary radiation exposure can be avoided by refraining from performing computed tomography (CT) scans. Here is a case of ovarian torsion due to ovarian hyperstimulation syndrome diagnosed by the whirlpool sign during the first trimester of pregnancy.

Case presentation

Written informed consent for this case report was obtained from the patient. A 26-year-old nulliparous woman with a history of polycystic ovarian syndrome presented to a tertiary hospital complaining of sudden onset lower abdominal pain. She was in her sixth week of pregnancy after taking clomifene as induction of ovulation. Her vital signs were unremarkable. Physical examination revealed left lower quadrant abdominal tenderness. Transvaginal ultrasound (Volson P8, GE Healthcare, Chicago, IL) revealed a gestational sac inside the uterus. An 8 cm multilocular left ovarian cyst was detected and a whirlpool sign was found between the uterus and the enlarged left ovary (Fig. 1). Blood flow in the ovarian cyst was preserved. Ascites were found in the pouch of Douglas. Blood test results were unremarkable. A CT scan was not conducted for the reason that the patient was in her first trimester of pregnancy and to avoid any unnecessary radiation exposure. A magnetic resonance imaging test was not chosen because it was time-consuming and detorsion was required as soon as possible to prevent ovarian dysfunction. Since there were no ovarian tumors before her pregnancy, ovarian torsion due to ovarian hyperstimulation syndrome was suspected and laparoscopic surgery was performed.

Intraoperatively, an enlarged left ovary was found twisted at 540° involving the left fallopian tube (Fig. 2). The left ovary was dark blue, and ischemic change was suspected. After the detorsion of the enlarged left ovary, the dark blue color faded rapidly and the blood flow resumed. Both ovaries were placed in the pouch of Douglas and the operation was finished. After the surgery, her symptoms disappeared and the postoperative course was uneventful. The size of bilateral ovaries decreased and she carried on her pregnancy course without any recurrence of torsion. She continued her pregnancy check-up at a maternity hospital.

Discussion

Ovarian torsion is a gynecological emergency found in women of all ages, especially in reproductive age. Prompt diagnosis is important since the delay of detorsion may lead to ovarian dysfunction, peritonitis, and even death [1,2]. Though

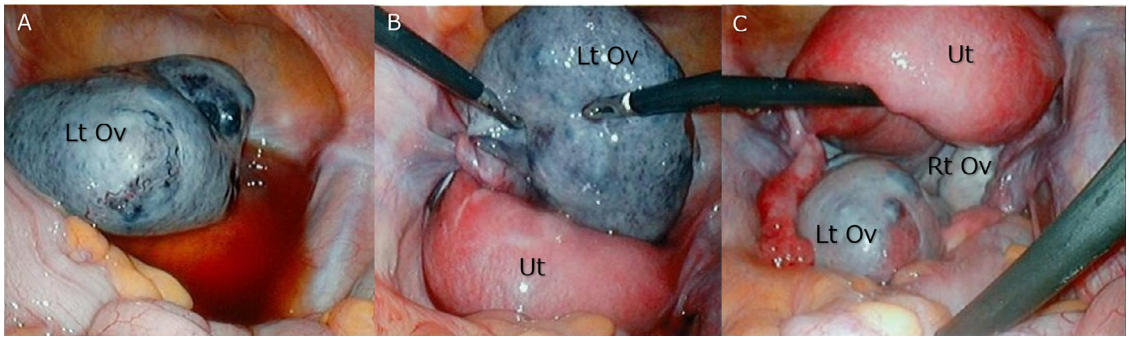

Fig. 2 – Intraoperative photos of the case. (A) The left ovary had turned dark blue and hemorrhagic ascites was found in the pelvis. (B) The enlarged left ovary was twisted at 540° involving the left fallopian tube. (C) Bilateral ovaries in the pouch of Douglas. The blue color of the left ovary faded rapidly after detorsion. Lt Ov, left ovary; Rt Ov, right ovary; Ut, uterus.

prompt diagnosis is necessary, the definitive diagnosis is confirmed intraoperatively, and diagnosing ovarian torsion preoperatively is difficult. Symptoms mimic other acute abdomen diseases including appendicitis, ectopic pregnancy, pelvic inflammatory disease, and ovarian hemorrhage [3]. There is no clear-cut biomarker and therefore, clinicians have difficulty diagnosing ovarian torsion.

The whirlpool sign is known for its high diagnostic value for diagnosing ovarian torsion. Introduced in 2004 by Vijayaraghavan, the sonographic whirlpool sign directly indicates the torsion of ligaments [5]. Out of all the classic sonographic features of ovarian torsion, such as ovarian stromal edema, follicular ring sign, and absence of vascularization on color Doppler, the whirlpool sign has the highest specificity for ovarian torsion [6,7]. Moro et al. [7] reported the whirlpool sign's positive predictive value is higher than 90%, hence it is a highly useful sign to predict torsion preoperatively. Since ultrasonography is a noninvasive and efficient diagnostic method, detecting the whirlpool sign is a highly practical tool for ovarian torsion suspected patients.

Ovarian torsion during pregnancy is a relatively rare condition. The estimated incidence of ovarian torsion is ~1-5:10,000 pregnancies [8,9]. Ovarian hyperstimulation syndrome is a risk factor for ovarian torsion. Especially in pregnant women with OHSS, the risk of ovarian torsion is higher [4,10]. The estimated incidence is up to 16% in pregnant women with OHSS [4]. Though several cases have been reported, the diagnostic procedure is not standardized. In this case, the whirlpool sign was found preoperatively and strongly suspected ovarian torsion, which led to prompt operation and detorsion.

Detecting the whirlpool sign plays a pivotal role in pregnant women suspected of ovarian torsion. In the case presented, ovarian torsion was strongly suspected without performing radiation-exposing or time-consuming examinations. Radiation to pregnant women may result in adverse effects such as miscarriage, growth reduction, IQ reduction, and severe mental retardation [11]. Especially in the first trimester of pregnancy, unnecessary radiation exposure should be avoided. Finding the whirlpool sign is a noninvasive technique that has higher specificity compared to other findings, and is useful in such situations.

There are limitations to finding the whirlpool sign. In some cases, sonographers cannot detect the whirlpool sign even in the existence of ovarian torsion. When the enlarged ovary is cranial to the uterus, creating a section-cut view of the torsion axis might be difficult by transvaginal ultrasound. In such cases, transabdominal ultrasound can be helpful for detecting the whirlpool sign. Though this sign is useful, detection of the whirlpool sign needs training. Moro et al. [7] reported a study of adnexal torsion in which all ultrasound examiners had >10 years of experience performing gynecological ultrasonography. Even in such a setting, there are cases in which the whirlpool sign is undetected, therefore, negative test results do not rule out suspected ovarian torsion.

Laparoscopic surgery during pregnancy has the same neonatal outcome compared to laparotomy surgery. Reedy et al. [12] reported there was no difference between laparoscopy and laparotomy in infant survival up to 1 year and fetal malformation rates . Long-term follow-up for up to 6 years after laparoscopic surgery during pregnancy revealed no evidence of developmental or physical abnormalities [13]. A retrospective case-control study revealed that laparoscopic surgery for adnexal torsion during pregnancy is not a risk factor for preterm labor and neonatal outcomes [14]. When adnexal torsion is suspected even during pregnancy, laparoscopic surgery should be promptly performed without concern for maternal and neonatal outcomes.

Conclusion

Ovarian torsion was strongly suspected solely by ultrasonographic features, and laparoscopic surgery was promptly performed without radiation exposure to a woman in her first trimester of pregnancy. Detecting the whirlpool sign is a highly useful method as it can rapidly suspect ovarian torsion and is a minimally invasive technique. CT scans and other tests can be avoided in situations when radiation exposure and time-consuming examinations are unpreferable.

Patient consent

The authors confirm that written patient consent for publication has been obtained.

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