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Case Report

A case of torsion of a normal ovary in the third trimester of pregnancy: MRI findings with emphasis on asymmetry in the diameter of the ovarian veins

Yoshikazu Tanaka, MD^{a,*}, Takahiro Tsuboyama, MD, PhD^b, Kazuhiro Yamamoto, MD, PhD^a, Yoshito Terai, MD, PhD^c, Masahide Ohmichi, MD, PhD^c, Yoshifumi Narumi, MD, PhD^a

^a Department of Radiology, Osaka Medical College, Osaka Prefecture, Takatsuki, Japan

^b Department of Radiology, Osaka National Hospital, Osaka, Osaka Prefecture, Japan

^c Department of Obstetrics and Gynecology, Osaka Medical College, Osaka Prefecture, Takatsuki, Japan

ARTICLE INFO

Article history:

Received 24 October 2018

Revised 28 November 2018

Accepted 30 November 2018

Available online 11 December 2018

Keywords:

Ovarian torsion

Third trimester in pregnancy

MRI

ABSTRACT

A 33-year-old woman, gravida two para one, at 31 weeks of gestational age experienced sudden onset of left lower quadrant pain and underwent unenhanced pelvic MRI. On fast imaging employing steady state precession (FIESTA) sequence images, a marked difference was observed in the diameters of the right and left ovarian veins. The right ovarian vein was tortuous and dilated, measuring 35 mm in diameter, while the left ovarian vein was thin and linear, measuring 7 mm in diameter. The left ovary showed no apparent swelling or hemorrhage, but was suspected to have been shifted anteriorly. The patient underwent explorative laparotomy and was found to have left ovarian torsion. A difference in diameter of the ovarian veins, with thinning of the twisted side and compensatory dilatation of the contralateral side for drainage of increased uterine blood flow, may be a useful imaging sign for the diagnosis of ovarian torsion during pregnancy.

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Background

Pregnancy is a one of the risk factors of ovarian torsion, with approximately 25% of cases occurring during pregnancy [1]. The majority of episodes are seen in the first or second

trimester, and only 5% of cases are observed after 20 weeks of gestation [2,3]. The cause of the higher incidence of ovarian torsion in early pregnancy is speculated to be the presence of a corpus luteum cyst, which may give rise to torsion, whereas that of the lower incidence in late pregnancy may be decreased mobility of the ovary due to the enlarged uterus.

Conflict of interest: The authors declare that they have no conflict of interest.

Informed consent: For this type of study, formal consent is not required.

* Corresponding author.

E-mail address: rad110@osaka-med.ac.jp (Y. Tanaka).

<https://doi.org/10.1016/j.radcr.2018.11.021>

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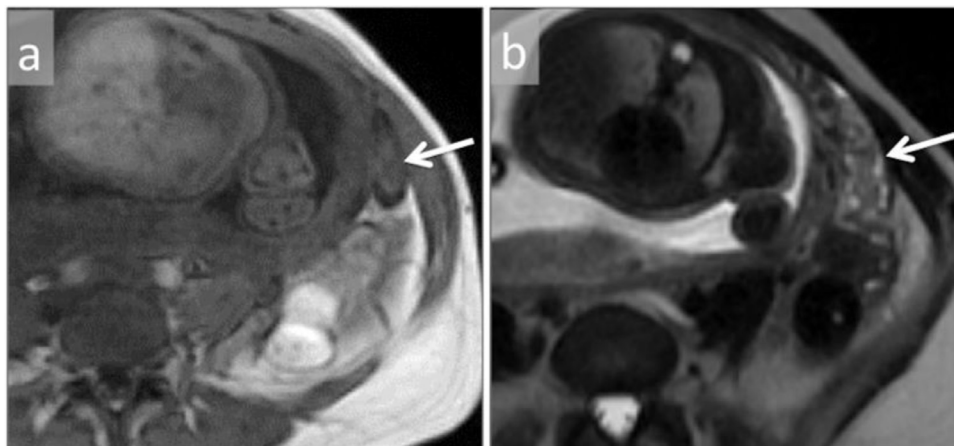


Fig. 1 – Axial T1- (a) and T2-weighted (b) images showed a normal left ovary without edema, hemorrhage or a mass (arrow). Coronal fast imaging employing steady-state acquisition (FIESTA) images (c, d) demonstrated asymmetry in the diameters of the ovarian veins. The right ovarian vein was dilated and torturous, while the left ovarian vein was thin and linear (arrows).

Although ultrasound (US) is used to assess acute abdominal pain in the gravid state, evaluation of pelvic pathology may be limited, especially in the late stages of pregnancy [1,4]. Magnetic resonance imaging (MRI) can provide diagnostic images with excellent soft-tissue resolution, and may serve as a second-line modality when the US results are inconclusive or nondiagnostic [1,4–6]. We experienced a case of torsion of a normal ovary at 31 weeks of gestation and herein report the case with its MRI findings.

Case presentation

A 33-year-old woman, gravida two para one, was brought to hospital by ambulance at 31 weeks of gestation after a sudden onset of left lower quadrant pain lasting for 4 hours. Her medical history included asthma. On physical examination, her temperature was 36.6°C, blood pressure was 103/57 mmHg, pulse was 89 beats per minute, and SpO₂ was 97% in room air. There was no tenderness on palpation in all four quadrants. There was no guarding or rebound tenderness. Laboratory data revealed an increased white blood cell count (11,300/ μ L).

On abdominal US, both ovaries appeared normal. The amniotic fluid index was 12 cm and there were no signs of fetal distress. On unenhanced MRI, both ovaries appeared normal, measuring approximately 40 mm in diameter. Although the left ovary was suspected to have been shifted anteriorly, it did not contain a mass, hemorrhage represented by high intensity areas on T1-weighted images (T1WI) (Fig. 1a), or edematous parenchyma represented by high intensity areas on T2WI (Fig. 1b). The only remarkable finding was a difference in the diameters of the ovarian veins, which showed low intensity on T2WI due to flow voids and high intensity on fast imaging employing steady-state acquisition sequence (FIESTA). The left ovarian vein appeared thin and linear, measuring 7 mm in diameter, while the right ovarian vein was dilated and torturous, measuring 35 mm in diameter (Fig. 1c and d).

Due to insufficient pain control with analgesics, the patient underwent explorative laparotomy at 8 hours after the onset of pain. During the procedure, it was confirmed that the left ovary had rotated 180 degrees around the fallopian tube and 360 degrees around the mesovarium. The left ovary appeared congested and dark red in color, measuring 48 mm in length (Fig. 2). As the ovary was discolored and the possibility of recurrence of torsion was also considered, salpingo-oophorectomy was performed. Pathologically, the resected ovary did not contain tumors, and showed interstitial edema, bleeding, and some necrosis, which were consistent with ischemic changes (Fig. 3). Postoperatively, there were no complications and the patient was discharged after 2 weeks.

Discussion

Ovarian torsion in the third trimester is rare because an enlarged ovary due to the presence of a corpus luteum cyst or ovarian hyperstimulation syndrome, which predisposes to ovarian torsion in the first trimester, usually resolves in the second and third trimester [1–3]. Smorgick et al. reported that normal ovarian appearance was more common in second- and third-trimester torsion than in first-trimester torsion (35.3% vs 14.3%) [3]. This is consistent with our case. Inherent ovarian mobility, such as a long ovarian ligament or hypermobile ligament, may be the cause of normal ovarian torsion.

Many diseases in the gastrointestinal, hepatobiliary, genitourinary, vascular, and gynecologic systems are included in the differential diagnosis of acute abdominal pain in pregnant women. Although US is the initial imaging method of choice, the diagnostic ability of US is operator-dependent. MR is now considered to be a good second-line imaging modality because it can reveal nonobstetrical diseases, such as appendicitis, as well as obstetrical or gynecologic diseases without exposing the subjects to ionizing radiation [6]. The MRI findings of ovarian torsion are well described [1,4,5,7,8]: ovarian enlargement,



Fig. 2 – Intraoperative gross appearance showed that the left ovary was congestive and dark red in color, suggestive of hemorrhage.

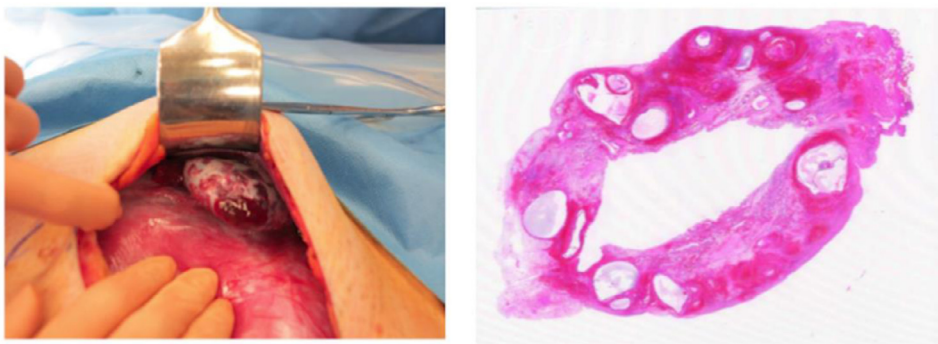


Fig. 3 – Loupe view of the resected left ovary (hematoxylin and eosin stain) showed interstitial edema and hemorrhage.

heterogeneous appearance of the ovary on T1WI and T2WI due to edema or hemorrhage, twisting of the vascular pedicle, tubal thickening, and uterine deviation toward the side of torsion. Recently, the perifollicular T2 hypointense rim sign was reported to represent perifollicular hemorrhage and may be a marker of ovarian nonviability [8].

In the present case, the findings mentioned above were not detected. However, the ovary was slightly enlarged and hemorrhage was detected during surgery. The ovary was resected 4 hours after MRI, and this delay may explain the discrepancy between the imaging and surgical findings. It is important to note that the appearance of ovarian torsion varies at different stages, and in the early stages there may not be any changes in the ovary. With regards to the signal intensities suggestive of hemorrhage, T1WI can only detect subacute hemorrhage, including methemoglobin, as a high intensity area. Acute hemorrhage contains oxy- or deoxy-hemoglobin, which shows isointensity to skeletal muscle on T1WI. Another point to note in this case is the absence of twisting of the vascular pedicle. Rotation of 360° might not be sufficient to twist the vascular pedicle.

The only obvious finding in this case was the asymmetry in diameters of the ovarian veins; the ovarian vein of the unaffected side was 5 times the diameter of that of the twisted side. This finding may be a useful sign of ovarian torsion in late pregnancy. The blood flow of the ovarian veins increases 60-fold during pregnancy [9]. In such circumstances, the occlusion of the blood flow in one side due to torsion may increase the blood flow to the contralateral side, giving rise to a tortuous and dilated ovarian vein. This finding was best depicted on the balanced steady-state gradient echo sequence, in which vessels show high intensity. Although the usefulness of this sequence in the abdomen and pelvis has been described [10], its utility in acute abdominal pain in pregnant women has not previously been reported. Further study is required to confirm the association of this finding with ovarian torsion.

In conclusion, we presented a rare case of normal ovarian torsion in the third trimester. The difference in diameters of the ovarian veins, with thinning of the twisted side and compensatory dilatation of the contralateral side for drainage of the increased uterine blood flow, may be a useful imaging sign for the diagnosis of ovarian torsion during late pregnancy.

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