



Contents lists available at ScienceDirect

## Gynecology and Minimally Invasive Therapy

journal homepage: [www.e-gmit.com](http://www.e-gmit.com)

## Case report

## Laparoscopic conservative surgery for massive ovarian edema with torsion

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## ARTICLE INFO

## Article history:

Received 14 December 2015

Received in revised form

19 January 2016

Accepted 26 January 2016

Available online 26 February 2016

## Keywords:

laparoscopy

massive ovarian edema

ovarian torsion

preserved ovarian function

## ABSTRACT

Massive ovarian edema is a rare condition in which intermittent torsion of the ovary at its pedicle obstructs venous and lymphatic drainage and results in the development of edema in the ovarian stroma. Massive ovarian edema occurs in young women, and most women undergo oophorectomy or wedge resection of the ovary to verify the presence of a neoplasm. We report a case of massive ovarian edema with torsion in a patient who underwent laparoscopic surgery with preserved ovarian function. It is clinically important to make a diagnosis appropriately and rapidly to prevent unnecessary oophorectomy and preserve ovarian function.

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## Introduction

Massive ovarian edema (MOE) is a rare disorder in which edema develops in the ovarian stroma because of reflux disorders in the ovarian vein and lymph duct, thereby resulting in swelling of the affected ovary. Most cases of MOE occur in one or both ovaries of young women and are characterized by intermittent lower abdominal pain with ovarian torsion. Many patients with MOE have undergone conventional laparotomy and oophorectomy. However, because most MOE cases involving young patients are not accompanied by a neoplasm, minimally invasive surgery with ovarian functional preservation should be considered. In this paper, we report a patient with MOE with torsion who underwent laparoscopic surgery with preserved ovarian function.

## Case Report

A 32-year-old woman, gravida-1 para-1, presented to our hospital with sudden right lower abdominal pain. After menarche at

age 12 years, her menstrual cycles were regular and occurred approximately every 28 days; her menstrual periods lasted 5 days. She had no past medical and family histories. The transvaginal ultrasonography showed an approximately 7-cm solid mass with peripheral small cysts in the right ovary. Magnetic resonance imaging (MRI) revealed diffuse enlargement of the right ovary with isointensity on the T1-weighted image and high intensity with small peripheral cysts on the T2-weighted image (Figures 1A and 1B). The physical examination was unremarkable, except for mild tenderness in the lower abdomen. Her laboratory values were within normal limits and included tumor markers (e.g., carbohydrate antigen 125, carbohydrate antigen 19-9, and carcinoembryonic antigen). Based on the examinations, we diagnosed her as having MOE. However, because she was free from abdominal pain soon after the examinations, she had a follow-up examination in the outpatient clinic.

Nine days after the first visit, she was admitted to our hospital with severe pain in her lower abdomen. The MRI showed that the enlarged right ovary had increased in size with a lack of obvious enhancement (Figures 1C and 1D); therefore, laparoscopy was performed with a preoperative diagnosis of MOE with torsion. In the intraoperative findings, the enlarged right ovary was twisted and showed ischemic change (Figure 2A). She underwent only the release of the torsion. A few minutes later, there were symptomatic improvements in enlargement and ischemia of the ovary (Figure 2B).

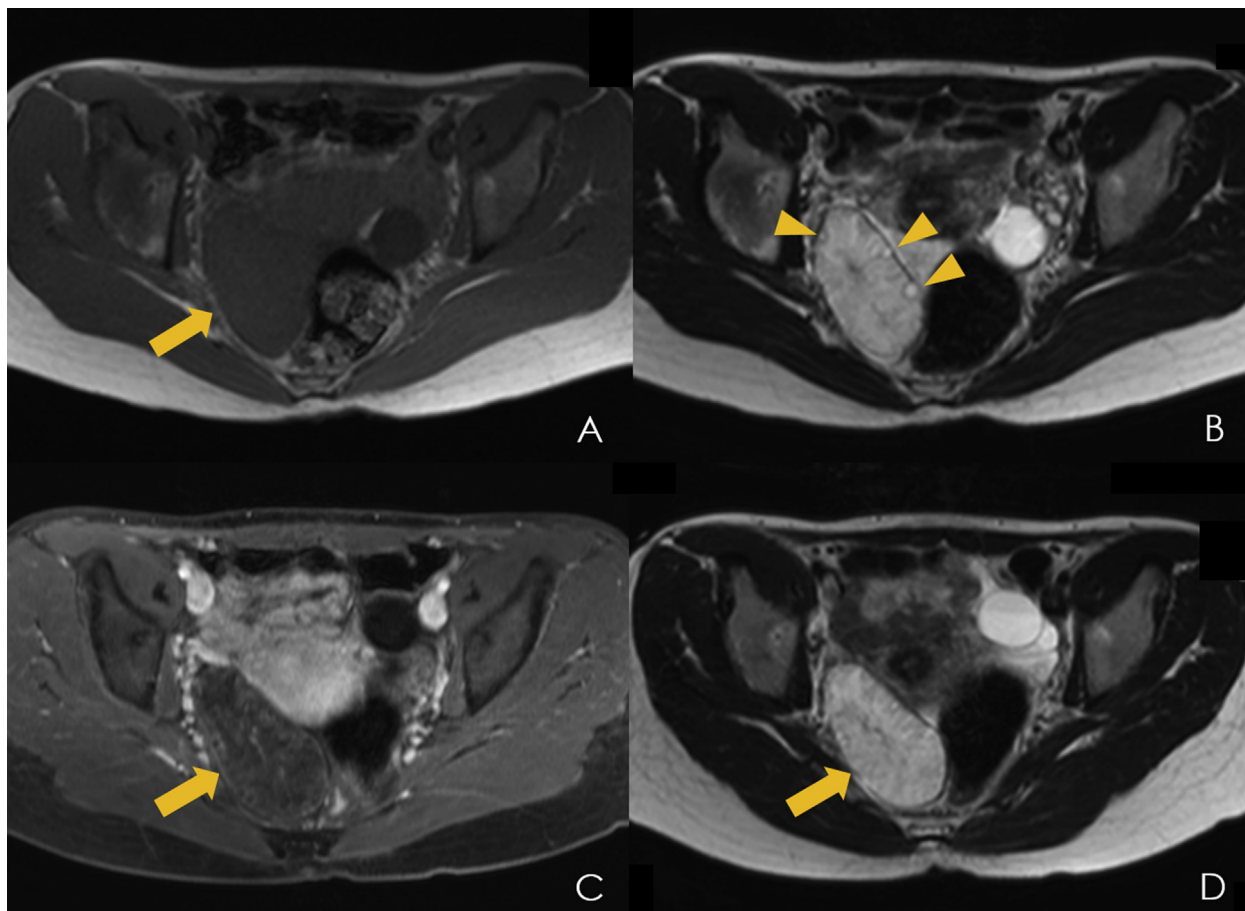
Conflicts of interest: All contributing authors declare no conflicts of interest.

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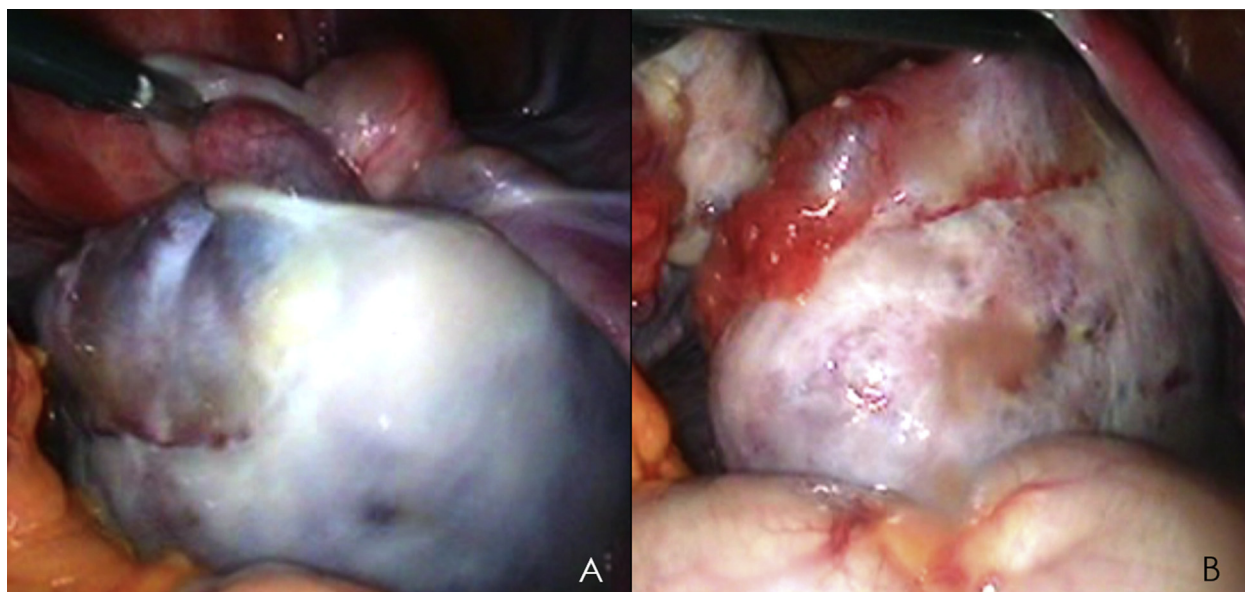
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<http://dx.doi.org/10.1016/j.gmit.2016.01.007>

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**Figure 1.** Magnetic resonance imaging of the pelvis in a 32-year-old woman with lower abdominal pain. (A) The axial T1-weighted image on the first visit shows the enlarged right ovary (arrow) with isointensity. (B) The axial T2-weighted image on the first visit shows the enlarged right ovary with high intensity and peripheral small cysts (arrowheads). (C) The postcontrast axial T1-weighted image on admission reveals ovarian torsion and a lack of obvious enhancement (arrow). (D) The axial T2-weighted image on admission shows the enlarged ovary has increased and the peripheral small cysts are less clearly visible (arrow).



**Figure 2.** Laparoscopic view of the enlarged right ovary. (A) The right ovary is enlarged to 8 cm in diameter with torsion and ischemic change. (B) After releasing the torsion, the right ovary has shrunk and blood flow has improved.

She was discharged from the hospital 3 days after surgery. The right ovary had reduced in size to 5 cm based on ultrasonography and she had no abdominal pain or ovarian torsion. Three weeks after surgery, the diameter of the ovary had decreased to 4.5 cm without the recurrence of torsion. Three months after this, she achieved a spontaneous pregnancy.

## Discussion

Massive ovarian edema was first reported by Kalstone et al<sup>1</sup> in 1969. It was subsequently shown that MOE involved stromal changes such as stromal hyperplasia and fibromatosis.<sup>2</sup> Furthermore, the administration of clomiphene in patients with polycystic ovaries may cause intermittent torsion of the enlarged ovarian pedicle and result in the development of MOE.<sup>3</sup>

Most cases of MOE occur at a younger age with the average age of 20 years (range, 6.5–33 years). Eighty-six percent and 14% of MOE cases develop unilaterally and bilaterally, respectively.<sup>3,4</sup> Approximately two-thirds of unilateral MOE cases are on the right side, which could be explained by the greater vein pressure on the right side than on the left side.<sup>5</sup> Symptoms include menstrual irregularities, abdominal pain, ovarian torsion, and virilization.<sup>2</sup> The most common symptoms are abdominal pain with pelvic mass and partial or complete torsion, which is observed in 59% of patients with MOE.<sup>3</sup> In the present case, the patient was 32 years old and exhibited the typical clinical manifestations of MOE in the form of an enlarged right ovary, intermittent abdominal pain, and ovarian torsion.

The most common treatment for MOE is oophorectomy. However, 80% of extracted ovaries do not contain a neoplasm,<sup>6</sup> more than 10% of MOE cases are bilateral, and the disease tends to develop in young patients. Therefore, it is critical to avoid unnecessary oophorectomy in these patients. In addition, wedge resection for diagnosis and oophoropexy to the uterus or the lateral pelvic wall should be conducted to prevent recurrence.<sup>7</sup> In addition, surgery should be performed by laparoscopy rather than laparotomy to take into consideration postoperative adhesions, easier conception, and esthetic outcomes.

There are several reports on the imaging findings of MOE using ultrasonography and MRI, but currently no clear diagnostic criteria of MOE have been described. Ultrasonography reveals diverse findings such as solid mass, cystic lesion, and a mixture of solid and cystic components.<sup>3</sup> Typical findings on MRI are an enlarged ovary with edematous stroma of high intensity on T2-weighted images, peripheral small cysts, and contrast enhancement in the stroma and cyst walls.<sup>8</sup> For conservative surgery, accurate preoperative diagnosis and careful selection of surgical procedure are mandatory. The possibility of using laparoscopic surgery, minimally invasive surgery, and avoiding oophorectomy or wedge resection should always be taken into consideration. It is accordingly

necessary that malignant tumors such as peripheral primitive neuroectodermal tumors of the ovary that form a solid mass with the edematous stroma in young women are considered in the differential diagnosis of an ovarian solid tumor.<sup>9</sup> Even if the enlarged ovary does not have the possibility of malignancy in the preoperative diagnosis, cytologic examination of ascites during surgery should be performed and outpatient follow up should involve ultrasonography.

This patient had neither clear neoplastic lesions in the imaging studies during the initial examination nor elevated levels of tumor markers, which suggested that the clinical features were consistent with MOE. Contrast-enhanced MRI was performed for this patient after an emergency hospitalization, and the findings indicated that the enlarged ovary had grown further and that the follicles were not circumscribed and had poor contrast effects. Because decreased blood flow caused by ovarian torsion and increased ovarian edema was suspected, she underwent emergency laparoscopic surgery. Release of the torsion reduced the edema and improved blood flow, thereby eliminating the need for oophorectomy and wedge resection. We did not perform oophoropexy because of the risk of reducing ovarian function after the procedure.<sup>10,11</sup>

In conclusion, most cases of MOE occur in young women. Minimally invasive surgery with preservation of ovarian function is the best practice for patients who require surgery. Therefore, conservative surgery with an appropriate and rapid diagnosis of MOE, which is frequently encountered in young women, should not be overlooked.

## References

1. Kalstone CE, Jaffe RB, Abell MR. Massive edema of the ovary simulating fibroma. *Obstet Gynecol.* 1969;34:564–571.
2. Harrison BT, Berg RE, Mittal K. Massive ovarian edema associated with a broad ligament leiomyoma: a case report and review. *Int J Gynecol Pathol.* 2014;33:418–422.
3. Kawaguchi R, Ueda S, Tsuji Y, et al. Massive ovarian edema in pregnancy after ovulation induction using clomiphene citrate. *Arch Gynecol Obstet.* 2008;277:375–378.
4. Hall BP, Printz DA, Roth J. Massive ovarian edema: ultrasound and MR characteristics. *J Comput Assist Tomogr.* 1993;17:477–479.
5. Lambert B, Lessard M. Massive ovarian edema in a twin pregnancy. *Can J Surg.* 1987;30:40–41.
6. Kim SK, Rozanski R. Massive edema of the ovary. *Radiology.* 1976;118:689–690.
7. Thorp Jr JM, Wells SR, Droegemueller W. Ovarian suspension in massive ovarian edema. *Obstet Gynecol.* 1990;76:912–914.
8. Yamashiro T, Inamine M, Kamiya H, Kinjo A, Murayama S, Aoki Y. Massive ovarian edema with torsion: unusual hemorrhage and the recovery of contrast enhancement. *Emerg Radiol.* 2008;15:115–118.
9. Huang BS, Horng HC, Lai CR, et al. Peripheral primitive neuroectodermal tumor of the ovary with torsion. *Gynecol Minim Invasive Ther.* 2013;2:65–69.
10. Geist RR, Rabinowitz R, Zuckerman B, et al. Massive edema of the ovary: a case report and review of the pertinent literature. *J Pediatr Adolesc Gynecol.* 2005;18:281–284.
11. Breech LL, Hillard PJ. Adnexal torsion in pediatric and adolescent girls. *Curr Opin Obstet Gynecol.* 2005;17:483–489.