

Recurrence of ovarian torsion in a multiple pregnancy: conservative management via transabdominal ultrasound-guided ovarian cyst aspiration

Kathleen Marie Osterman Boswell, B.S.^a and Kaylen Mark Silverberg, M.D.^b

^a University of Texas Medical Branch; and ^b Texas Fertility Center, Austin, Texas

Objective: To report a case of recurrent ovarian torsion during a multiple-gestation pregnancy and successful treatment via transabdominal ultrasound-guided ovarian cyst aspiration.

Design: Case report and literature review.

Setting: Tertiary care fertility center.

Patient(s): A 33-year-old gravida 2, para 1 woman with a history of ovarian torsion in a previous pregnancy, who presented with recurrent ovarian torsion in the 13th week of a multiple pregnancy.

Intervention(s): Ultrasound-guided transabdominal ovarian cyst aspiration and body repositioning to allow for spontaneous detorsion.

Main Outcome Measure(s): Resolution of the ovarian torsion, as well as preservation of the pregnancy without surgical intervention.

Result(s): After transabdominal ultrasound-guided cyst aspiration, ovarian detorsion was observed, accompanied by resolution of the patient's acute pain. The remainder of the patient's pregnancy was uncomplicated, culminating in the delivery of healthy infants.

Conclusion(s): Conservative treatment of ovarian torsion via ultrasound-guided transabdominal cyst aspiration and body repositioning represents a reasonable alternative to surgical intervention in the pregnant patient. (*Fertil Steril*® 2010;94:1910.e1–e3. ©2010 by American Society for Reproductive Medicine.)

Key Words: Ovarian torsion, multiple pregnancy, ovarian stimulation, ultrasound-guided transabdominal cyst aspiration

Ovarian torsion is responsible for $\leq 3\%$ of all gynecologic emergencies (1–6). Many anatomic and physiologic factors predispose a woman to experience torsion of the ovary, but the true etiology is not always identified. Pregnant women who conceive as a result of controlled ovarian hyperstimulation are at greater risk for the development of ovarian torsion (2, 3). With an increasing number of women undergoing assisted reproductive technology with controlled ovarian hyperstimulation, it is essential for physicians to suspect ovarian torsion when confronted with a patient presenting with acute onset abdominal pain, nausea, and/or vomiting. Torsion can be a severe complication after ovarian stimulation, and it frequently may accompany ovarian hyperstimulation syndrome (OHSS) (2–4, 6). As symptoms are mainly nonspecific, ovarian torsion often may be confused with other conditions including a ruptured corpus luteum cyst, adnexal abscess, ovarian hyperstimulation, urinary obstruction, heterotopic pregnancy, and appendicitis (2, 6, 7).

Torsion occurs when the ovary twists around its pedicle. This may be due to increased length of the infundibulopelvic or ovarian ligaments, cysts that increase the size of the ovary and make it more

mobile, or pregnancy as the uterus enlarges and rotates, changing the position of the ovary (5, 8). The first signs and symptoms of torsion develop when decreased venous and lymphatic return increases the size of the ovary; eventually arterial supply to the ovary is restricted as well, leading to ischemia and necrosis if left untreated (1, 5, 6). The right ovary is 50% more likely to twist and cause torsion than the left, implying that the sigmoid colon may protect against torsion (7, 9). It is crucial to identify torsion early to preserve the ovary. However, in cases in which the diagnosis is delayed and the ovary is found to be black or bluish in appearance on surgical examination, the ovary still may be salvageable. This implies that full arterial constriction does not often occur; rather the edema and venous stasis may cause the mottled appearance of the affected ovary (1, 3, 5).

The imaging study of choice to diagnose ovarian torsion is Doppler ultrasound, as it may show absent or reduced blood flow to the ovary (6). The ovary appears unilaterally enlarged with edema and multiple cystic structures that often are accompanied by some degree of ascites (3, 7). Although it is possible to use Doppler flow to diagnose torsion, it has been shown that Doppler may miss up to 60% of cases as there is often no change in vascular flow (2–4). In such cases, a strong clinical suspicion of ovarian torsion must lead to laparoscopic evaluation. Data suggests that power-flow Doppler provides a more sensitive assessment of ovarian vascular flow than does color-flow Doppler.

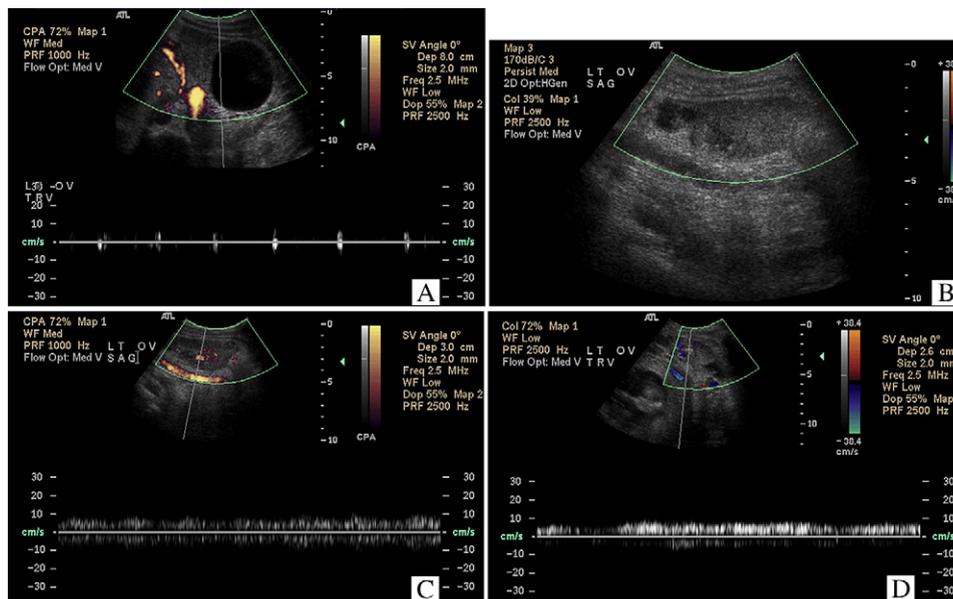
Received February 8, 2010; revised February 26, 2010; accepted March 8, 2010; published online April 18, 2010.

K.M.O.B. has nothing to disclose. K.M.S. has nothing to disclose.

Reprint requests: Kathleen Marie Osterman Boswell, B.S., University of Texas Medical Branch, 1719 Maize Bend Dr., Austin, TX 78727 (FAX: 512-335-7511; E-mail: kmoboswell@gmail.com).

FIGURE 1

(A) Power Doppler on presentation of patient to the emergency department shows no vascular flow to left ovary. (B) Color-flow Doppler after aspiration of ovarian cysts and body maneuvering shows no vascular flow. (C) Power Doppler after aspiration of ovarian cysts and body maneuvering shows resumption of vascular flow, with normal waveform. (D) Color-flow Doppler the day after the procedure shows resumption of vascular flow with normal waveform.



Boswell. Innovative treatment of ovarian torsion. *Fertil Steril* 2010.

CASE REPORT

A 33-year-old woman, gravida 2, para 1, presented at 13 weeks 2 days gestation with a multiple-gestation pregnancy and new-onset left flank pain. The patient conceived as a result of controlled ovarian hyperstimulation with gonadotropins, combined with IUI with donor sperm due to azoospermia.

The patient presented to our facility in May 2008 desiring pregnancy. She had previously conceived and delivered a viable singleton infant in 2004. After evaluation, the patient was treated with FSH (Gonal-F, gonadotropins; Serono Laboratories Inc., Randolph, MA); hCG 250 μ g (Ovidrel, gonadotropins; Serono) was administered when she had three follicles ≥ 17 mm in accordance with our previously published protocol (10). Intrauterine insemination was performed on each of the 2 days after hCG administration. An ultrasound examination at 6 weeks 5 days gestation identified several sacs with fetal poles and cardiac activity. The patient was followed closely. Selective reduction was offered, but the patient and her husband declined.

At 13 weeks 2 days gestation the patient presented with the acute onset of left-sided flank pain. In light of her previous history of ovarian torsion, a recurrent ovarian torsion was suspected, and a Doppler ultrasound examination was performed. Imaging revealed two simple cysts in the left ovary measuring 5.3 and 4.1 cm. Both color and power Doppler showed markedly reduced flow to the left ovary; only scant tracing was seen with the power Doppler, suggesting ovarian torsion. The right ovary appeared to be normal with adequate vascular flow. The patient was afebrile and clinically stable. A white blood cell count was within normal limits at 11,000, and the remainder of the complete blood cell count was normal.

In light of the multiple gestation and concomitant risk of fetal anesthetic exposure, consideration was given to a nonsurgical ap-

proach. After extensive consultation with an interventional radiologist, as well as the patient's family, informed consent was obtained, and transabdominal percutaneous cyst aspiration was performed. With use of ultrasound guidance, the cysts were localized, and a 20-gauge spinal needle was advanced into the 5.3-cm cyst with complete decompression. The 4.1-cm cyst also was decompressed. The procedure was monitored with continuous Doppler flow ultrasonography (Fig. 1). The ovary was observed for recurrent flow in the hope that intestinal peristalsis might facilitate spontaneous detorsion; when this failed to occur, the patient was maneuvered gently from side to side to assist in detorsion of the ovary. The resumption of vascular flow soon was noted, but only by power Doppler. The power Doppler waveform was normal; however, no vascular flow was observed with use of color flow. The patient's symptoms immediately began to abate, and she eventually was transferred to a room on the floor for continued close observation. The following day, a repeated Doppler imaging study was done to assess blood flow to the ovary. Results of both power-flow and color-flow Doppler were normal, and the patient was discharged home. She had no complications or recurrence of ovarian torsion during this pregnancy. At 30 weeks gestation, the patient delivered healthy infants by cesarean section because of severe preeclampsia.

Five years previously the same patient was treated for infertility in an identical manner with use of FSH followed by hCG 250 μ g. Intrauterine insemination was performed on the subsequent 2 days.

A viable single intrauterine pregnancy resulted, and the patient was complication free until 5 weeks 4 days gestation, when she began complaining of diarrhea and abdominal pain not relieved by acetaminophen (Tylenol). Bilateral ovarian cysts were observed on ultrasound examination, and the patient was monitored carefully because of evolving OHSS. She was sent home with precautions and mild analgesics. At 6 weeks 1 day gestation the patient presented

to the emergency department with the acute onset of severe left lower quadrant abdominal pain. She was afebrile with stable vital signs, and a white blood cell count was within normal limits at 7,000. On physical examination, the patient was found to be exquisitely tender to palpation with rebound tenderness and cervical motion tenderness. Abdominal ultrasound examination suggested normal Doppler flow to the ovary, but ovarian torsion was suspected and the patient was admitted for observation. After no relief with IV narcotics, the patient was taken to the operating room for laparoscopy. Operative findings demonstrated a massively enlarged left ovary with multiple cysts >3 cm. The ovary had a bluish-ischemic appearance and was found to be extremely friable. The ovary appeared to have twisted one-and-a-half turns around the infundibulopelvic ligament. The cysts were drained effectively, and the ovary was detorsed successfully. Vascular blood flow resumed, and the ovary regained a normal appearance. The patient had no further problems during the pregnancy, and a healthy infant was delivered at 37 weeks 3 days gestation. Because of the use of controlled ovarian hyperstimulation for conception and her previous history of torsion, the patient was monitored closely for a recurrence of ovarian torsion during the multiple gestation in 2008.

DISCUSSION

Although an uncommon surgical emergency, occurring in 1 in 1,000 to 1 in 5,000 pregnancies, the incidence of ovarian torsion has increased in the population of women undergoing fertility treatment (2, 7). In those women undergoing gonadotropin stimulation, an incidence of 6% has been reported, and in those with OHSS the number may rise as high as 16% (8). The symptoms of OHSS and torsion are similar, making it difficult to differentiate between the two (3). Doppler ultrasound examination may be used effectively to establish the diagnosis as OHSS typically shows increased diastolic blood flow to the ovary, whereas with torsion the flow is decreased (6). In a retrospective study of 33 women with 38 cases of surgically proved torsion, Smorgick et al. (7) reported that 55.3% occurred during the first trimester (defined as 5–14 weeks), 35.2% during the second trimester (15–28 weeks), and only 10.5% in the third trimester (≥ 29 weeks). Forty-eight percent of the pregnancies had been conceived through ovulation induction or IVF, and it was found that this population had multicystic ovaries on laparoscopic examination (7). There is a strong relationship between ovarian stimulation, pregnancy, and torsion: 70% of torsions occur during multiple pregnancies (2). Although it has been shown that adnexal torsion in pregnancy predisposes the woman to a recurrence during the same pregnancy

($\leq 15.1\%$) (11), the risk of repeated torsion in subsequent pregnancies is unknown. Despite this, 5% of individuals will have a subsequent ovarian torsion on the ipsilateral side during their lifetime (3).

The movement toward minimally invasive treatment of ovarian torsion is becoming more popular. Initially, laparotomy with salpingo-oophorectomy was advocated as the standard treatment for ovarian torsion because of concern that an embolus from within the torsed structure might develop (1, 4–6). Laparoscopic evaluation with simple detorsion gradually has become the surgical approach of choice for ovarian torsion, thereby keeping the ovary intact (4, 6). This minimally invasive procedure allows the physician to drain cysts, examine possible underlying causes of the torsion, and manually detorse the ovary (1, 3, 5, 6). Because recurrence of torsion is rare and the risk-benefit ratio of ovarian fixation has not been assessed sufficiently, this procedure cannot be recommended (5).

More conservative procedures may pose a better option for the pregnant patient, as laparotomy and laparoscopy may increase the risk of fetal loss. Zhu et al. (12) described treatment of two pregnant patients with presumed ovarian torsion by transvaginal ultrasound-guided ovarian cyst aspiration with subsequent symptom relief. In their report, one of the women lost her fetus (12). It is possible that transvaginal manipulation may increase the risk of uterine disruption and loss of the fetus. In the present case, the patient was treated with a more conservative procedure: ultrasound-guided transabdominal aspiration of the cysts and repositioning. To our knowledge, transabdominal drainage of ovarian cysts for the treatment of torsion in the pregnant patient has not been described previously in the literature.

This method of intervention is conservative and allows the pregnant patient to avoid the many risks inherent with surgical intervention. Although percutaneous cyst aspiration does pose theoretical risks of bleeding and injury to adjacent structures, those risks appear to be less than the risks inherent in surgical management. In addition to the risks of anesthetic exposure, studies in animals show that CO₂ exposure during laparoscopy reduces uterine blood flow, leading to decreased maternal cardiac output and venous return with a concomitant risk of fetal hypotension and hypoxia. To date, this has not been shown in pregnant human patients (2, 8). Compared with percutaneous drainage, surgical intervention for ovarian torsion also increases the risks of blood loss and infection. In patients with clinical signs and symptoms and Doppler ultrasound findings consistent with ovarian torsion, transabdominal drainage of cysts and patient repositioning to assist in spontaneous detorsion should be considered as a viable alternative to surgical intervention.

REFERENCES

1. Pan HS, Huang LW, Lee CY, Hwang JL, Chang JZ. Ovarian pregnancy torsion. *Arch Gynecol Obstet* 2004;270:119–21.
2. Arena S, Canonico S, Luzi G, Epicoco G, Brusco GF, Affronti G. Ovarian torsion in in vitro fertilization-induced twin pregnancy: combination of Doppler ultrasound and laparoscopy in diagnosis and treatment can quickly solve the case. *Fertil Steril* 2009;92:1496.e9–13.
3. Rackow BW, Patrizio P. Successful pregnancy complicated by early and late adnexal torsion after in vitro fertilization. *Fertil Steril* 2007;87:697.e9–12.
4. Weitzman VN, DiLuigi AJ, Maier DB, Nulsen JC. Prevention of recurrent adnexal torsion. *Fertil Steril* 2008;90:2018.e1–3.
5. Oelsner G, Shashar D. Adnexal torsion. *Clin Obstet Gynecol* 2006;49:459–63.
6. Pinto AB, Ratts VS, Williams DB, Keller SL, Odem RR. Reduction of ovarian torsion 1 week after embryo transfer in a patient with bilateral hyperstimulated ovaries. *Fertil Steril* 2001;76:403–6.
7. Smorgick N, Pansky M, Feingold M, Herman A, Halperin R, Maymon R. The clinical characteristics and sonographic findings of maternal ovarian torsion in pregnancy. *Fertil Steril* 2008;92:1983–7.
8. Djavadian D, Braendle W, Jaenicke F. Laparoscopic oophorectomy for the treatment of recurrent torsion of the adnexa in pregnancy: case report and review. *Fertil Steril* 2004;82:933–6.
9. Katz VL, Lentz GM, Lobo RA, Gershenson DM. *Comprehensive gynecology*. 5th ed. Philadelphia: Mosby, 2007: 462–3.
10. Silverberg K, Olive D, Burns W, Johnson J, Groff T, Schenken R. Follicular size at the time of human chorionic gonadotropin administration predicts ovulation outcome in human menopausal gonadotropin-stimulated cycles. *Fertil Steril* 1991;56:296–300.
11. Pansky M, Feingold M, Maymon R, Ami IB, Halperin R, Smorgick N. Maternal adnexal torsion in pregnancy is associated with significant risk of recurrence. *J Minim Invasive Gynecol* 2009;16:551–3.
12. Zhu W, Li X, Chen X, Fu Z. Conservative management of adnexal torsion via transvaginal ultrasound guided ovarian cyst aspiration in patients with ovarian hyperstimulation. *Fertil Steril* 2008;89:229.e1–3.