

Corrective surgery using a gridiron incision for abdominal pain caused by a folded ovary in the third trimester of pregnancy

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Abstract

Introduction: Sonography and magnetic resonance imaging (MRI) may be helpful to obtain an accurate diagnosis of acute abdominal pain in pregnancy. Adnexal torsion presenting in the first or second trimester can be confirmed and treated through laparoscopic surgery; however laparoscopic surgery in the third trimester can be difficult owing to the large uterus, and a gridiron incision can be useful.

Case Report/Case presentation: An 18-year-old gravida 1, para 0 (G1P0) woman at 30 + 4 weeks of gestation presented with sudden-onset cyclic pain in the right lower quadrant. Abdominal ultrasonography showed a normal appendix, and MRI showed a normal appendix and normal ovaries. The patient's prominent tender point was marked and compared with the MR images, which confirmed the mark as the position of the right ovary. Laparotomy was performed through a gridiron incision, and a folded right ovary was identified. The ovary was unfolded, and TachoSil[®] and Surgicel[®] were used to maintain the unfolded position. The patient's pain resolved, and her post-operative course was uneventful. She delivered a healthy, 2540-g male baby at 35 weeks' gestation.

Discussion/Conclusions: A gridiron incision was useful to treat a folded ovary in the third trimester and to evaluate the adnexa and minimize uterine manipulation.

Keywords

Folded ovary, pregnancy, gridiron incision, third trimester, abdominal pain, imaging

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Introduction

Acute abdominal pain in pregnant patients presents a difficult diagnostic dilemma. Differential diagnoses during pregnancy are numerous because abdominal pain may be obstetric in nature or may be caused by diseases of other intraabdominal or intrapelvic structures.¹ Therefore, it may be helpful to use radiographic imaging to obtain an accurate diagnosis. Sonography is the first imaging technique in a pregnant patient with abdominal pain. Recently, magnetic resonance imaging (MRI) was also shown to be safe in pregnancy and can be used for further examination. Adnexal torsion presenting in the first or second trimester of pregnancy can be confirmed and treated through laparoscopic surgery. However, laparoscopic surgery can be difficult in the third trimester owing to the large uterus.

A gridiron incision is a downward and inward incision from McBurney's point. The gridiron incision can be used in right lower quadrant area diseases, such as appendicitis, and can also be used to drain pelvic abscesses. Laparoscopic management requires skilled personnel and equipment, and a gridiron incision through McBurney's point is useful to explore the adnexa without uterine manipulation.² If the location of the right adnexa is similar to the appendix in non-pregnancy, a gridiron incision is useful to evaluate the adnexa and minimize uterus manipulation.

Herein, we report a case of a folded ovary that was treated using a gridiron incision in the third trimester.

Case report

An 18-year-old gravida 1, para 0 (G1P0) woman at 30+4 weeks of gestation presented with sudden-onset cyclic pain in the right lower quadrant. She was admitted to a local hospital and treated with tocolytics;

however, the symptoms persisted, and she was referred to our hospital. She had no remarkable medical history, including no history of vaginal bleeding, dysuria, or uterine contractions. The patient had no fever, and her vital signs were stable; however, physical examination revealed marked tenderness in the right lower abdominal quadrant. Blood laboratory evaluations revealed a white blood cell count of $22.4 \times 10^9/L$ and a hemoglobin concentration of 83 g/L; the C-reactive protein concentration was normal, and urine microscopy results were also normal. There were irregular uterine contractions. Abdominal ultrasonography showed a normal appendix with fetal biometry compatible with a 29+3-week pregnancy, with normal amniotic fluid volume and normal placenta on the posterior wall and normal fetal activity. Neither ovary was identified on ultrasonography, and no mass-like lesions were seen. She received tocolytic therapy, but the abdominal pain persisted; thus, abdominal MRI was performed on the same day to obtain an accurate diagnosis. MRI revealed a normal appendix and that both ovaries were normal. Despite no abnormal imaging findings, the patient continued to complain of right lower abdominal pain; therefore, we decided to perform exploratory laparotomy. The prominent tender point was marked on the patient's abdomen and was compared with the MR images (Figure 1). The marked point was confirmed to match the position of the right adnexa in the MR images; therefore, we considered that the pain originated in the right adnexa. Laparotomy was subsequently performed through a gridiron incision. No abnormal fluid collection, hematoma, or pus were seen upon entering the abdomen, and the right ovary was immediately identified. The size of the right ovary was normal, but it was flat and folded (Figure 2). There was no necrosis of the ovary or fallopian tube. We unfolded the right ovary,

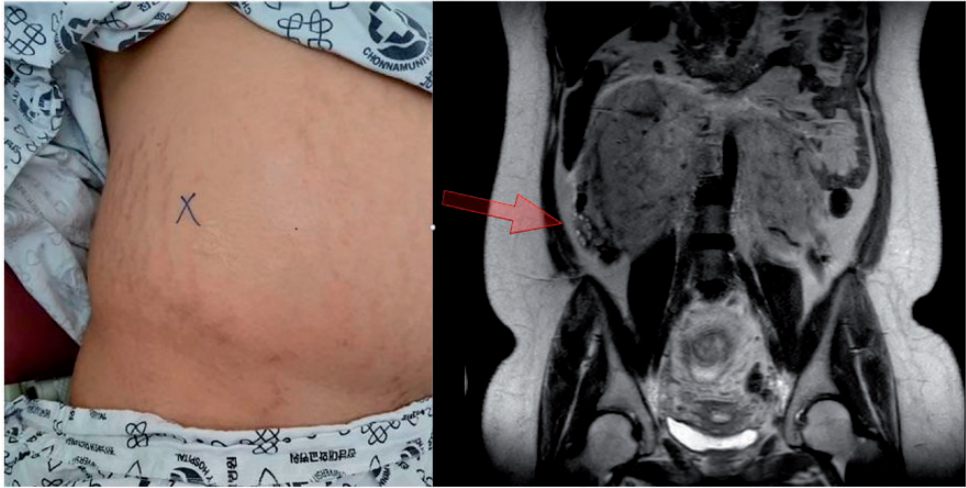


Figure 1. Prominent tender point and MR image. The marked point was confirmed to match the position of the right adnexa in the MR image. MRI, magnetic resonance.



Figure 2. Intraoperative finding of the folded right ovary. The size of the right ovary was normal, but it was flat and folded.



Figure 3. Intraoperative findings after fixation of the unfolded ovary. TachoSil® was attached to the front and back of the ovary and fallopian tube. Three Surgicels® were rolled and packed behind the ovary to hold it in place.

but it immediately refolded, and we used TachoSil® (Takeda Austria GmbH, Linz, Austria) to unfold the ovary. We then attached TachoSil® to the front and back of the ovary and fallopian tube and packed three rolled Surgicels® (Ethicon Inc., New Brunswick, NJ, USA) behind the ovary to maintain the unfolded anatomy (Figure 3).

After surgery, tocolytics were used to address irregular uterine contractions. The patient experienced minimal postoperative tenderness, the right lower quadrant pain resolved, and her postoperative course was uneventful. Because the patient had no symptoms of preterm labor, tocolytics

were stopped on postoperative day 4, and she was discharged on postoperative day 5. She experienced no recurrent abdominal pain, postoperatively, and she delivered a healthy 2540-g male baby at 35 weeks of pregnancy. There were no maternal or fetal complications.

Discussion

The causes of acute abdominal pain during pregnancy vary greatly. Certain anatomic and physiologic changes specific to pregnancy may make the cause of the pain difficult to identify.³ Additionally, the enlarging gravid uterus may make it difficult to localize the pain and may also mask or delay peritoneal signs.⁴ An acute abdomen may be the result of gastrointestinal, gynecologic, urologic, or obstetric causes.³ The potential diagnoses of abdominal pain in a gravid patient are placental abruption, cholecystitis, pancreatitis, appendicitis, intussusception, pyelonephritis, round ligament syndrome, hydronephrosis, ovarian torsion, uterine fibroid degeneration, ovarian cysts or tumors, intra-abdominal and rectus muscle abscesses, and Crohn's disease with diffuse peritoneal inflammation.⁵

Sonography in the evaluation of abdominal pain in pregnancy is desirable because it is a safe technique in pregnancy. However, in pregnancy, intraabdominal organs may be displaced and challenging to visualize on sonography.⁶ Our patient complained of right lower quadrant pain; therefore, we considered appendicitis as a possible cause. We evaluated the appendix sonographically, but the findings were normal, and neither ovary was identified.

MRI can also be used to identify a wide variety of abdominal and pelvic disease processes in pregnant patients with acute abdominal or pelvic pain.⁷ In our case, MRI was performed on the same day as

the sonography, for further evaluation, and revealed a normal appendix and normal bilateral adnexa. There were no abnormal findings in other organs.

The reported incidence of non-obstetric surgery during pregnancy is 0.75% to 2.0%.⁸ Surgery during pregnancy increases the incidence of spontaneous abortion, preterm labor, antepartum hemorrhage, pre-eclampsia/eclampsia, gestational diabetes, and cesarean section.⁹ In particular, surgeries performed in the third trimester are associated with an increased risk of preterm labor compared with surgery performed in the first and second trimesters.⁹ Generally, a Pfannenstiel skin incision or vertical skin incision is performed in pregnancy. In our case, the patient complained of persistent right lower quadrant pain. We compared the prominent tender point with the MR images and confirmed that the locations matched. Surgery with a Pfannenstiel skin incision or vertical skin incision involves inevitable uterine manipulation to evaluate the right ovary. Because uterine manipulation carries a high risk of a patient developing the complications mentioned above, we decided to perform a gridiron incision, which is commonly used for appendectomy. We reviewed the literature and identified no reported cases of gridiron incisions for ovarian surgery. A gridiron incision has the advantages of minimizing uterine manipulation and allowing accurate observation of the right ovary. We counseled the patient regarding her diagnosis and the treatment options; after which, she underwent emergency exploratory laparotomy. Intraoperatively, we immediately identified the right folded ovary. If the ovary is not the cause of abdominal pain, a gridiron incision is very limited for identifying other organs.

In our case, the cause of the pain was the folded right ovary. The shapes of the fallopian tube and ovary were normal, and only

the ovary itself was completely folded; this was an extremely rare case. To unfold the ovary, we used TachoSil[®], which is an equine-derived collagen sponge coated on one side with human fibrinogen and human thrombin. TachoSil[®] is used to improve hemostasis, promote tissue sealing, and provide support during suturing in vascular surgery and interlobar fixation.^{10,11} Upon contact with tissue, the clotting factors in the TachoSil[®] dissolve and form a fibrin network that adheres the collagen sponge to the tissue surface. The honeycomb-like collagen structure of TachoSil[®] remains flexible and extensible,¹¹ and to make use of these characteristics, we attached the TachoSil[®] to the front and back of the ovary and fallopian tube to unfold the ovary and maintain the unfolded anatomy.

We searched PubMed for case reports describing a folded ovary or ovarian torsion and gridiron incision and pregnancy, and found a single case of torsion of a normal-sized ovary in the third trimester.² However, the case was initially diagnosed as appendicitis, and surgery was performed with a gridiron incision. Intraoperatively, the appendix was normal in appearance, and the right ovary was found to have twisted three times. In our patient, we believed that the pain originated in the right adnexa, prior to surgery. Although appendicitis was not suspected, we used a gridiron incision to minimize uterine manipulation. To our knowledge, this is the first case report describing the use of a gridiron incision to treat an ovarian problem in pregnancy.

In conclusion, it is very rare for a folded ovary to cause abdominal pain during pregnancy. If diagnosed in the third trimester, laparoscopic surgery can be difficult owing to the large uterus. Thus, a gridiron incision is useful to evaluate the adnexa and minimize uterine manipulation.

Ethics statement

Ethics approval was not required by our institution for this case report. The manuscript does not disclose the patient's private information. The patient provided verbal informed consent for publication.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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References

1. Cappell MS and Friedel D. Abdominal pain during pregnancy. *Gastroenterol Clin North Am* 2003; 32: 1–58.
2. Silja A and Gowri V. Torsion of a normal ovary in the third trimester of pregnancy: a case report. *J Med Case Rep* 2008; 2: 378–379.
3. Kilpatrick CC and Monga M. Approach to the acute abdomen in pregnancy. *Obstet Gynecol Clin North Am* 2007; 34: 389–402.
4. Ryan JP and Pellechia D. Effect of ovarian hormone pretreatment on gallbladder motility in vitro. *Life Sci* 1982; 31: 1445–1449.
5. Munoz M and Usatine RP. Abdominal pain in a pregnant woman. *J Fam Pract* 2005; 54: 665–668.
6. Kennedy A. Assessment of acute abdominal pain in the pregnant patient. *Semin Ultrasound CT MR* 2000; 21: 64–77.
7. Birchard KR, Brown MA, Hyslop WB, et al. MRI of acute abdominal and pelvic pain in pregnant patients. *AJR Am J Roentgenol* 2005; 184: 452–458.
8. Reitman E and Flood P. Anaesthetic considerations for non-obstetric surgery during pregnancy. *Br J Anaesth* 2011; 107: 72–78.

9. Yu CH, Weng SF, Ho CH, et al. Pregnancy outcomes following nonobstetric surgery during gestation: a nationwide population-based case-control study in Taiwan. *BMC Pregnancy Childbirth* 2018; 18: 460.
10. Rickenbacher A, Breitenstein S, Lesurtel M, et al. Efficacy of TachoSil a fibrin-based haemostat in different fields of surgery—a systematic review. *Expert Opin Biol Ther* 2009; 9: 897–907.
11. Fiorelli A, Scaramuzzi R, Costanzo S, et al. Interlobar fixation using TachoSil: a novel technique. *Transl Lung Cancer Res* 2015; 4: 605–609.