

Secondary pregnancy by an implant in a laparoscopic trocar site

A case report

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Abstract

Rationale: For nearly 20 years, laparoscopy has been generally regarded as the gold standard for the surgical treatment of ectopic pregnancy and its application is very widespread. According to our knowledge, secondary pregnancy at the laparoscopic trocar site has not yet been reported until now.

Patient concerns: A 24-year-old Chinese female patient is reported herein. Her left fallopian tube was removed via laparoscopy due to a first ectopic pregnancy. Her postoperative blood β -human chorionic gonadotropin (β -hCG) was increasing with irregular vaginal bleeding. The patient was initially regarded as having an old ectopic pregnancy.

Diagnoses: Secondary pregnancy by an implant in a laparoscopic trocar Site.

Interventions: Because of secondary pregnancy at the laparoscopic port site, laparoscopic surgery was performed again 32 days after the first operation. Approximately 1000 milliliters (mL) of free intraperitoneal hemorrhage and active bleeding of the lesion were detected. Histopathologic examination confirmed the lesion was the result of pregnancy with visible villous tissue.

Outcomes: Her blood β -hCG gradually declined to a normal range in 28 days after the second operation. Menstruation occurred on day 20 after the second operation, and the duration and quantity were normal.

Lessons: Although laparoscopy has many advantages, secondary pregnancy at the laparoscopic trocar port wound caused the patient enormous physical and mental pain and increased the medical costs. The etiology of secondary ectopic pregnancy at the laparoscopic puncture site was mainly an iatrogenic factor. Therefore, the procedure should be standardized to avoid its occurrence.

Abbreviations: hCG = human chorionic gonadotropin, IL-6 = interleukin-6, mL = milliliter, mm = millimeter.

Keywords: ectopic pregnancy, implant, laparoscopy

1. Introduction

Ectopic pregnancy is one of the most common gynecological acute abdominal diseases, accounting for 1.3% to 2.4% of all pregnancies.^[1] Early studies reported that ectopic pregnancy resulted in 8.7% pregnancy-related mortality.^[2] With the improvements in diagnosis and treatment equipment, mortality from ectopic pregnancy has obviously declined, and is presently approximately 0.05%.^[3] It is well known that 95.5% of ectopic

pregnancies occur in the fallopian tubes, while ovarian and abdominal-cavity pregnancies are rare.^[4] The etiology of ectopic pregnancy remains unclear, it is generally considered to have multiple risk factors, but up to 50% of ectopic-pregnancy patients have no specific risk factors. Approximately 88% of ectopic pregnancies are diagnosed by the combination of signs, symptoms, risk factors, hCG levels, and ultrasound findings. For nearly 20 years, studies have reported that laparoscopy has been the gold standard of surgical treatment for ectopic pregnancy patients who must undergo surgical treatment, including ruptured ectopic pregnancy, hemodynamic instability, unclear diagnosis, and suspected ectopic-pregnancy patients who require a laparoscopic diagnosis.^[5] Laparotomy is used only when laparoscopy cannot be performed due to technical or medical reasons. As a minimally invasive procedure, the advantages of laparoscopy are well known, including faster access to the abdomen, shorter operation time, reduced bleeding, lower postoperative adhesion, less pain, quicker recovery, and lower costs. However, it has the risk of iatrogenic seeding, although the incidence is low, but this increases the secondary surgical rate, costs, and patient physical and mental trauma, so iatrogenic implantation should be avoided.

2. Consent

This case report was approved by the ethics committee of the First Affiliated Hospital of Xi'an Jiaotong University, and informed consent was obtained from the patient's family.

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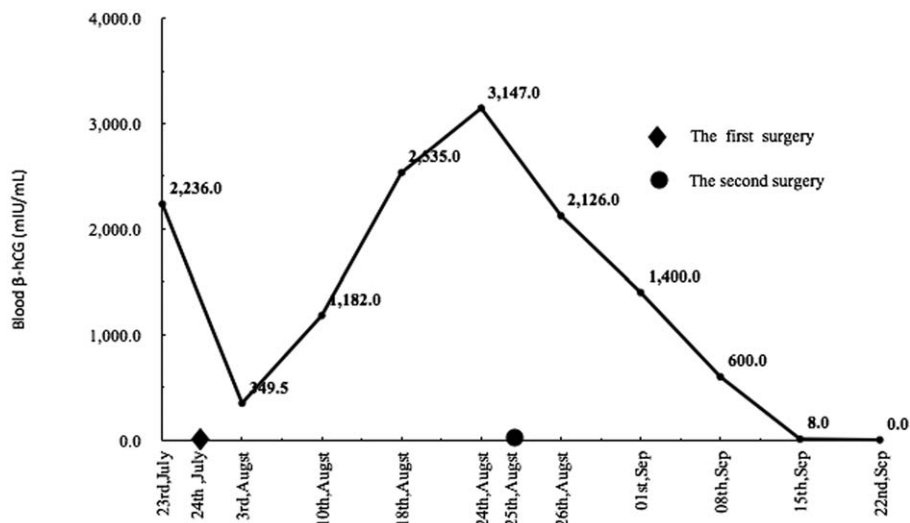


Figure 1. The changing trends in blood β -hCG level during illness. The peak occurred before the second surgery. hCG=human chorionic gonadotropin.

3. Case report

A 24-year-old Chinese woman underwent cesarean section surgery due to fetal distress and delivered 1 live male baby 3 years prior. On July 24, 2017 her left fallopian tube was removed through laparoscopy at the Hanzhong Central Hospital because of ectopic pregnancy. Histopathologic examination confirmed the left tubal pregnancy with hemorrhage. However, her postoperative blood β -hCG was increasing with irregular vaginal bleeding. Her blood β -hCG was 3147 mIU/mL on the day 30 after the first procedure (Fig. 1) without abdominal pain and other symptoms. Color ultrasound indicated an 18 millimeter (mm) \times 15 mm low-echo mass in the left ovary with visible peripheral-blood signal on the day 31 after the first operation, which was considered as a possible yellow cyst. Six hours after an ultrasound examination, cervical lifting pain was positive by bimanual examination, and the patient experienced great pain at the original puncture site in the left abdominal wall. Around 8 mL of noncoagulant blood was extracted from the pouch of Douglas through the vaginal posterior fornix. A 14 mm \times 10 mm effusion in front of the uterus and a 60 mm \times 27 mm effusion in the rectal fossa were scanned via color ultrasound. The size of the yellow cyst was unchanged. The second surgery was performed on the day 32 after the first operation. The

laparoscopic exploration detected some adhesion between the partial omentum and the abdominal wall, a normal size uterus, and a small amount of inflammatory exudates on the uterus surface. In addition, the bilateral ovaries and the right oviduct appearance were normal without left fallopian tube (Fig. 2A). A 10 mm \times 8 mm \times 5 mm mass was found at the initial trocar site of the left abdominal wall, which was purple and blue with active bleeding (Fig. 2B and Video 1 (The secondary pregnancy at the initial laparoscopic trocar site with active bleeding), <http://links.lww.com/MD/C222>). Furthermore, a 1000 mL free intraperitoneal hemorrhage was detected (Fig. 2). The abdominal wall mass had been removed completely and histopathologic examination confirmed the lesion was the result of pregnancy with visible villous tissue. The patient's blood β -hCG was 2126.0 mIU/mL on the first day after surgery and gradually declined to a normal range by day 28 after the second procedure. Menstruation occurred on day 20 after the second operation, and the duration and quantity were normal.

4. Discussion

There are increasing reports and studies of tumor seeding at the trocar sites following laparoscopic procedures in patients with

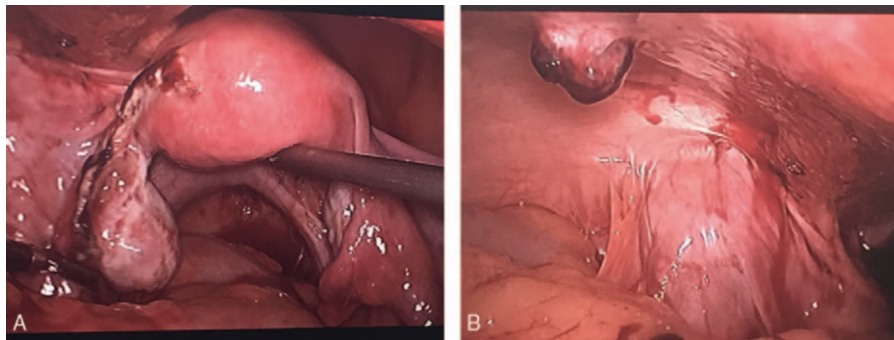


Figure 2. The pelvic cavity in the second surgery and the secondary pregnancy at the original laparoscopic trocar site in the left abdominal wall. (A) The left fallopian tube was missing with 1000 mL free intraperitoneal hemorrhage detected. (B) The ectopic pregnant mass was purple and blue with active bleeding. Its size was approximately 10 mm \times 8 mm \times 5 mm.

cancers.^[5-9] Although the abdominal wall implantation after laparoscopy associated with malignant disease has raised significant concerns,^[10] the port site seeding after laparoscopic surgery related to gynecologic benign disease is rare. Therefore, according to the authors' knowledge, this is a unique published case describing a pregnancy implantation on the abdominal wall secondary to the first ectopic pregnancy.

A number of mechanisms have been proposed for the development of trocar site seeding. First and foremost, several studies concerning malignant tumors have demonstrated that the direct wound contamination accounts for 60% of abdominal wall implantation after minimally invasive surgery.^[11] Instrument contamination can also cause operation area seeding. Aerosolization causes the tumor cells to fall off, leading to leakage. Furthermore, insufflation causes turbulence and displaces exfoliated tumor cells due to microleakage around ports, which is named as chimney effect. The intraperitoneal tumor cells preferentially migrate to this area of turbulence and then implant at these sites.^[12] Moreover, changing of the host immune response promotes implantation of abdominal wall incision, which changes the biological activity of the tumor cells. Numerous investigators have revealed the risk factors, including decreasing pH, interleukin-6 (IL-6), and C-reactive protein levels, and increasing IL-1, IL-10, and tumor necrosis factor during the laparoscopic procedure.^[8] In addition, surgical techniques and selecting appropriate patients are also important risk factors.

Some etiologies of abdominal wall implantation after laparoscopy with ectopic pregnancy may be similar to malignant tumors. For example, direct wound contamination, instrument contamination, surgical techniques, and selecting appropriate patients may be the causes, and all of these can be prevented and improved. However, whether the aerosolization, the "chimney effect" and changes in the host immune response are associated with implantation of abdominal wall trocar site are unclear at present.

Some data have shown that trocar-site implantation does not affect the prognosis, and merely increases second operation rates and affects the cancer cure rate.^[13] Concomitantly, it increases patient pain and medical costs. Thus, abdominal wall implantation after laparoscopy should be avoided, whether dealing with malignant tumors or benign diseases.

The following preventive measures can be used to reduce the abdominal wall wound implantation after laparoscopic surgery. First, minimizing the trocar port wound and preventing the carbon dioxide leakage around trocars is necessary.^[14] Second, the instruments should be cleaned promptly after each use and the trocars irrigated before removal. Third, the specimens must be completely removed. Fourth, protective bags should be used to retrieve specimens and protect extraction site.^[15] Fifth, training the surgical team, selecting the proper patients, and providing adequate laparoscopic equipment are necessary factors.^[16]

5. Conclusion

Although studies have demonstrated that laparoscopy has many advantages and has been the gold standard of surgical treatment for ectopic pregnancy patients who must undergo surgery, the secondary pregnancy at laparoscopic trocar site should be avoided. The etiology of secondary ectopic pregnancy at the laparoscopic puncture site was mainly an iatrogenic factor.

Therefore, the procedure should be standardized to avoid its occurrence.

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References

- [1] Taran FA, Kagan KO, Hübner M, et al. The diagnosis and treatment of ectopic pregnancy. *Dtsch Arztebl Int* 2015;112:693–703. quiz 704–5.
- [2] Sziller I, Ujházy A, Bardóczy Z, et al. Incidence and mortality of extrauterine pregnancy in Hungary (1931–1995). *Orv Hetil* 1998;139:493–8.
- [3] Barnhart KT. Clinical practice. Ectopic pregnancy. *N Engl J Med* 2009;361:379–87.
- [4] Bouyer J, Coste J, Fernandez H, et al. Sites of ectopic pregnancy: a 10 year population-based study of 1800 cases. *Hum Reprod* 2002;17:3224–30.
- [5] Cases-Baldo MJ, Menarguez Pina FJ, Moltó Aguado M, et al. Late diagnosis of occult gallbladder carcinoma by an implant in a laparoscopic trocar site. *Cir Esp* 2015;93:258–60.
- [6] Wittich P, Mearadji A, Marquet RL, et al. Irrigation of port sites: prevention of port site metastases? *J Laparoendosc Adv Surg Tech A* 2004;14:125–9.
- [7] Banyas-Paluchowski M, Yeganeh B, Luetgtes J, et al. Isolated subcutaneous implantation of a borderline ovarian tumor: A case report and review of the literature. *World J Clin Oncol* 2016;7:270–4.
- [8] Hoffstetter W, Ortega A, Chiang M, et al. Effects of topical tumoricidal agents on port-site recurrence of colon cancer: an experimental study in rats. *J Laparoendosc Adv Surg Tech A* 2001;11:9–12.
- [9] Cotlar AM, Mueller CR, Pettit JW, et al. Trocar site seeding of inapparent gallbladder carcinoma during laparoscopic cholecystectomy. *J Laparoendosc Surg* 1996;6:35–45.
- [10] Ramirez PT, Wolf JK, Levenback C. Laparoscopic port-site metastases: etiology and prevention. *Gynecol Oncol* 2003;91:179–89.
- [11] Bolles O, Borowsky M. Port-site metastasis following robotic-assisted radical hysterectomy for squamous cell cervical cancer. *Gynecol Oncol Case Rep* 2011;2:32–4.
- [12] Ba MC, Long H, Zhang XL, et al. Port-site metastases and chimney effect of b-ultrasound-guided and laparoscopically-assisted hyperthermic intraperitoneal perfusion chemotherapy. *Yonsei Med J* 2017;58:497–504.
- [13] Neuhaus SJ, Ellis T, Leeder PC, et al. Port-site metastases following laparoscopic surgery. *Br J Surg* 1998;85:735–41.
- [14] Tan Z, Li A, Chen L, et al. Port-site metastasis of uterine carcinosarcoma after laparoscopy. *J Korean Med Sci* 2017;32:1891–5.
- [15] Berger-Richardson D, Chesney TR, Englesakis M, et al. Trends in port-site metastasis after laparoscopic resection of incidental gallbladder cancer: a systematic review. *Surgery* 2017;161:618–27.
- [16] Are C, Talamini MA. Laparoscopy and malignancy. *J Laparoendosc Adv Surg Tech A* 2005;15:38–47.