

Laparoscopic surgery for ectopic pregnancy within a cesarean scar

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Summary

Background: Ectopic pregnancy in a previous cesarean section scar is rarely reported, and is very difficult to manage. There are only 12 cases to date that have been successfully managed under laparoscopy. **Cases:** Two females were admitted to this Hospital and were suspected to suffer from ectopic pregnancy from a previous cesarean section scar under the impression of Doppler ultrasound. Conservative regimen was first applied to one patient but failed to demonstrate enough efficacy. The beta-human chorionic gonadotropin (β -HCG) of the other patient was extremely high, therefore conservative treatment was not considered. Then laparoscopic surgery was performed for the two patients and not only confirmed the diagnosis, but also successfully removed the ectopic gestational products. Surgery under laparoscopy was uneventful. Total surgical time was 80 minutes, blood loss was only about 100 ml, and blood transfusion was not necessary. **Conclusion:** It seems that for a skilled surgeon, laparoscopy may be a sound and reasonable technique to diagnose and resect ectopic pregnancy within a cesarean scar.

Key words: Laparoscopic surgery; Ectopic pregnancy; Cesarean scar.

Introduction

A pregnancy implanted within the uterine scar of a previous cesarean scar was first reported in 1978 by Larsen and Solomon in South Africa [1], and since then, more and more cases are reported [2-5]. Patients suffering from cesarean scar pregnancy are at high risk of vaginal bleeding, uterine rupture, and hysterectomy [6]. Although conservative therapy methods such as systematic and local methotrexate, potassium chloride, and hyperosmolar glucose have been successful, only surgical resection has access to remove the ectopic pregnancy and simultaneously repair the defect considering that a uterine dehiscence will accompany cesarean scar implantation, potentially affecting future pregnancy [6]. So in this report the authors piloted laparoscopic resection technique of ectopic pregnancy within a cesarean scar.

Case one

A 28-year-old female, gravida 3, para 1, abortus 2, was admitted to this Hospital on May 10, 2011 with amenorrhea for 43 days requiring termination of pregnancy. She had not experienced any vaginal bleeding, abdominal pain, or other uncomfortable complaints. Her last menstrual period (LMP) was March 28, 2011. Urine pregnancy test was positive after 37 days of amenorrhea. She underwent an uneventful term transverse lower segment cesarean operation five years prior. Endovaginal Doppler sonographic scan suggested ectopic pregnancy within a cesarean scar (Figure 1) and serum beta-human chorionic gonadotropin (β -HCG) was 18,341 mIU/ml on the admission day.

Conservative therapy was first applied to this patient with single dose of 1.8 mg trichosanthin intramuscular injection. Serum β -HCG decreased to 6,218 mIU/ml six days after trichosanthin intramuscular injection but rebounded to 26,359 mIU/ml three

days later (Figure 2). The treatment regimen was then converted to methotrexate (MTX) intramuscular injection. Sixty-seven mg of methotrexate was intramuscularly injected four times every other day. During MTX injection, serum β -HCG improved to as high as 46,755 mIU/ml (two days after MTX injection), but declined to 46,450 mIU/ml (five days after MTX injection) and 31,368 mIU/ml (nine days after MTX injection) at the end of treatment (Figure 2). Alanine transaminase (ALT) was slightly elevated to 52 IU/l and aspartate transaminase (AST) was normal during methotrexate injection. The patient refused to undergo conservative therapy or expectant management and demanded surgery treatment.

Given that total laparoscopic hysterectomy has been a routine procedure in this Hospital and 12 such cases have been treated under laparoscopy in Taiwan, Hong Kong, and Singapore, therefore laparoscopic management was arranged for this patient on her 66th day of pregnancy. Laparoscopic surgery was performed under general endotracheal anesthesia and the patient was placed in the 15 degree Trendelenburg position on the operating table. Before commencing surgery, an indwelling Foley catheter was inserted to keep the bladder empty and monitor urine output continuously during and after the procedure. A Veress needle was inserted through a small incision just inferior to the umbilicus. Pneumoperitoneum was created by insufflating carbon dioxide at a maximal pressure of 13 mm Hg. After the Veress needle was removed, an operative five-mm trocar was inserted into the abdomen. A laparoscope with an attached camera was inserted through the cannula to visualize the intra-abdominal organs. Two additional five-mm (right side) and ten-mm (left side) trocars were inserted at the level of the anterior superior iliac spine, lateral to the epigastric blood vessels. The uterus was retroverted and as large as pregnancy 50 days in size, and the surface of cesarean scar showed violet blue and a bulging mass measuring three cm in diameter protruding from serosa of the cesarean scar (Figure 3). The cesarean scar adhered to the bladder and the right pelvic wall. Bilateral adnexae were normal. There was no free fluid in the pouch of Douglas. The adhesions were carefully and completely removed. The previous cesarean section scar was resected and the gestational sac was shown. The amniotic fluid and

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Fig. 1

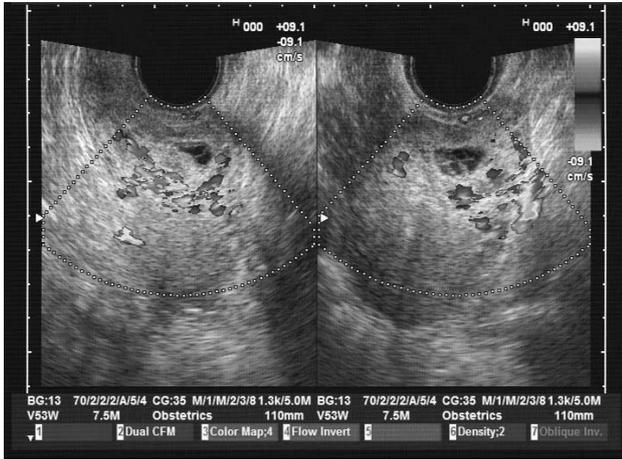


Figure 1. — Endovaginal sonography of the gestational sac in the anterior part of the uterine isthmus, just located in the previous cesarean section scar. CDFI shows rich blood flow signals surrounding the gestational sac and the sac edge is only two to three mm from the uterine serosa.

Fig. 2

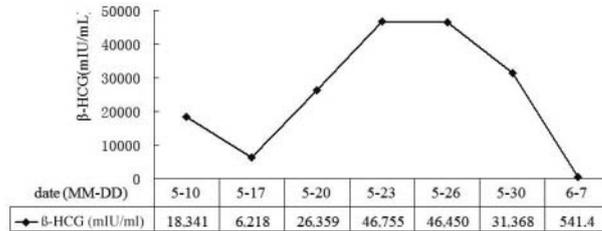


Figure 2. — Serum β-hCG was 18,341 mIU/ml on the admission day; single dose of 1.8 mg trichosanthin im on May 11; MTX im qod four times from May 21 to 27; surgery on June 2.

Fig. 3

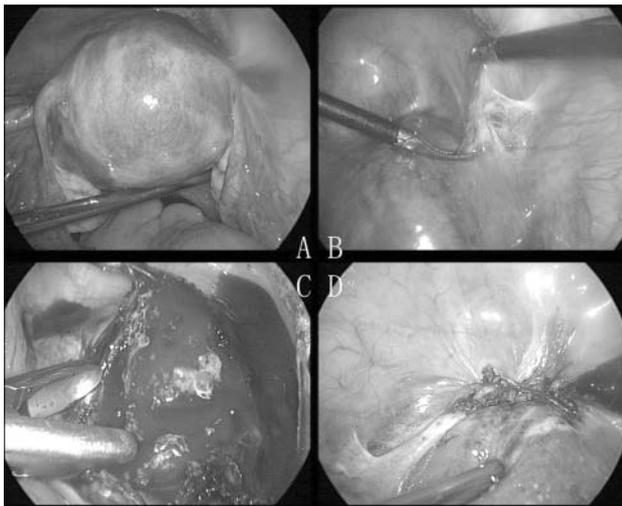


Figure 3. — A: The uterus is as large as pregnancy at 50 days and bilateral adnexae are normal. B) A bulging mass measuring three cm in diameter protruding from serosa of the cesarean scar and the cesarean scar adhering to bladder and the right pelvic wall can be seen. C) The amniotic fluid and chorionic villi are seen in the sac and the gestational tissue was removed using spoon-shaped forceps. D) One layer of continuous endoscopic sutures along the affected uterine wall was made with 1-0 Ethicon.

Fig. 4

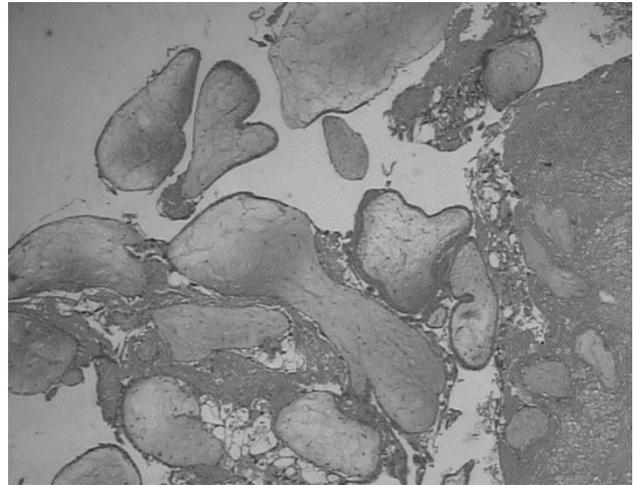


Figure 4. — Pathological examination revealing the chorionic villi and decidua tissue of the submittal specimen and also recognized villous interstitial edema and slightly trophoblastic hyperplasia.

Fig. 5

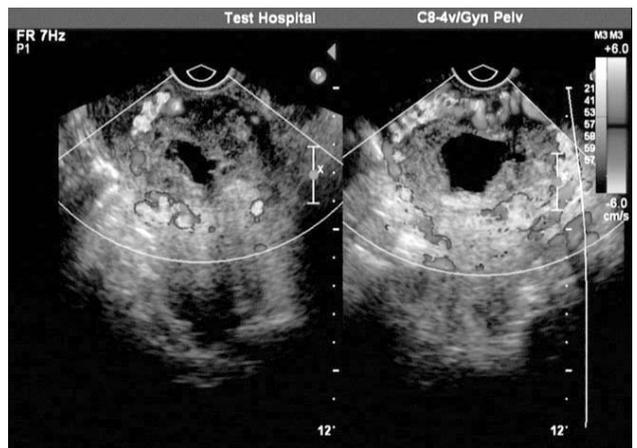


Figure 5. — Transvaginal ultrasound suggesting villus-like echoes in the anterior part of the uterine isthmus, just located in the previous cesarean section scar with an area of about 37 × 29 × 40 mm. CDFI showing rich blood flow signals surrounding the gestational sac and the sac edge only two mm from the uterine serosa.

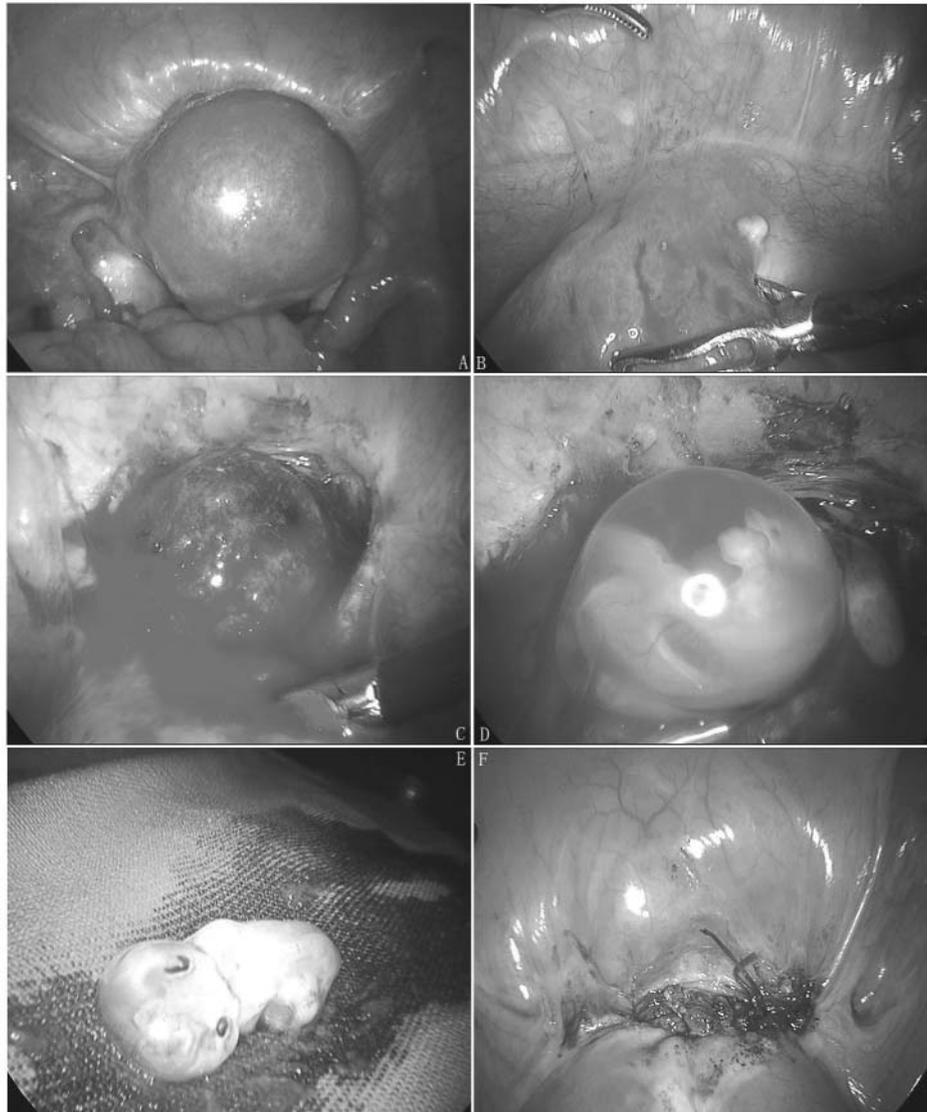


Figure 6. — A: The uterus is as large as pregnancy at 50 days and bilateral adnexae are normal. B: A bulging mass measuring five cm in diameter protruding from serosa of the cesarean scar and the cesarean scar adhering to the right pelvic wall can be seen. Bilateral adnexae were normal. C and D: The chorionic villi and embryo are seen in the sac. E: The embryo is removed using spoon-shaped forceps. F: One layer of continuous endoscopic sutures along the affected uterine wall was made with 1-0 Ethicon.

chorionic villi were seen in the sac and the gestational tissue was removed using spoon-shaped forceps. About $3 \times 2 \times 2$ cm of bright red tissue in total was submitted for rapid and routine pathological diagnosis. Homeostasis was achieved using bipolar forceps at 30W. One layer of continuous laparoscopic sutures along the affected uterine wall was made with 1-0 Ethicon (Figure 3). The total operative time was 80 min, blood loss was only about 100 ml, and blood transfusion was not necessary. The rapid pathological examination during laparoscopic surgery and the routine pathological examination after the surgery both confirmed the chorionic villi and decidual tissue of the submittal specimen and also recognized villous interstitial edema and slightly trophoblastic hyperplasia (Figure 4). Serum β -HCG drastically reduced to as low as 541.4 mIU/ml on the fifth day after laparoscopic surgery and serum progesterone was 0.488 ng/ml at the same day. Although recovery was uneventful, taking into ac-

count that the first laparoscopic management of an ectopic pregnancy within a cesarean scar that was performed in mainland China, the patient was discharged on the seventh postoperative day for the sake of prudence.

Case two

A 31-year-old female, gravida 2, para 1, abortus 1, was admitted to this Hospital on January 10, 2012 with amenorrhea for 51 days requiring termination of pregnancy. She had not experienced any vaginal bleeding, abdominal pain, or other uncomfortable complaints. Her LMP was November 20, 2011. Urine pregnancy test showed positive after 40 days of amenorrhea. She underwent an uneventful term transverse lower segment cesarean operation eight years prior. Endovaginal Doppler sonographic scan suggested ectopic pregnancy within a cesarean scar

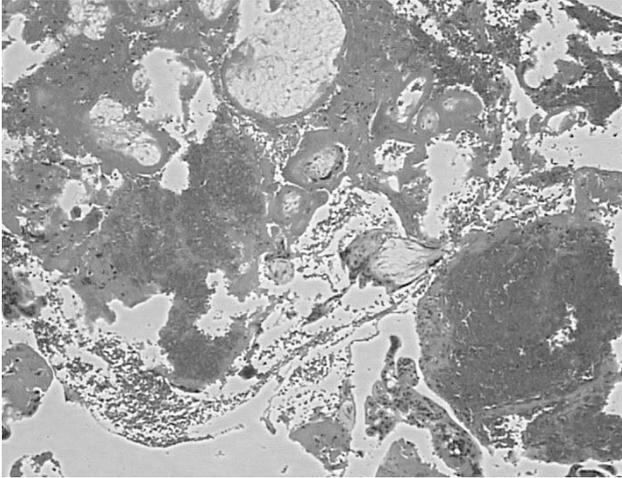


Figure 7. — Pathological examination revealing the chorionic villi and decidual tissue of the submittal specimen and also recognized villous interstitial edema.

(Figure 5), and serum β -HCG was as high as 100,363 mIU/ml on the admission day.

Considering that the extremely high level of β -HCG and had successfully managed the first ectopic pregnancy within cesarean scar with laparoscopic surgery, the authors directly performed laparoscopic surgery for this patient on January 12, 2012 before conservative regimen was applied. The surgical procedure was similar as in the first patient.

The uterus was anteverted and as large as pregnancy 50 days in size, and the surface of the cesarean scar showed violet blue and a bulging mass measuring five cm in diameter protruding from serosa of the cesarean scar (Figure 6). The cesarean scar adhered to the right pelvic wall. Bilateral adnexae were normal. There was no free fluid in the pouch of Douglas. The adhesions were removed carefully and completely. The previous cesarean section scar was resected and the gestational sac was shown. The amniotic fluid, chorionic villi, and embryo were seen in the sac and the gestational tissue was removed using spoon-shaped forceps. About $4 \times 3 \times 2$ cm of bright red tissue in total was submitted for routine pathological diagnosis. A rapid pathological examination was not prescribed for this patient. Homeostasis was achieved using bipolar forceps at 30W. One layer of continuous laparoscopic sutures along the affected uterine wall was made with 1-0 Ethicon (Figure 6). The total operative time was 80 min, blood loss was only about 200 ml, and blood transfusion was not necessary. The routine postoperative pathological examination confirmed the embryo, chorionic villi, and decidual tissue of the submittal specimen and also recognized villous interstitial edema (Figure 7). Serum β -HCG substantially reduced to 47,021 mIU/ml on the second day after laparoscopic surgery. β -HCG declined to 15,214 mIU/ml on the fifth day after surgery (Figure 8). Single dose of 75 mg MTX was intramuscularly injected and 150 mg mifepristone was administered per os due to relatively high β -HCG. The patient was discharged on the sixth day after surgery but was re-admitted to this Hospital on January 28, 2012, due to high fever without chills and the highest temperature was 39°C . Routine blood analysis on January 27, 2012 showed that total white blood cell count was $10.9 \times 10^9/\text{l}$, percentage of neutrophil granulocytes was 81.5%, and C-reactive protein (CRP) was 134 mg/l. The origin of fever was unknown. Etimicin and tinidazole was intravenous infused for only three days and the

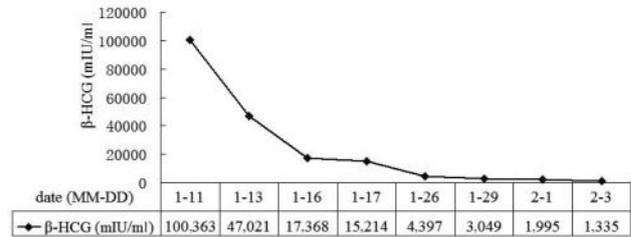


Figure 8. — Serum β -HCG was 1,003,631 mIU/ml on the admission day; laparoscopic surgery was performed on January 12, 2012; 75 mg MTX im and 150 mg mifepristone per os on January 17. 50 mg MTX im on February 3.

body temperature returned to normal on the second day after antibiotics administration. The blood routine analysis on February 3, 2012 showed that total white blood cells count was $4.8 \times 10^9/\text{l}$, percentage of neutrophil granulocytes was 63.2%, CRP was seven mg/l. On the same day β -HCG was 1,335 mIU/ml and the patient was discharged after 50 mg of MTX was intramuscularly injected. Outpatient follow-up showed that β -HCG declined to normal and the recovery was uneventful.

Discussion

Ectopic pregnancy within a cesarean scar is a very rare pregnant phenomenon, although cesarean section delivery is a very common procedure worldwide. Precisely because of the rarity of this kind of ectopic implantation, large sample research is infeasible and there are only some case reports available. There are only 12 cases to date that have been successfully managed under laparoscopy, among these cases, ten were performed in Taiwan [7-9], one in Hong Kong [10], and one in Singapore [3]. The natural history of such a condition is unknown. Therefore no universal treatment guidelines are accessible by medical doctors, including no explicit criteria for conservative therapy or surgery management to choose from (laparotomy, transvaginal or laparoscopy) for a specific patient without life-threatening situations. The case one patient was first administered conservative regimens, including trichosanthin and MTX, but failed to demonstrate enough efficacy. Serum β -HCG failed to decline continuously so the authors resorted to surgery management. For the case two patient, because the serum β -HCG was extremely high (1,003,631 mIU/ml), the authors performed laparoscopic surgery to remove the gestational tissue before conservative regime was administered. The serum β -HCG declined sharply to 47,021 mIU/ml on the second day after laparoscopic surgery. Although serum β -HCG dropped dramatically after laparoscopic surgery, it was still as high as 15,214 mIU/ml on the fifth day after surgery due to the extremely original high value on the admission day. So MTX and mifepristone were administered after surgery.

It is not very easy to establish both diagnosis and differential diagnosis of ectopic pregnancy within a cesarean scar, but if it is delayed and the pregnancy is allowed to continue, the patient will be at very high risk of uterine scar rupture, hemorrhage, and hypovolemic shock even in the

first trimester. It is possible for the patient to undergo serious maternal morbidity and hysterectomy and thus lose subsequent fertility. Therefore early diagnosis establishment for a patient suffering ectopic pregnancy within a cesarean section scar is imperative and urgent. Doppler sonography is reliable to establish early diagnosis before surgery intervention and thus enable treatment options, can avoid uterine rupture and hemorrhage, and thereby preserve the uterus. In both cases, Doppler ultrasound revealed an empty uterine cavity, an empty cervical canal, and development of the gestational sac in the anterior part of the uterine isthmus, just located in the previous cesarean section scar. Ultrasound also suggested the volume of the gestational sac, $30 \times 23 \times 16$ mm and $37 \times 36 \times 26$ mm, respectively. Color Doppler flow imaging (CDFI) showed rich blood flow signals surrounding the gestational sac and the sac edge was only two to three mm from the uterine serosa. Healthy myometrium between the bladder and the gestational sac was absent under sonographic scan (Figures 1 and 5), hence early diagnosis was established with ultrasound in both cases and was confirmed later by laparoscopy.

Laparoscopic surgery not only confirms diagnosis, but also simultaneously removes the ectopic gestational products. As far as the authors' knowledge is concerned, they prefer laparoscopic surgery to laparotomy for a patient with a high index of cesarean scar pregnancy suspicion and early diagnosis with transvaginal sonography. If a life-threatening situation occurs, laparoscopy is not available, or the surgeon is not very skilled at minimally invasive surgery (MIS), laparotomy is considered to be better. Overall the authors recommend surgical intervention other than non-surgical treatment to manage ectopic pregnancy within a cesarean scar, especially for patients with very high serum β -HCG, considering that a uterine dehiscence will accompany cesarean scar implantation, potentially affecting fu-

ture pregnancy, and only surgical management is able to remove the ectopic pregnancy and repair the defect simultaneously. If the serum β -HCG delays to normal after surgery, MTX intramuscular injection is recommended.

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