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Original Research

Laparoscopic treatment of cornual heterotopic pregnancy: A retrospective cohort study

Wenzhi Xu, Xiaona Lin, Dong Huang, Songying Zhang*

Assisted Reproduction Unit, Department of Obstetrics and Gynecology, Sir Run Run Shaw Hospital, School of Medicine, Zhejiang University, Key Laboratory of Reproductive Dysfunction Management of Zhejiang Province, No. 3 East Qing Chun Road, Hangzhou, 310016, PR China

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ABSTRACT

Objective: To report on our experience of laparoscopic cornuostomy or cornual repair for cornual heterotopic pregnancy.

Study design: A single center, retrospective review of patients who were diagnosed as cornual heterotopic pregnancy, which developed after in vitro fertilization and embryo transfer (IVF/ET) between January 2009 and June 2014. All patients were managed by laparoscopic cornuostomy or cornual repair.

Results: 14 patients were enrolled and 4 patients were finally confirmed to have a ruptured cornu. 4/4 presented as acute abdominal pain and 3/4 as metrorrhagia. The blood pressure of all the patients were stable. The earliest ruptured patient of this series happened at 23 days after IVF/ET. The hemoglobin levels of the 4 ruptured patients were significantly lower than the other patients (8.6 ± 1.8 g/dl versus 12.2 ± 1.1 g/dl, $p < 0.001$). Internal bleeding before operation was significantly higher in the ruptured patients than in the intact patients (1050.0 ± 369.8 ml versus 0.0 ± 0.0 ml, $p < 0.001$). All 14 patients were managed by laparoscopic cornuostomy or cornual repair. No one was converted to laparotomy. Post-operation pregnancy was uneventful. All neonates were delivered by cesarean section with no evident complications.

Conclusion: Laparoscopic cornuostomy or cornual repair appears to be an effective treatment for cornual heterotopic pregnancy, even in ruptured ones. These operations can be safely performed in an institution with well-trained gynecological laparoscopists with experienced support teams.

1. Introduction

Heterotopic pregnancy, defined as the coexistence of an intrauterine pregnancy and an ectopic pregnancy (EP), is a rare entity. The incidence is 1 in 30,000 spontaneous pregnancies, and ranges from 1% to 3% in assisted reproductive technology pregnancies [1–3].

Cornual pregnancy is a special ectopic pregnancy, as it is located in the part of the fallopian tube which penetrates the muscular layer of the uterus. An interstitial pregnancy is sometimes used as a synonymous name. Cornual (interstitial) pregnancies can be confused with angular pregnancies; the latter, however, are located within the endometrial cavity, in the corner where the tube connects; typically those pregnancies are viable, although the miscarriage rate is high [2].

When a coexisting EP of heterotopic pregnancy occurs at the cornual region of the uterus, it is known as cornual heterotopic pregnancy (CHP). If the zone of implantation ruptures, it always results in severe hemodynamic decompensation and miscarriage. CHP is the most life-threatening EP, and the mortality rate is approximately 6–7 times higher than that of other types of EP [4].

Because of the extremely low incidence of CHP, only a few reports have discussed or summarized CHP treatment modalities, and even fewer about laparoscopic management or subsequent pregnancy outcomes.

In this study, we report our experience on treatment of cornual heterotopic pregnancy with laparoscopic cornuostomy or cornual repair. Some important surgery details have been included which lead to a successful outcome of the gravida and neonatus.

2. Materials and methods

2.1. Patients

This was a retrospective study, carried out on patients treated between January 2009 and June 2014. The data of all CHP patients, including the demographic features, clinical symptoms, transvaginal sonography examinations, laparoscopic findings, management details, operative time, blood loss, and subsequent pregnancy outcomes, were reviewed for further detailed analysis. This work has been reported in

* Corresponding author.
E-mail address: zhangsongying@zju.edu.cn (S. Zhang).

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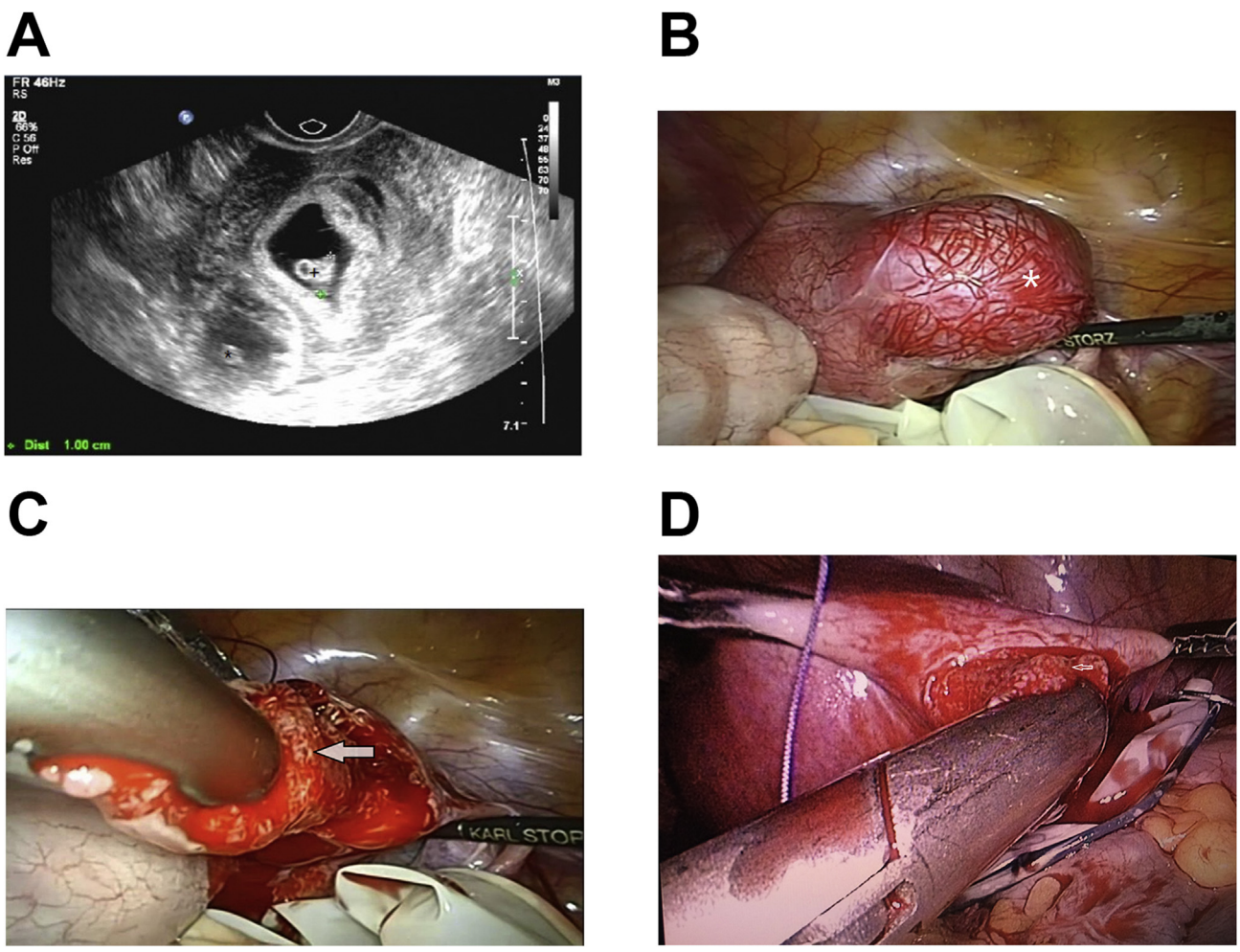

Fig. 1. A) Sonar picture of CHP (+ intrauterine pregnancy germ, *cornual pregnancy germ), B) Laparoscopy picture of CHP (*cornual pregnancy), C) Removal of Villi with spoon forceps. Arrow villi, D) Removal of Villi with spoon forceps. Arrow villi.

line with the STROCSS criteria [15].

2.2. Diagnosis of CHP

A diagnosis of CHP was made by two-dimensional transvaginal ultrasound (Fig. 1-A), and confirmed with an endoscope (Fig. 1-B).

2.3. Management

All the patients were managed by laparoscopic cornuostomy or cornual repair. The operations were performed by experienced laparoscopic surgeons using similar techniques, which were developed in our unit.

The most important aim of the operation was to reduce the negative effect on pregnancy. To achieve this goal, we performed as following: (1) reduced the anesthesia time. (2) reduced the intra-abdominal pressure to 10 mmHg. (3) reduced intraoperative hemorrhage by the following steps: (a) initially put an absorbable suture with a curved needle and a specimen bag into the abdominal cavity; (b) used forceps to clamp both ends of the incised cornu to control hemorrhage; (c) used a 10-mm spoon forceps to promptly and completely remove the sac; (d) continuously sutured the incision as quickly as possible to achieve rapid hemostasis. (4) avoided pulling the uterus. (5) cleaned the hematocele by suction and avoided washing the pelvic cavity because it could stimulate the uterus owing to a difference in temperature.

Four targets were set when the laparoscopic procedures were performed: (1) complete removal of the ectopic sac; (2) fast and effective hemostasis during cornual repair; (3) successful preservation of intrauterine pregnancy; (4) preventing future cornual rupture during pregnancy.

Operative Procedure: Informed consent was obtained before the operation. Before general endotracheal anesthesia, urethral catheterization, disinfection, draping, and other preparations were completed. The abdominal cavity was insufflated with CO2 gas and intra-abdominal pressure was maintained at 10 mmHg during the operation. A 10-mm trocar was inserted through a supra umbilical port. After cornual pregnancy was confirmed with an endoscope (Fig. 1-B), three more ancillary trocars were placed: one in the left mid quadrant (10-mm trocar); one in the left lower quadrant 5 cm medial to the left anterior superior iliac crest (5-mm trocar); and one at the McBurney's point (5-mm trocar). The surgeon stood on the left side of the patient and the assistant stood on the right side. A Vicryl 1™ suture with a curved needle (COVIDEN, Shanghai, China) and a specimen bag were put into the abdominal cavity. Without using any uterotonic, the thinnest part of the bulging cornu was incised; the gestational sac was dislodged and removed with a 10-mm spoon forceps (Fig. 1-C,D). After the gestational sac and tissues were completely removed, the cornual incision was continuously sutured in one layer. Removed blood clots and hematocele by suction and avoided washing the pelvic cavity or pulling the uterus.

Follow up after surgery: All patients received intramuscular injections of 40 milligram progesterone twice a day for 1 week after surgery, subsequently 40 milligram daily until 10 weeks' gestation.