

# Laparoscopic management of three rare types of ectopic pregnancy

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The laparoscopic management of three rare types of ectopic pregnancy, including rudimentary horn pregnancy, caesarean scar pregnancy, and interstitial pregnancy is described. All were managed with little morbidity. When the appropriate facilities and skills are available, laparoscopic surgery is the surgical treatment of choice for the various types of ectopic pregnancy.

## Introduction

The benefits of using a laparoscopic approach in gynaecological surgery are well recognised. Compared with conventional open surgery, laparoscopic surgery is associated with smaller incisions and better cosmetic results, less blood loss, less tissue trauma, less postoperative pain, shorter hospital stays, faster recovery with an earlier return to work and full activity, and less formation of postoperative adhesions. Depending on the particular situation, both medical treatment and surgery are established modalities of management for tubal pregnancies. Where surgery is indicated, laparoscopic resection has become the treatment of choice. Nowadays, even the more unusual types of ectopic pregnancy (EP) are being managed with laparoscopic surgery. This is illustrated by the following case reports, which describe the management of rudimentary uterine horn, caesarean scar, and the interstitial pregnancies.

## Case reports

### Case 1

A 33-year-old, Gravida 2, Para 1, woman was seen at a gestation of 5 weeks and 3 days, calculated by her last menstrual period, complaining of vaginal bleeding. A pelvic ultrasound scan revealed a 3.9 x 4.3 cm right adnexal mass with a gestational sac inside. A secondary yolk sac was present but the foetal pole was absent. The uterus was normal with a regular endometrial lining. The provisional diagnosis was right tubal pregnancy. Her haemoglobin level was 129 g/L.

The patient opted for laparoscopic surgery. During the laparoscopy, no tubal pregnancy was detected. Instead, a right rudimentary uterine horn was seen and a rudimentary horn pregnancy (RHP) was suspected (Fig 1a). Hysteroscopy was then performed. The hysteroscope went into the cavity of the uterus proper and no communication was detected between the uterine cavity and the rudimentary horn, confirming the RHP. The rectovesical ligament stretching between the uterine horns was divided and the vesicouterine space was entered. The bladder was dissected away from the uterus. The right broad ligament was opened and the ureter was traced in the pelvis to the

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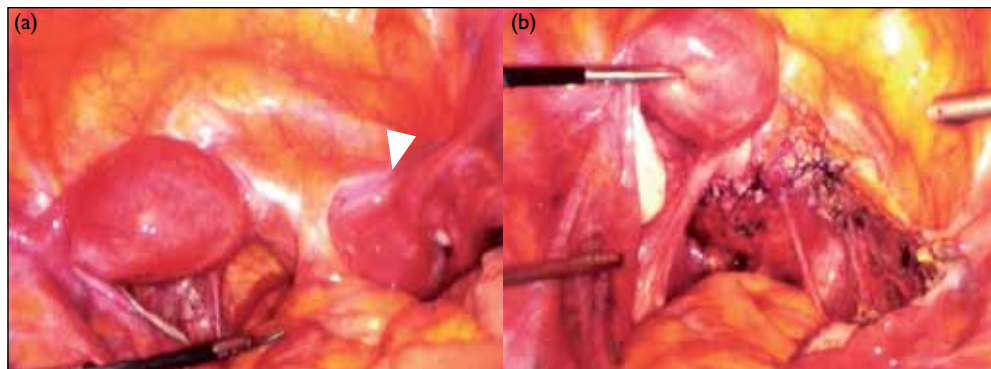


FIG 1. (a) The rudimentary uterine horn (arrowhead) was seen on the right side of the uterus proper. (b) The rudimentary uterine horn has been excised

ureteric tunnel. The right uterine artery was dissected from the ureter and was desiccated and divided. The round and ovarian ligaments and the fallopian tube were desiccated and divided. After confirming the location of the ureter, the connecting tissue between the uterus proper and the rudimentary horn was injected with vasopressin and then divided using an ultrasonic scalpel. The wound on the uterus proper was then sutured laparoscopically (Fig 1b). The rudimentary uterine horn was removed through a posterior colpotomy. The operation lasted 180 minutes and the blood loss was 100 mL. The patient recovered uneventfully.

### Case 2

A 33-year-old Gravida 2, Para 1, woman with a history of lower segment caesarean section was seen in the antenatal clinic at 10 weeks' gestation. The pregnancy had been achieved through in-vitro fertilisation. A pelvic ultrasound scan revealed a 2.41 x 1.67 cm gestational sac inside the anterior myometrium at the isthmic region, containing a secondary yolk sac and a 0.266-cm non-viable foetal pole. Caesarean scar pregnancy (CSP) was diagnosed. Her haemoglobin level was 120 g/L and she was haemodynamically stable. Her serum human chorionic gonadotropin (HCG) level was 21 220 IU/L. After thorough counselling, the patient opted for surgical rather than medical treatment.

At laparoscopy the vesicouterine peritoneum was opened and the bladder was dissected from the uterus. The CSP site was identified and then incised using an ultrasonic scalpel, after vasopressin injection. The gestational products were removed entirely via an endobag (Fig 2a). The uterine defect was repaired laparoscopically in two layers (Fig 2b). The operation lasted for 80 minutes and the blood loss was 50 mL.

The patient's HCG level was 5702 IU/L on day 2 and dropped to 835 IU/L by day 7 and she recovered uneventfully.

### Case 3

A 38-year-old Gravida 2, Para 0, woman was seen in the clinic at a gestation of 5 weeks and 2 days calculated by her last menstrual period. She had undergone a right salpingectomy for a tubal pregnancy 5 months before. An ultrasound scan was performed and revealed a 0.93 x 0.56 cm gestational sac-like structure in the right cornual region of the uterus. The uterus was of normal size and had a normal endometrial lining. Two subserosal masses, measuring 2.52 x 3.23 cm and 2.59 x 2.52 cm, compatible with uterine fibroids, were also seen. The patient's HCG level was 3600 IU/L the previous day. She was diagnosed with interstitial pregnancy (IP) and was admitted for

## 三宗較罕見的宮外孕腹腔鏡手術治療

本文報告三種較罕見的宮外孕病例，包括萎縮子宮孕、疤痕孕和子宮角孕。所有病人均已康復。在適當的技術及儀器配合下，腹腔鏡手術可妥善治理宮外孕，而腹腔鏡切除術可說是已成為主流。

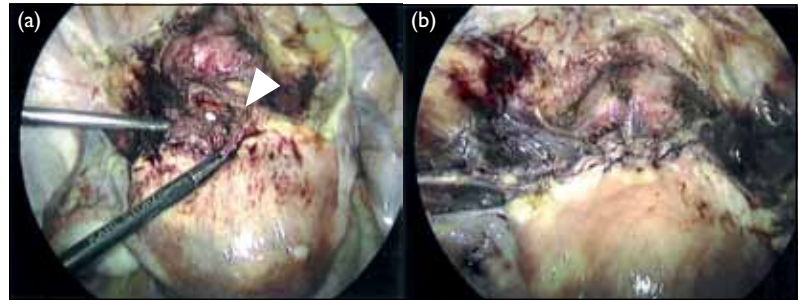


FIG 2. (a) The caesarean scar pregnancy has been totally removed from the uterine scar (arrowhead). (b) The defect at the isthmic region has been repaired laparoscopically

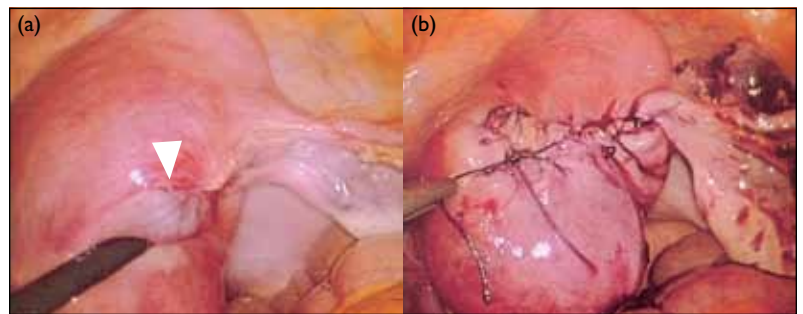


FIG 3. (a) The interstitial pregnancy at the right cornu (arrowhead). (b) Laparoscopic resection of the right interstitial pregnancy and repair of the right cornu has been accomplished

further management. Her haemoglobin level was 143 g/L.

The patient opted for laparoscopic resection. Intra-operatively, a right IP measuring 1 cm in diameter was seen (Fig 3a). Vasopressin was infiltrated around the gestational mass at the right cornu and an ultrasonic scalpel was used to resect it. The IP was delivered via an endobag. The defect in the right cornu was then sutured laparoscopically in two layers using vicryl o (Fig 3b). Blood loss was minimal and the operation lasted for 60 minutes. The patient's postoperative course was uneventful.

## Discussion

Rudimentary horn pregnancy, described in case 1, occurs once in 76 000 pregnancies. In 70 to 90% of cases, the horn is non-communicating, so fertilisation is thought to take place by transperitoneal migration

of sperm or of the conceptus. Ultrasound scanning is only 29% sensitive for diagnosing RHP. Most are still diagnosed during surgery.<sup>1</sup>

Half of RHP cases end up with uterine rupture, a life-threatening situation. Only 6% proceeded to term with reported neonatal survival rates ranging from 0 to 13%.<sup>2</sup> Therefore, RHP are usually managed surgically with resection of the pregnancy together with the rudimentary horn. This prevents the non-communicating uterine horn from becoming a site for future EPs that may cause uterine rupture. It may also reduce dysmenorrhoea and prevent pelvic endometriosis. Nonetheless, there is no scientific evidence demonstrating that removing the rudimentary horn improves reproductive outcomes.<sup>3</sup>

A literature search found 11 English-language articles describing 12 cases of laparoscopic management for a RHP.<sup>4-14</sup> In most cases coagulation was used for excision of the fibrous band that connected the horn. Specimens were retrieved intact through a posterior colpotomy or a suprapubic incision or were morcellated before removal. No intra-operative or postoperative complications were encountered. The absence of a cervix and communication with the uterus made the procedure easier and there was minimal bleeding.<sup>4</sup> Various reports indicate that laparoscopic removal of the non-communicating rudimentary uterine horn is a safe and effective procedure.<sup>15</sup>

Case 2 is a case of CSP. With the rising number of caesarean sections, CSP is perhaps less rare nowadays.<sup>16</sup> It occurs in about one in 2000 pregnancies and accounts for 6% of EPs among women with a prior caesarean delivery.<sup>17</sup> A CSP is a gestation completely surrounded by myometrium and the fibrous tissue of the caesarean section scar and separated from the endometrial cavity and endocervical canal. The pathogenesis may involve the implantation of the embryo in the microscopic tract of the scar or a wedge defect in the lower uterine segment. In-vitro fertilisation is one of the purported risk factors.<sup>18</sup> Ultrasonographic diagnosis requires the demonstration of a gestational sac in the isthmic region of the anterior myometrium.

Expectant management of a viable scar pregnancy puts patients at significant risk of requiring an emergency hysterectomy if the pregnancy progresses beyond the first trimester.<sup>9</sup> The main management options are still surgical and non-surgical treatment. Non-surgical treatment mainly consists of methotrexate, administered either systemically, locally, or combined. Though Jurkovic et al<sup>19</sup> reported an efficacy of 80%, the efficacy and safety of medical treatment are still unknown and the HCG level takes up to 4 months to return to normal.<sup>20</sup> Besides, bleeding and rupture may still occur when the HCG level is falling.<sup>21</sup>

With surgical excision of the gestational mass, the HCG level returns to normal much more quickly—within 1 to 2 weeks. Dehiscence has also been detected after successful medical treatment and a second scar pregnancy following local methotrexate treatment has also been reported.<sup>22</sup> It is believed that excision of the old scar may reduce the risk of dehiscence and recurrence. Nonetheless, along with the anaesthetic risks, surgical treatment involves operative risks, especially the possibility of massive bleeding. Furthermore, though surgical treatment offers the opportunity to remove the gestational mass and simultaneously repair the defect, no treatment modalities can guarantee uterine integrity.<sup>19</sup>

It has been proposed that systemic methotrexate be used for an early scar pregnancy with an HCG level of less than 10 000 IU/L.<sup>16,19,23</sup> In other circumstances, and also if expectant or systemic methotrexate treatment fails, the choice should be between surgery and ultrasound-guided local medical treatment, depending on local expertise, practice and experience. Surgical treatment was chosen in the case reported here because ultrasound-guided methotrexate injection is not available in our hospital. Surgical intervention and repair of the myometrial defect should also be considered when patients desire further pregnancies. In the hands of a trained operator, laparoscopy appears to be a reasonable approach, as long as the facilities are available for immediate action, for instance, laparoscopic hysterectomy, should massive bleeding occur.

In case 3 the patient had an IP, which accounts for 2 to 4% of all EPs.<sup>24</sup> This is often referred to as a cornual pregnancy, which actually means pregnancy in the rudimentary horn of a bicornuate uterus. Interstitial pregnancy is defined as a gestation developing in the uterine portion of the fallopian tube lateral to the round ligament.<sup>25</sup> Ultrasonography will show an empty uterus and an eccentric gestational sac that is very laterally located and not surrounded by decidua. An IP should be distinguished from an angular pregnancy where the gestational sac, though also laterally located, is surrounded by decidua and is inside the endometrial cavity. The pathogenesis of IP is not clear but a previous ipsilateral salpingectomy, as in the case we report here, is a risk factor.<sup>26</sup>

Management options for IP include medical therapy and surgery. Medical management is usually methotrexate administered systemically, locally, or combined.

The American College of Obstetrics and Gynecology guidelines include the following prerequisites for medical management: haemodynamic stability, initial HCG level not exceeding a predetermined level of 6000 to 15 000 IU/L, absence of foetal cardiac activity, and an unruptured ectopic mass smaller than 3.5 cm.<sup>27</sup>

The overall success rate of methotrexate treatment, local, systemic or combined, has been reported as ranging from 65 to 83%.<sup>26,28</sup> As with CSP, non-surgical management of IP avoids the anaesthetic and surgical risks but has the following disadvantages: slow return rate of HCG to normal levels, the possibility of uterine rupture despite a falling HCG level and concern about a deficient scar in the uterus, especially if further pregnancies are desired.

Conventionally, surgery involves either hysterectomy or laparotomy and cornual resection. A cornual resection entails risks of anaesthesia and surgery, as well as the possibility that hysterectomy may be needed if uncontrollable haemorrhaging occurs during the procedure. In the past few years, laparoscopic cornual resection has become the gold standard treatment for IP when feasible.<sup>29</sup> Currently, it is difficult to comment on the scar integrity and safety of subsequent pregnancies and whether elective caesarean section is indicated for future deliveries.

Laparoscopic surgery is now the standard surgical approach for tubal pregnancy, the commonest type of EP. The three cases of relatively rare EP described here, and the few similar cases

reported in the literature, illustrate that unusual types of EP can be managed with laparoscopy, though medical treatment is an acceptable alternative in many instances. The use of vasoconstrictors and the availability of laparoscopic suturing skills permit the excision of RHP, CSP, and IP with minimal blood loss and in reasonable operating time.

Ectopic pregnancy is particularly suited to laparoscopic management. The soft consistency and small volume of most EP means they can easily be delivered through the laparoscopic ports. Bigger EP can be morcellated inside an endobag or inside the peritoneal cavity before being removed without causing problems because of their non-malignant nature. Fertility may be better preserved since fewer postoperative adhesions develop after laparoscopic surgery than after a laparotomy.<sup>30</sup>

Therefore, where surgery is indicated or chosen for managing EP, laparoscopic resection can be achieved with little morbidity. It should probably be first-line surgical treatment if the facilities and skills are available. Given all the advantages of laparoscopic surgery over laparotomy, it is reasonable to anticipate that laparoscopic surgical resection will become the surgery of choice for various types of EP.

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