

Use of Transvaginal Ultrasound in the Management of an Interstitial Pregnancy

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ABSTRACT

An interstitial pregnancy is an ectopic pregnancy that is implanted in the interstitial segment of the fallopian tube and embedded within the muscular layer of the uterus. Because of the rich vascular supply of this region, maintaining hemostasis during surgical management of interstitial pregnancies is a recognized challenge. Visualizing the entirety of the gestational sac beneath the uterine serosa can also present a challenge, especially in cases of uncomplicated interstitial ectopic pregnancies. Here we present a case in which intraoperative transvaginal ultrasound was used to assist with a laparoscopic cornual wedge resection in a 24-year-old woman with a confirmed interstitial pregnancy. The use of intraoperative transvaginal ultrasound during the laparoscopy helped accurately delineate the location and extent of invasion of the interstitial pregnancy. It guided the placement of the uterine incision and helped ensure that the entire gestational sac and products of conception had been removed. This case demonstrates that transvaginal ultrasound can be used as an intraoperative tool to enhance surgical safety and minimize patient risk.

Key Words: Ultrasonography, Pregnancy, Ectopic, Laparoscopy.

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INTRODUCTION

An interstitial pregnancy is an ectopic pregnancy that is implanted in the interstitial segment of the fallopian tube and embedded within the muscular layer of the uterus.¹ The myometrial layer surrounding this portion of the tube allows an interstitial pregnancy to expand and remain asymptomatic for much longer than a true tubal ectopic pregnancy.² The rich vascular supply in this region, in conjunction with a larger gestation, has the potential for rupture and catastrophic hemorrhage.¹ As a result, a high index of suspicion, diagnostic accuracy, and timely management are of utmost importance.

Classically, surgical treatment of interstitial pregnancies involved a hysterectomy or a laparotomy with cornual resection.³ With advancements in minimally invasive techniques, both hysteroscopic and laparoscopic methods for surgical excision are gaining favor among prac-

tioners. Laparoscopic cornual wedge resection is a commonly described technique that involves the circumferential excision of the interstitial pregnancy and surrounding uterine cornua, with suture closure of the uterine defect.¹

As a result of the extensive vascular supply, maintaining hemostasis during laparoscopy is a well-recognized challenge. Methods described include injection of vasopressin into the myometrium below the cornual bulge,⁴ preemptive placement of sutures beneath the pregnancy,⁵ the use of an automatic stapler,⁶ and ligation of the ascending branch of the uterine artery.⁷ Suture closure of the uterine defect is the primary method of attaining hemostasis and helps decrease the risk for uterine rupture in an ensuing pregnancy.¹

Visualizing the gestational sac beneath the uterine serosa can also present a challenge. If an interstitial pregnancy is

small, a distinct bulge may not be obvious, making it difficult to determine the location to make the hysterotomy. The depth of implantation into the myometrium can also be hard to determine on the basis of laparoscopic views alone, and surgeons often rely on preoperative imaging to guide surgical planning, particularly if hysteroscopy is not being used simultaneously.

We suggest that intraoperative ultrasound can overcome these challenges, as real-time imaging helps provide clearer identification of tissue planes, alleviates the reliance on tactile feedback, and can assist surgeons in making challenging intraoperative decisions.⁸

CASE REPORT

A 24-year-old woman, gravida 3, para 1–0–1–1, with a previous right-sided ectopic pregnancy treated with a laparoscopic salpingectomy was seen with a suspected right-sided interstitial pregnancy. Serum evaluation revealed a quantitative β human chorionic gonadotropin level of 11,550 mIU/mL. Transvaginal ultrasound showed a mixed echoic lesion measuring $13.2 \times 16.3 \times 13$ mm with a central cystic component measuring $8 \times 10 \times 6$ mm at the right side of the uterine cavity, near the fundus (**Figure 1A**). The endometrium was 10 mm in thickness, without any evidence of a gestational sac (**Figure 1B**).

Because of the high serum β human chorionic gonadotropin level and the size of the ectopic pregnancy, the decision was made to forgo medical management and proceed with the surgical excision of the cornual pregnancy. The patient consented to a laparoscopic cornual wedge resection, possible salpingectomy, and possible conversion to laparotomy. She was provided with a general anesthetic and placed in the dorsal lithotomy position. An infraumbilical skin incision was made and a 10-mm balloon port inserted, followed by the placement of 5-mm accessory ports in the right and left lower quadrants.

The left ovary and tube were visualized and were unremarkable. The right ovary appeared normal, and the right fallopian tube showed evidence of previous salpingectomy. The right cornua had a slight bulge with evidence of hyperemia, consistent with the interstitial ectopic (**Figure 2A**).

The decision was made to perform intraoperative transvaginal ultrasound to better characterize the location and dimensions of the gestational sac. Pneumoperitoneum was maintained throughout the procedure. Using ultrasound, the uterus was visualized, along with the interstitial pregnancy. The distance from the outer edge

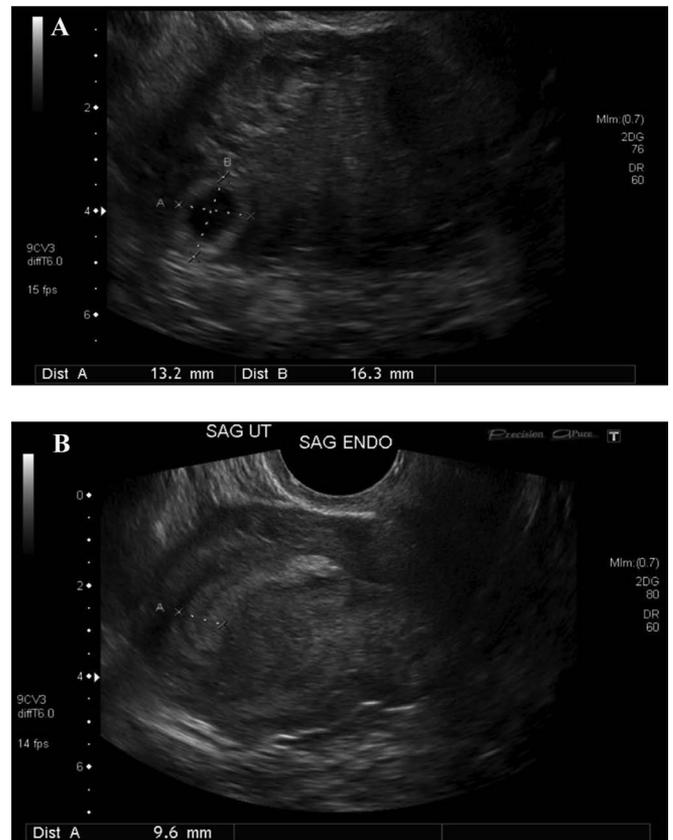


Figure 1. (A) Sagittal view of the uterus showing a gestational sac within the right cornua. (B) Concomitant sagittal view of an empty uterus showing no evidence of a gestation sac within the uterine cavity.

of the gestational sac to the cornual edge was 5 mm. A fetal pole was visualized, but there was no fetal heart rate.

With a spinal needle, 20 U of vasopressin was injected into the bulge of the cornua (**Figure 2B**). A suture was used to place a running, unlocked stitch underneath the cornua to ensure hemostasis. Using ultrasound as a guide, needle-tip cautery was used to make a circumferential incision overlying the interstitial pregnancy (**Figure 3A**). The gestational sac and its surrounding myometrium were removed in their entirety (**Figure 3B**). Again, transvaginal ultrasound was used to ensure that the pregnancy was fully excised. The cornual defect was repaired in a continuous unlocked fashion (**Figure 3C**).

The patient tolerated the procedure well, and estimated blood loss was <50 mL.

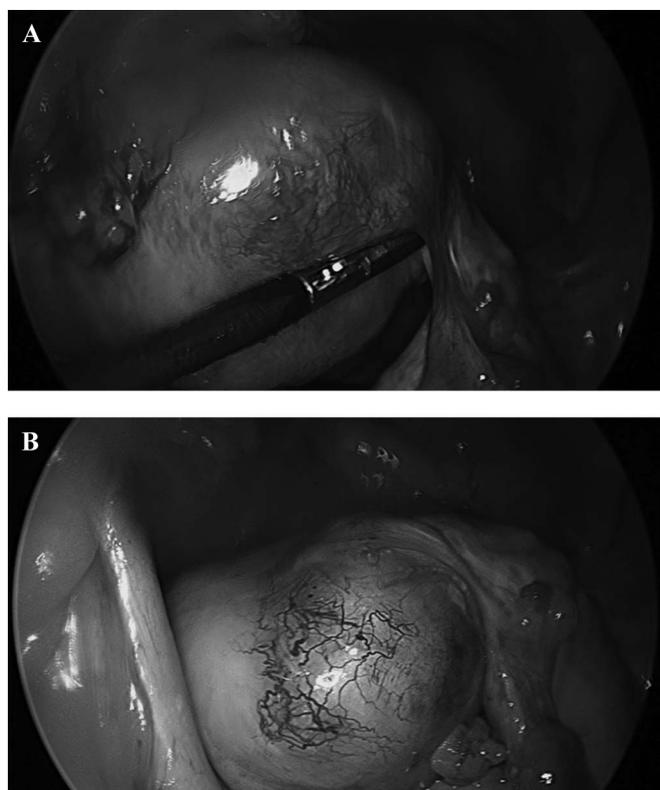


Figure 2. (A) Right cornual bulge with evidence of hyperemia, consistent with the interstitial ectopic pregnancy. (B) Blanching of the myometrium at the site of the cornual bulge after injection of vasopressin.

DISCUSSION

Since its first documented use in 1961, intraoperative ultrasonography has developed into a valuable surgical tool used during various laparoscopic procedures.⁸ Real-time imaging provides clearer identification of tissue planes, alleviates the reliance on tactile feedback, and can assist surgeons in making challenging intraoperative decisions.⁸

The application of intraoperative ultrasound is growing in gynecology. Transvaginal ultrasound is consistently being used to guide oocyte retrieval and embryo transfer during in vitro fertilization. Real-time transabdominal ultrasound is being introduced as a method of uterine cavity assessment during difficult cervical dilations, hysteroscopic lysis of adhesions, and hysteroscopic myomectomies.⁸ Transrectal ultrasound has also been described as an alternative during hysteroscopic resections of submucosal myomas.⁹ Intraoperative ultrasound during laparoscopic myomectomy is gaining acceptance, as it can guide the site of the hysterotomy when uterine distortion from the myoma is not obvious.⁸

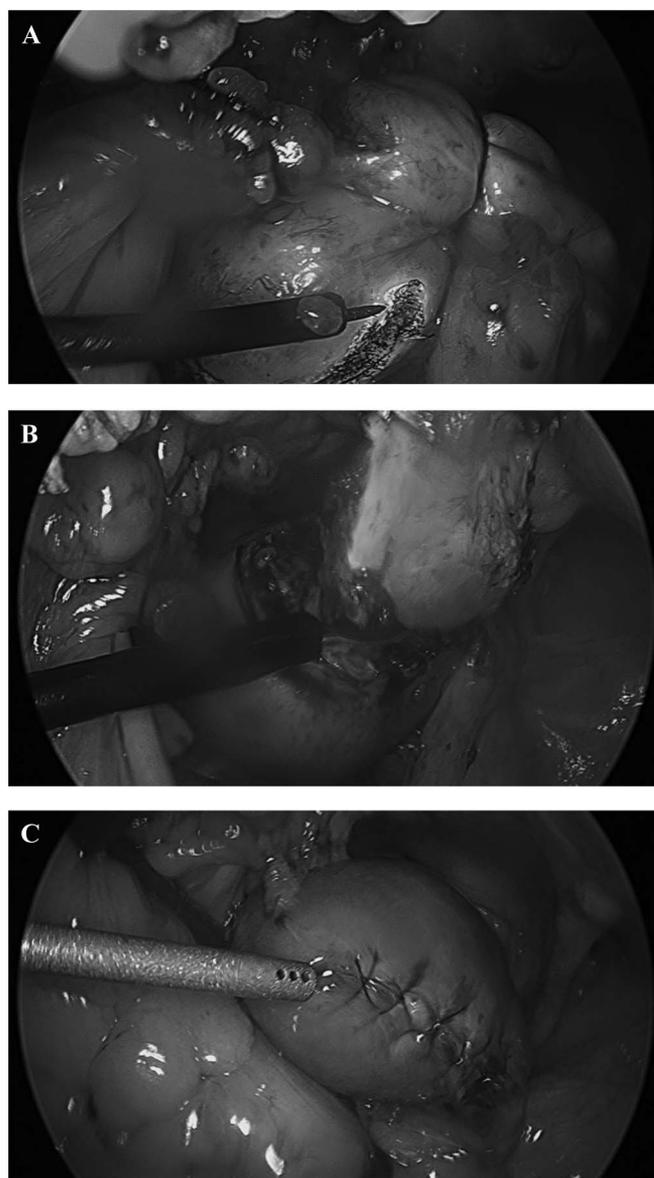


Figure 3. (A) Site of the circumferential hysterotomy overlying the interstitial pregnancy. (B) Removal of the gestational sac and the surrounding myometrium. (C) Repair of cornual defect.

The use of intraoperative ultrasound to assist with the treatment of an interstitial pregnancy has recently been described in various situations. Ultrasound-directed transvaginal injection of methotrexate can be used when the gestational sac is large or the level of β human chorionic gonadotropin is too high for systemic administration.¹⁰ Ultrasound has also been used to guide the intrauterine disruption of an interstitial pregnancy,¹¹ as well as to allow transcervical suction evacuation of an interstitial pregnancy.¹²

This case demonstrates the utility of an intraoperative transvaginal ultrasound in a laparoscopic cornual wedge resection. The use of the ultrasound helped accurately delineate the exact location and extent of invasion of the interstitial pregnancy. With this information, one can accurately determine the placement of the uterine incision and later ensure that the entire gestational sac and products of conception have been removed.

In a procedure that is recognizably high risk, we suggest that intraoperative transvaginal ultrasound has the potential to be used, in association with the previously described surgical techniques, to enhance surgical safety and minimize patient risk. Future trials would be helpful in examining its utility with respect to operative outcomes.

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