Title: A laparoscopic approach to cesarean scar ectopic pregnancy

Authors:

Charlotte M PICKETT, MD, Indianapolis, IN, Minimally Invasive Gynecology Fellow,
Department of Obstetrics and Gynecology, Indiana University School of Medicine;
Nicole MINALT MD, Indianapolis, IN, PGY-3, Department of Obstetrics and Gynecology,
Indiana University School of Medicine;
Olivia M HIGGINS, MD, Indianapolis, IN, Minimally Invasive Gynecology Fellow, Department of Obstetrics and Gynecology, Indiana University School of Medicine;
Caitlin BERNARD, MD, MSCI, Indianapolis, IN, Assistant Clinical Professor, Department of Obstetrics and Gynecology, Division of Complex Family Planning, Indiana University School of Medicine;
Kelly M KASPER, MD, Indianapolis, IN, Professor of Clinical Obstetrics and Gynecology, Director of the IU Fellowship of Minimally Invasive Gynecologic Surgery, Indiana University School of Medicine.

Prior presentation: none

Sources of support: no funding sources

Disclosures: The authors have no conflicts of interest to disclose

Corresponding Author Contact Information: Charlotte Pickett, cpicket@iu.edu, 550 N. University Boulevard, Ste 2301 Indianapolis, IN 46202 Fax: 317-948-7454 Work Ph: 317-948-4103 Cell Ph 530-902-6418.

Word Counts: Abstract 133; Manuscript 657.

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1 Present address: Rochester, NY, Department of Obstetrics and Gynecology, Rochester Regional Health.

This is the author's manuscript of the article published in final edited form as:
Condensation: A laparoscopic approach to cesarean scar ectopic removal with concurrent scar revision.

Short Title: Cesarean scar ectopic
Abstract

Cesarean scar pregnancies confer serious risk and severe morbidity. Appropriate management is key to preventing complications. While expectant management is usually contraindicated, the ideal combination of medical or surgical treatments is unclear and must be tailored to the patient’s preferences and stability, provider skill, and available resources. In this article, we present a combined medical and surgical approach successfully employed for the termination and excision of a cesarean scar pregnancy of 12 weeks gestation in a patient desiring uterine preservation. A video is included demonstrating the surgical steps of a laparoscopic approach used to safely resect the pregnancy and cesarean scar with minimal blood loss. The management technique described can be utilized to effectively resolve cesarean scar pregnancy, possibly decrease risk of recurrence, and preserve future fertility with a minimally invasive outpatient surgery.

Keywords: Cesarean scar ectopic, laparoscopy, minimally-invasive, video, surgery
With an increase in the number of patients undergoing cesarean delivery and obstetric ultrasound, diagnosis of cesarean scar pregnancy (CSP) has increased with a reported incidence of 1 in 1800 to 1 in 2500 pregnancies. CSP is defined as an empty uterine cavity and cervical canal with a gestational sac (GS) embedded either on the scar created by a prior cesarean delivery or within the anterior wall myometrial defect/niche. These pregnancies pose a unique challenge because CSP is associated with severe maternal morbidity due to high rates of massive hemorrhage, placenta accreta spectrum, uterine rupture and cesarean hysterectomy.

The Society for Maternal Fetal Medicine (SMFM) recently provided guidelines recommending against expectant management. Instead, women are counseled on pregnancy termination. However, because the literature on CSP largely consists of case series, the optimal treatment is not known. Many different modalities for managing CSP have been described ranging from more well-known options like hysterectomy and methotrexate to transvaginal surgery, curettage, uterine artery embolization, needle-guided sac decompression, high-intensity focused ultrasound imaging and balloon catheters. Treatments can be combined or performed in a stepwise fashion and are often dictated by local resources.

Intra-gestational methotrexate injection is a preferred approach and reaches success rates as high as 85%. However, because patients included in these studies averaged only 6-8 weeks gestational age, it is difficult to predict success in more advanced gestations. Additionally, the gestational mass can take weeks to months to resolve.
Benefits of laparoscopic resection are complete removal of the pregnancy, ability to preserve fertility, decreased follow-up time, decreased need for secondary or emergent procedures, and ability to resect and repair the scarred lower uterine segment (though it is unknown if this practice decreases the risk of CSP recurrence).\(^5,^7\)

The patient in this article was diagnosed with a CSP at 6 weeks gestational age (Figure 1) but declined intervention until she reached 12 weeks gestational age (Figure 2), at which point there was concern medical management alone would be unsuccessful. She strongly desired future pregnancy and therefore uterine preservation. She was counseled on options and elected to undergo intrasac methotrexate injection followed by laparoscopic surgical resection with concurrent cesarean scar revision.

Our solution

This article and accompanying video demonstrate our approach to a laparoscopic CSP removal and scar revision. Decreasing risk of blood loss during the surgery was a priority. In order to stop placental growth and potentially decrease the vascularity of the pregnancy, the patient first underwent a 1mg/kg of maternal weight intra-gestational methotrexate injection under ultrasound guidance. The surgery was scheduled laparoscopically during the following week. An initial survey of the pelvis was performed to identify the CSP and plan the surgical steps. Four five-millimeter ports were used. To avoid prematurely disrupting the pregnancy we relied heavily on Trendelenburg position and manipulated the uterus with blunt graspers. We isolated the uterine artery in each hemipelvis and applied vascular clamps to both the origins of the uterine arteries
and infundibulopelvic (IP) ligaments (Figure 3). The video demonstrates a common technique for confirming the anatomic location of the hypogastric and its branches by applying tension to the obliterated umbilical artery. Placing a sponge stick in the vagina helped delineate the anterior fornix during bladder flap creation. Twenty units of dilute vasopressin was injected through the anterior abdominal wall into the fundus of the uterus to further decrease blood flow. The Harmonic Ace and blunt dissection were used to excise the pregnancy (Figure 4). The cesarean scar was also excised, and the lower uterine segment repaired in a two-layer closure using barbed suture for efficiency (Figure 5). The blood supply to the uterus was then restored. There was minimal blood loss, and the patient was discharged on the same day.

While the laparoscopic approach to CSP may initially seem daunting, simple steps can be taken to decrease blood loss, avoid early disruption of the pregnancy, repair the uterine defect, and ultimately offer women a definitive yet uterine sparing treatment option.


Figures

Figure 1. Here, in a sagittal view of the uterus during transvaginal ultrasound at 6 weeks gestational age, the cesarean scar pregnancy is seen as a gestational sac embedded eccentrically in the lower uterine segment in the location of a prior cesarean section scar.

Figure 2. The cesarean scar pregnancy was imaged again at 12 weeks gestational age. Power Doppler ultrasound shows a rich vascular pattern in the area of the scar concerning for placental implantation.

Figure 3. Vascular clamps have been applied to the bilateral uterine arteries at their origin and bilateral infundibulopelvic ligaments, temporarily occluding the four major sources of blood supply to the uterus. The bladder has been dropped to expose the cesarean scar pregnancy.

Figure 4. The overlying myometrium has been incised with a Harmonic Ace. Keeping the gestational sac intact facilitates complete removal and was followed by gentle curettage with the suction device.

Figure 5. After completion of the case the lower uterine segment can be seen reapproximated with a two-layer closure.

Videos

Video 1. Key steps to laparoscopic cesarean scar ectopic removal with concurrent scar revision.