

Sierra J. Seaman, MD

Dr. Seaman is Assistant Professor, Division of Gynecologic Specialty Services, Department of Obstetrics and Gynecology, Columbia University Irving Medical Center, New York-Presbyterian Hospital, New York, New York.

Jessica Chaoul, MD

Dr. Chaoul is Fellow, Minimally Invasive Gynecologic Surgery, Department of Obstetrics and Gynecology, Columbia University Irving Medical Center, New York-Presbyterian Hospital.

Arnold P. Advincula, MD

Dr. Advincula is Richard U. Levine Professor and Chief, Gynecologic Specialty Surgery, Columbia University Irving Medical Center, New York-Presbyterian Hospital. He serves on the OBG MANAGEMENT Board of Editors.

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Focused guidance on treating cesarean scar pregnancy, preventing complications from laparoscopic hysterectomy for endometriosis, and large study outcomes on the prevalence of diaphragmatic endometriosis

It has been an incredible year for complex gynecology and minimally invasive gynecologic surgery (MIGS), with several outstanding new findings and reviews in 2023. The surgical community continues to push the envelope and emphasize the value of this specialty for women's health.

Endometriosis and adenomyosis were at the center of several large cohort studies and systematic reviews that reassessed what we know about how to evaluate and treat these challenging diseases, including both surgical and nonsurgical approaches, with an

emphasis on fertility-sparing modalities.¹⁻⁸ In addition, a focus on quality of life, patient-centered care, and racial biases allowed us to reflect on our own practice patterns and keep the patient at the center of care models.⁹⁻¹³ Finally, there was a clear expansion in the use of technologies such as artificial intelligence (AI) and machine learning for care and novel minimally invasive tools.¹⁴

In this Update, we highlight and expand on how several particularly important developments are likely to make a difference in our clinical management.

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New classification system for cesarean scar ectopic pregnancy with defined surgical guidance has 97% treatment success rate



Ban Y, Shen J, Wang X, et al. Cesarean scar ectopic pregnancy clinical classification system with recommended

surgical strategy. *Obstet Gynecol.* 2023;141:927-936.

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A large multiarmed study by Ban and colleagues used multivariable modeling to formulate and test a classification system and recommended surgical treatment strategies for patients with a cesarean scar ectopic pregnancy (CSP).¹⁵ In the study, 273 patients were included in the predictive modeling group, 118 in the internal validation group, and 564 within the model testing cohort. Classifications were based on 2 independent risk factors for intraoperative hemorrhage: anterior myometrial thickness and mean diameter of gestational sac (MSD).

The subgroups were matched with recommended surgical strategy using expert opinion: Type I CSP was treated with suction dilation and aspiration (D&A) under ultrasound guidance, with or without hysteroscopy. Type IIa CSP was treated with suction D&A with hysteroscopy under ultrasound guidance. Type IIb CSP was treated with hysteroscopy with laparoscopic monitoring or excision, or transvaginal excision. Type IIIa CSP was treated with laparoscopic excision or transvaginal excision. Type IIIb CSP was treated with laparoscopic excision after uterine artery embolization or laparotomy (TABLE).¹⁵

Classification types

The 3 main CSP types were defined based on the anterior myometrial thickness at the cesarean section scar (type I, > 3 mm; type II, 1–3 mm; type III, ≤ 1 mm) and subtyped based on the MSD (type IIa, MSD ≤ 30 mm; type IIb, MSD > 30 mm; type IIIa, MSD ≤ 50 mm; type IIIb, MSD > 50 mm).

Treatment outcomes

These guidelines were tested on a cohort of 564 patients between 2014 and 2022. Using these treatment guidelines, the overall treatment success rate was 97.5%; 85% of patients had a negative serum β-human

TABLE Clinical classification of CSP and surgical treatment strategy as recommended by Ban et al¹⁵

Classification	Anterior myometrium thickness, mm	Average diameter of the mass ^a , mm	Recommended surgical treatment
Type I	> 3		Suction curettage (with or without hysteroscopy ^b) guided by ultrasonography
Type II	1–3	IIa: ≤ 30	Suction curettage with hysteroscopy ^b guided by ultrasonography
		IIb: > 30	Hysteroscopy with laparoscopic monitoring or excision ^c (or transvaginal excision)
Type III	≤ 1	IIIa: ≤ 50	Laparoscopic excision (or transvaginal excision)
		IIIb: > 50 or with uterine arteriovenous fistula	Laparoscopic excision after uterine artery embolization or laparotomy

Abbreviation: CSP, cesarean scar ectopic pregnancy.

^aMass or gestational sac.

^bHysteroscopy is used to evaluate whether products of conception have been removed completely, with hysteroscopic resection of residual products when indicated.

^cDuring laparoscopy, if the products of conception could not be removed completely by hysteroscopy, hemorrhage occurred, or myometrial layer bulge or thin-appearing myometrium was found, laparoscopic excision with scar defect repair was performed.

chorionic gonadotropin (β -hCG) level within 3 weeks, and 95.2% of patients resumed menstrual cycles within 8 weeks.

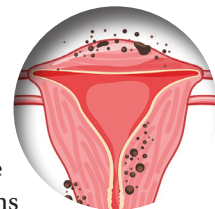
Successful treatment was defined as:

- complete resection of the products of conception
- no need to shift to a second-line surgical strategy
- no major complications
- no readmission for additional treatment
- serum β -hCG levels that returned to normal within 4 weeks.

WHAT THIS EVIDENCE MEANS FOR PRACTICE

Although the incidence of CSP is reported to be around 1:2,000 pregnancies, these rare findings frequently cause a clinical conundrum.¹⁶ This thoughtful study by Ban and colleagues provides guidance with the creation of a classification system aimed at decreasing the severe morbidity that can come from mismanagement of these problematic pregnancies using predictive quantitative measures. In our own practice, we have used classification (type 1 endogenous or type 2 exogenic), mean gestational sac diameter, and overlying myometrial thickness when weighing options for treatment. However, decisions have been made on a case-by-case basis and expert opinion without specific cutoffs. Having defined parameters to more accurately classify the type of ectopic pregnancy is essential for communicating risk factors with all team members and for research purposes. The treatment algorithm proposed and tested in this study is logical with good outcomes in the test group. We applaud the authors of this study on a rare but potentially morbid pregnancy outcome. Of note, this study does not discuss nonsurgical alternatives for treatment, such as intra-sac methotrexate injection, which is another option used in select patients at our institution.

Pre-op hormonal treatment of endometriosis found to be protective against post-op complications



Casarin J, Ghezzi F, Mueller M, et al. Surgical outcomes and complications of laparoscopic hysterectomy for endometriosis: a multicentric cohort study. *J Minim Invasive Gynecol.* 2023;30:587-592. doi:10.16/j.jmig.2023.03.018

In a large European multicenter retrospective cohort study, Casarin and colleagues evaluated perioperative complications during laparoscopic hysterectomy for endometriosis or adenomyosis in 995 patients treated from 2010 to 2020.²

Reported intraoperative data included the frequency of ureterolysis (26.8%), deep nodule resection (30%) and posterior adhesiolysis (38.9%), unilateral salpingo-oophorectomy (15.1%), bilateral salpingo-

oophorectomy (26.8%), estimated blood loss (mean, 100 mL), and adverse events. Intraoperative complications occurred in 3% of cases (including bladder/bowel injury or need for transfusion).

Postoperative complications occurred in 13.8% of cases, and 9.3% had a major event, including vaginal cuff dehiscence, fever, abscess, and fistula.

Factors associated with postoperative complications

In a multivariate analysis, the authors found that increased operative time, younger age at surgery, previous surgery for endometriosis, and occurrence of intraoperative

complications were associated with Clavien-Dindo score grade 2 or greater postoperative complications.

Medical treatment for endometriosis

with estrogen-progestin or progestin medications, however, was found to be protective, with an odds ratio of 0.50 (95% confidence interval, 0.31–0.81).

WHAT THIS EVIDENCE MEANS FOR PRACTICE

It is well known that endometriosis is a risk factor for surgical complications. The reported complication rates in this cohort were relatively high, with nearly 10% of patients sustaining a major event postoperatively. While surgical risk is multifactorial and includes factors that are difficult to capture, including surgeon experience and patient population baseline risk, the relatively high incidence reported should be cause for pause and be incorporated in patient counseling. Of note, this cohort did undergo a large number of higher order dissections and a high number of bilateral salpingo-oophorectomies (26.8%), which suggests a high-risk population.

What we found most interesting, however, was the positive finding that medication administration was protective against complications. The authors suggested that the anti-inflammatory effects of hormone suppressive medications may be the key. Although this was a retrospective cohort study, the significant risk reduction seen is extremely compelling. A randomized clinical trial corroborating these findings would be instrumental. Endometriosis acts similarly to cancer in its progressive spread and destruction of surrounding tissues. As is increasingly supported in the oncologic literature, perhaps neoadjuvant therapy should be the standard for our “benign” high-risk endometriosis surgeries, with hormonal suppression serving as our chemotherapy. In our own practices, we may be more likely to encourage preoperative medication management, citing this added benefit to patients.

Diaphragmatic endometriosis prevalence higher than previously reported



Pagano F, Schwander A, Vaineau C, et al. True prevalence of diaphragmatic endometriosis and its association with severe endometriosis: a call for awareness and investigation. *J Minim Invasive Gynecol.* 2023;30:329-334. doi:10.1016/j.jmig.2023.01.006

Pagano and colleagues conducted an impressive large prospective cohort study that included more than 1,300 patients with histologically proven endometriosis.¹ Each patient underwent a systematic evaluation and reporting of intraoperative findings, including bilateral evaluation for diaphragmatic endometriosis (DE).

Patients with DE had high rates of infertility and high-stage disease

In this cohort, 4.7% of patients were found to have diaphragmatic disease; 92.3% of these cases had DE involving the right diaphragm. Patients with DE had a higher rate of infertility than those without DE (nearly 50%), but otherwise they had no difference in typical endometriosis symptoms (dysmenorrhea, dyspareunia, dyschezia, dysuria). In this cohort, 27.4% had diaphragmatic symptoms (right shoulder pain, cough, cyclic dyspnea).

Patients found to have DE had higher rates of stage III/IV disease (78.4%), and the left pelvis was affected in more patients (73.8%).

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PHOTO: DRAGANA GORDIC/SHUTTERSTOCK

WHAT THIS EVIDENCE MEANS FOR PRACTICE

The prevalence of DE in this large cohort evaluated by endometriosis surgeons was far higher than previously reported rates of DE (0.19%–1.5% for abdominal endometriosis cases).^{17,18} Although admittedly this center cares for a larger portion of women with high-stage disease than many nonspecialty centers do, it still begs the question: Are we as a specialty underdiagnosing diaphragmatic endometriosis, especially in our patients with more severe endometriosis? Because nearly 5% of endometriosis patients could have DE, a thoughtful and systematic approach to the abdominal survey and diaphragm should be performed for each case. Adding questions about diaphragmatic symptoms to our preoperative evaluation may help to identify about one-quarter of these complicated patients preoperatively to aid in counseling and surgical planning. Patients to be specifically mindful about include those with high-stage disease, especially left-sided disease, and those with infertility (although this could be a secondary association given the larger proportion of patients with stage III/IV disease with infertility, and no multivariate analysis was performed). This study serves as a thoughtful reminder of this important subject.

A word on fertility-sparing treatments for adenomyosis

Several interesting and thoughtful studies were published on the fertility-sparing management of adenomyosis.⁶⁻⁸ These included a comparison of fertility outcomes following excisional and nonexcisional therapies,⁶ a systematic review of the literature that compared recurrence rates following procedural and surgical treatments,⁸ and outcomes after use of a novel therapy (percutaneous microwave ablation) for the treatment of adenomyosis.⁷

Although our critical evaluation of these studies found that they are not robust

enough to yet change our practice, we want to applaud the authors on their discerning questions and on taking the initial steps to answer critical questions, including:

- What is the best uterine-sparing method for treatment of diffuse adenomyosis?
- Are radiofrequency or microwave ablation procedures the future of adenomyosis care?
- How do we counsel patients about fertility potential following procedural treatments?
- How likely are symptoms to recur with global treatments such as uterine artery embolization? ●

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