



Can we diagnose infertility with US?

Vered Eisenberg, MD, MHA
Department of Obstetrics and Gynecology,
Sheba Medical Center, Tel Hashomer,
and Sackler Faculty of Medicine



Pathogenesis

- Functional endometrial glands and stroma in sites outside the uterine cavity
- Retrograde menstruation
- Implantation on peritoneal surfaces
- Inflammatory response
- Angiogenesis, adhesions, fibrosis, scarring, neuronal infiltration
- Anatomic distortion
- Pain and infertility

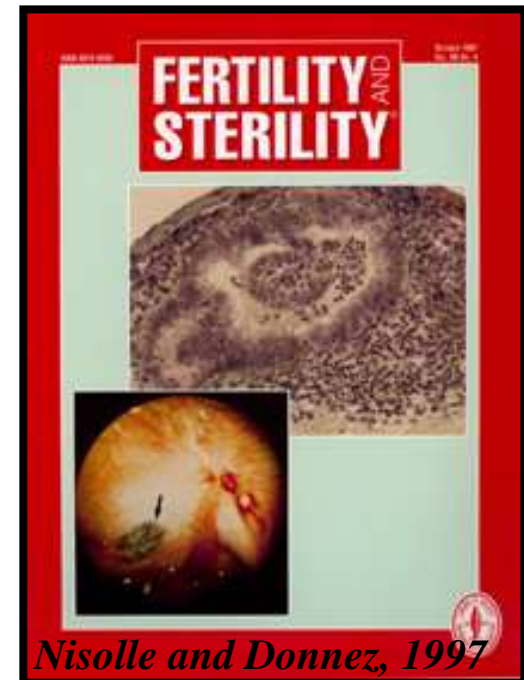
Variability

- Peritoneal endometriosis — retrograde menstruation
- Ovarian endometriosis — coelomic metaplasia
- Rectovaginal septum — mullerian remnants

are

3 Entities

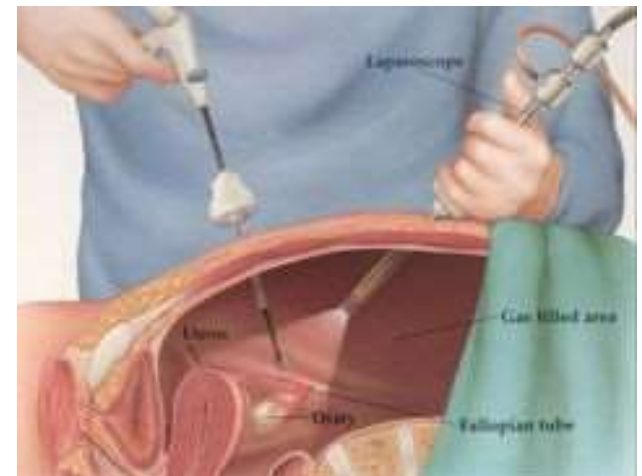
But often co-exist



Purpose of ultrasound examination

- Try to explain underlying symptoms
- Assess severity of disease prior to medical therapy or surgical intervention
- Map disease location – GPS
- **Essential in infertility assessment**

**Ultrasound to optimize
endometriosis surgery - GPS**



IDEA Consensus

Ultrasound Obstet Gynecol 2016

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Systematic approach to sonographic evaluation of the pelvis in women with suspected endometriosis, including terms, definitions and measurements: a consensus opinion from the International Deep Endometriosis Analysis (IDEA) group

S. GUERRIERO¹#, G. CONDOUS²#, T. VAN DEN BOSCH³, L. VALENTIN⁴, F. P. G. LEONE⁵, D. VAN SCHOUBROECK³, C. EXACOUSTOS⁶, A. J. F. INSTALLÉ⁷, W. P. MARTINS⁸, M. S. ABRAO⁹, G. HUDELIST¹⁰, M. BAZOT¹¹, J. L. ALCAZAR¹², M. O. GONÇALVES¹³, M. A. PASCUAL¹⁴, S. AJOSSA¹, L. SAVELLI¹⁵, R. DUNHAM¹⁶, S. REID¹⁷, U. MENAKAYA¹⁸, T. BOURNE¹⁹, S. FERRERO²⁰, M. LEON²¹, T. BIGNARDI²², T. HOLLAND²³, D. JURKOVIC²³, B. BENACERRAF²⁴, Y. OSUGA²⁵, E. SOMIGLIANA²⁶ and D. TIMMERMAN³

4 basic steps – any order

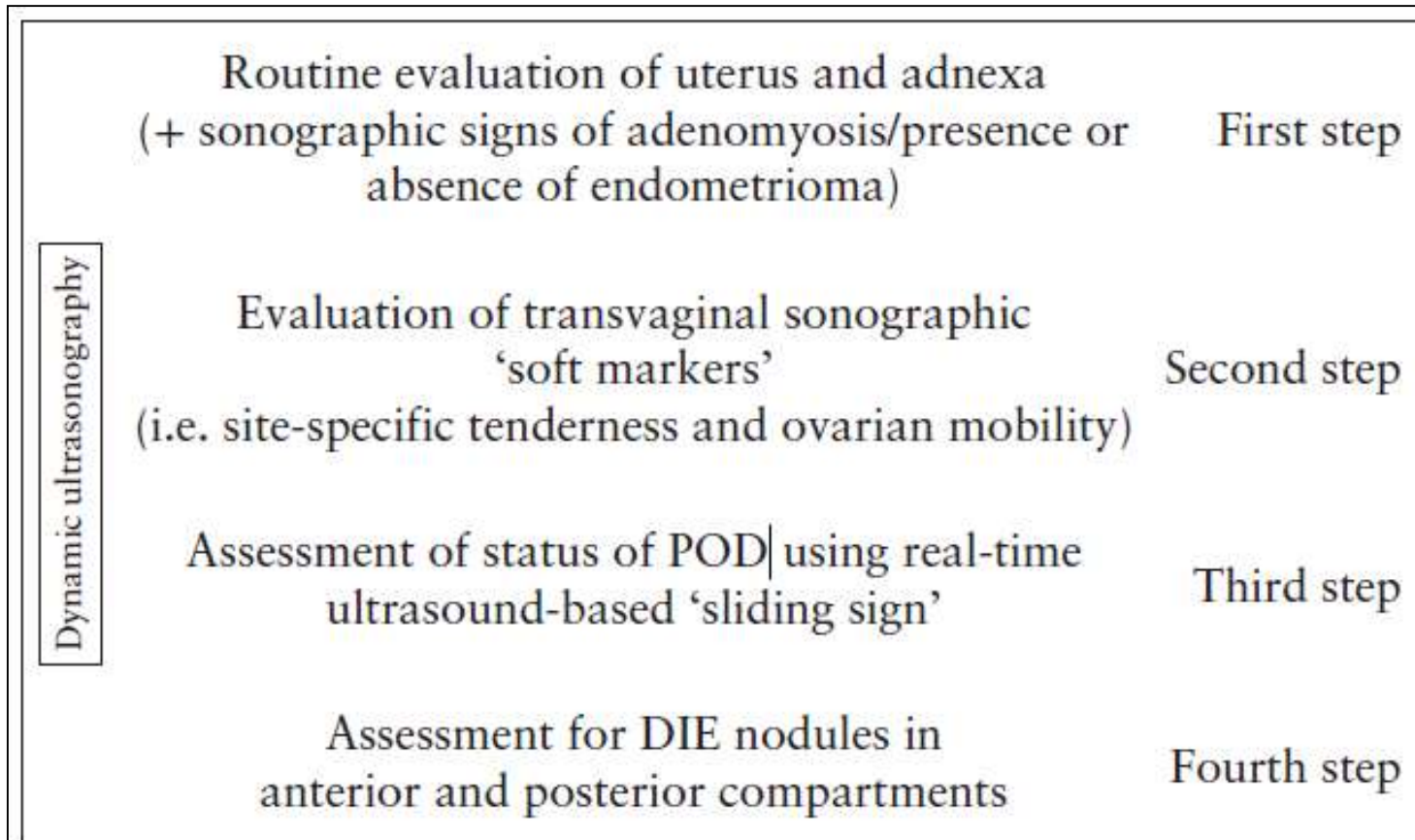


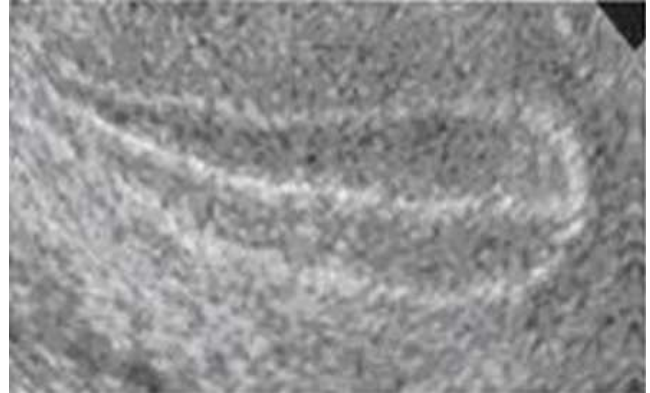
Figure 1 Four basic sonographic steps for examining women with clinical suspicion of deep infiltrating endometriosis (DIE) or known endometriosis. All steps should be performed, but not necessarily in this order. Note, bladder should contain small amount of urine.

Uterus

Abnormal uterine direction



Endometrium

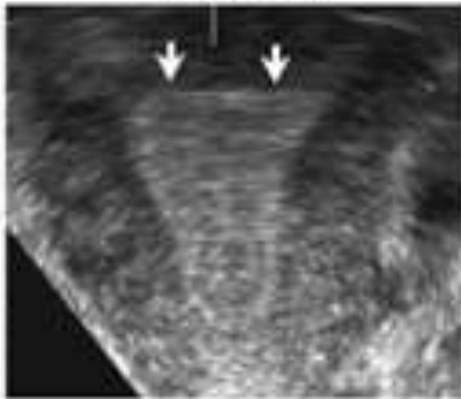


Uterine malformations

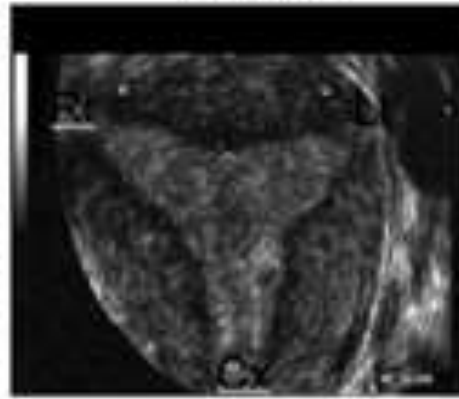
normal



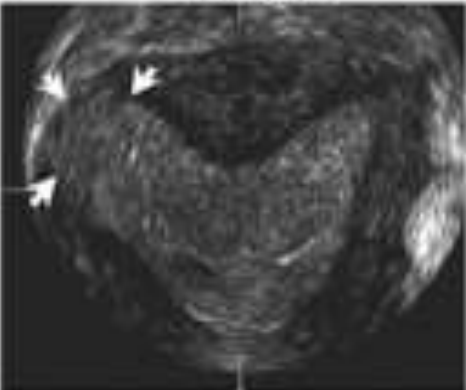
normal



arcuate



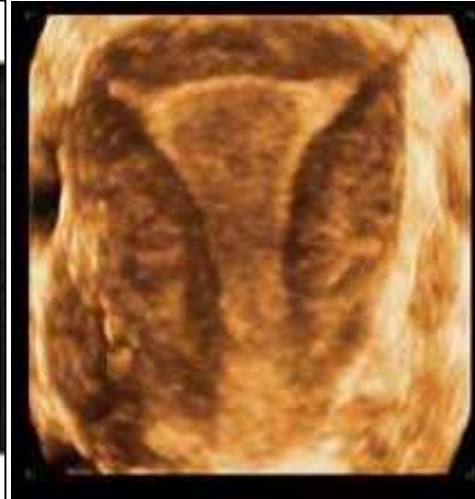
septate



septate



bicornuate

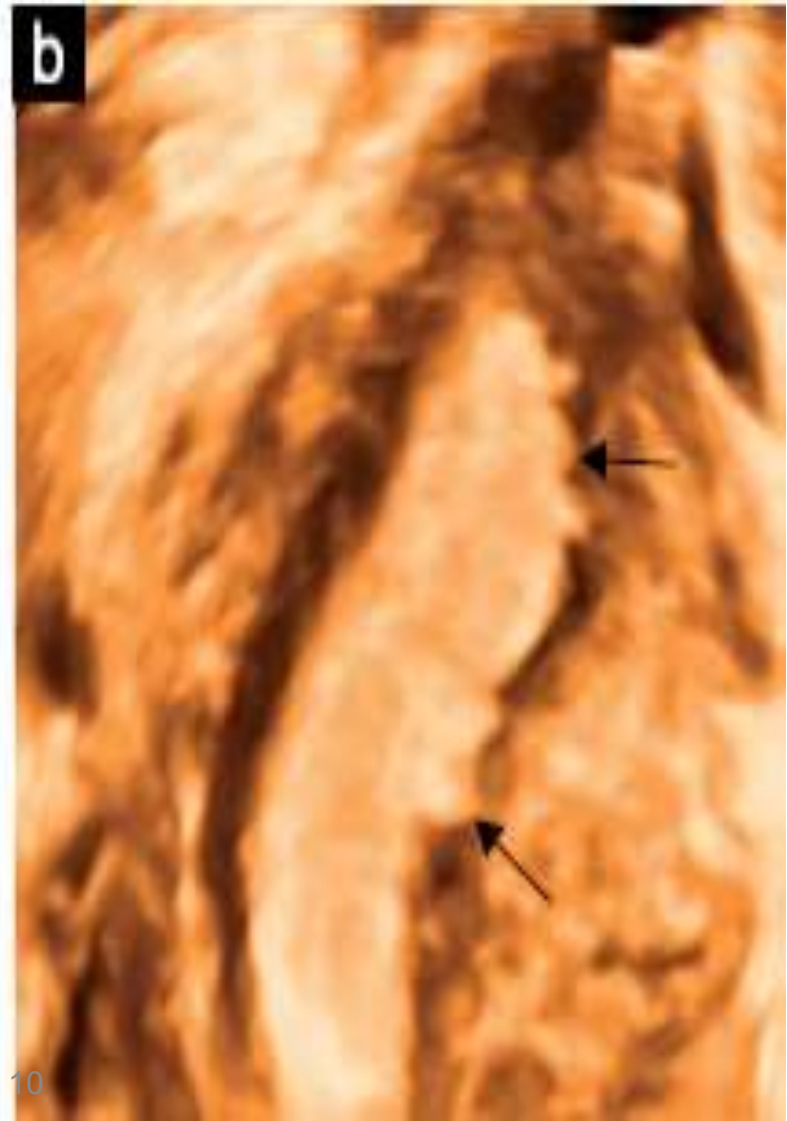
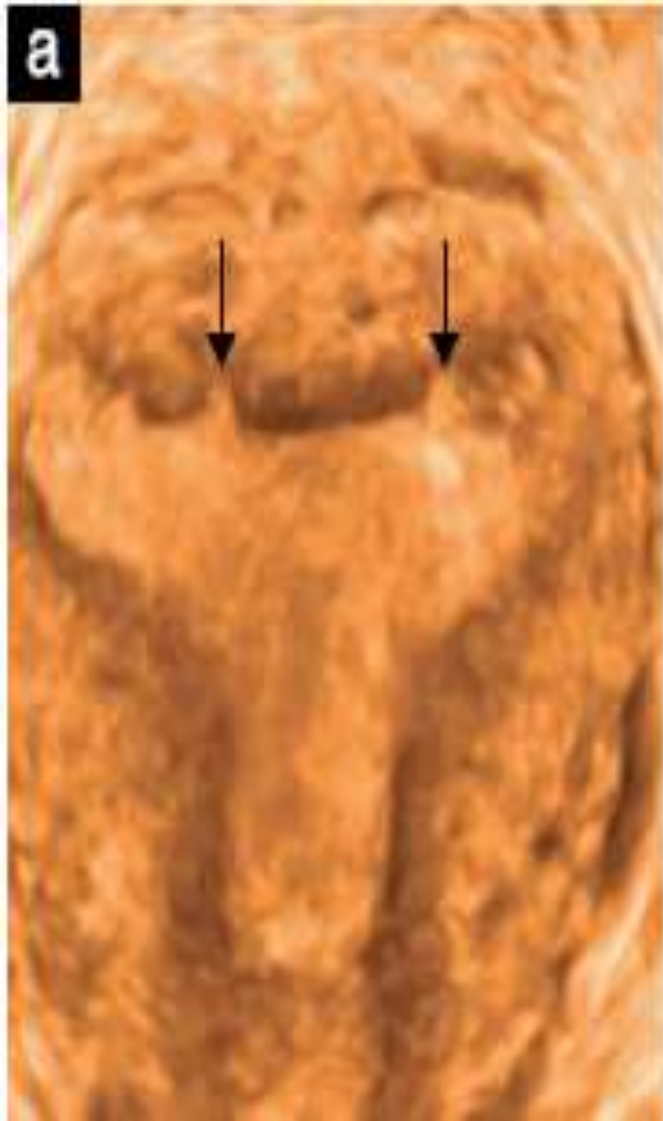


Adenomyosis

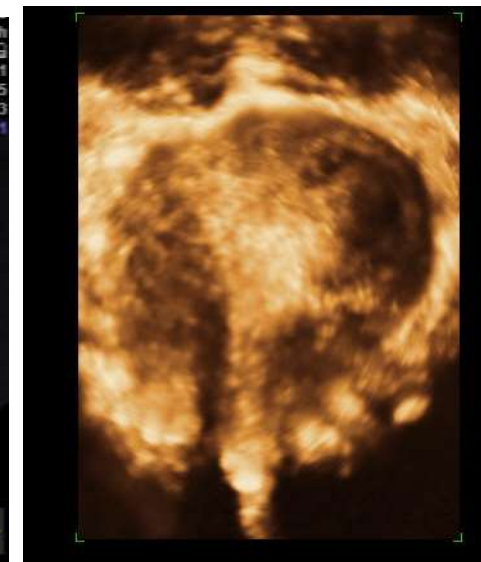
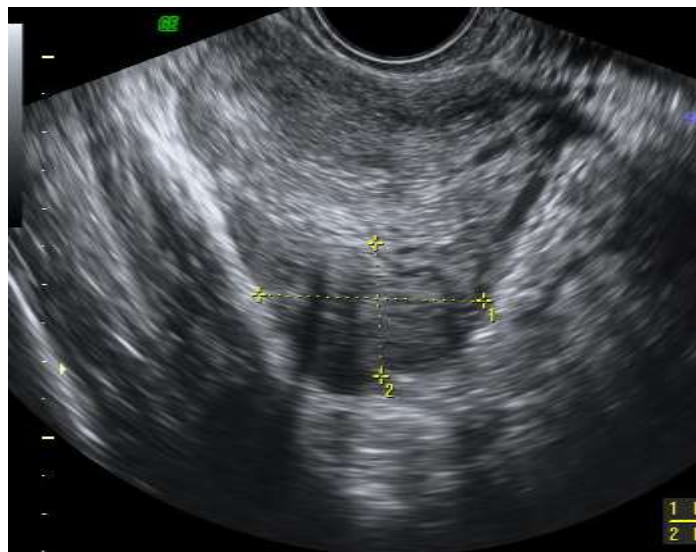
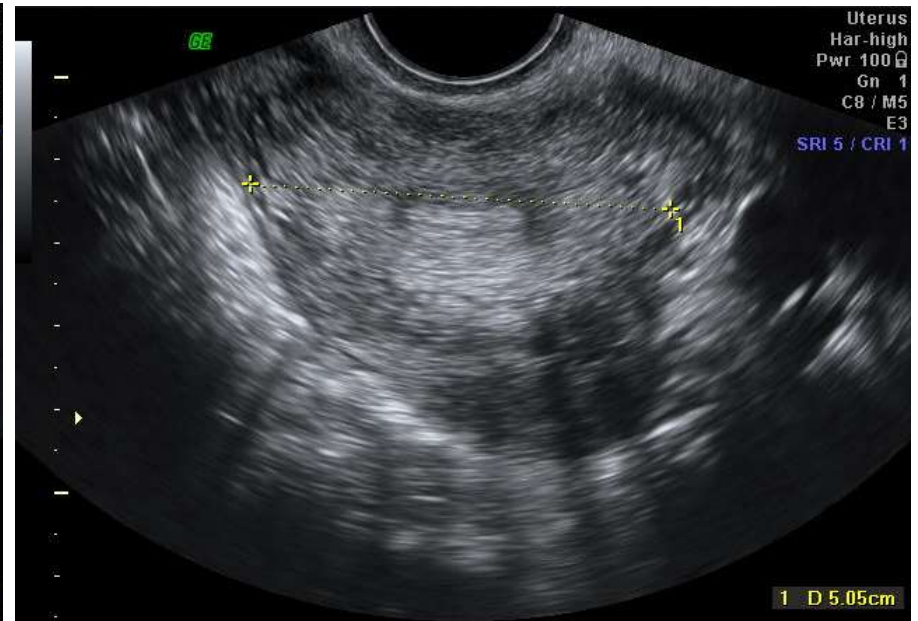
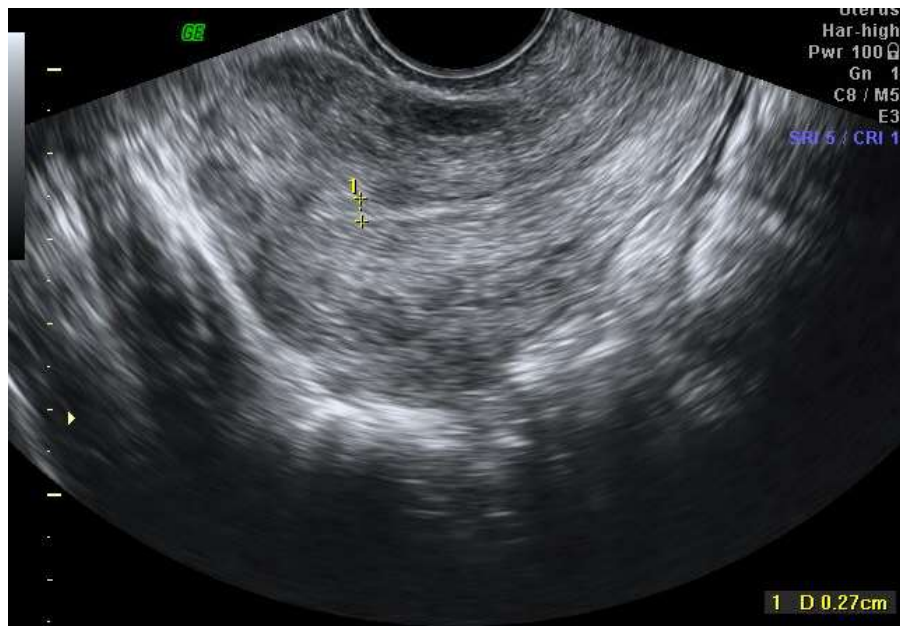
- Globular shaped uterus
- Mottled inhomogeneous myometrium
- Indistinct endometrial stripe
- Subendometrial myometrial cysts (2-6 mm)
- Subendometrial echogenic nodules
- Subendometrial echogenic linear striations
- Asymmetric thickening of the anterior/posterior wall
- Irregular endometrial-myometrial junction (EMJ)
- Adenomyomas



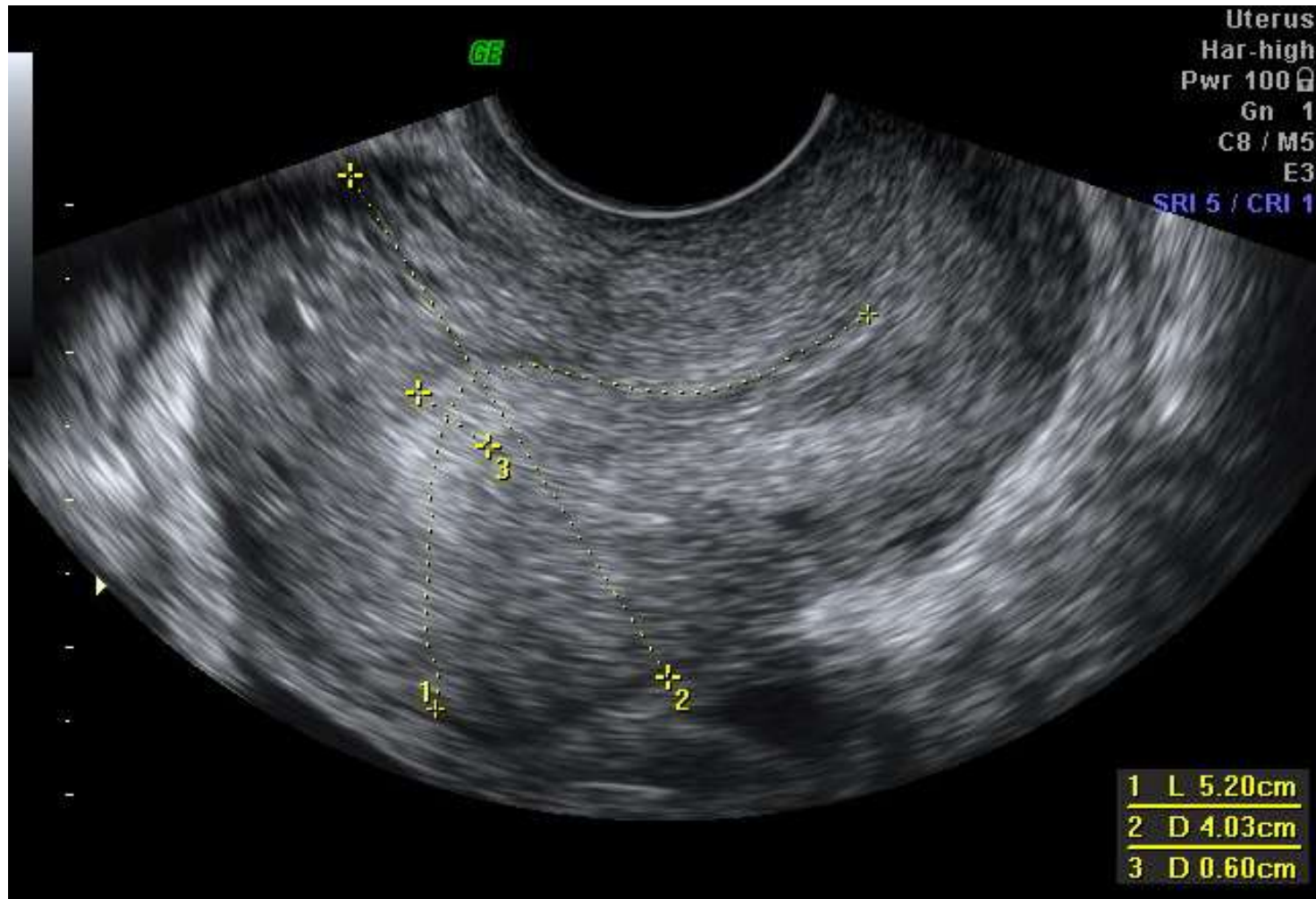
Early adenomyosis



Adenomyosis



Adenomyosis S sign



Adenomyosis and infertility

Associated with poor reproductive outcome on IVF and early pregnancy loss

Screening for adenomyosis before suggesting difficult and risky procedures may allow identification of a subgroup of patients at particularly worse prognosis for which surgery would have a marginal effect on the likelihood of conception

Research Article

Sonographic Signs of Adenomyosis Are Prevalent in Women Undergoing Surgery for Endometriosis and May Suggest a Higher Risk of Infertility

Vered H. Eisenberg,^{1,2} Nissim Arbib,^{1,2} Eyal Schiff,^{1,2} Motti Goldenberg,^{1,2} Daniel S. Seidman,^{1,2} and David Soriano^{1,2}

¹Department of Obstetrics and Gynecology, Sheba Medical Center, Tel Hashomer, Israel

²Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel

Correspondence should be addressed to Vered H. Eisenberg; veredeis@bezeqint.net

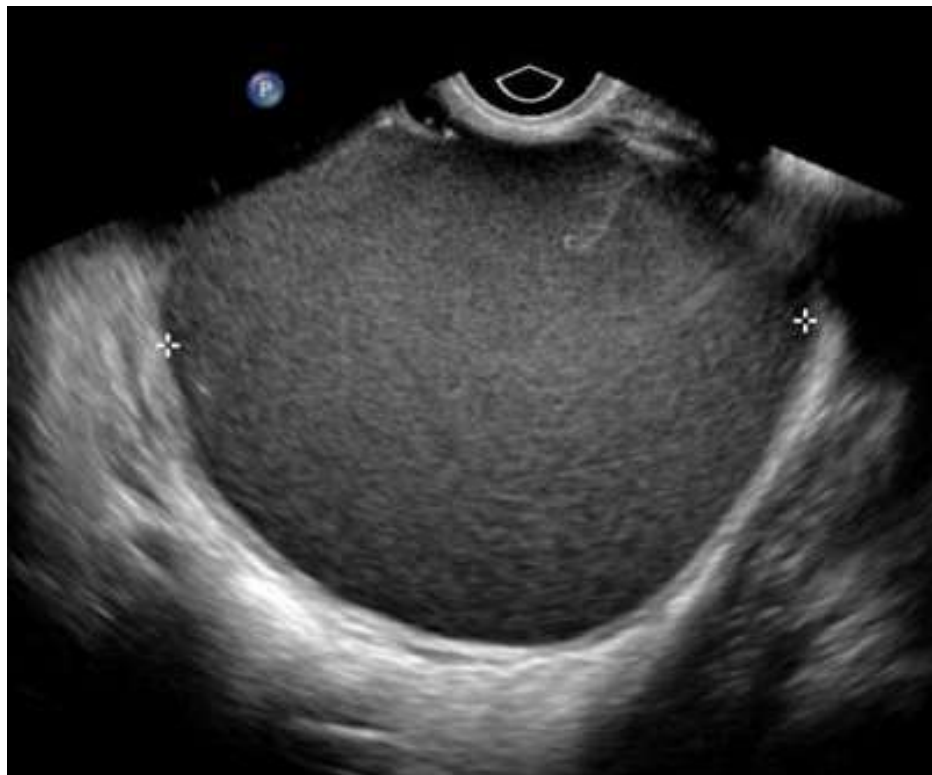
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Objectives. To determine the prevalence of ultrasound features suggestive of adenomyosis in women undergoing surgery for endometriosis compared with a control group of healthy women without endometriosis and to explore the relationship between these sonographic features and clinical and demographic parameters. **Methods.** A retrospective case-control study in a tertiary referral center. Women with intractable pain or infertility, who underwent a dedicated transvaginal ultrasound scan (TVUS) and subsequent laparoscopic surgery, were compared with a control group of healthy women without a previous history of endometriosis. A diagnosis of adenomyosis on TVUS was made based on asymmetrical myometrial thickening, linear striations, myometrial cysts, hyperechoic islands, irregular endometrial-myometrial junction, parallel shadowing, and localized adenomyomas and analyzed for one sign and for three or more signs. Statistical analysis was performed comparing the 2 groups for demographics, symptoms, clinical data, and univariate and multivariate associations with significance set at $p < 0.05$. **Results.** The study and control groups included 94 and 60 women, respectively. In the study group, women were younger and had more dysmenorrhea and infertility symptoms. The presence of any sonographic feature of adenomyosis, as well as three or more signs, was found to be more prevalent in the study group, particularly the following features: parallel shadowing, linear striations, irregularity of the EMJ, and focal adenomyomas. This effect persisted after controlling for age, for all features but linear striations. Women in the study group who had five or more sonographic features of adenomyosis had more than a threefold risk of suffering from infertility (OR = 3.19, $p = 0.015$, 95% CI: 1.25–8.17). There was, however, no significant relationship with disease severity at surgery. **Conclusions.** Sonographic features of adenomyosis are highly prevalent in women undergoing surgery for endometriosis compared to a control group. Women with more than five features had an increased risk of infertility. This may be important for tailoring patient-specific treatments both before and after definitive surgery.

Endometrioma

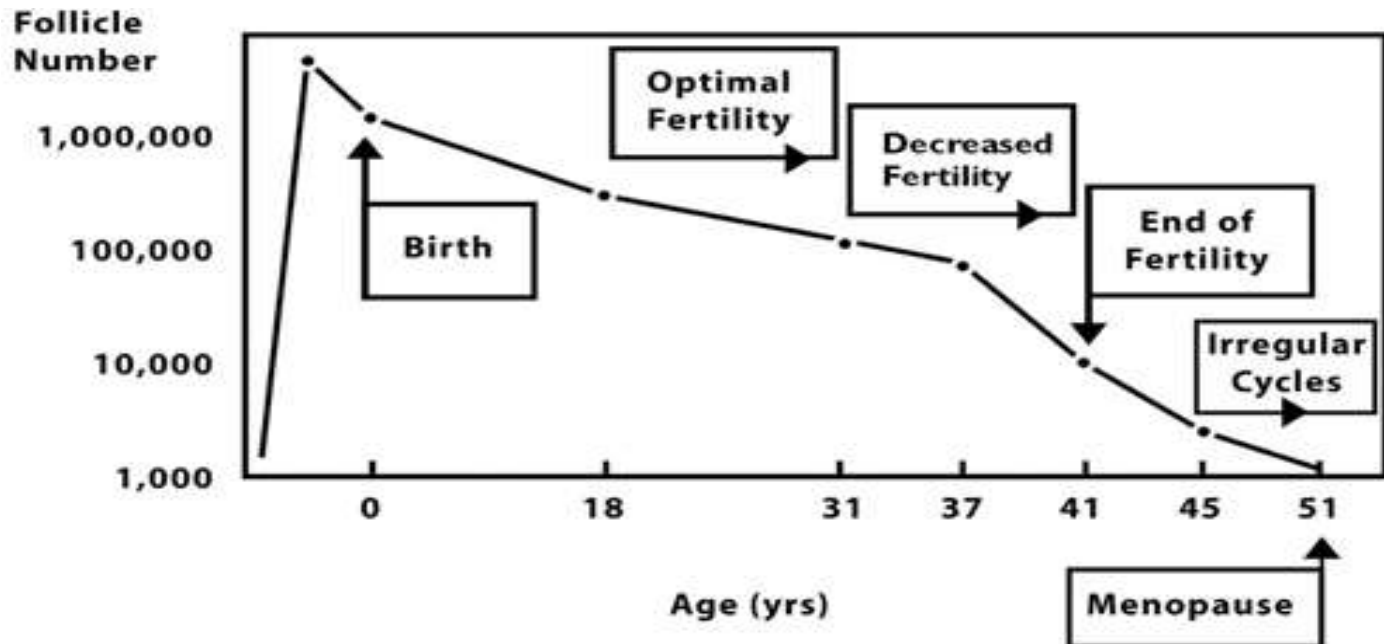


Ovarian reserve

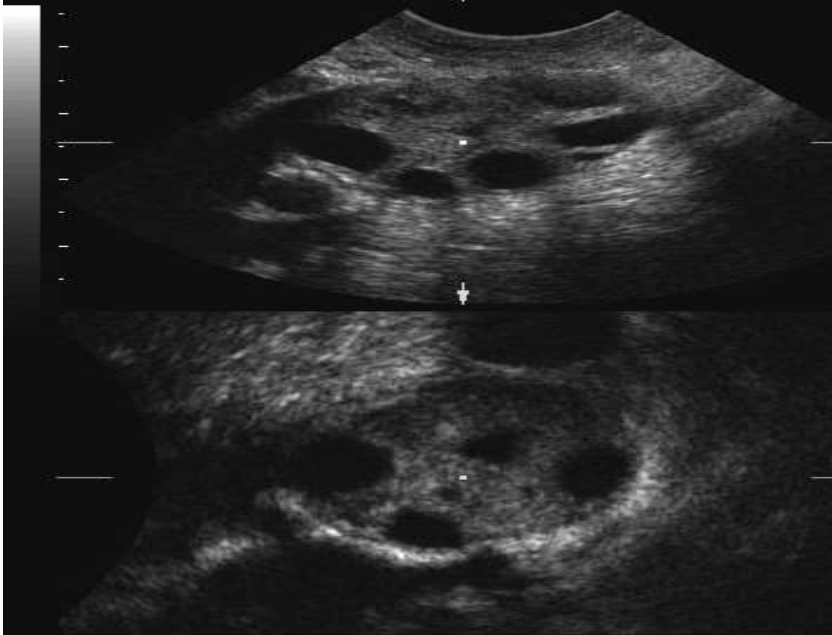
Rate of ↓ follicles is proportion to the total number present

6 million 20 weeks → 2 million at birth → 300,000 million at puberty

400 cycles

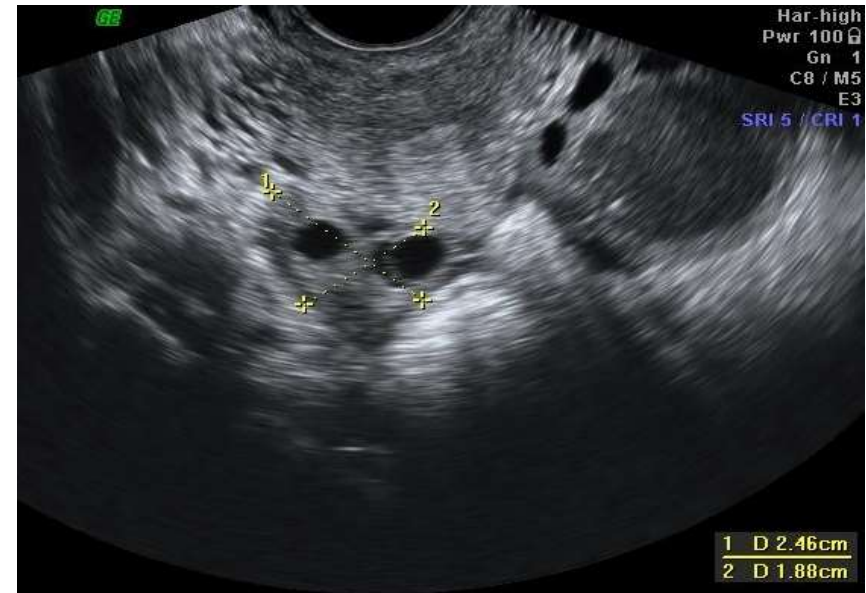


Antral Follicle Count (AFC)

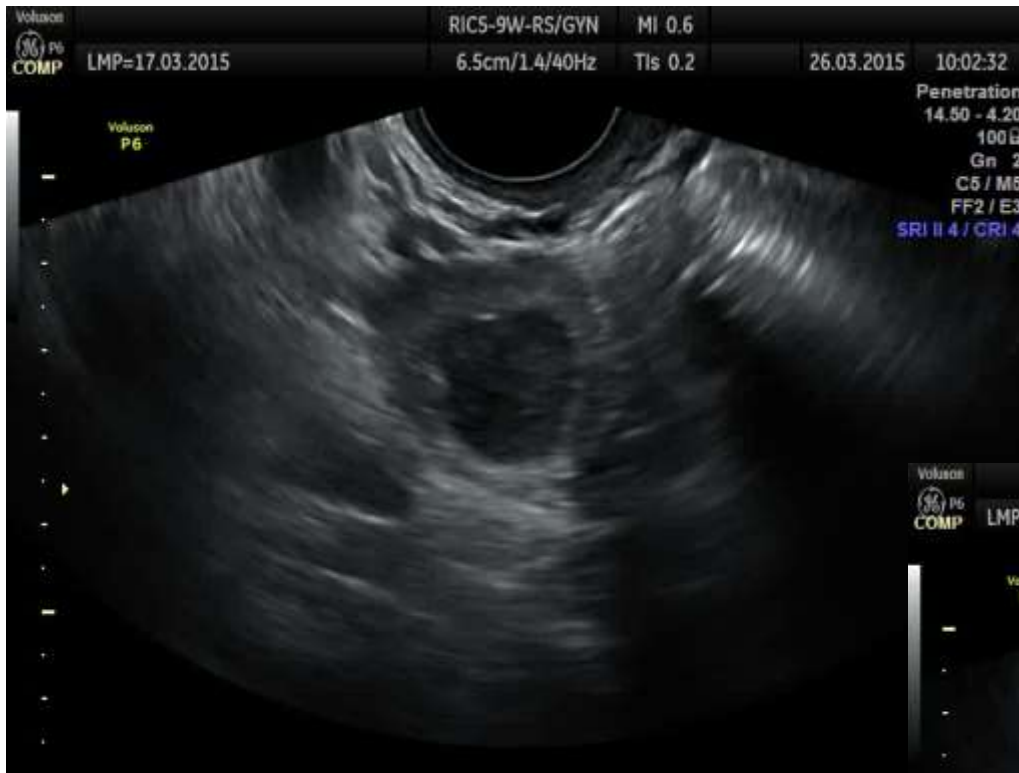


Kissing ovaries

Criteria	Kissing ovaries	Non kissing ovaries
Bowel involvement	18.5	2.5
Fallopian tube obstruction	80	8.6
AFS score	74	35
Operating time	115 min	50 min



Adhesions to the ovaries



Pelvic sidewall

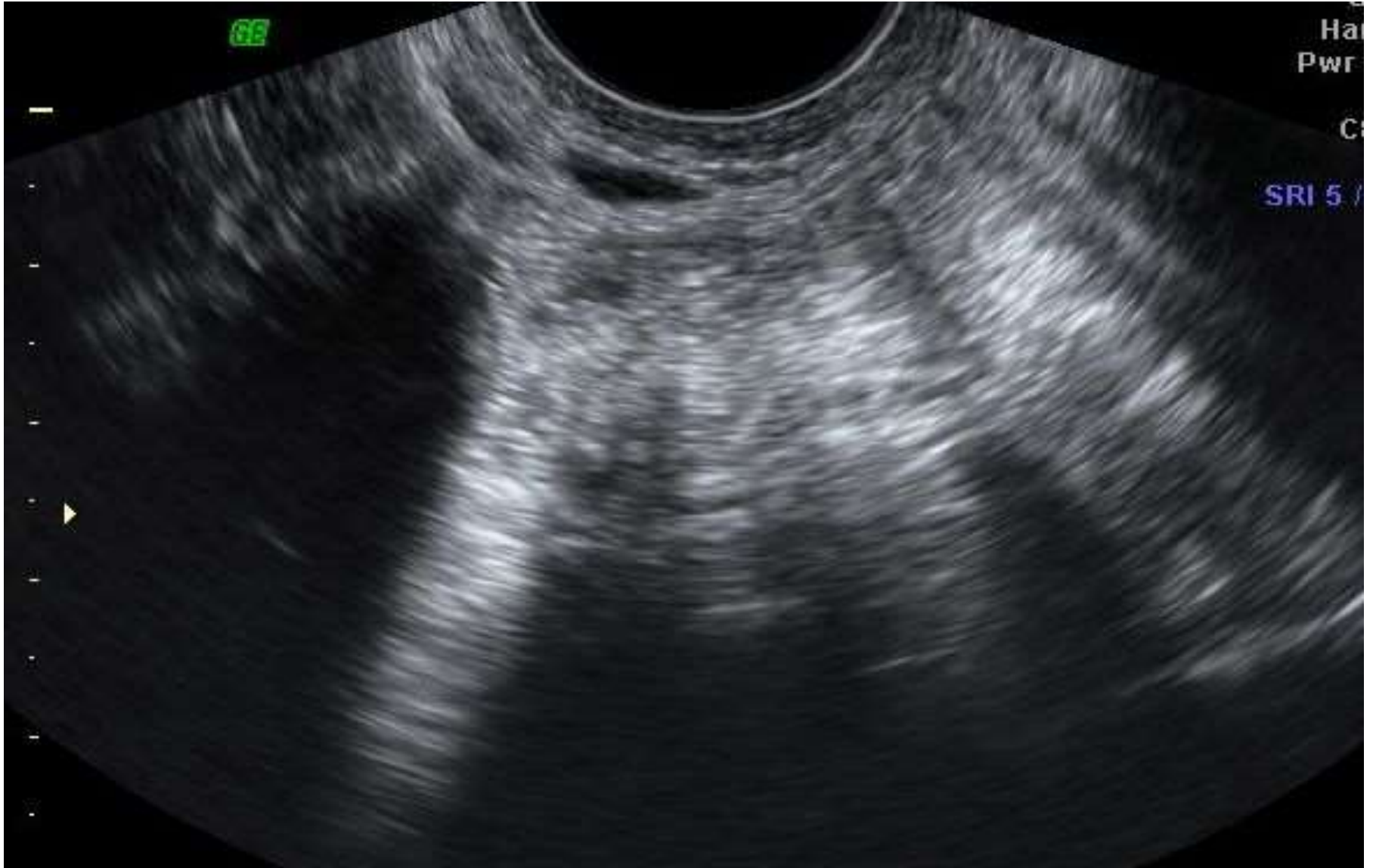


Uterus

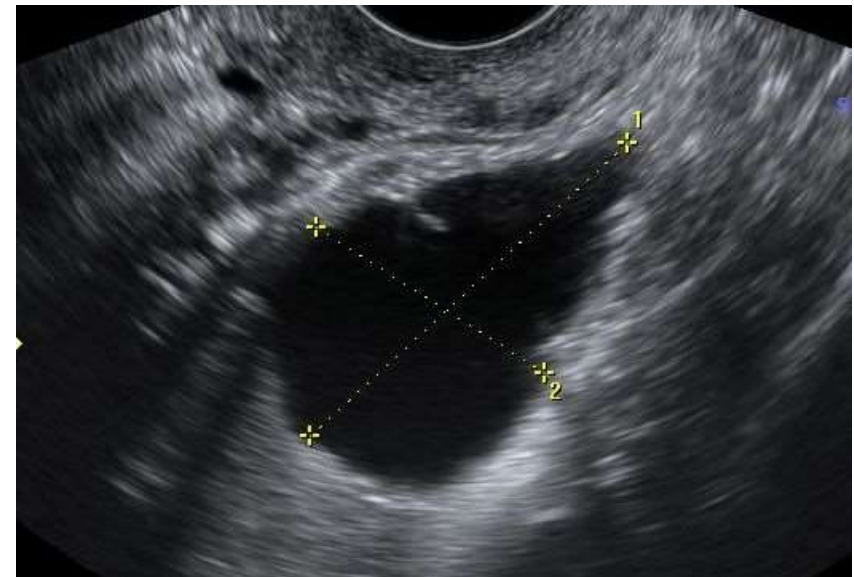
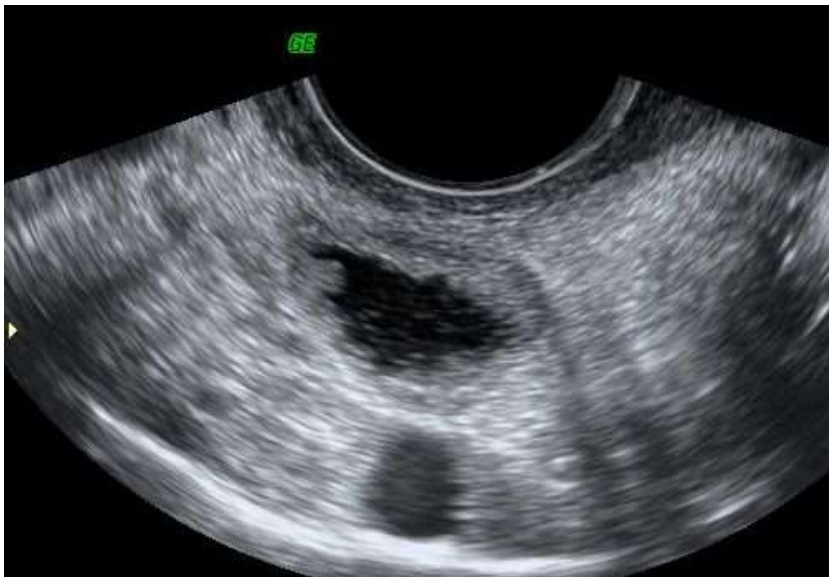
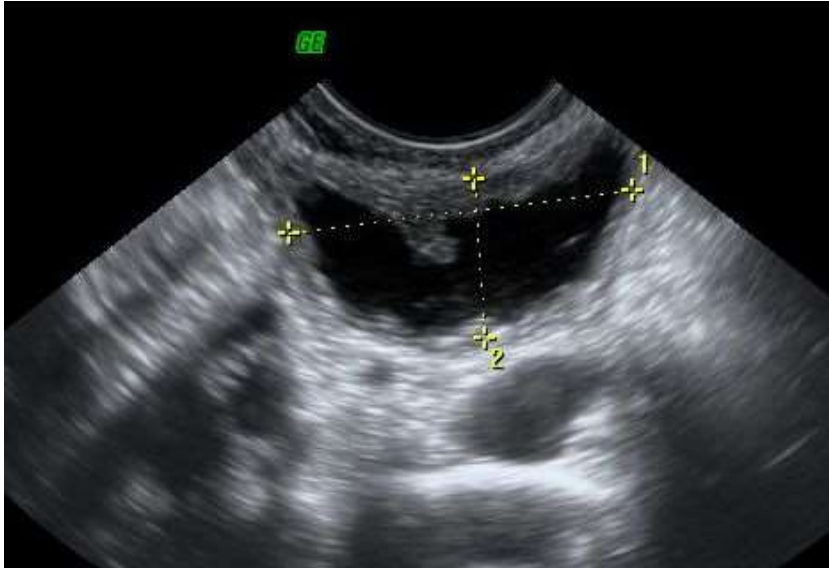
Intestinal adhesions to ovaries



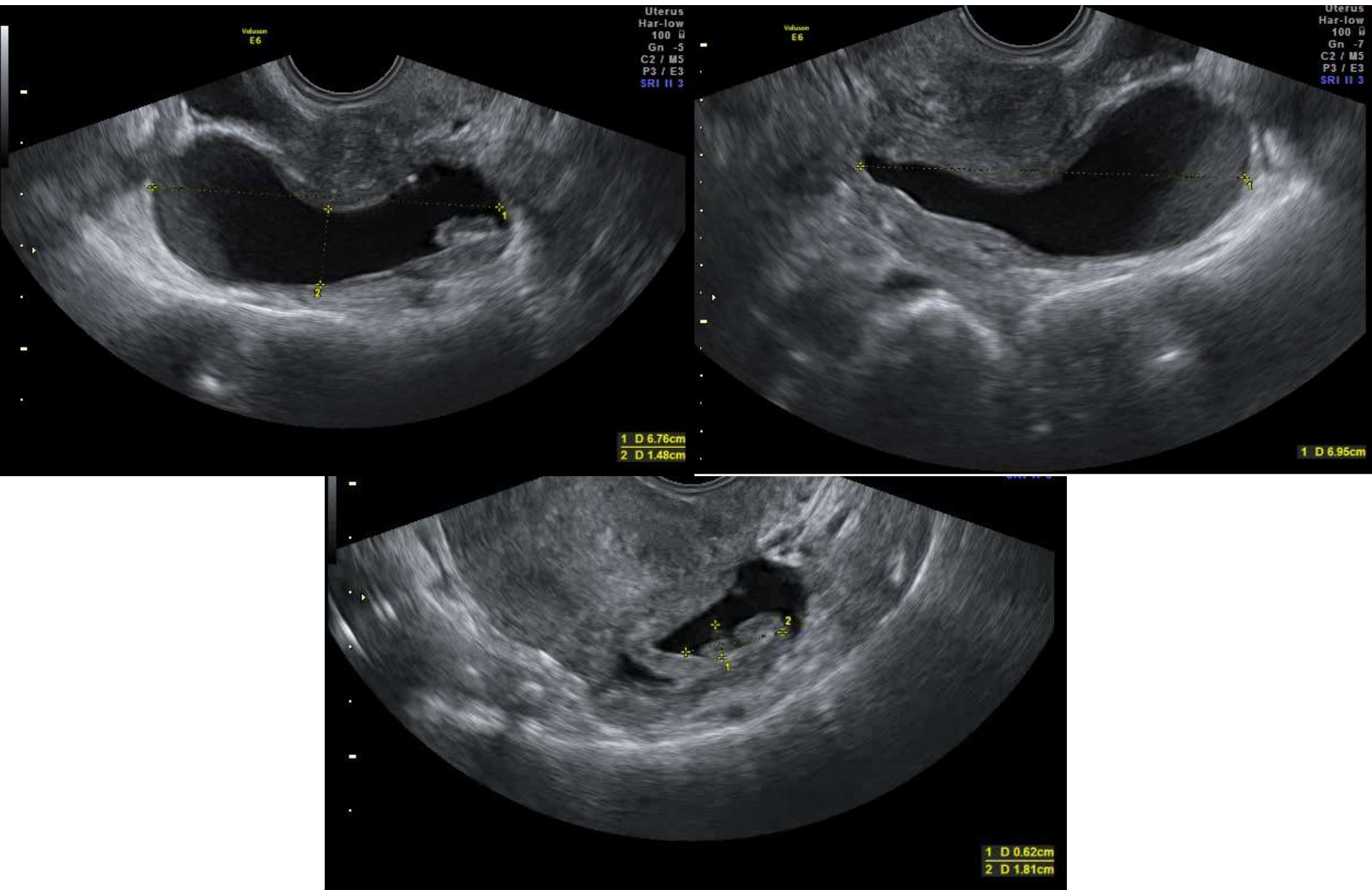
Intestinal adhesions



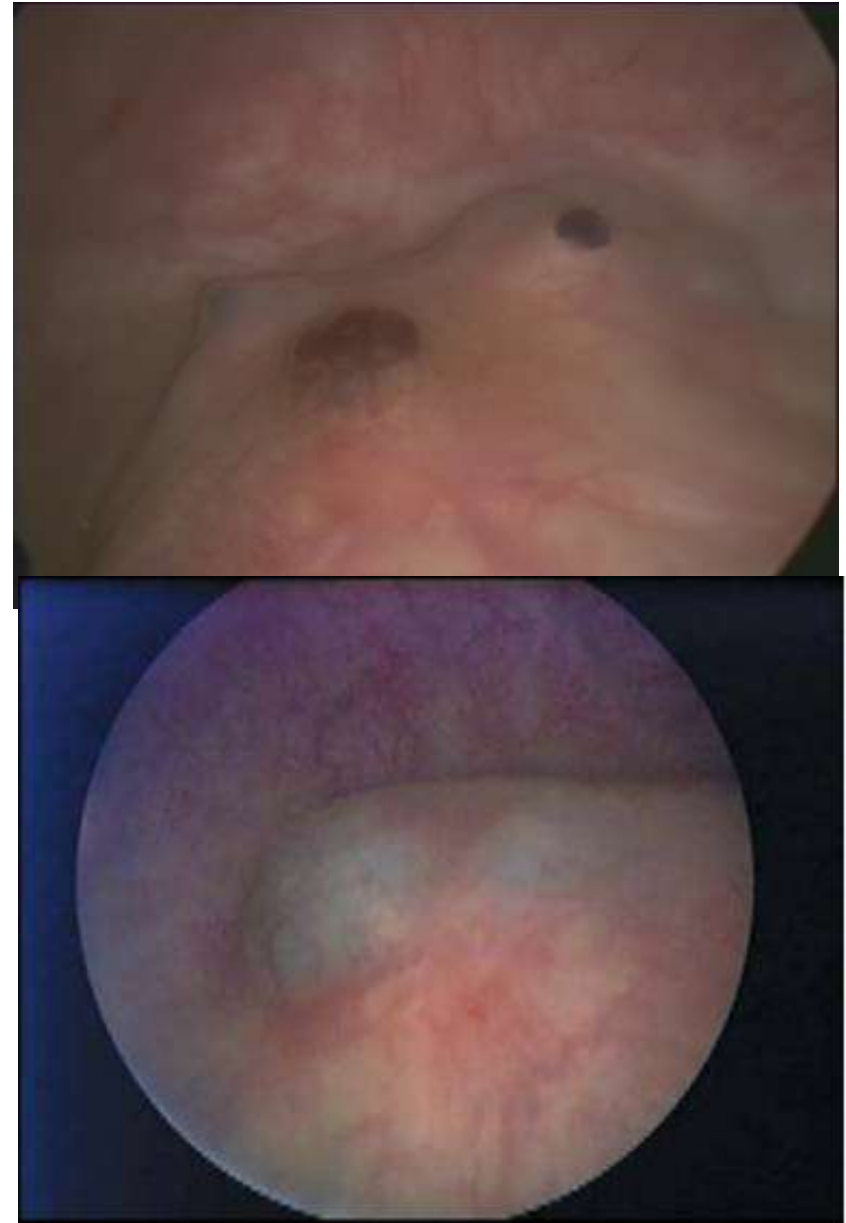
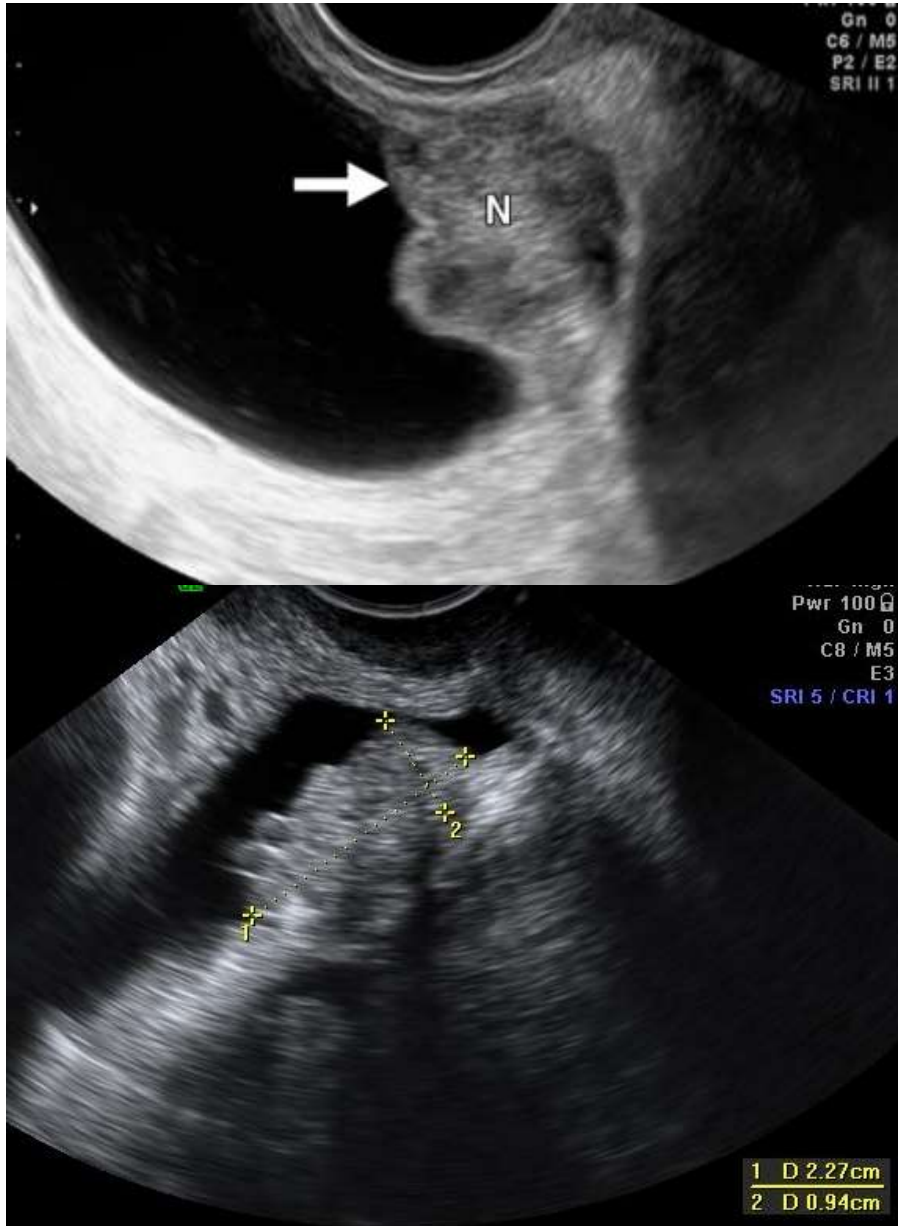
Tubal disease



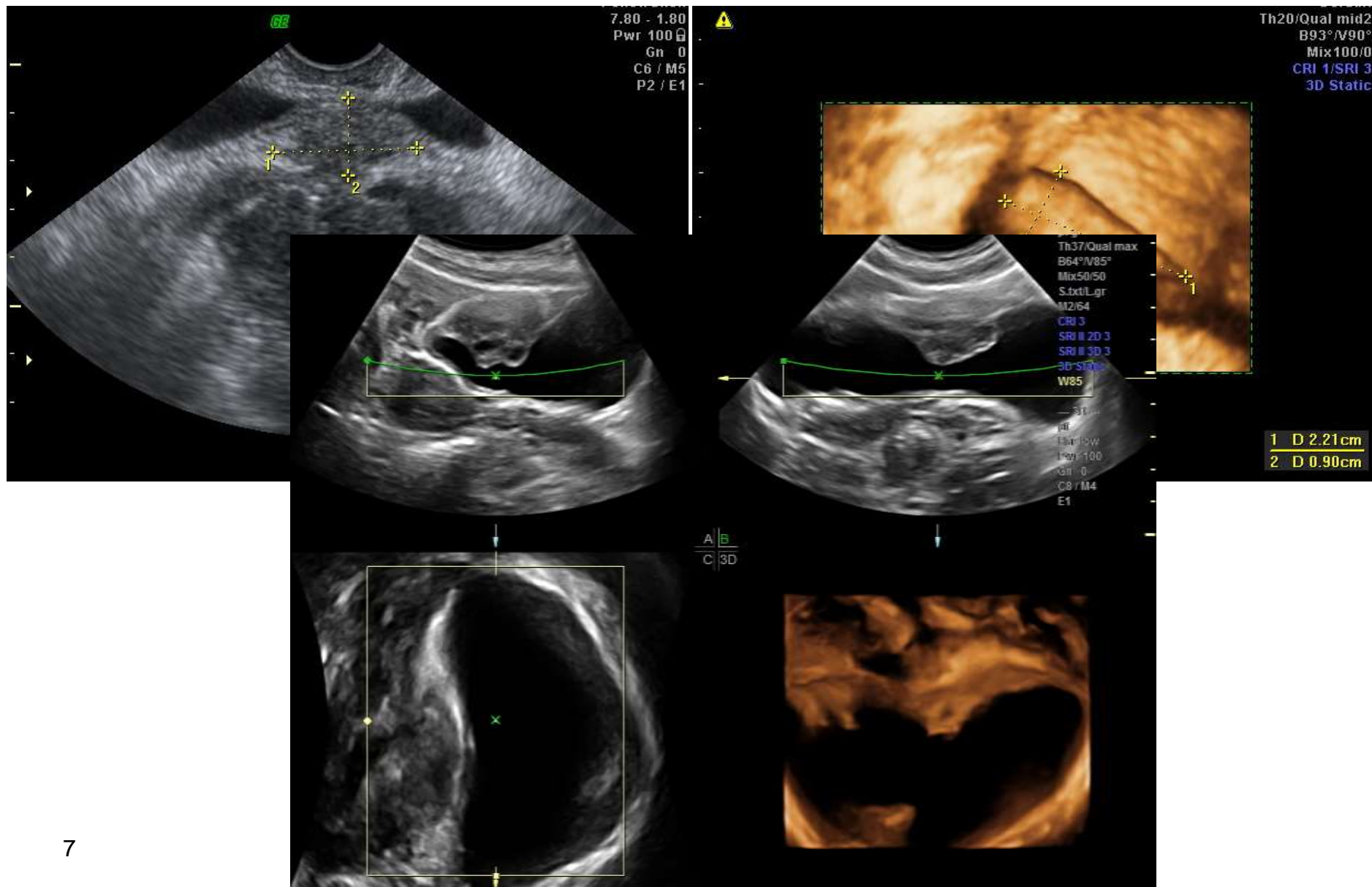
Tubal disease



Bladder involvement



Bladder involvement



Original Article

Reproductive Outcome Is Favorable After Laparoscopic Resection of Bladder Endometriosis

David Soriano, MD, Jerome Bouaziz, MD*, Shai Elizur, MD, Mati Zolti, MD, Raoul Orvieto, MD, Daniel Seidman, MD, Mordechai Goldenberg, MD, and Vered H. Eisenberg, MD

From the Department of Obstetrics and Gynecology, Chaim Sheba Medical Center, Tel-Hashomer, Israel (all authors), and Sackler School of Medicine, Tel Aviv University, Tel Aviv, Israel (all authors).

ABSTRACT **Study Objective:** To assess the reproductive outcome (spontaneous and assisted conception rates) in women who underwent laparoscopic resection of bladder endometriosis.

Design: This was a retrospective, observational study analyzing prospectively recorded data (Canadian Task Force classification II-2).

Setting: A tertiary referral center.

Patients: Over a 9-year period, we identified 69 consecutive women with symptomatic pelvic endometriosis who underwent laparoscopic resection of bladder endometriosis at our center.

Interventions: Group A patients ($n = 21$) had full-thickness endometriotic invasion of the bladder and underwent laparoscopic partial cystectomy. Group B ($n = 48$) patients had partial endometriotic bladder penetration and underwent partial-thickness excision of the detrusor muscle. Most patients (over 70%) had additional, nonbladder endometriotic lesions, which were also removed during surgery.

Measurements and Main Results: Fertility outcomes were analyzed in patients who wished to conceive ($n = 42$), and improvements in symptoms were assessed for all patients. The minimum follow-up after surgery was 36 months. Of the 42 patients who wished to conceive, 35 patients (83.3%) conceived: 16 patients spontaneously and 18 patients after IVF treatment. No difference was observed in fertility outcome between group A (partial cystectomy) and group B (partial-thickness excision of the detrusor muscle). For all patients, long-term follow-up revealed that 80% of the patients (55 patients) had no urinary/endometrial symptoms after surgery.

Conclusion: Pregnancy rates after laparoscopic surgery for bladder endometriosis by either partial cystectomy or deep excision of the detrusor muscle are favorable, both for spontaneous pregnancy and conception after IVF treatment. Additionally, urinary symptoms were improved for the majority of patients. Based on our findings, it seems warranted to offer laparoscopic surgical management to symptomatic infertile patients diagnosed with bladder endometriosis, even after IVF failure. *Journal of Minimally Invasive Gynecology* (2016) ■, ■-■ © 2016 AAGL. All rights reserved.

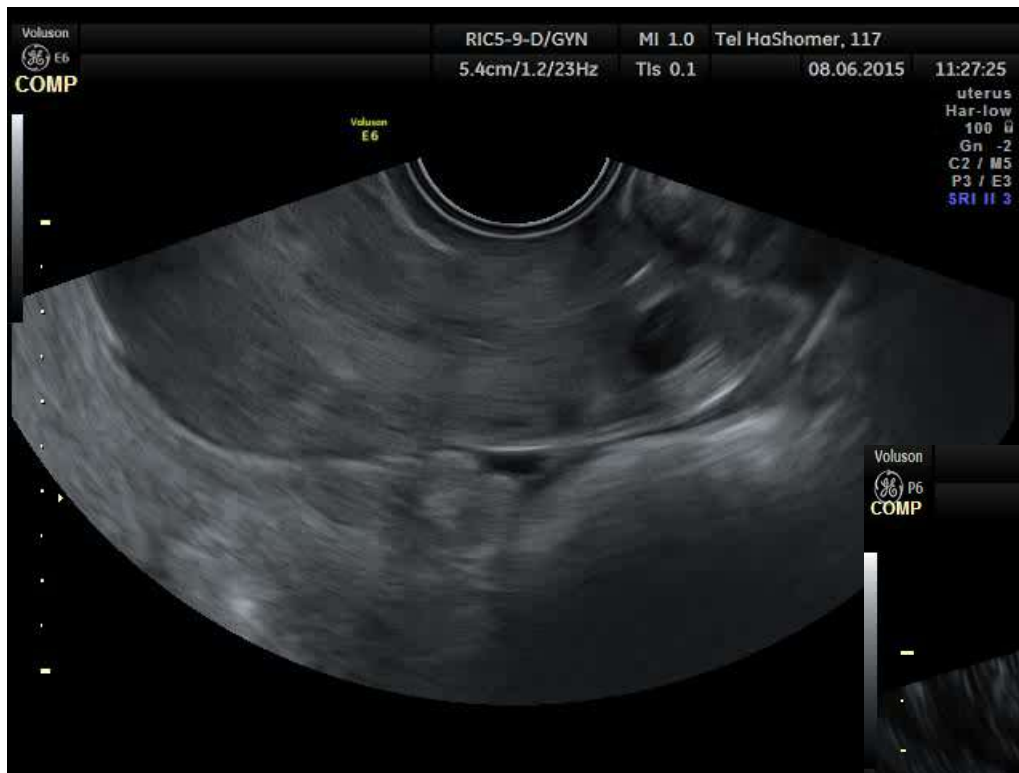
Keywords:

Bladder endometriosis; Infertility; Laparoscopy; Lesions of bladder; Laparoscopic surgery

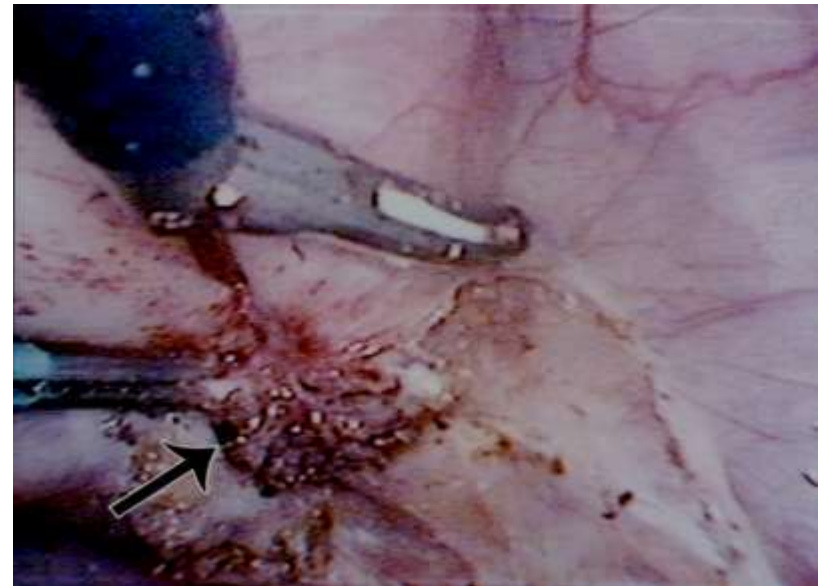
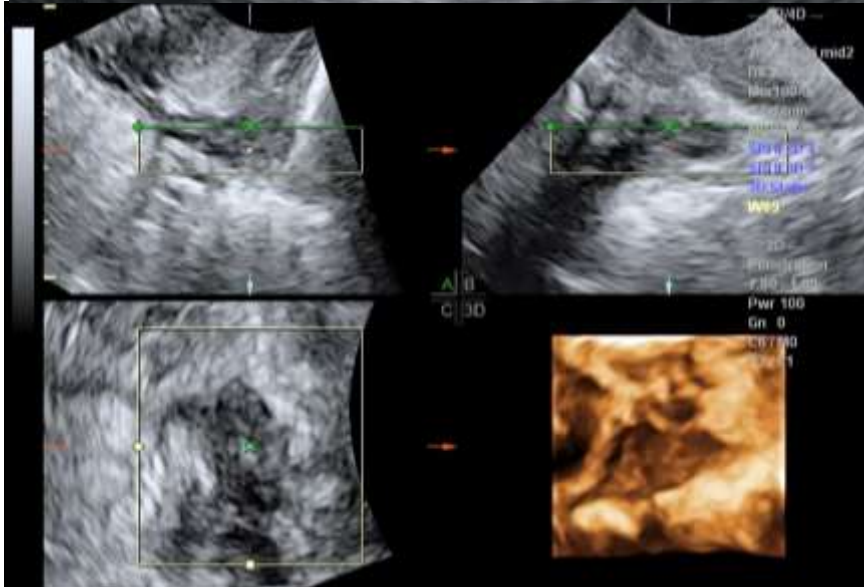
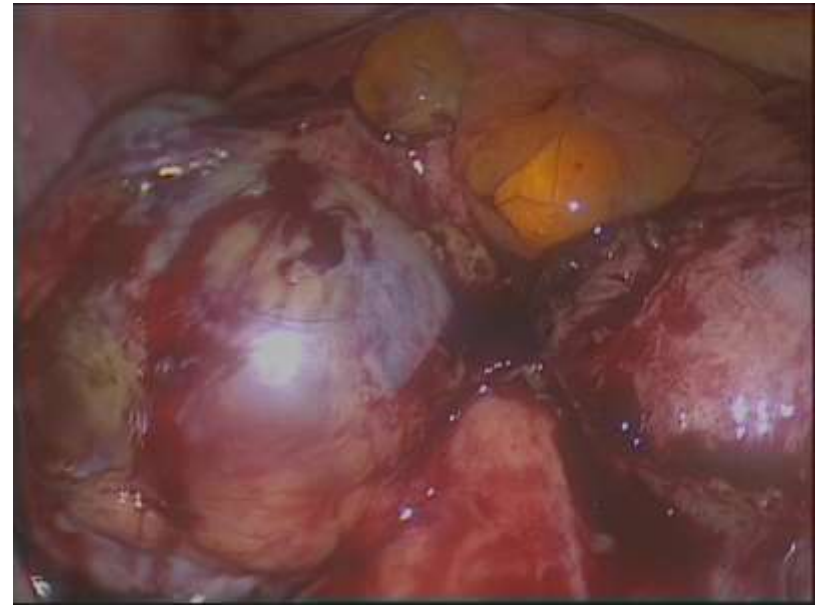
Ureter with lesion



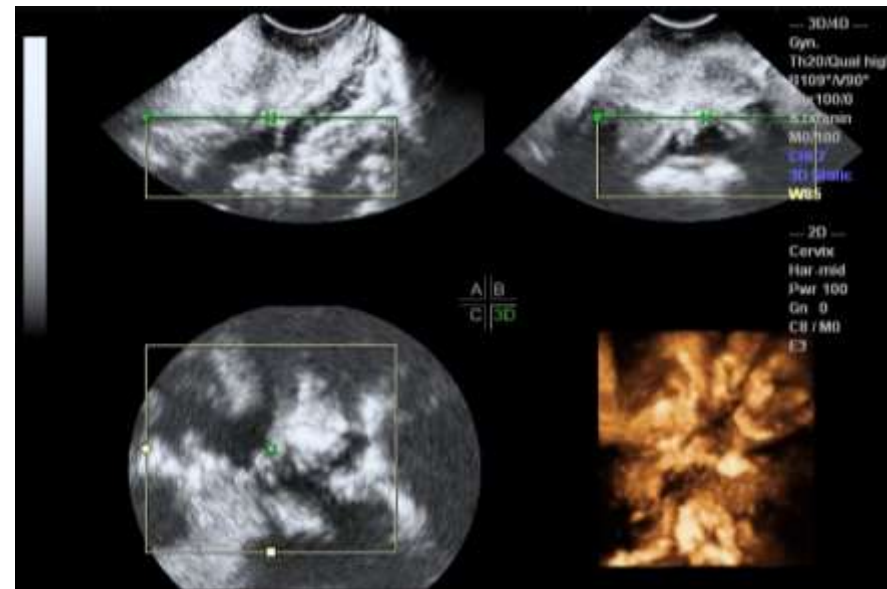
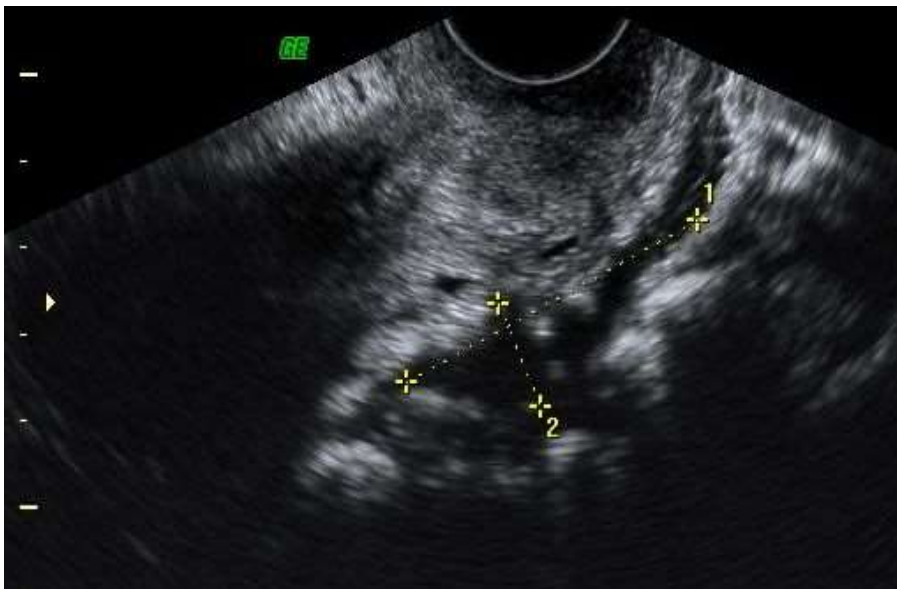
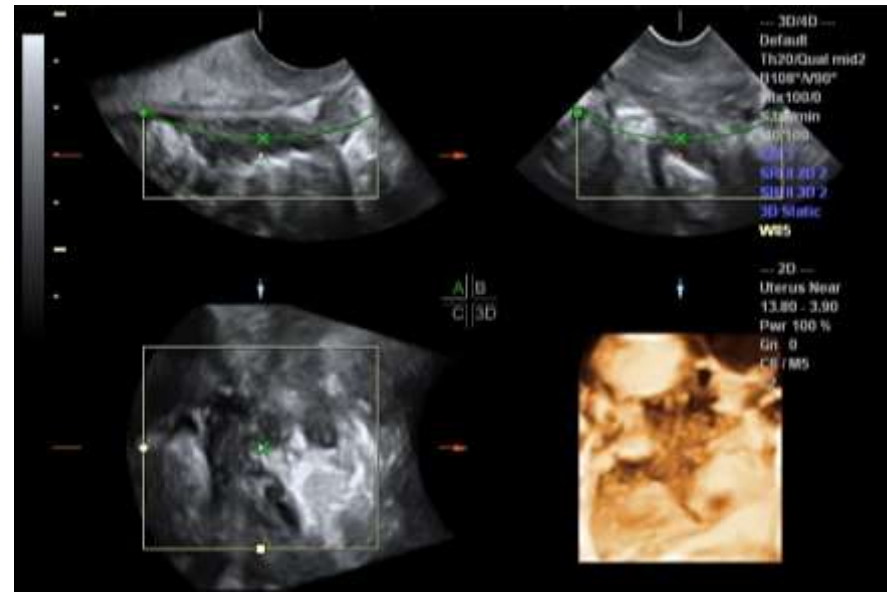
Posterior sliding sign



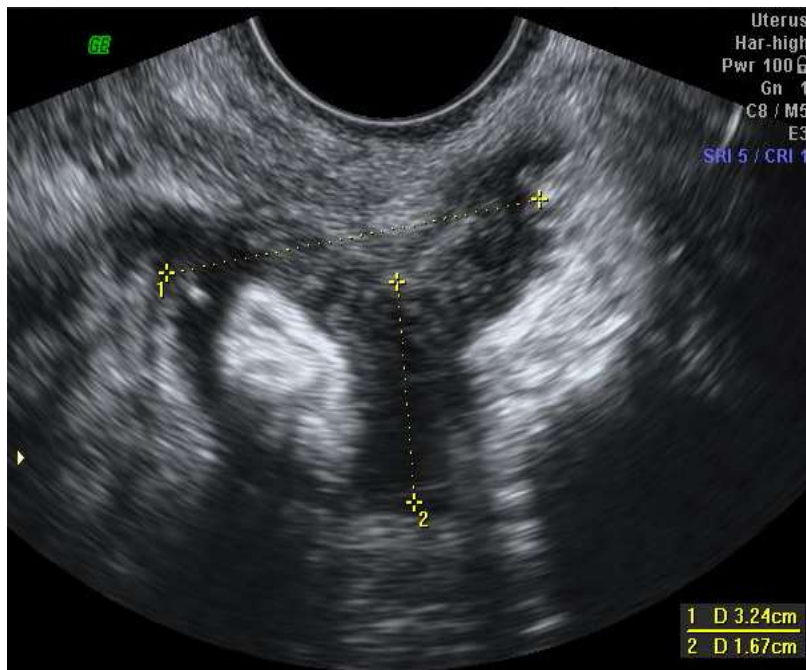
Anterior rectal DIE



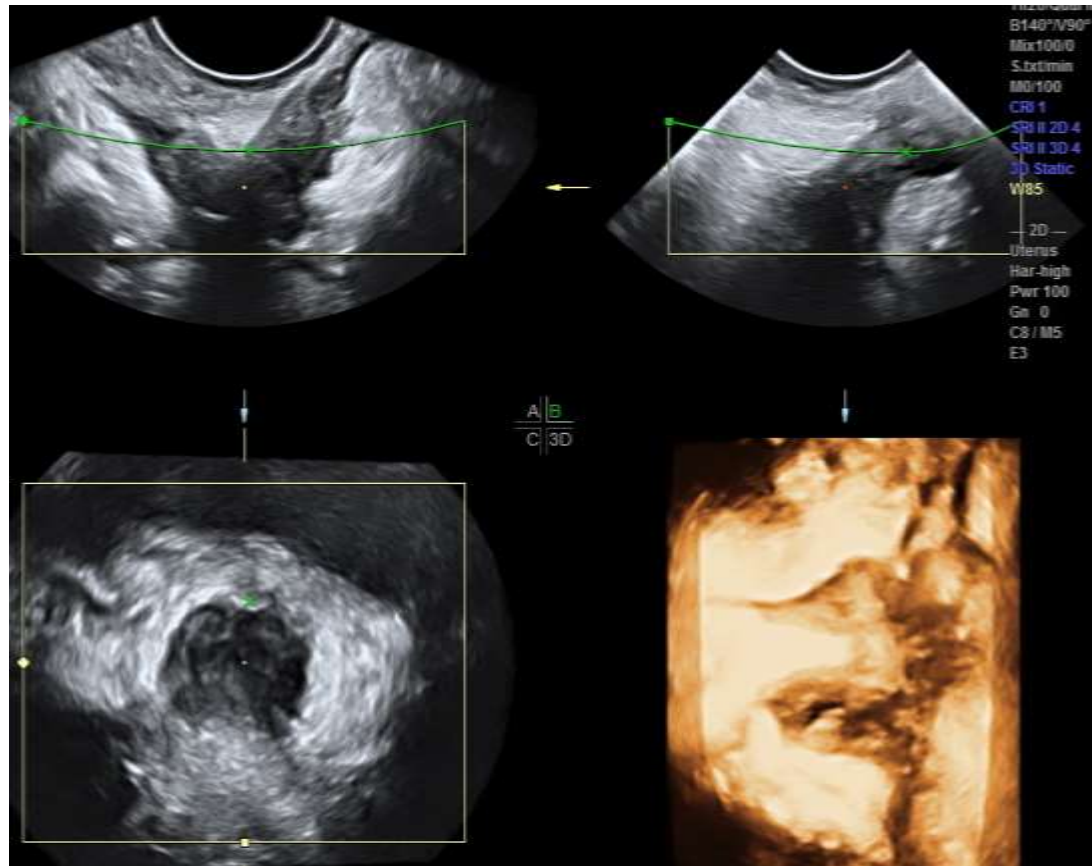
Anterior rectal DIE



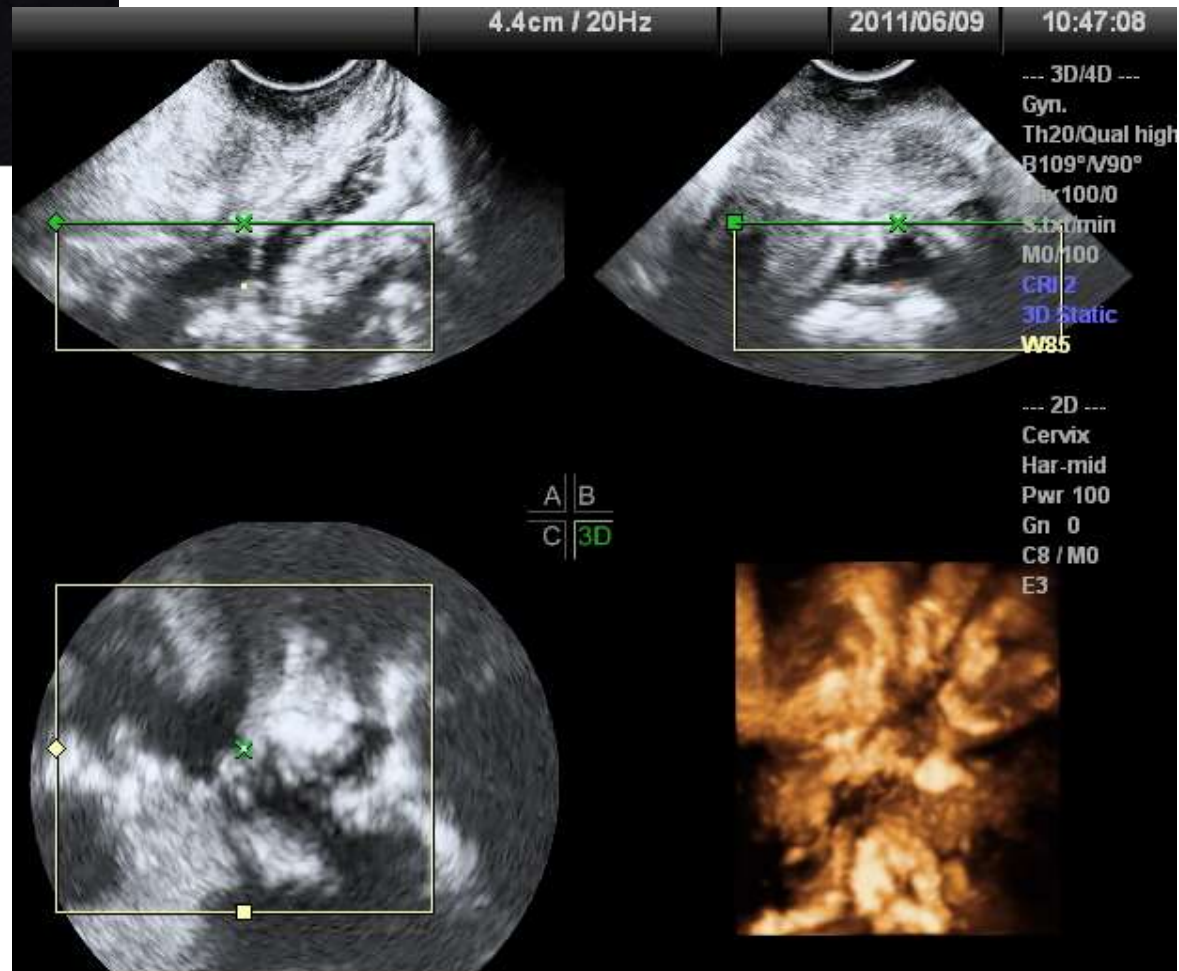
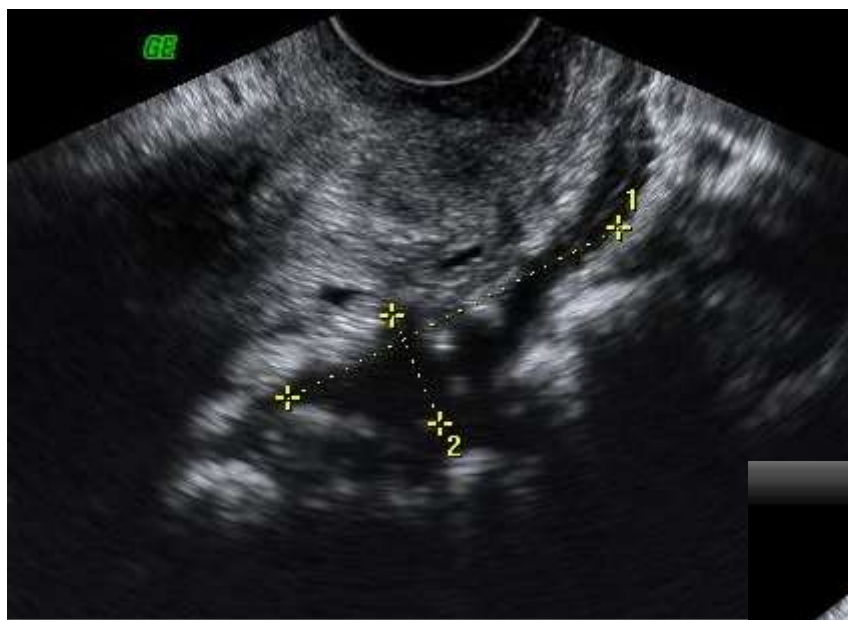
Rectosigmoid endometriosis



Mushroom cap sign



DIE lesions – 3 planes and 3D



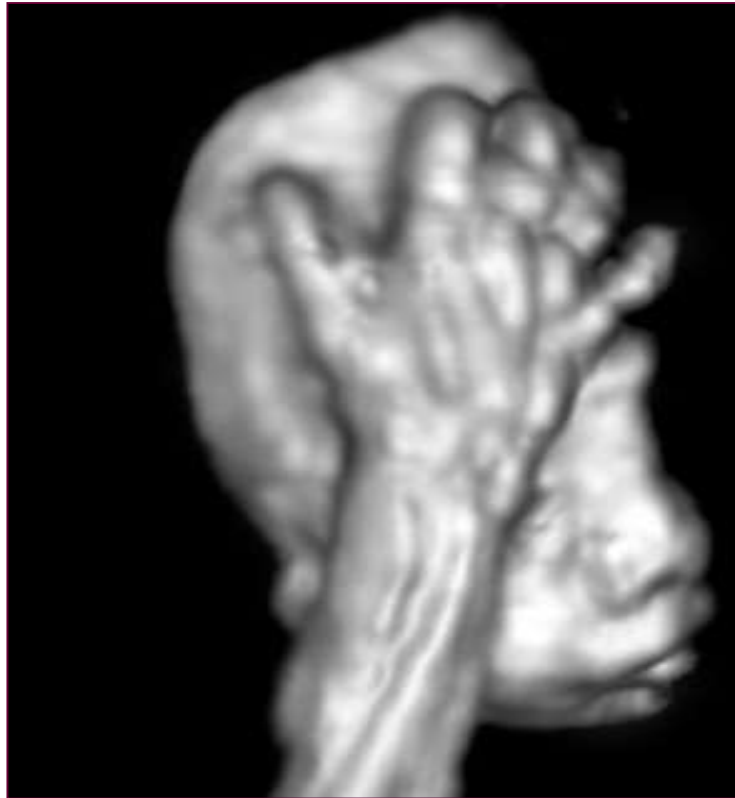
Report

- בדיקה בטנית וגינלית משולבת
- הודגמו 2 הכליות ללא הידרונפרוזיס
- רחם קדמי ממ רירית ממ
- מבנה לא מלפורמטיבי בתלת מימד נצפו פיות החצוצרות
- מרקם אדנומיוזיס - רחם גלובולרי ממצאים ציסטיים זעירים, אגמים אקוגניים, טשטוש EMJ, linear striations, דופנות אסימטריות. Parallel striations
- ניידות קיימת בכל התחנות, sliding sign,
- ללא נוזל באגן
- שחלה ימנית מיקום ומנח תקין מימדים יש זקיקים ללא ציסטות ניידות ביחס לאגן ניידות ביחס לרחם
- שחלה שמאלית מיקום ומנח תקין מימדים יש זקיקים ללא ציסטות ניידות ביחס לאגן ניידות ביחס לרחם
- רזרבה שחלתית
- שלפוחית אורטרים ללא ממצא חריג וללא הרחבת אורטרים
- מדור אחורי:
- RVS נרתיק צוואר ומעי עד סיגמואיד ללא נודולה
- ללא מעורבות רצועות אוטרוסקרליות
- לסיכום:

Summary

- US must be part of the evaluation of the infertile patient and every patient with endometriosis
- US guides the surgeon – GPS
- US guides conservative management and infertility treatment
- An important tool for continued follow- up

Thank you



veredeis@bezeqint.net