

The background features abstract blue geometric shapes, including triangles and polygons, in various shades of blue, creating a modern and dynamic design.

► *In the name of
God*

Diagnosis of endometriosis

Nasim NASSERI .radiologist



Postoperative imaging findings after laparoscopic surgery for deeply infiltrating endometriosis


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Abstract

Deeply infiltrative endometriosis (DIE) is a common gynecologic disease affecting women of reproductive age and often causing chronic pelvic pain and infertility. Clinical treatment options and preventive actions are ineffective due to the lack of knowledge about the etiology of DIE. Surgical treatment is currently the only alternative to eradicate the disease. Diagnostic imaging plays a crucial role for surgical planning and postoperative evaluation. Transvaginal sonography (TVS) with a dedicated protocol and magnetic resonance imaging (MRI) can be used to evaluate recurrent disease. Extensive pelvic surgery may cause anatomical changes and a variable spectrum of postoperative findings. Residual disease and complications can be also evaluated and are of great importance to estimate pain relief and fertility prognosis. The most common imaging findings following radical surgery for DIE are fibrotic scars in the retrocervical space and bowel anastomosis, absence of the posterior vaginal fornix and loculated fluid in the pararectal spaces. Ovaries are the most frequent site of early recurrence. Complications include infection, hemorrhage, urinary/evacuatory voiding dysfunctions as well as bowel and ureteral stenosis. The purpose of this article is to review the surgical techniques currently used to treat endometriosis in the retrocervical space,

Transvaginal Ultrasound Findings After Laparoscopic Rectosigmoid Segmental Resection for Deep Infiltrating Endometriosis

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Objectives—To evaluate transvaginal ultrasound (TVUS) findings in patients who underwent segmental rectosigmoid resection for deep infiltrating endometriosis (DIE) and to correlate postsurgical ultrasound findings with symptoms.

Methods—A retrospective study including 50 premenopausal women with bowel endometriosis who underwent segmental rectosigmoid resection was conducted. Within 12 months after surgery, a TVUS examination was conducted in all patients to evaluate the presence of postsurgical endometriosis.

Postoperative evaluation is the new challenge of imaging

studies in patients with DIE as the number of radical surgeries to treat endometriosis has increased enormously.

Radiologists must be aware about the most common imaging findings following extensive surgery for DIE.

Possible complications and the differentiation between residual disease and fibrotic scar are also of paramount importance

Besides that, postoperative imaging evaluation provides a baseline study to estimate pain relief and surgical cure and to establish a reproductive prognosis.

Transvaginal sonography (TVS) is a valuable tool for postoperative evaluation and is generally used as the first-line imaging modality The exam should follow a standardized protocol including the search for residual or recurrent lesions in the most common pelvic locations and possible complications Magnetic resonance imaging (MRI) is also an invaluable method in the postoperative workup evaluation and is commonly indicated as a problem solving method in complex cases

Based on author's experience, the best time to perform the first-imaging evaluation following surgery is after 6 months due to the extensive healing process. Exception can be made among infertile women waiting for embryo transfer or to starting a hormonal stimulation for oocyte retrieval, where imaging evaluation may be anticipated to 3 months wait.

The literature on postoperative imaging evaluation is scarce and there is no clear recommendation regarding the best imaging modality or protocol. TVS or MRI can be used following the same preoperative standards and a skilled radiologist in endometriosis Correlation with previous exams and knowledge about the surgical technique applied are critical for best imaging interpretation. Besides that, patient's hormonal status is another important point to be considered, providing that hormonal suppression can be used following radical surgery for DIE. Patients under suppression may present different ovarian and uterine volumes as well as reduced antral follicle count.

One key point to consider when interpreting a postoperative study is that DIE has an indolent behavior taking years to become visible as a “de novo” lesion. Therefore, the identification of a nodular lesion within a short interval after surgery reinforces the probability of residual disease. According to the literature, recurrent endometriosis can occur in up to 20% of operated women at 2 years and 50% at 5 years. In authors point of view, these results are very controversial and should be interpreted with caution since most of the involved patients were operated on without preoperative imaging mapping allowing surgeons to miss subperitoneal disease. Instead of recurrence, most of them in fact present residual disease.

Residual disease and recurrence after surgery

comparative studies and correlation with surgical data were fundamental for proper evaluation.

► It is also of a great importance to know that in some cases, patients and surgeons decide to leave disease to avoid major complications, such as when endometriosis deeply infiltrates the uterine wall from outside in.

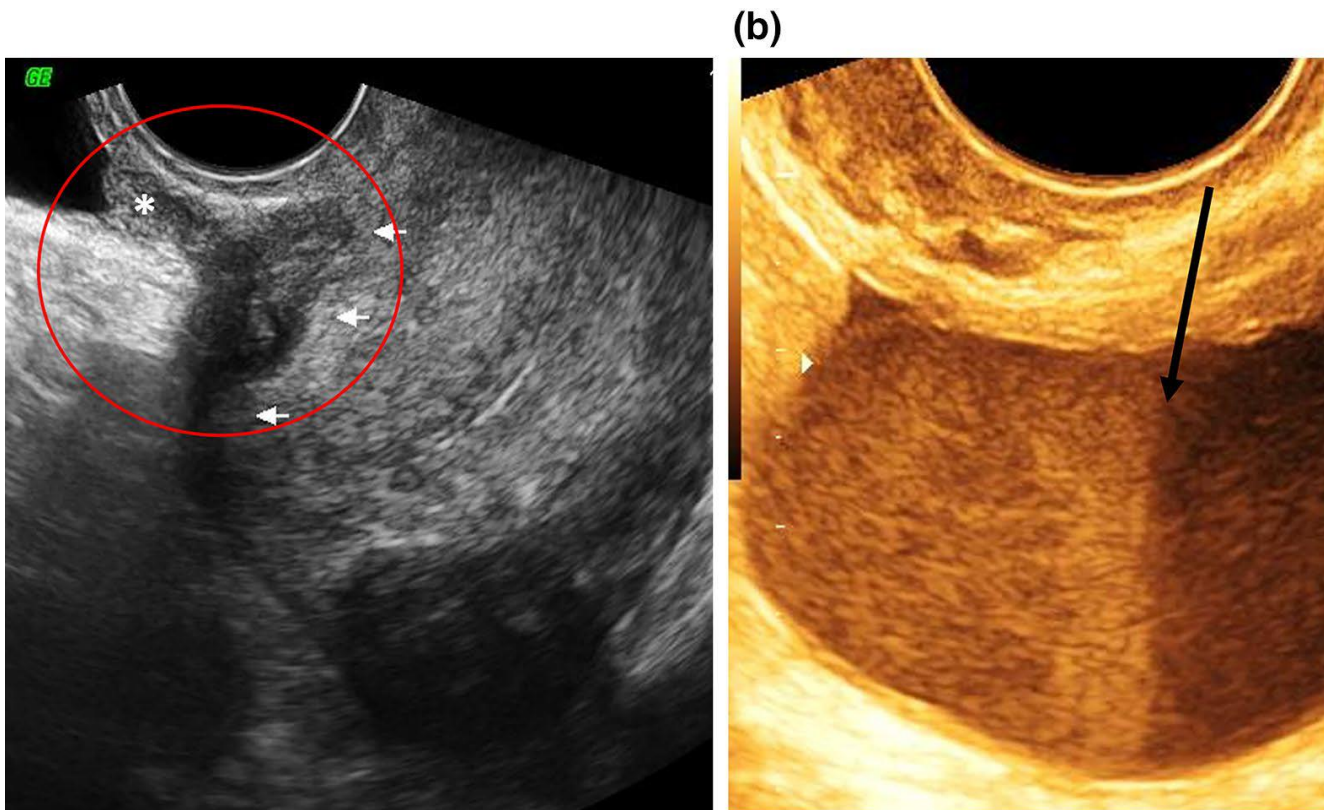
Ileal nodules or multiple recto sigmoid lesions may be leaved in situ to avoid extensive bowel resections).

► ***In these cases, information from operative reports is critical during imaging interpretation.***



Residual DIE in a 42-year-old woman 6 months after surgery

Sagittal T2-weighted MR image show a low signal intensity nodule attached to the bladder dome and deeply infiltrating the detrusor muscle (area inside the circle). There is also a small nodule attached to the vaginal vault



Residual disease 8 months after laparoscopic

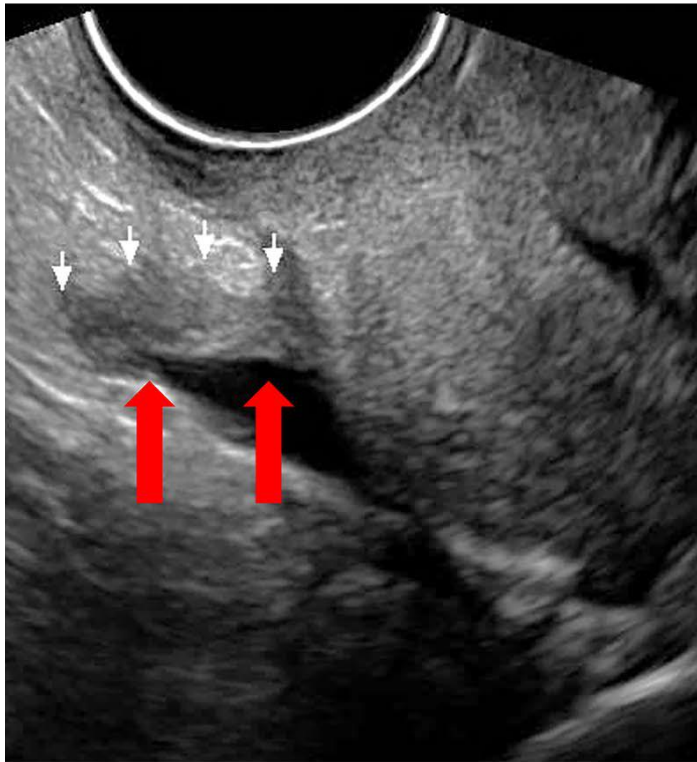
hypoechoic nodule attached to the anterior uterine wall (area inside the circle) associated with focal bladder infiltration (*). **b** transvaginal US image of the left ovary show an ovarian endometrioma with fluid-fluid level (arrow)

differential diagnosis between residual disease and fibrosis based on imaging findings relies fundamentally on morphologic aspects. Residual disease almost always present similar patterns to native DIE identified on previous exams, like a nodular shape, cystic areas with thick content, infiltrative pattern, and adhesions with adjacent structures. Conversely, fibrosis is shown as plaques, bands or striations on the peritoneal surface of the resected areas, lacking a nodular shape or cystic components.. Scar tissue will demonstrate a marked hypoechogenic aspect on TVS sometimes associated with a posterior acoustic shadow and marked low signal intensity on T2-weighted images on MRI

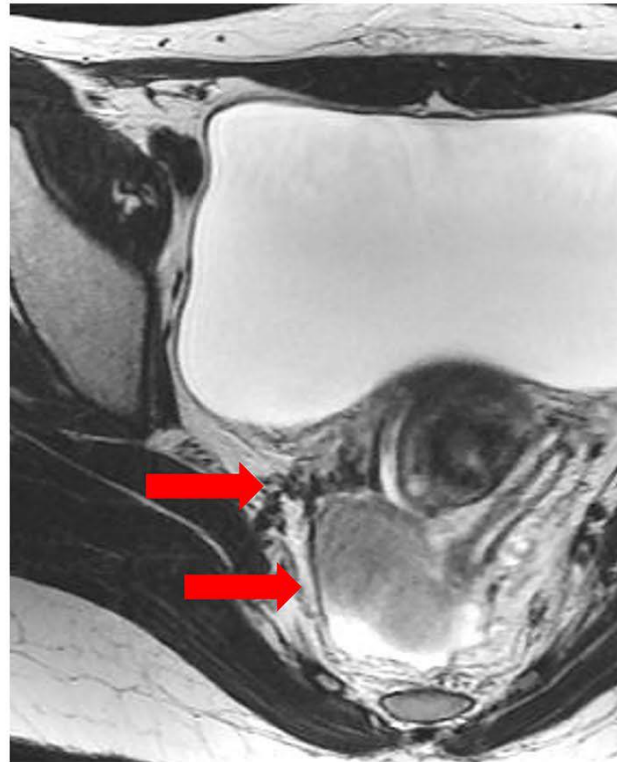
Hemorrhagic foci within the affected areas favor residual disease and works as a key finding

MRI is superior to TVS in confirming hematic component of these lesions with high specificity. Lesions will appear as hyperintense signal intensity foci on T1-weighted fat-suppressed images. During follow-up, morphologic changes should be taken into consideration, especially when a plaque lesion assumes a more nodular shape or display a heterogenous aspect containing cystic areas. Stability throughout the controls confirms the fibrotic nature of imaging findings.

Adhesions are a common postoperative finding on second-look laparoscopies and not always associated with residual disease or recurrence. They should be evaluated with cautious to avoid false-positive findings. They can be presented as angulated bowel loops, medial displacement of the ovaries, loss of fat planes between structures and loculated fluid collections without associated nodules or peritoneal thickening.



(b)



Fibrotic scars in a 32-year-old woman 8 months after laparoscopic surgery to DIE

(a, b). a Axial oblique transvaginal US image obtained after bowel preparation show hypoechoic band with irregular margins in the right paracervical space (arrows). b Axial T2-weighted MR image show retractor bands with marked low signal intensity and irregular contours in the right retro and paracervical spaces (arrows)

Most common postoperative imaging findings in the retrocervical space

Retrocervical space

Fibrotic scars- bands, plaques, linear tracks in the dissected peritoneal areas

Thinning of the uterine wall < 5 mm

Complete or partial obliteration of the posterior compartment

Adhesions

Postoperative imaging findings following ovarian surgery

- ▶ Ovary
- ▶ Reduced and fixed ovary
- ▶ Reduced or absent antral follicles
- ▶ Persistent endometrioma

Incomplete excision of an ovarian endometrioma may be an option to preserve ovarian reserve in women wishing to conceive, especially young patients with bilateral ovarian lesions or those with an already reduced ovarian reserve. Cystic drainage followed by ablation of the inner surface of the cyst can be used to minimize parenchymal loss. When the cystic wall is left recurrence can occur within a short interval

Conclusion

Postoperative imaging evaluation following radical laparoscopic surgery to treat DIE is the new challenge for radiologists since the increased number of surgically treated patients. TVS and MRI are excellent imaging modalities to evaluate patients and confirm clinical suspicion of residual or recurrent disease. Imaging interpretation should be based

on comparative studies and surgical data to avoid misinterpretation and false-positive results. The most representative findings are fibrotic scars that will present a hypoechogenic aspect on TVS and marked low signal intensity on T2-weighted images on MRI. Residual disease is suspected when a nodular or a like-native DIE lesion is identified in the surgical wound frequently associated with cystic areas. The ovaries are the most common site of recurrence even in patients without previous ovarian endometriomas.

Thanks for your attention