



Comparison of transvaginal sonography and double-contrast barium enema for diagnosing deep infiltrating endometriosis of the posterior compartment

L. SAVELLI*, L. MANUZZI*, M. COE†, M. MABROUK*, N. DI DONATO*, S. VENTUROLI* and R. SERACCHIOLI*

*Gynecology and Reproductive Medicine Unit, Department of Obstetrics and Gynecology, S. Orsola-Malpighi Hospital, Bologna, Italy;

†Department of Radiology, S. Orsola-Malpighi Hospital, Bologna, Italy

KEYWORDS: accuracy; deep infiltrating endometriosis; double-contrast barium enema; endometriosis; imaging; transvaginal sonography; ultrasound

ABSTRACT

Objectives To compare the diagnostic accuracy of transvaginal sonography (TVS) and double-contrast barium enema (DCBE) in the preoperative detection of deep infiltrating endometriosis (DIE) of the posterior compartment.

Methods This was a prospective study of 69 consecutive patients with results of pelvic examination or symptoms suggestive of DIE of the posterior compartment. TVS and DCBE were performed before surgery by two groups of physicians specialized in endometriosis, each blinded to the results of the other technique. Imaging data were compared with histopathologic analysis of the resected specimen (gold standard). Sensitivity, specificity, positive and negative predictive values and test accuracies were calculated for both imaging modalities.

Results Sixty seven of the 69 women had a nodule of DIE confirmed at laparoscopy and histopathologic examination. TVS diagnosed DIE in 57 (85%) of these patients, while DCBE revealed the presence of the lesion in 24 (36%) women. For the diagnosis of posterior DIE, TVS and DCBE had, respectively, a sensitivity of 85% and 36%, specificity of 100% and 100%, positive predictive value of 100% and 100%, negative predictive value of 17% and 4% and accuracy of 85.5% and 38%. In patients with pure bowel DIE the sensitivity was 91% and 43%, specificity was 100% and 100%, positive predictive value was 100% and 100%, negative predictive value was 29% and 6% and accuracy was 91% and 45%, respectively.

Conclusions TVS has a much higher sensitivity than does DCBE in detecting the presence of posterior DIE and

should thus be regarded as the imaging modality of choice when there is clinical suspicion of the disease. Copyright © 2011 ISUOG. Published by John Wiley & Sons, Ltd.

INTRODUCTION

Deep infiltrating endometriosis (DIE) is defined by the presence of endometrial glands and stroma penetrating the retroperitoneal space to a depth of at least 5 mm^{1–3}. It can affect several structures in the posterior pelvis (rectum, sigmoid colon, uterosacral ligaments, rectovaginal septum, vagina) as well as in the anterior compartment (bladder)⁴. Clinically, DIE is responsible for painful symptoms, such as dysmenorrhea, dyspareunia, dyschezia and chronic pelvic pain, and sterility. The aim of surgical treatment is removal of the entire endometriotic lesion, reduction of pain and restoration of fertility. To achieve such goals, good laparoscopic skills are necessary. Removal of DIE of the posterior compartment is risky, challenging and time-consuming; it carries a high rate of surgically related complications, particularly in cases involving the digestive tract⁵. Moreover, a general surgeon is sometimes needed when bowel resection has to be carried out. Thus, precise preoperative knowledge of the presence and extent of DIE would help in planning proper treatment (medical vs surgical), in counseling women about the risks and complications of surgery and in deciding whether to refer the patient to a skilled laparoscopist working in a recognized center for the treatment of endometriosis.

To date, there is no consensus regarding the preoperative evaluation of patients with suspected DIE of the posterior compartment. Being widely available, cheap and well accepted, transvaginal sonography (TVS) is the

Correspondence to: Dr L. Savelli, Via Pietro Mengoli 31/4, 40138 Bologna, Italy (e-mail: luca.savelli@aosp.bo.it)

Accepted: 31 May 2011

method of choice for evaluation of an adnexal mass, and it has been demonstrated to be useful in diagnosing DIE^{6–12}. Double-contrast barium enema (DBCE) has shown promising results when performed by expert radiologists in the preoperative evaluation of patients with clinically suspected intestinal (rectal, sigmoid, cecal) DIE^{13–17}. However, DBCE requires a low-residue diet for 1 day before the examination, the administration of drugs in order to empty the colon and exposure to X-rays (effective dose approximately 5 mSv).

The aim of this study was to compare the accuracy of TVS and DCBE in the detection of nodules of DIE in the posterior compartment in women scheduled for surgery.

METHODS

This prospective study was conducted on patients enrolled at a single center from January 2004 to December 2007. Inclusion criteria for the study were a complaint of symptoms indicative of DIE of the posterior compartment (e.g. crampy abdominal pain during or after defecation, rectal pain, deep dyspareunia, rectal bleeding with menses) and a fixed irregular nodule found in the posterior pelvis on pelvic examination. Institutional review board approval was obtained before initiating the study.

Ninety-four consecutive women were enrolled initially into the study. Of these, 25 were excluded due to: refusal to undergo surgical intervention ($n = 15$), refusal to undergo DCBE ($n = 7$) or incomplete TVS examination because this was judged to be painful by the woman, who asked that the examination be stopped ($n = 3$). The study group therefore comprised 69 patients (median \pm SD age, 33.6 ± 5.9 years) who underwent DCBE and TVS and who subsequently underwent surgery at our center. Both DCBE and TVS were performed during the month before surgery by physicians with training and expertise in gynecologic imaging studies, who were aware of each patient's history, symptoms and pelvic examination results. Tailored data-entry forms were used to record results. The

radiologists performing DCBE and the gynecologists performing TVS were each blinded to the others' results.

Transvaginal sonography

TVS was performed in a systematic manner using commercially available ultrasound machines (ESAOTE, Technos MP, Genova, Italy and Voluson 730 Pro, GE Medical Systems, Milwaukee, WI, USA) equipped with a transvaginal wide-band 5.0–9.0-MHz transducer. No bowel preparation was performed. Detailed sonographic reports were made, and representative digital images of every patient were saved and stored on a hard disk for subsequent review and analysis.

First, the pelvic organs were examined to evaluate the anatomy of the uterus and ovaries. Then, the posterior pelvic compartment (consisting of the rectosigmoid colon, pouch of Douglas, uterosacral ligaments, rectovaginal septum and posterior vaginal wall) was investigated by positioning the transducer in the posterior vaginal fornix and tilting the probe downward, looking for the presence on the above-mentioned structures of hypoechoic linear thickening and/or hypoechoic irregular-shaped nodules with a hyperechoic rim and scarcely vascularized at power Doppler (Figures 1–3)^{6–12}. Another useful, distinct feature of DIE on TVS is the fixity of the nodule, and the pain evoked by exerting gentle pressure with the vaginal probe (Videoclip S1). No attempt was made to evaluate the depth of endometriotic infiltration within the bowel wall.

Double-contrast barium enema

All DCBE procedures were carried out using a motorized tilting table for fluoroscopic and radiological examination. In preparation, patients maintained a low-residue diet for 1 day prior to the examination in order to keep the enteric content fluid. The examination was performed after intramuscular administration of 20 mg (1 ampoule) Scopolamine (Buscopan, Boehringer Ingelheim, Italy) in order to induce colonic hypotonia. The presence of DIE

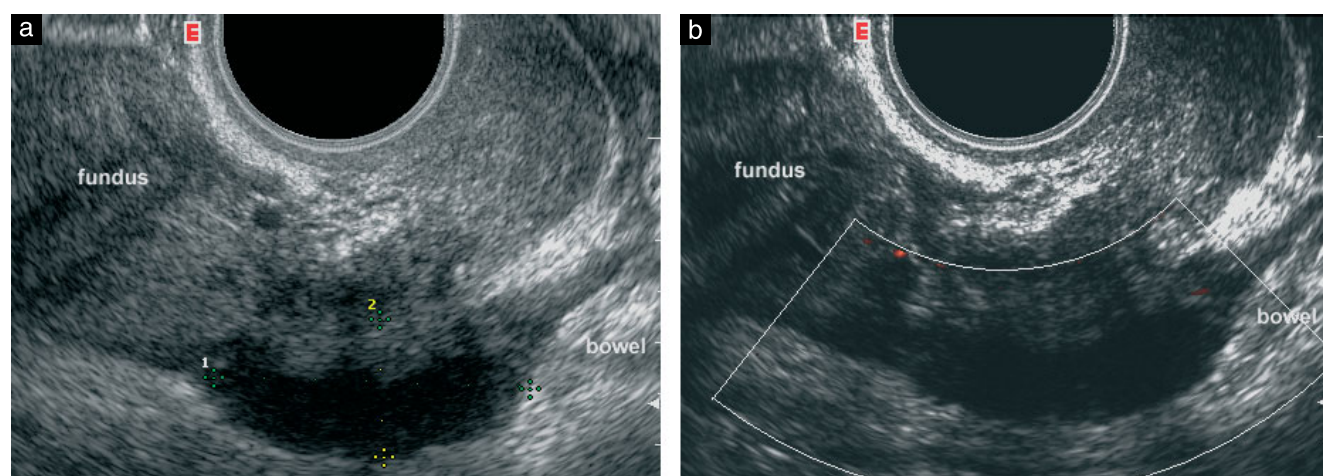


Figure 1 Sagittal transvaginal ultrasound images of the posterior compartment of the pelvis, including the pouch of Douglas. (a) Gray-scale image: a solid hypoechoic nodule with blurred margins and a hyperechoic rim (calipers) suggestive of the presence of deep infiltrating endometriosis is seen at the level of the anterior wall of the rectum. (b) Power Doppler reveals the absence of blood vessels inside the nodule.

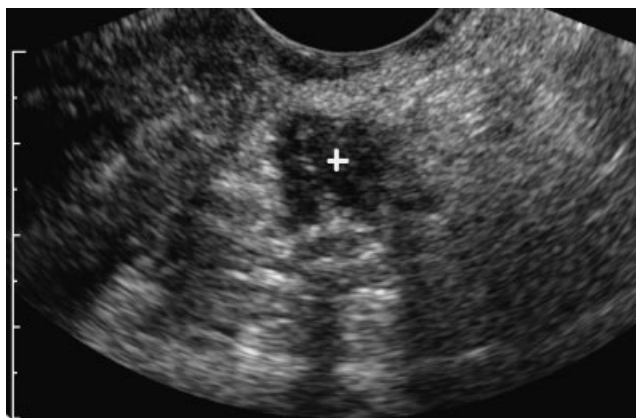


Figure 2 Transverse transvaginal ultrasound image of the posterior compartment of the pelvis, beside the uterus. A small (12 mm mean diameter) nodule of deep infiltrating endometriosis of the left uterosacral ligament is shown (+).

was diagnosed on DCBE when the bowel lumen was narrowed at any level from the sigmoid to the anus (extrinsic mass effect) in association with crenulation of the mucosa and/or spiculation of contour (Figure 4)¹⁵.

Laparoscopic findings and histopathology

All 69 patients underwent operative laparoscopy performed by a skilled gynecologic surgeon specialized in endometriosis (R.S.), who was aware of the TVS and DCBE findings. In each case, the laparoscopy involved a diagnostic phase, during which the surgeon scored the stage of pelvic endometriosis by eye subjectively, according to the revised American Fertility Society (rAFS) classification¹⁸. Whenever DIE was found during surgery, removal of the whole lesion was carried out with one of two techniques: skinning of the rectal wall was performed if this was judged feasible because of the small size of the lesion; intestinal resection was carried out when, on the basis of visual inspection of the nodule size and location, this procedure seemed most suitable. Intestinal resection was performed in 18 (27%) women. In all 18, both TVS



Figure 4 Double-contrast barium enema (lateral view) showing the effect of a large endometriotic nodule on the anterior surface of the sigmoid colon. Note the narrowing of the lumen due to extrinsic mass effect and the crenulations of the mucosa (arrow).

and DCBE revealed the presence of a bulky DIE located in the rectum or sigmoid colon.

All specimens removed were sent for histopathological analysis. Confirmation of DIE was based on the presence of endometrial glands and stroma together with fibrosis and smooth muscle cell hyperplasia and hypertrophy. When pelvic pathologies other than posterior DIE were found (e.g. adhesions, ovarian cysts, hydrosalpinges), laparoscopic removal was performed, except for the case of superficial peritoneal endometriosis, which was diagnosed based on visual inspection by the surgeon.

Statistical analysis

Continuous variables are expressed as median \pm SD or as median, percentiles and range. All grouping variables

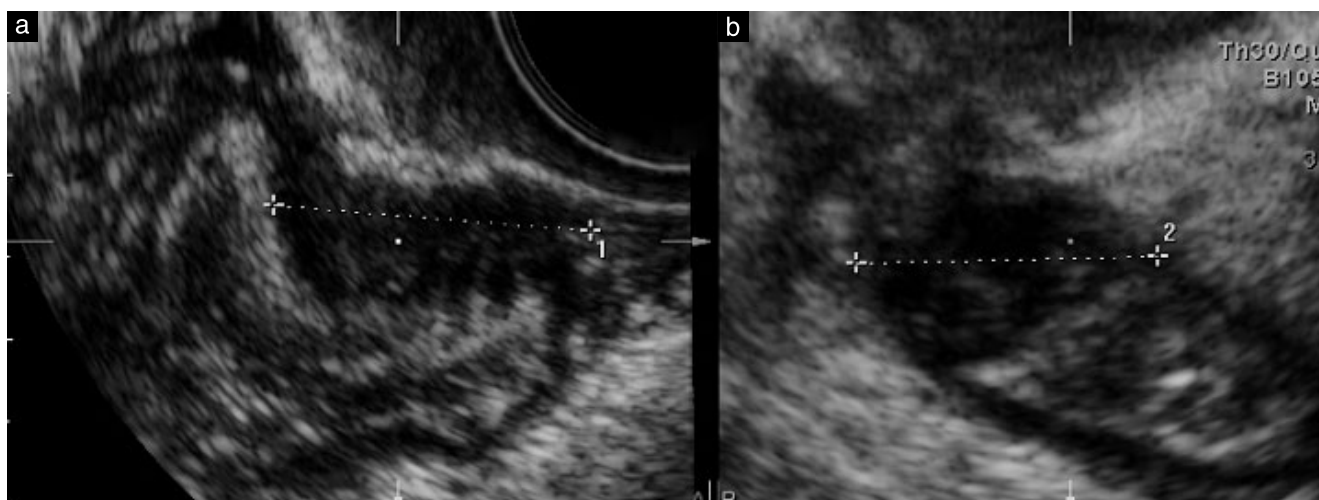


Figure 3 Sagittal transvaginal ultrasound images of the sigmoid colon. (a) Longitudinal section: a hypoechoic nodule with irregular borders is shown (calipers) located on the antimesenteric surface of the bowel. (b) Transverse section at the same level of the nodule.

are expressed in terms of frequency and percentage. Sensitivity, specificity and positive and negative predictive values were calculated to investigate the accuracy of TVS and DCBE in detecting posterior DIE, using histology as the gold standard. For all tests, $P < 0.05$ was considered statistically significant. The significance of the differences in sensitivities between TVS and DCBE was assessed by means of McNemar's test. Statistical analysis was carried out using Statistical Package for the Social Sciences (SPSS) software version 14.1 (SPSS Inc., Chicago, IL, USA).

RESULTS

Characteristics of the study population are summarized in Table 1. Surgery and subsequent histopathology confirmed the presence of one DIE nodule in the posterior compartment in 67/69 (97%) patients and two women had a normal pelvis. The median diameter of the endometriotic nodule removed, as measured at histopathology, was 45 mm (10th and 90th percentiles, 15 and 72 mm; range, 8–80 mm). Findings at laparoscopy are summarized in Table 2. Associated pelvic pathologies were: one or more endometriotic ovarian cysts in 38/69 (55%) cases, ovarian cysts other than endometriotic in 6/69 (9%), pelvic adhesions in 50/69 (72%), superficial peritoneal endometriosis in 65/69 (94%), bladder endometriosis in 9/69 (13%) and hydrosalpinges in 9/69 (13%).

Diagnostic performance of TVS and DCBE is reported in Table 3. TVS correctly diagnosed the presence of DIE in 57/67 cases, while the nodule was missed in 10/67 (Figure 5). DCBE correctly diagnosed the presence of DIE in 24/67 cases, while the nodule was missed in 43/67 (Figure 6). The difference between the two methods in correctly diagnosing DIE was significant ($P < 0.05$). Both TVS and DCBE correctly identified the two women with normal pelvises but symptoms suggestive of DIE. It was not possible to obtain a positive likelihood ratio (LR) due to the fact that specificity was 100%. The negative LR was 0.149 for TVS (95% CI, 0.084–0.264) and 0.642 (95% CI, 0.537–0.767) for DCBE.

Table 1 Clinical characteristics of 69 patients undergoing surgery for suspected deep infiltrating endometriosis of the posterior compartment

Characteristic	Value
Age (years)	33.6 ± 5.9
Diameter (cm) at histopathology of nodule found in posterior compartment and resected at surgery*	4.5 (0.8–8)
Previous surgery for endometriosis	18 (26)
Nulliparous	49 (71)
Estroprogestin therapy before surgery	22 (32)
Infertility	30 (43)
Dysmenorrhea	64 (93)
Dyspareunia	59 (86)
Dyschezia	45 (65)

Data are given as median ± SD, median (range) or n (%). *A single nodule in the posterior compartment per patient.

Table 2 Location at laparoscopy of deep infiltrating endometriosis of the posterior compartment (67 patients)

Location	n (%)
Rectum	30 (45)
Sigmoid colon	18 (27)
Uterosacral ligaments	8 (12)
Rectum and rectovaginal septum	8 (12)
Vagina	3 (4)

Each patient with confirmed DIE of the posterior compartment had a single nodule. Two patients with suspected DIE had a normal pelvis on laparoscopy.



Figure 5 Sagittal transvaginal ultrasound (TVS) image of the rectosigmoid junction in a false-negative case. On the anterior wall of the colon a small nodule of deep infiltrating endometriosis is present (+), which was missed at preoperative TVS.

When only patients with pure bowel DIE were included (i.e. excluding eight cases with uterosacral ligament DIE and three cases of pure vaginal DIE), the accuracy of the two techniques improved substantially, but TVS still performed better. Differences in sensitivity between the two methods were statistically significant. TVS showed good agreement with histology (Cohen's K , 0.413 ($P = 0.07$, McNemar's test)); DCBE showed very low agreement with histology (Cohen's K , 0.049 ($P < 0.0005$, McNemar's test)). The negative LR for pure bowel DIE was 0.090 (95% CI, 0.039–0.206) for TVS and 0.570 (95% CI, 0.456–0.717) for DCBE.

DISCUSSION

Our study confirms the diagnostic value of TVS in cases with suspected DIE, with an overall accuracy comparable to that previously reported^{6–12} and higher than that of DCBE performed by expert radiologists working in the same institution.

The strengths of this study are its prospective nature, the use of predefined standardized protocols for evaluating the patients at TVS and DCBE and the fact that the examinations were carried out by experienced physicians working in a single tertiary referral center for the diagnosis and treatment of endometriosis.

Table 3 Diagnostic performance of transvaginal sonography (TVS) and double-contrast barium enema (DCBE) in preoperative detection of deep infiltrating endometriosis (DIE) of the posterior compartment (69 patients)

	<i>Sensitivity</i> (% (n))	<i>Specificity</i> (% (n))	<i>PPV</i> (% (n))	<i>NPV</i> (% (n))	<i>Accuracy</i> (% (n))	<i>Cohen K</i> (95% CI)
Overall posterior DIE						
TVS	85.1 (57/67)	100 (2/2)	100 (57/57)	16.7 (2/12)	85.5 (59/69)	0.248 (0.078–0.419)
DCBE	35.8 (24/67)	100 (2/2)	100 (24/24)	4.4 (2/45)	37.7 (26/69)	0.031 (0–0.202)
Bowel DIE only*						
TVS	91.1 (51/56)	100 (2/2)	100 (51/51)	28.6 (2/7)	91.4 (53/58)	0.413 (0.242–0.583)
DCBE	42.9 (24/56)	100 (2/2)	100 (24/24)	5.9 (2/34)	44.8 (26/58)	0.049 (0–0.220)

*Excluding cases with uterosacral ligament DIE and of pure vaginal DIE. NPV, negative predictive value; PPV, positive predictive value.



Figure 6 Double-contrast barium enema (frontal view) showing a normal profile of the intestinal wall in a false-negative case. At laparoscopy, an endometriotic nodule was present on the anterior surface of the rectum, neither narrowing the lumen nor indenting the muscular layer.

A potential limitation of this study is the fact that we tended to group together DIE nodules from somewhat different sites (rectosigmoid colon, pouch of Douglas, uterosacral ligaments, rectovaginal septum, vagina), these lesions usually being grouped together under the expression 'DIE of the posterior pelvic compartment'⁴. The rAFS classification¹⁸ does not take into account the specific site involved and is not helpful when distinction has to be made between different posterior DIE locations. We admit that the accuracy of the two imaging modalities could differ depending on the particular anatomic structures involved, but nodules of DIE in the posterior compartment produce symptoms which are similar irrespective of which site in the posterior compartment is involved (e.g. abdominal/rectal pain, deep dyspareunia, diarrhea and/or constipation, rectal bleeding with menses, chronic non cyclic pelvic pain). Moreover, posterior DIE nodules tend to grow and involve different adjacent

anatomic structures, producing a fibrotic retraction and distortion of the pelvic anatomy and rendering it difficult to delineate precisely the anatomical site involved.

A possible bias of the study is the high prevalence of DIE in the study population (97% of cases), reflected by the high negative predictive value. This is due to the fact that we included only patients with a strong clinical suspicion of having DIE, i.e. those with heavy symptoms or with positive results of physical examination, and willing to undergo surgery. As a consequence, our results apply to a high-risk population only and we cannot comment on the accuracy of the two imaging modalities for diagnosing DIE in the general population. This bias is common to other published studies that included women enrolled on the basis of signs and symptoms strongly indicative of DIE and considered surgical results as the gold standard^{10–12}.

In our experience, DCBE did not perform as well as has been reported previously^{13–15}. This could be due to several factors. As for any imaging modality, accuracy of DCBE is operator-dependent. Our radiologists who performed the procedure, although trained and expert in gynecologic imaging, are not dedicated exclusively to this field of radiology, given the busy schedule of our university hospital. A radiologist dedicated only to gynecologic imaging might be expected to perform better, but, in everyday clinical practice, this situation is difficult to achieve. Also, we believe that DCBE gives good results in cases with a high degree of bowel distortion and infiltration, which is generally produced by bulky endometriotic lesions rather than small DIE. Finally, the available literature on DCBE is based on retrospective studies in which patients with mostly bowel endometriosis were included: lesions confined to the vagina or uterosacral ligaments could not reduce the lumen of the colon or indent the mucosal profile, giving normal radiograms of the posterior compartment. In our study, we included women with DIE of the whole posterior compartment⁴. Furthermore, the images produced by DBCE of DIE are not specific: the condition can be mimicked by several pathologic processes, such as diverticulitis, pelvic inflammatory disease, benign and malignant colonic neoplasms, metastatic carcinoma and pelvic abscesses^{13,14}. We agree with Faccioli and colleagues¹⁵ that incomplete bowel distention, residual feces and incomplete passage of contrast medium are

additional factors which can hamper the diagnosis using DBCE. It is well known that in patients who have previously undergone conservative surgery for DIE (i.e. shaving of the wall of the bowel or full-thickness disk excision without intestinal resection), postoperative fibrosis of the intestinal wall and peritoneal adhesions could kink and entrap the intestine, mimicking true DIE and rendering the differential diagnosis very challenging.

The main drawbacks of TVS are the difficulty of investigating the cranial part of the sigmoid colon, the impossibility of detecting ileal endometriosis (although this is very rare) and the fact that accuracy is strongly operator-dependent¹⁹. Recently, the addition of water contrast in the rectum has been proposed in order to improve the accuracy of TVS in the diagnosis of rectal infiltration^{17,20}. Although interesting, this technique needs further investigation in order to confirm its potential advantages.

In conclusion, we recommend TVS as the imaging modality of choice for patients with symptoms of posterior DIE, reserving DCBE for cases of signs and symptoms strongly suggestive of the presence of bowel DIE located in the upper part of the sigmoid, which is difficult to visualize on TVS.

REFERENCES

- Koninckx PR, Meuleman C, Demeyere S, Lessafre E, Cornillie FJ. Suggestive evidence that pelvic endometriosis is a progressive disease, whereas deeply infiltrating endometriosis is associated with pelvic pain. *Fertil Steril* 1991; 55: 759–765.
- Cornillie FJ, Oosterlynck D, Lauwereyns JM, Koninckx PR. Deeply infiltrating endometriosis: histological and clinical significance. *Fertil Steril* 1990; 53: 978–983.
- Anaf V, Simon P, Fayt I, Noel J. Smooth muscles are frequent components of endometriotic lesions. *Hum Reprod* 2000; 15: 767–771.
- Chapron C, Fauconnier A, Vieira M, Barakat H, Dousset B, Pansini V, Vacher-Lavenu MC, Dubuisson JB. Anatomical distribution of deeply infiltrating endometriosis: surgical implications and proposition for a classification. *Hum Reprod* 2003; 18: 157–161.
- Chapron C, Jacob S, Dubuisson JB, Vieira M, Liaras E, Fauconnier A. Laparoscopically assisted vaginal management of deep endometriosis infiltrating the rectovaginal septum. *Acta Obstet Gynecol Scand* 2001; 80: 349–354.
- Koga K, Osuga Y, Yano T, Momoeda M, Yoshino O, Hirota Y, Kugu K, Nishii O, Tsutsumi O, Taketani Y. Characteristic images of deeply infiltrating rectosigmoid endometriosis on transvaginal and transrectal ultrasonography. *Hum Reprod* 2003; 18: 1328–1333.
- Exacoustos C, Zupi E, Carusotti C, Rinaldo D, Marconi D, Lanzi G, Arduini D. Staging of pelvic endometriosis: role of sonographic appearance in determining extension of disease and modulating surgical approach. *J Am Assoc Gynecol Laparosc* 2003; 10: 378–382.
- Bazot M, Detchev R, Cortez A, Amouyal P, Uzan S, Darai E. Transvaginal sonography and rectal endoscopic sonography for the assessment of pelvic endometriosis: a preliminary comparison. *Hum Reprod* 2003; 8: 1686–1692.
- Bazot M, Thomassin I, Hourani R, Cortez A, Darai E. Diagnostic accuracy of transvaginal sonography for deep pelvic endometriosis. *Ultrasound Obstet Gynecol* 2004; 24: 180–185.
- Bazot M, Malzy P, Cortez A, Roseau G, Amouyal P, Darai E. Accuracy of transvaginal sonography and rectal endoscopic sonography in the diagnosis of deep infiltrating endometriosis. *Ultrasound Obstet Gynecol* 2007; 30: 994–1001.
- Abrao MS, Gonçalves MO da C, Dias JA, Podgaec S, Chamie LP, Blasbalg R. Comparison between clinical examination, transvaginal sonography and magnetic resonance imaging for the diagnosis of deep endometriosis. *Hum Reprod* 2007; 22: 3092–3097.
- Hudelist G, English J, Thomas AE, Tinelli A, Singer CF, Keckstein J. Diagnostic accuracy of transvaginal ultrasound for non-invasive diagnosis of bowel endometriosis: systematic review and meta-analysis. *Ultrasound Obstet Gynecol* 2011; 37: 257–263.
- Gordon RL, Evers K, Kressel HY, Laufer I, Herlinger H, Thompson JJ. Double-contrast enema in pelvic endometriosis. *AJR Am J Roentgenol* 1982; 138: 549–552.
- Landi S, Barbieri F, Fiaccavento A, Mainardi P, Ruffo G, Selvaggi L, Syed R, Minelli L. Preoperative double-contrast barium enema in patients with suspected intestinal endometriosis. *J Am Assoc Gynecol Laparosc* 2004; 11: 223–228.
- Faccioli N, Manfredi R, Mainardi P, Dalla Chiara E, Spoto E, Minelli L, Mucelli Pozzi R. Barium enema evaluation of colonic involvement in endometriosis. *AJR Am J Roentgenol* 2008; 190: 1050–1054.
- Faccioli N, Foti G, Manfredi R, Mainardi P, Spoto E, Ruffo G, Minelli L, Mucelli Pozzi R. Evaluation of colonic involvement in endometriosis: double-contrast barium enema vs. magnetic resonance imaging. *Abdom Imaging* 2010; 35: 414–421.
- Bergamini V, Ghezzi F, Scarpieri S, Raffaelli R, Cromi A, Franchi M. Preoperative assessment of intestinal endometriosis: a comparison of transvaginal sonography with water contrast in the rectum, transrectal sonography, and barium enema. *Abdom Imaging* 2010; 35: 732–736.
- American Fertility Society. Revised American Fertility Society Classification of Endometriosis. *Fertil Steril* 1985; 43: 351–352.
- Savelli L. Transvaginal sonography for the assessment of ovarian and pelvic endometriosis: how deep is our understanding? *Ultrasound Obstet Gynecol* 2009; 33: 497–501.
- Valenzano Menada M, Remorgida V, Abbamonte LH, Nicoletti A, Ragni N, Ferrero S. Does transvaginal ultrasonography combined with water-contrast in the rectum aid in the diagnosis of rectovaginal endometriosis infiltrating the bowel? *Hum Reprod* 2008; 23: 1069–1075.

SUPPORTING INFORMATION ON THE INTERNET

The following supporting information may be found in the online version of this article:



Videoclip S1 Transvaginal sagittal scan of the posterior compartment of the pelvis, showing the presence of an endometriotic nodule located on the anterior wall of the rectum. Note the movement of the vaginal probe, directed toward the nodule, in order to evaluate the fixity of the adjacent structures (sliding sign) and to investigate whether the pressure exerted evokes pain, similar to that experienced during intercourse (pain mapping).