Pre-operative assessment of bladder endometriosis

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The aim of our study was to verify the reliability of transvaginal ultrasonography in the pre-operative evaluation of bladder endometriosis. Six patients with suspected bladder endometriosis were studied. At referral to our department all six women underwent magnetic resonance imaging (MRI), transabdominal and transvaginal ultrasonography, cystoscopy and descending urography. Subsequently all the women underwent transperitoneal cystotomy and excision of endometriotic lesion at laparotomy. In three patients the bladder endometriotic lesions were continuous with adenomyosis in the anterior uterine wall. Histological examination confirmed the endometriotic nature of bladder nodule in all cases. Abdominal ultrasonography visualized the detrusor neoformation in all the patients but was less precise than transvaginal ultrasonography and MRI in defining the size of the lesions, infiltration of the detrusor and continuity with extravesical lesions. Transvaginal ultrasonography was more accurate and versatile than abdominal ultrasonography. The better image resolution allowed an accurate structural analysis of the bladder wall lesion. Furthermore, involvement of the uterovesical septum could be evaluated and adjacent myometrial infiltration recognized. MRI, although very precise, was less versatile than transvaginal ultrasonography and less accurate in establishing the margins of the lesions as perilesional fibrosis is visualized less clearly than areas containing haematic material. Urography was as specific but still useful to evaluate the integrity of the upper urinary tract and ureters. In conclusion, in our patients transvaginal ultrasonography was found to be the most accurate technique in the diagnosis of bladder endometriosis.

Key words: bladder/endometriosis/transvaginal ultrasonography

Introduction

The bladder is an infrequent site of endometriosis and it is estimated that only 1% of patients with this disease have lesions involving the urinary system (Aldridge et al., 1985; Shook and Nyberg, 1988). To date fewer than 200 cases of bladder endometriosis have been described (Stanley et al., 1965; Aldridge et al., 1985; Godlewski et al., 1992; Nezhat and Nezhat, 1993; Vercellini et al., 1996). Symptoms, when present, mimic those of recurrent cystitis (Sircus et al., 1988) or, more rarely, the condition is characterized by pathognomonic menstrual haematuria. Diagnosis is easy when cystoscopy visualizes endometriotic foci on the bladder mucosal surface but this method is unable to define the extent of endometriotic lesions and their relationship with the uterus. Such information is required if the lesions are to be excised completely, which is essential as partial removal exposes the patient to the risk of clinical recurrence. Transvaginal ultrasonography has recently been found useful in defining many gynaecological pathological conditions (Fedele et al., 1992; Pellerito et al., 1992). We therefore decided to verify the reliability of this method in the pre-operative evaluation of bladder endometriosis.

Materials and methods

From November 1995 to October 1996 six women with suspected bladder endometriosis were sent to our department. They all reported menstrual pollakiuria and dysuria and three of them had undergone cystoscopy which revealed typical bluish lesions compatible with endometriosis. One patient had had a vaginal delivery, two others had tried unsuccessfully to conceive for >2 years, and the fourth did not want children. They all reported pain symptoms, dyspareunia in all six and dysuria in two. Two patients had previously undergone abdominal surgery for endometriosis, enucleation of ovarian endometriomas in one case and adnexectomy in the other. The former had taken danazol for 6 months postoperatively.

At referral to our department all six women underwent magnetic resonance imaging (MRI), transabdominal and transvaginal ultrasonography, cystoscopy and descending urography. Ultrasonography was performed with Ansaldo AU 560 equipment (Ansaldo, Genova, Italy) with transvaginal probe of 6.5 MHz. Sagittal and coronal scans were obtained of the wall of the half-full bladder. Special attention was given to the relations between the bladder neoformation and the adjacent organs, particularly the uterus and ovaries. Subsequently all the women underwent laparotomy: transperitoneal cystotomy was performed, and the lesion was identified visually and by palpation and then excised after cannulation of the ureters. The detrusor was then sutured in two layers. Other genital and extragenital endometriotic lesions were excised at the same time. After the operation, the findings at the various pre-operative diagnostic investigations were compared with the surgical findings, and an accuracy score of 1-3 was attributed to each technique for each variable considered (lesion size, degree of detrusor infiltration, diagnosis of associated pelvic anomalies, localization, and relationship with ureters).
Table I. Clinical characteristics of the patients

<table>
<thead>
<tr>
<th>Patient no.</th>
<th>Age (years)</th>
<th>Previous surgery for endometriosis</th>
<th>Urinary symptoms</th>
<th>Pain symptoms</th>
<th>Size of bladder lesion (cm)</th>
<th>Uterine adenomyosis</th>
<th>Other endometriotic localizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>22</td>
<td>Enucleation of an ovarian endometrioma</td>
<td>Pollakiuria, dysuria, haematuria</td>
<td>Dysmenorrhea, dyspareunia</td>
<td>3.5</td>
<td>Yes</td>
<td>Rectosigmoid left ovary</td>
</tr>
<tr>
<td>2</td>
<td>34</td>
<td>Right adnexectomy</td>
<td>Pollakiuria, dysuria, haematuria</td>
<td>Dysmenorrhea</td>
<td>3×4</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>38</td>
<td>No</td>
<td>Pollakiuria, dysuria, haematuria</td>
<td>Dysmenorrhea, dyspareunia</td>
<td>2.5×2</td>
<td>No</td>
<td>Left parametrium</td>
</tr>
<tr>
<td>4</td>
<td>26</td>
<td>No</td>
<td>Pollakiuria, dysuria, haematuria</td>
<td>Dysmenorrhea</td>
<td>3×4</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>29</td>
<td>No</td>
<td>Pollakiuria, dysuria, haematuria</td>
<td>Dysmenorrhoea</td>
<td>2×2</td>
<td>No</td>
<td>Pouch of Douglas</td>
</tr>
<tr>
<td>6</td>
<td>34</td>
<td>No</td>
<td>Pollakiuria, dysuria, haematuria</td>
<td>Dysmenorrhea, pelvic pain</td>
<td>3×2</td>
<td>No</td>
<td>Left ovary</td>
</tr>
</tbody>
</table>

Table II. Accuracy scores (1 = low, 2 = moderate, 3 = high) of the different diagnostic techniques in the assessment of bladder endometriosis

<table>
<thead>
<tr>
<th>Diagnostic Modality</th>
<th>Lesion size</th>
<th>Degree of detrusor infiltration</th>
<th>Diagnosis of associated disease</th>
<th>Localization and relationship with uterus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cystoscopy</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Urography</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Abdominal ultrasonography</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Transvaginal ultrasonography</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Magnetic resonance imaging</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

Figure 1. Transvaginal ultrasonographic image of vesical endometriosis. The endometriotic nodule (E) involves the whole thickening of bladder detrusor but does not infiltrate the bladder mucosa (white arrow). B = bladder.

Results

The clinical characteristics of the patients and relative intra-operative findings are summarized in Table I. In all the women the lesion infiltrated the entire thickness of the bladder wall, from the mucosa to the serosa. In three of them the lesion was continuous with a nodule of adenomyosis of the anterior uterine wall and in the fourth the lesion extended as far as the left parametrium. The bladder lesion was always localized in the postero-superior wall of the organ and did not involve the intramural tract of the ureters.

The accuracy of the various diagnostic modalities is compared in Table II. Cystoscopy visualized lesions suggestive of endometriosis consisting of mamillae that bled easily or typical endometriotic formations underlying and raising apparently intact mucosa in all the patients. It also demonstrated the relationship of the lesions with the ureteral meatuses and their patency but never established the degree of infiltration of the detrusor or detected associated pelvic anomalies. Urography revealed the presence of masses occupying part of the bladder lumen originating from the postero-inferior wall of the bladder.
Figure 2. Transvaginal ultrasonographic image of vesical endometriosis. The endometriotic nodule (E) infiltrates the whole thickening of posterior bladder wall. The vesical mucosa has a ‘bubble-like’ aspect (arrows). B = bladder.

Figure 3. Transvaginal ultrasonographic image of vesical endometriosis. The endometriotic nodule (E) partly infiltrates the vesical mucosa, which has a ‘bubble-like’ aspect (arrow). (B) Bladder, (U) Uterus.

Figure 4. Transvaginal ultrasonographic image of vesical endometriosis. The endometriotic nodule (E) had a solid, heterogeneous echostructure containing numerous anechoic areas. B = bladder; U = uterus.

in all the cases, and also documented the patency of the ureters. On the other hand, it provided no information on the nature and extent of infiltration of the lesion nor on the presence of associated anomalies. Abdominal ultrasonography clearly visualized a structure that deformed the intraluminal profile of the bladder in all the patients, but without defining the degree of extension of the lesion in the detrusor. In two of three women it raised the suspicion of adenomyosis of the anterior uterine wall, yet without demonstrating its continuity with the bladder nodules. Transvaginal ultrasonography identi-
fied the site and size of the bladder lesions as well as their extension in the detrusor in all the cases (Figures 1–3). Moreover, it defined the relationship of these lesions with the nodules of adenomyosis of the anterior uterine wall and with the subperitoneal endometriotic lesions of the parametrium accurately. Lastly, in two instances it clearly visualized the microcystic structure of the bladder lesions by heterogeneous echostructures containing numerous anechoic areas (Figure 4). MRI always demonstrated clearly the presence and size of the bladder lesions, without defining their margins precisely in three cases, probably due to the relatively low haemosiderin content. It delineated uterine adenomyosis and endometriosis in the parametrium clearly but yielded no information on the relationship of the lesions with the ureters and the patency of the latter. No intra-op postoperative complications arose in any of the patients. The bladder catheter was removed after 8 days, after a repeat cystography. The patients were followed for 4–12 months postoperatively and did not develop any symptom or sign of recurrence. Histological examination confirmed the endometriotic nature of the bladder nodules in all cases, and also the diagnosis of adenomyosis of the uterine nodules.

Discussion
In our patients transvaginal ultrasonography was found to be the most accurate technique in the pre-operative assessment of bladder endometriosis. It proved adequate in determining the site and size of lesions, the degree of infiltration of the detrusor and mucosa, and the relationship with concomitant adenomyosis of the uterus. Our series is certainly small but this is a rare disease. Moreover, it did not include women who had previously undergone Caesarean section, which is a risk factor for bladder endometriosis. All the patients underwent the same diagnostic and therapeutic procedures in the same department in a relatively short period of time.

Imaging techniques are fundamental in the diagnosis of these endometriotic localizations and for programming the most appropriate treatment. In fact, cystoscopy diagnoses endometriosis only in the presence of typical bluish nodules, which do not develop in all cases. The main use of this procedure is to exclude a different origin of the bladder neoformation by biopsy examination. Abdominal ultrasonography visualized the detrusor neoformation in all the patients but was less precise than transvaginal ultrasonography and MRI in defining the size of the lesions, infiltration of the detrusor and continuity with extravesical lesions. Transvaginal ultrasonography was more accurate and versatile than abdominal ultrasonography. It uses higher frequencies (6.5 MHz versus 3.5 MHz) and image resolution is thus better. This allows an accurate structural analysis of the bladder wall lesion. Furthermore, involvement of the uterovesical septum can be evaluated and adjacent myometrial infiltration recognized. If combined with colour Doppler assessment, transvaginal ultrasonography can also be used to visualize the urine flow from the ureters to the bladder, documenting patency and clarifying the relationship between the endometriotic lesion of the detrusor and the ureters. MRI, although very precise, was less versatile than transvaginal ultrasonography and less accurate in establishing the margins of the lesions, as peritoneal fibrosis is visualized less clearly than areas containing haematic material (Nishimura et al., 1987). Urography was specific but still useful to evaluate the integrity of the upper urinary tract and ureters.

Differential diagnosis of endometriosis of the bladder detrusor is made with epithelial tumours of the bladder mucosa and with the rarer mesenchymal tumours such as haemangioma, fibroma and leiomyoma, which grow in the detrusor. Lastly, it must be remembered that uterine myomas of the anterior wall may deform the bladder wall, mimicking an expanding lesion of the detrusor. Endometriosis of the bladder detrusor concerns both urologists and gynaecologists, who should be jointly responsible for the diagnosis and treatment of this disease and concomitant pelvic lesions.

References

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