



## Female Urology – Incontinence

# Clinical Aspects and Surgical Treatment of Urinary Tract Endometriosis: Our Experience with 31 Cases

Alessandro Antonelli<sup>a,\*</sup>, Claudio Simeone<sup>a</sup>, Danilo Zani<sup>a</sup>,  
Tazio Sacconi<sup>b</sup>, Gianfranco Minini<sup>b</sup>, Emma Canossi<sup>a</sup>, Sergio Cosciani Cunico<sup>a</sup>

<sup>a</sup> Chair and Department of Urology, University of Brescia, Brescia, Italy

<sup>b</sup> Chair and Department of Gynaecology, University of Brescia, Brescia, Italy

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### Abstract

**Objectives:** To present and discuss clinical and surgical management of urologic endometriosis.

**Methods:** Retrospective review of a database on surgical patients with endometriosis.

**Results:** Thirty-one patients (incidence, 2.6%; mean age, 33.1 yr) were affected by urologic endometriosis (bladder, 12; ureter, 15; both, 4). Bladder endometriosis was revealed by symptoms related to menses and showed a typical endoscopic picture, whereas ureteral involvement had a non-specific or silent symptomatology. All patients affected by bladder endometriosis and undergoing transurethral resection (2 cases) developed a bladder recurrence; a ureteral recurrence was observed in two of six patients submitted to laparoscopic ureterolysis and in one of two patients submitted to ureterectomy with ureteroureterostomy. Conversely, no relapses were observed among the 14 patients who had partial cystectomy or the 9 who had ureterectomy and ureterocystoneostomy. Finally, two patients underwent nephrectomy due to end-stage renal atrophy.

**Conclusions:** Cystoscopy is advisable in women with pelvic endometriosis with lower urinary tract symptoms; the upper urinary tract should be evaluated in all patients with pelvic endometriosis to exclude asymptomatic ureteral involvement. Partial cystectomy gives the best results when used to treat bladder endometriosis. Ureterolysis can be successful only in case of limited ureteral involvement with no urinary obstruction, whereas terminal ureterectomy and ureterocystoneostomy should be preferred in case of obstructive ureteral endometriosis.

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\* Corresponding author. Clinica Urologica, Spedali Civili di Brescia, Piazzale Spedali Civili 1, 25123 Brescia, Italy. Tel. +390303995215; Fax: +39030399002.  
E-mail address: [alxanto@hotmail.com](mailto:alxanto@hotmail.com) (A. Antonelli).

## 1. Introduction

Endometriosis is defined as the presence of active endometrial tissue outside the uterine cavity. Even though reported figures vary widely depending on the population under study, the prevalence of endometriosis can be estimated to be around 10% in premenopausal women [1,2], and it is one of the first causes of hospitalization in female patients between 15 and 44 years of age [3]. Recent clinical data suggest that low parity and heavy menstrual cycles are risk factors, supporting the menstrual reflux etiopathogenetic hypothesis [2]. The disease, characterised by high local aggressiveness and risk of recurrence, requires both surgical and hormonal treatments (luteinising hormone-releasing hormone [LHRH] analogues, danazol, or estroprogestins). Therefore, although benign, it may be viewed as a true neoplastic process [4].

The involvement of the urinary tract, concerning the bladder and the pelvic ureter, can be regarded as a rare condition (1–5% of all cases) that shares many aspects with gynaecologic presentations but, at the same time, has its own peculiar clinical and therapeutic features [5,6].

Treatment should aim at symptom relief and the recovery of the renal function within acceptable morbidity levels.

The data of a single-centre cohort of patients who had surgery were reviewed in this study to provide urologists and gynaecologists with more information about the management of such a rare and complex pathologic condition.

## 2. Methods

Since 1995, the clinical, surgical, and follow-up data of patients having surgery because of pelvic endometriosis have been stored in a dedicated database. This study reviews the information concerning the cases of genitourinary endometriosis proved by histology. The cases with negligible adherent involvement that required no specific procedures were excluded.

Two patients with bilateral ureteral endometriosis who had initially been treated in other centres and then in our department due to relapsing ureteral endometriosis were included because of the completeness of their clinical records. Urologic follow-up included clinical evaluation, serum and urine analysis, and radiologic assessments (ultrasonography or urography) every 6 mo for 2 yr and then every year.

## 3. Results

Of 1242 patients with surgically proved diagnosis of endometriosis in the decade from 1995 to 2005, the

records of 31 patients (2.5%) with urinary tract involvement were selected. The mean age was 33.1 yr (range, 20–48 yr). The bladder was affected in 12 patients, the ureter in 15, and either the bladder or the ureter in 4. Follow-up data were adequate for 30 patients.

The urinary tract was affected at the time of the first diagnosis of endometriosis in 18 cases (58%); in 13 cases (42%) medical history was indicative of pelvic endometriosis, treated with surgery and hormonal therapies in all cases, with a mean latency of 37 mo (range, 6–144 mo). No patients had had previous hysterectomy or bilateral salpingo-ovariectomy. Diagnosis was incidental, respectively, in 33% and 25% of ureteral and combined (ie, associated bladder and ureteral) presentations, whereas bladder presentations were all symptomatic. Symptoms were related to menses for bladder and combined endometriosis, but only for 40% of ureteral endometriosis.

All patients underwent transvaginal and abdominal ultrasonography. Because of a moderate pelvic disease with no abnormal findings regarding the urinary tract at ultrasonographic assessments, four patients underwent explorative laparoscopy immediately but only limited ureteral involvement was shown. In the other 27 patients, further examinations (urography, computed tomography [CT], nuclear magnetic resonance, retrograde ureteropyelography) were performed following the detection of pathologic findings at ultrasonography (renal dilation, vesical wall abnormalities, severe pelvic disease).

With regard to the 19 cases of ureteral involvement, the left side was affected in 12, the right in 4, and both sides in 3. In eight cases (42% of ureteral cases) CT or urography (or both) revealed a severe impairment of the excretory axis, which appeared dilated and nonfunctioning. In six of these cases preoperative urinary drainage (nephrostomy or ureteral stenting) helped to demonstrate a good recovery of the unilateral renal function, whereas in two patients (11%) renal atrophy was irreversible.

Cystoscopy was performed in all cases with bladder endometriosis and showed a bluish irregular submucosal lesion on the dome (8 patients) or base (8 patients) of the bladder.

Transurethral resection (TUR) was attempted only in two patients with a small bladder base lesion without invasion of the ureteral ostium. The laparoscopic approach was adopted for easier procedures (partial cystectomy, ureterolysis), whereas the laparotomy approach was preferred for more complex (ureteral resection and anastomosis, larger bladder resections) or multiple procedures (gynaecologic or intestinal surgery).

**Table 1 – Clinical and surgical data of the patients**

	Symptoms (no. of patients)	Urologic procedures	No. of patients	Urologic lesion (cm)	Additional procedures (no. of patients)	Urologic relapses
Bladder	LUTSs (12)	Partial cystectomy	6	3.5	MSO (4), BSO (1), H (1), IR (2)	0
		LPS partial cystectomy	4	3.6	ER (1), vaginal resection (1)	0
		TUR	2	1.9	—	2 (bladder)
	Haematuria (3)					
Ureter	Renal pain (7)	Nephrectomy	1	2	MSO	0
	Dysmenorrhea, dispareunia (3)	LPS nephrectomy	1	3	MSO, BR	0
	None: renal failure (3), hypertension (2)	Ureterectomy and terminoterminal anastomosis	2	1.3	MSO (1)	1 (ureter)
		Ureterectomy and ureterocystoneostomy	6 <sup>a</sup>	2.7	BSO (2), H (2), MSO (4), BR (2)	0
		Ureterolysis	1	0.5	MSO	0
		LPS ureterolysis	4	0.8	MSO (1), ER (4)	1 (ureter)
Bladder and ureter	LUTSs (2)	Ureterocystoneostomy and partial cystectomy	3	2.5 (ureter)	BSO (3), H (3), BR (1)	0
	Renal pain (1)			1.5 (bladder)		
	None (renal failure)	LPS bilateral ureterolysis and partial cystectomy	1	3 (ureter)	MSO	1 (ureters)
				3 (bladder)		

Patients' symptoms (more than one symptom per patient is possible) and surgical and anatomic-pathologic data. Dimension means major diameter of bladder nodule and/or length of ureteral stricture; more than one additional procedure per patient is possible.

LUTSs = lower urinary tract symptoms; LPS = laparoscopic; TUR = transurethral resection; M/BSO = monolateral/bilateral salpingo-ovariectomy; H = hysterectomy; IR = ileal resection; ER = endometrioma resection; BR = bowel resection.

<sup>a</sup> Two patients, with bilateral ureteral involvement, underwent terminolateral ureteroureteral anastomosis.

Isolated urologic endometriosis (ie, with no other pelvic locations requiring a specific procedure) was diagnosed only in six patients, all affected by bladder endometriosis (dome, 5; base, 1).

Overall, six patients had hysterectomy with bilateral salpingo-ovariectomy; the others had hormonal therapy (generally based on LHRH analogues), except for three patients who were prescribed no hormonal therapy because they were affected by isolated bladder endometriosis that was surgically removed.

All patients who had bladder or ureteral surgical resection had margins free from endometriosis. Conversely in one of the two patients treated by TUR, the margin proved to be infiltrated. Among the 11 patients treated by ureterectomy, endometriosis deeply infiltrated the muscular layer in 4 (intrinsic endometriosis), whereas only adventitia or periureteral tissues were affected in 7 (extrinsic endometriosis).

With regard to urologic procedures, no major surgical complications occurred. The follow-up time averaged 56 mo (range, 12–110 mo). After a mean of 58 mo from surgery, 25 patients (9 bladder, 13 ureter, 3 both) remained asymptomatic (ie, without lower urinary tract symptoms [LUTSs] or renal pain) with

radiologic assessments showing recovery from ureteral obstruction and no bladder abnormalities.

On the other hand, in five cases (18.5%) having TUR (2 patients), laparoscopic ureterolysis (2 patients), and ureterectomy with ureteroureterostomy (1 patient), relapsing urologic endometriosis was detected after a mean interval of 18 mo (range, 3–36 mo) from previous surgery. These recurrences were treated by partial cystectomy (1 patient) or ureteroneocystostomy (3 patient), and follow-up was negative after a mean of 42 mo (range, 24–62 mo). One patient opted for hormonal treatment and achieved only incomplete symptom relief. Table 1 summarises the patients' clinical and surgical data.

#### 4. Discussion

Endometriosis can spread in almost every site, but urinary tract involvement is uncommon (1–5%) and mainly concerns bladder, ureter, and kidney according in a 40:5:1 ratio [7,8]. Our experience confirms that genitourinary endometriosis should be considered a rare condition. In contrast with literature data, similar incidences of bladder and ureteral endometriosis were noted in our survey, probably

because we enrolled only the patients in whom the bladder muscular layer was invaded and excluded those with only the supravescical peritoneum involved, because such condition have only minor clinical and surgical implications.

Endometriosis of the bladder could be considered an aspect of deeply infiltrating endometriosis, although it is thought that ureteral locations develop from severe ovarian endometriosis [5,6]. As reported by other authors [7,8], findings at endoscopy were highly suggestive of bladder endometriosis, whereas in the majority of patients with ureteral endometriosis, diagnosis was more difficult due to the aspecificity or the absence of symptomatology. Thus, cystoscopy is advisable in women affected by endometriosis complaining LUTSs or haematuria; an ultrasonographic study of the upper urinary tract should be performed in all patients with pelvic endometriosis, even if the patient is asymptomatic from an urologic point of view. At the same time, endometriosis should be included in the differential diagnosis of ureteral strictures in young women.

Comparing bladder with ureteral endometriosis, the latter was generally found to be more severe, because other pelvic organs were usually involved and the excretory axis was often impaired or definitely damaged, confirming that ureteral involvement may have been diagnosed too late, even if earlier than previously reported by other authors [9]. Furthermore, it suggests that the excretory function of a dilated and obstructed axis should be verified carefully by urography or CT before surgery. The degree of recovery of the renal function through urinary drainage, if necessary, can help to indicate reconstructive surgery versus nephrectomy.

The treatment of urinary tract endometriosis is controversial because the rarity of this condition makes randomised studies almost unfeasible. Positive results following medical management have been described [10-12], but close follow-up is recommended (especially in case of ureteral locations), because long-term side effects are significant and the symptomatic disease often recurs when therapy is discontinued [8,13]. Surgical castration is probably the best measure to prevent relapses [14]; even if we did not observe any recurrences among the patients who underwent hysterectomy and bilateral salpingo-ovariectomy, this procedure cannot be accepted as a preventive measure by the majority of patients.

As reported by other authors, our experience shows that TUR for bladder presentations cannot be curative, probably because it cannot be radical,

because to be so would require perforation of the bladder wall owing to the extramucosal nature of endometriosis [10,13]. The complete removal of the disease by surgical resection led to durable recovery from the symptoms. Moreover, morbidity decreased when the procedure was carried out laparoscopically [5,8,15]. At our centre the laparoscopic approach is presently indicated for dome locations, which are often isolated and easily identifiable via transperitoneal access. Conversely, as recently reported in a large surgical series [15], the base location was more frequently associated with more severe and diffuse pelvic endometriosis. In that condition laparotomy access was generally preferred because some additional procedures were necessary. Nevertheless, over the last few years the potential of laparoscopy has certainly increased, as the data published by referral institutions show [16].

Elective laparoscopic ureterolysis should be indicated only for minimal, extrinsic and nonobstructive ureteral involvement [8,17-19]. This consideration can be supported by the positive outcome achieved in four patients with no renal dilation at preoperative examinations, as well as by the relapses observed in two patients who had laparoscopic ureterolysis (in external centres) for obstructive ureteral endometriosis. Thus, when the ureter is obstructed, surgical resection represents a more suitable option because it removes the disease and the surrounding fibrosis. In our opinion the best way to restore urinary continuity is by ureteroneocystostomy, which does not use the ureteral tract distal to the site of endometriosis, which is at higher risk of recurrence, and warrants tension- and disease-free anastomosis. In our experience this procedure was successful, even when it was applied to a recurrence after ureteroureterostomy. We always adopted a laparotomy approach due to the complexity of the operation, and we often executed it consensually to additional gynaecologic or intestinal procedures, even though its feasibility by laparoscopy is known [20]. The literature [21,22] and our data indicate that radical removal of the disease could play an important role in curing severe genitourinary endometriosis. Surgery should be preferred also because of its capability to confirm the nature of suspected endometriosis and to prevent any possible malignant degeneration [16,23]. Because urinary endometriosis is a rare condition, the reported data could provide guidance in clinical management, even though the small number of cases and the retrospective design of the study may reduce the relevance of the evidence provided.

## 5. Conclusions

Cystoscopic evaluation is advisable in women affected by pelvic endometriosis with LUTSs, and a study of the upper urinary tract should be performed in all patients with pelvic endometriosis to detect the cases with asymptomatic ureteral involvement. Partial cystectomy offers durable results when used to treat bladder endometriosis. Ureterolysis is indicated for limited and nonobstructive ureteral endometriosis; otherwise ureteral resection is needed. To re-establish urinary continuity, ureteroneocystostomy is more suitable than ureteroureterostomy. The use of laparoscopy is presently elective in case of limited urinary tract involvement but should preferably be adopted in referral centres when the disease is more severe and requires multiple procedures, because radical surgery appears to play an important role in the prevention of recurrences.

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**Editorial Comment**  
**Mete Cek**  
 cekmd@doruk.net.tr

This study on endometriosis is one of the largest papers on urinary tract endometriosis recently published. Endometriosis of the urinary tract poses

a difficult problem for urologists as until recently it has been infrequently diagnosed and in all probability overlooked. Bladder involvement presents with irritative symptoms in more than 70% of patients, which indicates that this condition should be part of the differential diagnosis of interstitial cystitis [1]. On the other hand, ureteral

disease may present with asymptomatic renal failure. The diagnosis of ureteral endometriosis therefore requires a high index of observation as it presents itself with silent obstruction [2]. Genitourinary endometriosis should be considered in all women with a history of cesarean delivery or other gynecologic surgery and with symptoms of endometriosis [3]. TUR of the bladder cannot be curative; partial cystectomy seems to be a better solution to cure endometriosis of the bladder due to the infiltration of the whole bladder wall, from the outer layers towards the epithelium. However, certain patients with endometriosis can be treated with minimally invasive techniques such as laparoscopy [4]. Although high success rates have been reported with conservative management [1]; endometriosis involving the urothelium, bladder or ureter does not respond consistently to medical management. Close follow-up is required during attempts at conservative management [2]. It seems wiser to tailor the treatment according to individual patient requirements, taking into account factors such as age and reproductive needs.

A review of literature in 1960 gave 127 cases of vesical endometriosis compared to 15 ureteral

cases [5]. The fact that ureteral endometriosis is being reported more frequently in contemporary papers may reflect an increasing awareness of this disease as well as a big improvement in diagnostic tools.

Urologists might be expected to be more aware and diagnose more cases of urinary endometriosis after reading this article.

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