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## **Clinical characteristics of urinary tract endometriosis: A one-year national series of 232 patients from 31 endometriosis expert centers (by the FRIENDS group)**

Elise Froc, Gil Dubernard, Sofiane Bendifallah, Eric Hermouet, Chrystele Rubod-Dit-Guillet, Michel Canis, Sophie Warembourg, Francois Golfier, Arnaud Fauconnier, Horace Roman, et al.

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1 Clinical characteristics of urinary tract endometriosis: a one-year national  
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37 **Highlights :**

- 38 • a series of 232 patients suffering from urinary tract endometriosis describing their  
39 symptoms and the most frequent locations.
- 40 • Ureteral endometriosis was significantly associated with other deep invasive  
41 endometriosis lesions
- 42 • Ureteral endometriosis was more often asymptomatic than bladder locations

43 **Key Word :** Bladder endometriosis-Diagnosis of urinary tract endometriosis-Ureteral  
44 endometriosis;

45

46

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52 present study

53

## 54 ABSTRACT

55 (247 Words)

56 **Objective.** To review prospectively the clinical characteristics of patients suffering from urinary  
57 tract endometriosis (UTE) in France, in 2017.

58 **Study Design.** We conducted a prospective observational multicenter study including women  
59 managed surgically for UTE in 31 French endometriosis expert centers (FRIENDS group) from  
60 January 1, 2017 to December 31, 2017. We distinguished patient with isolated bladder  
61 endometriosis ("IBE") or isolated ureteral endometriosis ("IUE") and patients associating both  
62 locations (mixed locations "ML"). Surgeons belonging to FRIENDS group enrolled patients by  
63 filling a 24 items questionnaire the day of the surgery and 6 weeks later. Data on the locations  
64 of UTE, preoperative assessment, urinary symptoms and associated pelvic locations were  
65 collected in a single anonymized database.

66 **Results.** A total of 232 patients from 31 centers were included. IBE concerned 82 patients  
67 (35.3%), IUE 126 patients (54.4%) ML 24 patients (10.3%). 111 patients reported urinary  
68 symptoms (47.8%). IUE was more often asymptomatic than the rest of the locations (59.5%  
69 versus 43.3%, OR 1,92,  $p = 0.017$ ). Associated deep infiltrating endometriosis (DIE) lesions  
70 were found in 193 patients (83.1%). IUE was significantly associated with other DIE lesions  
71 (82.5% versus 66%, OR2.4,  $p = 0.006$ ), particularly with rectum or sigmoid nodules (57.1%  
72 versus 36.8%, OR 2.3,  $p = 0.002$ ) and retrocervical space nodules (31.7% versus 19.8%, OR  
73 1.9,  $p = 0.05$ ).

74 **Conclusion.** Our study reports the second largest series of patients operated from a UTE and  
75 shows that ureteral location seems more frequent, less symptomatic and more frequently  
76 associated to other DIE locations than bladder endometriosis.

77

## 78 INTRODUCTION

79 Deep infiltrating endometriosis (DIE) is defined as the infiltration by ectopic endometrial glands  
80 under the peritoneum for more than 5 mm. The most frequent locations are the retrocervical  
81 space, uterosacral ligaments, the ovaries, the bowel wall and the urinary tracts (1,2). Urinary  
82 tract endometriosis (UTE) is a rare location of the disease, which affects 1.2 to 6% of women  
83 (1–5). The incidence increase in populations of patients undergoing surgery for DIE (6). The  
84 bladder is usually reported as the most common location of UTE and may be present in up to  
85 85% of cases (22, 37). The ureter is less often affected, with a prevalence ranging from 0.5 to  
86 10% of UTE locations (7,8). Bladder endometriosis (BE) is responsible for symptoms of bladder  
87 irritation such as voiding dysfunction, polyuria, urgency, hematuria and urinary incontinence  
88 (9–15). Symptoms appear to be related to the location and size of the nodule (16).

89 The definition of ureteral endometriosis (UE) remains controversial. According to Nezhad *et al.*,  
90 extrinsic and intrinsic form of UE endometriosis should be differentiated. Intrinsic  
91 endometriosis, which is defined by the involvement of the ureter wall may affect up to 20% of  
92 patients with UTE (17). Conversely, extrinsic UE is **defined by an involvement of the ureter**  
93 **by an endometriosis nodule from adjacent structures(17)**. The incidence and  
94 characteristics of this pathology remains difficult to evaluate.

95 The objective of this study was to perform a prospective review of the main characteristics of  
96 patients with UTE in France during a one year period..

97

## 98 MATERIAL AND METHOD

### 99 Population of the study

100 We performed a multicentric prospective study on a population of patients managed surgically  
101 for deeply invasive UTE in France, from January 1, 2017 to December 31, 2017. All surgeons  
102 affiliated with the FRIENDS group (French coloRectal Infiltrating ENDometriosis Study group),  
103 were invited to prospectively and consecutively include all of their patients corresponding to  
104 the inclusions criteria, who underwent a surgery for UTE. The FRIEND group was founded in  
105 2015 and consists of a network of advanced endometriosis surgeons in France. The aim was  
106 to foster shared experiences and collect routine data on surgery to improve DIE management  
107 between gynecologist surgeons interested in endometriosis (6).

108 In this study, patients were selected by their surgeon prior to surgery each time a surgical  
109 treatment for UTE was planned. Inclusion criteria were patients with suspected UTE who had  
110 at least one lesion of the bladder or ureter, regardless of if they were isolated or congruent with  
111 each other or congruent with another endometriotic lesion. Exclusion criteria included patients  
112 under age 18 and surgery limited to ureterolysis performed as part of the dissection for the  
113 resection of DIE or extra urinary endometriosis with absence of a bladder or ureteral lesion.

### 114 Definition of UTE locations and surgeries

115 We defined UTE as endometriosis involving the bladder, the ureter or both. BE (bladder  
116 endometriosis) was defined as a deep infiltration of the bladder including detrusor muscle, with  
117 or without mucosae infiltration according to Chapron *et al.* definition (18). Ureteral  
118 endometriosis (UE) was defined as any situation where there existed a compression or  
119 distortion of the ureter by ureteral endometriosis nodule, either with or without ureteral  
120 dilatation or hydronephrosis (17). Ureteral dilatation was defined as an abnormal ureteral  
121 diameter measured up to 4 mm in size (19). Hydronephrosis was defined as an abnormal renal  
122 pelvis measured up to 10mm in size (19). Ureterolysis was defined as a dissection of the ureter  
123 from the endometriosis nodule until extracting all macroscopic endometriosis tissue and total  
124 liberation of the ureter, according to Nezhat *et al* and Uccella *et al* definition (17,20). As

125 explained previously, ureterolysis for the protection of the ureters prior to the resection of  
126 nodules not involving the bladder and ureters (DIE, uterosacral ligaments, rectal  
127 endometriosis, etc.) were excluded in this study.

#### 128 Population subgroups

129 In our study, we distinguished five overlapping subgroups depending on the considered  
130 variable. Some analysis included nodules confined to one urinary location either bladder  
131 (isolated bladder endometriosis "IBE") or the ureters (isolated ureteral endometriosis "IUE"). In  
132 other part we considered all bladder lesions either associated or not with ureteral involvement  
133 (bladder endometriosis "BE") and all ureteral lesions either associated or not with a bladder  
134 involvement (ureteral endometriosis "UE"). A final subgroup including a combination of the  
135 mixed lesions (involving both ureter and bladder) was designated "mixed locations" (ML).

136

#### 137 Standardized questionnaire and data collection

138 A 24-items questionnaire was sent to surgeons to be filled right after surgery. Patient  
139 demographic data were recorded (age at endometriosis diagnosis and surgery, parity,  
140 gravidity, history of surgery), as well as symptoms (urologic and non-urologic), pre-operative  
141 management (medical treatment, imaging examinations), location of urinary tract nodule or  
142 other locations of DIE, surgical procedure performed, and operative route. A specific part of  
143 the questionnaire concerned complications, which were defined as any adverse event in  
144 relation to the surgery, up to 6 weeks post operatively, according to the modified Clavien-Dindo  
145 classification (21). The questionnaires were anonymized and returned by surgeons at the end  
146 of the study period. Data were collected by a unique investigator (E.F.) in an anonymous  
147 database. Due to word constraints, data concerning surgical management and complication  
148 will be reported in a specific publication.



#### 149 Ethic consideration

150 The National Data Protection Authority (Commission Nationale de l'Informatique et des  
151 Liberté's) approved the study. All data were fully de-identified before analysis. Our work  
152 complied with French statutes and regulations, which authorize epidemiologic surveys without  
153 advance approval of an ethics committee. Our survey involved no intervention and is thus  
154 excluded from the French statute on biomedical research (Huriet-Serusclat law, dated  
155 December 20, 1998). We complied with all French statutes concerning data about the subjects,  
156 confidentiality, and restrictions.

#### 157 Statistical analysis

158 Data were collected in a Microsoft Excel for Windows files (Microsoft®, Redmond, Washington,  
159 USA). Median, mean, standard deviations were calculated directly in Microsoft Excel files.  
160 Odds ratios, relative risks, 95% confidence intervals and all statistical analysis were performed  
161 using "R: A Language and Environment for Statistical Computing" (R Core Team® 2008 by  
162 the R Foundation for Statistical Computing Vienna, Austria). Univariate analysis: Wilcoxon rank  
163 sum test was used to look for association with continuous data. Fisher exact test was used to  
164 assess correlation and risk associated with binomial data. Data were considered significant if  
165 p-value was below 5%. Each odds ratio and relative risk was calculated comparing the  
166 proportion of "positive" and "negative" value of each considered variable using the rest of our  
167 population of UTE patients as the reference population and not a whole endometriosis or  
168 healthy control population.

### 169 RESULTS

#### 170 Population and patient's characteristics

171 A total of 232 patients with UTE were included in our study from January 1, 2017 to December  
172 31, 2017. Among the members of the FRIENDS group, 31 centers participated in the study,  
173 23 (74.2%) were from University Hospitals and 8 (25.8%) from private structures. The median  
174 number of inclusions by department was 5 and varied between 1 to 27 patients.

175 Surgical history of endometriosis was reported in 76 patients (32.7%) which involved a  
176 urological location in 23 patients (9.9%). The patients with IBE has a mean age of 32.6 years  
177 (Standard Deviation (SD) = 5.56) against 34.4 years (SD = 7.05) for IUE (p=0.08).

178 There was no significant difference for the mean age of first symptoms of urinary symptoms  
179 between IBE and IUE (30.7; SD 5.31 versus 31.4 SD 8.42 years, p=0.46). The mean time  
180 between apparition of the first urinary symptoms and the diagnosis of UTE was 0.7 years (SD  
181 1.46) for IBE and 1.1 years for IUE (SD = 5.84, p= 0.63). There was no significant difference  
182 between IBE and IUE for the mean time between diagnosis of endometriosis and surgery (1.06  
183 versus 1.68 years, respectively, p=0.33), neither for the mean time between the first urinary  
184 symptoms and surgery (1.75 versus 2.33 years respectively, p = 0.85). The existence of a  
185 preoperative ureteral dilatation or specific urinary symptoms did not influence the mean time  
186 between diagnosis and surgical management. Patients' characteristics were summarized in  
187 table 1.

#### 188 Location of urinary lesions

189 Among the 232 patients with UTE, 126 presented an IUE, 82 an IBE and 24 a ML. In total, 150  
190 patients presented a ureteral involvement associated or not with a bladder involvement  
191 (Ureteral Endometriosis: UE), 134 were unilateral (89.3%) and 16 were bilateral (10.6%).  
192 Similarly, 106 patients (47.7%) presented a bladder involvement associated or not with a  
193 ureteral involvement (Bladder Endometriosis: BE). Among BE lesions, 31 accounted for the  
194 bladder base (29.2%), 70 the bladder dome (66%), 8 the trigone (7.5%) including 3 patients  
195 (2.8%) which presented several bladder lesions (association of nodule of the bladder base and  
196 dome). (Table 1)

#### 197 Urinary symptoms

198 Among the 232 patients, 111 (47.8%) presented at least one urinary symptom. Fifty-one of  
199 them had IUE (45.9%), 49 IBE (44.1%) and 11 ML (9.9%). The urinary symptoms reported  
200 were voiding dysfunction (15.9%), cystalgia (21.1%), polyuria (6.0%), urinary incontinence  
201 (0.9%), urgency (1.7%), macroscopic hematuria (5.6%), and recurrent cystitis (3.9%). The

202 presence of cystalgia, polyuria and hematuria were more frequent in cases of IBE than in other  
203 locations (46.3% versus 7.3%, OR = 10.9,  $p < 0.001$ , 12.2% versus 2.6%, OR = 5.07,  $p = 0.007$ ,  
204 and 12.1% versus 2%, OR = 6.81,  $p = 0.002$  respectively).

205 IUE were more often asymptomatic than other locations (59.5% versus 43.3, OR 1.92,  $p$   
206 = 0.017). However, the presence of lower back pain and renal colic were more frequent in IUE  
207 cases compared to other patients (30.1% versus 6.6%, OR 6.11,  $p < 0.001$  and 4.8% versus  
208 0%, OR =  $+\infty$ ,  $p = 0.03$  respectively) (Table 2).

209 IBE was significantly associated with the presence of cystalgia, polyuria and hematuria as  
210 compared to other locations (OR 10.9  $p < 0.001$ , OR 5.07,  $p = 0.007$ , and OR 6.18,  $p = 0.002$   
211 respectively). iUE was more frequent in asymptomatic patients (OR 1.92,  $p = 0.017$ ).

#### 212 Preoperative assessment

213 Before surgery, 172 patients (74.1%) underwent a pelvic MRI, 48 (20.7%) a pelvic ultrasound,  
214 58 (25%) a CT scan and 50 (21.5%) a cystoscopy. Nineteen renal scintigraphy (8.1%) were  
215 performed (Table 1).

216 CT scan and renal scintigraphy were significantly associated to the presence of IUE (OR 2.05,  
217  $p = 0.02$  and OR  $+\infty$ ,  $p < 0.001$  respectively), whereas a cystoscopy was significantly associated  
218 with the presence of IBE (OR 3.02,  $p < 0.001$ ). Among the patients presenting IUE, 12  
219 underwent a preoperative cystoscopy, which was performed as part of the insertion of a  
220 Double-J stent (Table 2a, b). The existence of a hydronephrosis was significantly associated  
221 with the performance of a renal scintigraphy (OR = 13.9,  $p < 0.001$ ).

#### 222 Associated pelvic locations

223 One hundred and ninety three patients (83.1%) presented at least one pelvic lesion associated  
224 with urological involvement. The most frequent associated locations were the digestive tract  
225 (111, 47.8%), the uterosacral ligaments (95, 40.9%), endometriomas (60, 25.7%) and the  
226 retrocervical space (61, 26.3%).

227 IUE was significantly associated with the presence of other pelvic lesions, compared to the  
228 rest of the urological locations (82.5% versus 66%, OR 2.4,  $p = 0.006$ ) and in particular with  
229 Gastrointestinal nodules (57.1% versus 36.8%, OR 2.3,  $p = 0.002$ ) and retrocervical space  
230 nodules (31.7% versus 19.8%, OR 1.9,  $p = 0.05$ ). IUE and ML were not significantly associated  
231 with other pelvic locations (Table 2 and 3).

#### 232 High urinary tract dilatation and preoperative Double-J stent

233 Data regarding to ureteral dilatations and hydronephrosis were available for 164 patients  
234 (70.6%) and 144 patients (62%) respectively. Among them, a preoperative ureteral dilatation  
235 was reported in 68 patients (41.4%) whereas a hydronephrosis was present in 20 patients  
236 (13.9%). Ureteral dilatation or hydronephrosis were more commonly found in iUE cases  
237 compared to the rest of the locations (respectively 57.1% versus 18.1%, OR 6.0 and 17.8%  
238 versus 5.7%, OR = 3.6). Four isolated bladder lesions were however associated with a ureteral  
239 dilatation and affected the bladder base in one case, the trigone in one case and the bladder  
240 dome in two cases.

241 The insertion of a Double-J Stent before or during surgery was reported in 107 patients (46%)  
242 and concerned 66 patients with IUE (52.4%), 22 patients with IBE (26.8%) and 19 patients with  
243 ML (79.1%). It was significantly associated with the presence of a ureteral lesion whether it  
244 was isolated (52.4% for IUE versus 39.2% for BE, OR = 1.74,  $p < 0.04$ ) or associated with  
245 bladder lesion (79.1% for UE versus 22.6% for IBE, OR = 3.57  $p < 0.001$ ) (Table 2 and 3).

#### 246 DISCUSSION

247 We report the results of a prospective longitudinal study, which included 232 patients managed  
248 surgically for UTE, in 31 French endometriosis center throughout the year 2017. To our  
249 knowledge, this is the second largest documented series of patients with UTE. Indeed,  
250 Ceccaroni *et al* recently reported a single center experience on 160 patients with UE and 264  
251 patients with BE over a 10 years period (21, 22).

252 We report 82 patients (35.3%) with IBE, 126 (54.5%) with IUE and 24 (10.3%) with ML,  
253 accounting for a total of 150 ureteral lesions (UE) and a total of 106 bladder lesions (BE). The  
254 incidence of UTE in our series varied from 8% to 27.7% depending on the center. According  
255 to Nezhat *et al.*, UTE concerns from 1% to 6% of patients suffering from endometriosis (17).  
256 In the series of Gabriel *et al.*, the prevalence of UTE was to 19.5% and up to 52.6% in the  
257 series of Knabben *et al.* (10,11).

258 We observed a higher rate of ureteral lesions than bladder lesions in this series (64.6% for UE  
259 versus 45.7% for BE, ratio = 1.41), while Macagnanno *et al.* reported in their review a 85%  
260 rate of bladder lesions versus 9% of ureteral lesions (7). However, our results are consistent  
261 with those of Knabben *et al.*, which reported a higher rate of ureteral lesions (94.6%) than  
262 bladder lesions (14.3%) (11). This variation in UTE repartition could be related to the existence  
263 of different definitions in UE and BE in the literature. Indeed, some authors only consider  
264 intrinsic nodule as real UE, which is defined by Nezhat *et al.* as an infiltration of ureteral wall  
265 by an endometriotic nodule. Conversely, Nezhat *et al.* also describe an extrinsic UE, which  
266 correspond to a compression or distortion of the pelvic ureter by a peritoneal nodule or an  
267 adjacent structure(17). In their study, Knabben *et al.* regrouped these two entities into UE  
268 definition (11). Similarly, we both included endometriosis nodule from the ureteral wall as well  
269 as compression of the ureter by an endometriosis nodule from an adjacent anatomical  
270 structure. However, by consensus with the whole FRIENDS group, ureterolysis performed as  
271 a prerequisite for resection of an endometrioma, a gastrointestinal nodule or utero sacral  
272 ligaments were excluded to avoid an overestimation of extrinsic ureteric involvement, which  
273 could be the case in some series (6). These distinctions raise the problem of the need for a  
274 common definition for UE, which is currently heterogenic in the literature. A new objective  
275 definition of UE could implicate pre-operative imaging.

276 We reported bilateral lesions in 10.7% of UTE patients, while ML accounted for 24 patients  
277 (10.3%). These results are in agreement with the study of Cavaco-Gomez *et al.* which reported

278 a rate of 10.6% bilateral UE and Chapron *et al.* which found a similar rate (9.3%) of mixed  
279 urinary tract locations (18,24).

280 We reported that UE was associated with less urinary symptoms than IBE (41.3% versus  
281 59,8%, RR = 1.45, p = 0.008), while it was associated with “unspecific” endometriosis  
282 symptoms. Data from the literature confirm that UE remains asymptomatic in nearly 50% of  
283 the cases (17,25). Cavaco-Gomez *et al.* reported also that UE was rarely associated with  
284 urinary symptoms (34.7%) but frequently associated with unspecific symptoms (dysmenorrhea  
285 in 81.4% of cases, pelvic pain in 70.2% of cases and dyspareunia in 66.4% of cases). These  
286 findings can be justified by the high association between UE and other DIE locations, which  
287 could explain these unspecific symptoms.(24). In our series, lower back pain was much more  
288 frequent in IUE or UE than for the rest of the population (30.1%, RR = 4.57, p<0.001 and 26.7,  
289 RR = 4.35, p<0.001 respectively). History of repetitive renal colics was only found in 6 cases  
290 of IUE (4.8%, p = 0.03). This association between lower back pain as also been reported in  
291 the literature, by Bosev *et al.* (11% of patients) and by Frenna *et al.* (9.2% of patients) (26,27).

292 Conversely, we report that BE is significantly associated with numerous urinary symptoms.  
293 This association was also reported by Fauconnier *et al.* in 2002, confirming the high specificity  
294 of urinary symptoms for the diagnosis of BE (9). In a series assessing urinary symptoms in  
295 patients with posterior DIE isolated or associated with BE, Panel *et al.* also reported an  
296 association between the existence of cystalgia and the presence of BE (90% versus 45%,  
297 p = 0.024) (14). Villa *et al.* also confirmed that location (bladder base) and size of BE lesion  
298 were related to the presence of this symptom (16).

299 In our study, 83% of UTE patients also presented associated DIE lesions; in particular IUE was  
300 strongly associated with gastrointestinal endometriosis. This association had already been  
301 described in the first prospective study of the FRIENDS group carried out on 1135 patients  
302 undergoing surgery for rectal and sigmoid endometriosis, which reported 13.4% of associated  
303 ureteral lesions (6).Based on 18 studies regrouping 668 patients with UE, Cavaco Gomez *et*

304 *al.* also found 58.8% of rectal lesions associated with UTE (24). In is monocentric study  
305 Ceccaroni *et al* report associated bowel nodule in 53% of BE and in 75.6% in case of UE. (21,  
306 22) We also reported that retrocervical space lesions and parametrium nodules were strongly  
307 associated with IUE. These data illustrate from our point of view the importance of  
308 systematically looking for UE in patients presenting a posterior DIE and especially in case of  
309 rectum or sigmoid involvement.

## 310 CONCLUSION

311 Our study describes the main clinical characteristic of urinary tract endometriosis patient in  
312 France, in 31 gynecological surgical departments over a one-year period. Schematically, we  
313 distinguished two different populations of patients with their own characteristics: Patients with  
314 UE are usually slightly older, often asymptomatic and present more frequently associated  
315 posterior DIE lesions. Conversely, BE is associated with specific urinary symptoms (polyuria,  
316 cystalgia, voiding dysfunction, hematuria) and presents less often concomitant DIE lesions.  
317 The FRIENDS group, which has twice shown its ability to organize national prospective  
318 studies, should continue on its path to improve the understanding of the surgical management  
319 of endometriosis.

320

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<b>Table 2:</b> Univariate analysis depending on the urological location (Ureteral or bladder location)							
Variable	N=	Bladder endometriosis <sup>a</sup> (82)			Ureteral endometriosis <sup>b</sup> (126)		
		YES *	OR	p-value	YES *	OR	p-value
Surgical history for endometriosis	76	16(19.5)	<u>0.36</u>	<b>0.001</b>	53(42.4)	<b>2.78</b>	<b>0,001</b>
<i>Urinary symptoms</i>							
Asymptomatic patients	121	33 (40.2)	<u>0.47</u>	<b>0.008</b>	75(59.5)	<b>1.92</b>	<b>0,017</b>
Lower back pain	45	5 (6.1)	<u>0.18</u>	<b>&lt;0.001</b>	38(30.1)	<b>6.11</b>	<b>&lt;0,001</b>
Cystalgia	49	38 (46.3)	<b>10.9</b>	<b>&lt;0.001</b>	5(4)	<u>0.06</u>	<b>&lt;0,001</b>
Dysuria	37	17 (20.7)	1.7	0.18	13(10.3)	<u>0.39</u>	<b>0,012</b>
Polyuria	14	10 (12.2)	<b>5.07</b>	<b>0.007</b>	4(3.2)	<u>0.31</u>	<b>0,05</b>
Hematuria	13	10 (12.1)	<b>6.81</b>	<b>0.002</b>	1(0.8)	<u>0.06</u>	<b>&lt;0,001</b>
Recurrent cystitis	9	6 (7.3)	3.87	0.07	1(0.8)	<u>0.09</u>	<b>0,01</b>
Renal colics	6	0 (0)	0	0.09	6(4.8)	+∞	<b>0,03</b>
<i>Preoperative imaging</i>							
CT	58	9 (10.1)	<u>0.25</u>	<b>&lt;0.001</b>	39(31)	<b>2.05</b>	<b>0.02</b>
MRI	172	64 (78)	1.38	0.34	95(75.4)	1.15	0.65
Pelvic or urinary ultrasound	48	16 (19.5)	0.89	0.86	29(23)	1.36	0.41
Cystoscopy	40	28 (34.1)	<b>3.02</b>	<b>&lt;0.001</b>	12(9.5)	<u>0.19</u>	<b>&lt;0.001</b>
Renal scintigraphy	19	0 (0)	<u>0</u>	<b>&lt;0.001</b>	18(14.3)	+∞	<b>&lt;0.001</b>
<i>High urinary tract dilatation</i>							
Ureteral dilatation	68	4 (8.2)	<u>0.07</u>	<b>&lt;0.001</b>	56(57.1)	<b>6.0</b>	<b>&lt;0.001</b>
Hydronephrosis	19	0 (0)	<u>0</u>	<b>0.001</b>	16(17.8)	<b>3.60</b>	<b>0.04</b>
<i>Associated lesions</i>							
Digestive tract	111	26 (31.7)	<u>0.35</u>	<b>&lt;0.001</b>	72(57.1)	<b>2.29</b>	<b>0,002</b>
Adenomyosis	19	4 (4.9)	0.46	0.21	14(0.11)	2.52	0,08
Parametrium	27	4 (4.9)	<u>0.28</u>	<b>0.018</b>	23(18.2)	<b>5.69</b>	<b>&lt;0,001</b>
USL	95	31 (37.8)	0.82	0.48	56(44.4)	1.37	0,28
Endometrioma	60	14 (17.1)	<u>0.46</u>	<b>0.02</b>	39(31)	1.81	0,07
Retrocervical space	61	15 (18.3)	<u>0.51</u>	<b>0.04</b>	40(31.7)	<b>1.88</b>	<b>0,05</b>
<i>Operative route</i>							
Laparoscopy	169	62(75.6)	1.24	0.54	93(73.8)	1.11	0,76
Laparotomy (total)	25	6(7.6)	0.54	0.27	12(9.5)	0.75	0.53
Laparoconversion	8	3(3.7)	1.1	1	1(0.8)	<u>0.11</u>	<b>0.02</b>
<i>Urological surgery</i>							
Double-J Stent	107	22(26.8)	<u>0.28</u>	<b>&lt;0.001</b>	66(52.4)	<b>1.74</b>	<b>0.04</b>
Collaboration with urologist	85	24 (29.3)	0.60	0.08	46(36.8)	1	1
Ureteral resection	28	0(0)	<u>0</u>	<b>&lt;0.001</b>	24(19)	<b>6.00</b>	<b>&lt;.001</b>
Ureteroneocystostomy	23	0(0)	<u>0</u>	<b>&lt;0.001</b>	20(15.9)	<b>6.48</b>	<b>&lt;0.001</b>
Ureteroureterostomy	5	0(0)	0	0,16	4(3.2)	3.44	0.38
Ureterolysis	128	14(17.1)	<u>0.07</u>	<b>&lt;0.001</b>	95(75,4)	<b>6.78</b>	<b>&lt;0.001</b>
Partial cystectomy	100	77(93.9)	<u>85.0</u>	<b>&lt;0.001</b>	0(0)	<b>0</b>	<b>&lt;0.001</b>
<i>Associated surgical procedure</i>							
Retrocervical space	64	15(18.3)	<u>0.46</u>	<b>0.02</b>	41(32.5)	1.74	0,07
Digestive tract	109	25(30.1)	<u>0.34</u>	<b>&lt;0.001</b>	72(57.1)	<b>2.48</b>	<b>&lt;0,001</b>
Unilateral ovariectomy	21	2(2.4)	<u>0.17</u>	<b>0.008</b>	16(12,7)	<b>2.94</b>	<b>0,039</b>
Bilateral ovariectomy	14	1(1.2)	<u>0.13</u>	<b>0.02</b>	9(7.1)	<b>1.55</b>	<b>0.44</b>
Hysterectomy	40	6(7.3)	<u>0.27</u>	<b>0.003</b>	30(23,8)	<b>3.00</b>	<b>0,004</b>
Parametrium nodules	24	3(3.7)	<u>0.23</u>	<b>0.01</b>	21(16.7)	<b>6.87</b>	<b>&lt;0,001</b>
Uterine adenomyosis	3	3(3.7)	+∞	<b>0.04</b>	0(0)	<u>0</u>	0,09
<i>Complications</i>							
Total	61	17(20.7)	0.63	0.16	35(27.8)	1.18	0,65
Urological	34	11(13.4)	0.77	0.57	18(14.3)	0.81	0,58
Second surgery	14	4(4.9)	0.72	0.77	9(7.1)	1.55	0,58

Notes: OR = odds ratio / USL: Uterosacral ligaments \* n (%): <sup>a</sup>: comparison of isolated bladder endometriosis (YES) with the rest of urological locations (NO) / <sup>b</sup>: comparison of isolated ureteral endometriosis (YES) with the rest of urological locations (NO)

<b>Table 3: Characteristics of the population depending on the urological location (Mixed location)</b>				
		<b>Mixed Urinary Endometriosis <sup>c</sup> (24)</b>		
<b>Variable</b>	<b>n</b>	<b>YES *</b>	<b>OR</b>	<b>p-value</b>
Surgical history for endometriosis	76	7(29.1)	0.82	0.84
<i>Urinary symptoms</i>				
Symptomatic patients	111	11(45.8)	0.91	1
Lower back pain	45	2(8.3)	0.34	0.18
Cystalgia	49	6(25)	1.27	0.60
Dysuria	37	7(29.2)	2.44	0.07
Polyuria	14	0(0)	-	0.37
Hematuria	13	2(8.3)	1.62	0.54
Recurrent cystitis	9	2(8.3)		0.23
Renal colic	6	0(0)	-	1
<i>Preoperative imaging</i>				
CT scan	58	10(41.7)	2.38	0.07
MRI	172	13(54.2)	<b>0.36</b>	<b>0.02</b>
Pelvic or urinary ultrasound	48	3(12.5)	0.51	0.43
Cystoscopy	40	10(41.7)	<b>3.0</b>	<b>0.01</b>
Renal scintigraphy	19	1(4.2)	0.46	0.70
<i>High urinary tract dilatation</i>				
Ureteral dilatation	68	8(47)	1.29	0.62
Hydronephrosis	19	3(23.1)	2.14	0.38
<i>Associated lesions</i>				
Digestive tract	111	13(54.1)	1.33	0.53
Adenomyosis	19	1(4.2)	0.45	0.70
Parametrium	27	0(0)	0	0.09
USL	95	8(33.3)	0.69	0.51
Endometrioma	60	7(29.2)	1.20	0.80
Retrocervical space	61	6(25)	0.92	1
<i>Operative route</i>				
Laparoscopy	169	14(58.3)	0.47	0.14
Laparotomy (total)	25	7(29.2)	<b>4.34</b>	<b>0.007</b>
Laparoconversion	8	4(16.7)	<b>10.2</b>	<b>0.005</b>
<i>Urological surgery</i>				
Double-J stent	107	19(79.1)	5.18	<b>&lt;0.001</b>
Association with urologist	85	15(62.5)	<b>3.26</b>	<b>&lt;0.001</b>
Ureteral resection	28	4(16.7)	1.53	0.50
Ureteroneocystostomy	23	3(12.5)	1.34	0.71
Ureteroureterostomy	5	1(4.2)	2.21	0.42
Ureterolysis	128	19(79.2)	<b>3.45</b>	<b>0.02</b>
Partial cystectomy	100	23(95.8)	<b>39.1</b>	<b>&lt;0.001</b>
<i>Associated surgical procedure</i>				
Retrocervical space	64	8(34.8)	1.36	0.48
Digestive	109	12(50)	1.14	0.83
Unilateral ovariectomy	21	3(12.5)	1.5	0.46
Bilateral ovariectomy	14	4(16.7)	3.96	0.04
Hysterectomy	40	4(16.7)	0.96	1
Parametrium nodules	24	0(0)	0	0.15
Uterine adenomyosis	3	0(0)	0	1
<i>Complications</i>				
Total	61	9(37.5)	1.8	0.22
Urological	34	7(29.1)	2.54	0.07
Second surgery	14	1(4.2)	0.65	0.20

Notes: RR = relative risk of presenting the variable according to the presence (YES) or not (NO) of a mixed location (ML). USL: Uterosacral ligaments \* n (%): comparison between mixed locations (ML) (+) and the rest of urological locations (-)