

# Pathophysiologic explanation for bladder retention in patients after laparoscopic surgery for deeply infiltrating rectovaginal and/or parametric endometriosis

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**Objective:** To investigate pathophysiologic mechanisms involved in bladder retention after surgery for rectovaginal deeply infiltrating endometriosis (DIE).

**Design:** Retrospective case study.

**Setting:** Tertiary referral unit.

**Patient(s):** All patients who presented at our center over the last 5 years with bladder retention developed after laparoscopic surgery for rectovaginal or parametric DIE.

**Intervention(s):** To assess the mechanisms involved in the pathogenesis of this complaint, we performed a step-by-step workup including patient history, clinical neurolpelveologic assessment, cystoscopy, and video-urodynamic testing with pelvic floor electromyography and rectomanometry.

**Main Outcome Measure(s):** Patient Perception of Bladder Condition, International Prostate Symptom Score, and the short-form version of the Urogenital Distress Inventory questionnaires.

**Result(s):** Forty-seven patients were investigated in this study. Mean ( $\pm$ SD) interval from the surgery was 9.5 years ( $\pm$ 4.3; range, 7–15 years). Eighteen patients developed acute paralytic motor bladder atony and 5 acute neurogenic bladder atony. Twenty-four patients developed chronic neurogenic bladder atony. The first symptom of chronic bladder retention was reduction of urinary frequency (after 5 years on average). The most frequent complaints that made patients aware of difficulties in voiding were a weak urinary stream (appearing on average 7 years after the procedure) and the need for Valsalva or Crede maneuver (on average 9 years after the procedure).

**Conclusion(s):** Segmental rectum resection with parametric resection exposes the most patients to the risk of bladder motor paralytic retention. However, the most frequent etiology seems to be chronic myogenic destruction secondary to chronic bladder overdistention. Patients after surgery for DIE require a long follow-up, with particular attention paid to postvoid residual volumes. (Fertil Steril® 2014;101:754–8. ©2014 by American Society for Reproductive Medicine.)

**Key Words:** Deep endometriosis, bladder retention, pelvic nerves, neurolpelveology, bladder function, pelvic nerves

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**D**eeply infiltrating endometriosis (DIE) is a pathologic condition that can affect not only

pelvic organs but also pelvic nerves responsible for intestinal and urinary disorders (1, 2); but surgical damage

to the pelvic nerves is by far the most frequent etiology for such functional morbidity. The sympathetic and parasympathetic nervous systems in the pelvis are essential for successful micturition. However, radical surgery for DIE of the rectovaginal septum or of parametric tissues can injure the autonomic nerves, which is the main cause of surgical complications related to bladder dysfunction. It is classically

Received September 13, 2013; revised and accepted December 6, 2013; published online January 11, 2014.

M.P. has nothing to disclose.

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Fertility and Sterility® Vol. 101, No. 3, March 2014 0015-0282/\$36.00

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<http://dx.doi.org/10.1016/j.fertnstert.2013.12.019>

believed that damage to the pelvic parasympathetic nerves (pelvic splanchnic nerves) is mainly responsible for bladder retention. The aim of our study was to report on patients who had developed bladder retention after laparoscopic surgery for DIE and to discuss potential pathophysiologic mechanisms involved in the genesis of this serious urinary complaint.

## MATERIALS AND METHODS

We conducted a retrospective case series study including all consecutive patients who presented at our center over the last 5 years for assessment/management (or at last second opinion) of bladder retention. Bladder retention has been defined in this study as postmicturitional residual >100 mL with micturition by Crede or Valsalva maneuvers, and/or need for self-catheterization. All patients had developed bladder retention either directly after or a period of years after a laparoscopic surgery for DIE of the rectovaginal space. Types and date of procedures were recorded according to the information contained in the surgical reports. Diagnoses of bladder dysfunction were made in the office through patient history, physical examination (gynecologic and neuropelvic), and basic bladder testing involving a urinalysis and urine culture to rule out infection. Postvoid residual volumes were measured by sonography and only in rare exceptions by catheterization. Urodynamic testing (with concomitant transanal sacral nerve root stimulation with a digital stimulation probe) was systematic; particular attention was paid to the first and imperious sensations during filling. To further investigate the mechanisms involved in dysfunction, previous urodynamic curves were reviewed and compared with actual urodynamic testing results for differentiation between atonic bladder by sympathetic denervation and motor paralytic bladder by parasympathetic denervation. Patients with a history of other pelvic radical surgeries (e.g., radical hysterectomy, oncologic rectum resection, hemorrhoidectomy, prolapse surgery), patients with parametric/rectovaginal DIE recurrence and/or urogenital prolapses, as well as patients under medical treatment (e.g., with neuroleptics or anticholinergics) or with neurogenic conditions of the nervous system (e.g., polyneuropathies, multiple sclerosis, spinal cord pathologies) were excluded from the study. Cystoscopy for exclusion of obstructive pathologies or organic pathologies of the bladder was also systematic. At the end of this workup patients were classified as having [1] acute neurogenic bladder atony (sympathetic denervation); [2] chronic neurogenic bladder atony (overdistention of the bladder over the time); or [3] acute motor paralytic bladder (parasympathetic denervation).

For evaluation of the symptoms, patients were requested to complete the following self-assessment questionnaires on outcomes and evolution of bladder function over the years since the procedure.

### Patient Perception of Bladder Condition

The Patient Perception of Bladder Condition questionnaire had the following scoring: 1: "My bladder condition does not cause me any problems at all"; 2: "My bladder condition causes me some very minor problems"; 3: "My bladder condition causes

me some minor problems"; 4: "My bladder condition causes me (some) moderate problems"; 5: "My bladder condition causes me severe problems"; and 6: "My bladder condition causes me many severe problems."

### The International Prostate Symptom Score

The International Prostate Symptom Score (IPSS) was originally developed to standardize the assessment of lower urinary tract symptoms (LUTS) in elderly men with benign prostatic hyperplasia. This questionnaire has been widely used to assess the severity and degree of symptoms caused by LUTS and the influence of LUTS on quality of life. It has been shown to be neither disease- nor sex-specific (3). The IPSS includes four items regarding voiding symptoms (incomplete emptying of the bladder, intermittency during urination, weak urinary stream, and straining) and three items regarding storage symptoms (daytime frequency, urgency, and nocturia). The seven questions of the IPSS are scored on a scale from 0 to 5 points.

### Urogenital Distress Inventory

The short-form version of the Urogenital Distress Inventory (UDI-6) consists of six questions (combining questions 1 and 2 about irritative symptoms, questions 3 and 4 about stress symptoms, and questions 5 and 6 about obstructive/discomfort symptoms) and is scored on a scale from 0 to 3 points (4).

Patients with no symptoms score 0 on both the IPSS and the UDI-6; the maximum possible scores are 35 on the IPSS and 18 on the UDI-6. Higher postoperative IPSS and UDI-6 scores compared with preoperative scores indicate an aggravated condition, whereas lower postoperative scores indicate improvement.

Approval by an ethics committee was not necessary because the study was based only on collection of data. All patients had signed an informed consent form for collection of the data reported in this study.

## RESULTS

Over the last 5 years, 47 consecutive patients were collected. All patients were premenopausal and had reported normal sensation and voiding function of the bladder before the procedures for DIE. Mean ( $\pm$ SD) interval from the surgery was 9.5 years ( $\pm$ 4.3; range, 7–15 years). Table 1 shows the correlation of the procedures with the corresponding type of retention. All patients with paralytic motor bladder atony ( $n = 18$ ) and acute neurogenic bladder atony ( $n = 5$ ) had developed bladder retention during the first month after the procedure. All these patients had undergone urodynamic testing several times before consultation at our center. Among bladder retention, only 14 patients were using intermittent self-catheterization, whereas the other 9 patients were voiding their bladder exclusively by Crede or Valsalva maneuver. Six of these last patients presented bilateral ureterohydro-nephrosis on sonography.

Patients with chronic neurogenic bladder atony ( $n = 24$ ) first took note of reduced urinary frequency (fewer than three times per day) after a period of 5 years on average. The most

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