SKILL AND TALENT

Laparoscopic cystectomy and intracorporeal continent urinary diversion (Mainz II) in treatment for interstitial cystitis

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Interstitial cystitis; Cystitis; Laparoscopy; Urinary diversion

Abstract
Introduction: Interstitial cystitis (IC) is a difficult-to-manage chronic and insidious condition. We present a series of patients with IC who failed to respond to conservative treatment. The patients underwent total cystectomy with completely intracorporeally performed continent urinary diversion (Mainz II rectosigmoid pouch) as a radical alternative to the treatment of this condition.

Materials and methods: Eight patients who fulfilled the clinical criteria for IC according to the National Institute of Health and in whom all previous conservative treatments had failed between January 2001 and April 2009 were operated on. A descriptive analysis was made with the following variables: age, surgical risk according to the American Society of Anesthesiology (ASA), total surgical time (ST), ST of the cystectomy, ST of the urinary diversion, early and late complications, time of hospital stay, bleeding and need of transfusion, specimen extraction pathway and uterine sparing.

Results: Mean age was 54.25 (±17.8) years, total mean ST 286.4 (±44.8) min, mean ST of the cystectomy 86.2 (±25.6) min, mean ST of the diversion 123.7 (±28.6) min, mean bleeding 321.4 (±242.9) cc, mean time of hospital stay 8.3 (±1.3) days. Fifty percent were ASA I, 37.5% ASA II and 12.5% ASA III. A hysterectomy was made in 50% of the cases. In 5 cases (62.5%) the bladder was extracted through the rectum and in 3 cases (37.5%) through the vagina. The only early complication was urinary sepsis in one patient. There was no conversion in the series.

Conclusions: Total cystectomy with urethrectomy and intracorporeal continent urinary diversion is an effective and definitive alternative for the treatment of treatment resistant IC. Their technical difficulty and its learning curve limit their application to centers with an extensive experience in laparoscopy.

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Cistectomía laparoscópica y derivación urinaria continente intracorpórea (Mainz II) en el tratamiento de la cistitis intersticial

Resumen

Introducción: La cistitis intersticial (CI) es una enfermedad de difícil manejo y de curso crónico e insidioso. Presentamos una serie de pacientes diagnosticadas de CI sin respuesta al tratamiento conservador, sometidas a cistectomía total con ureterectomía y derivación urinaria continente (Mainz II) laparoscópica totalmente intracorpórea, como alternativa radical al tratamiento de esta enfermedad.

Material y métodos: Entre enero de 2001 y abril de 2009 se operaron 8 pacientes que cumplían criterios clínicos y de exclusión para CI según el National Institute of Health y en las cuales había fracasado el tratamiento conservador. Se realizó un análisis descriptivo de la serie con las siguientes variables: edad, riesgo quirúrgico según la Sociedad Americana de Anestesiología (ASA), tiempo quirúrgico (TQ) total, TQ de la cistectomía, TQ de la derivación, complicaciones tempranas y tardías, tiempo de ingreso, sangrado y necesidad de transfusión, vía de extracción de la pieza y conservación del útero.

Resultados: La edad media fue 54,25 (± 17,8) años, el TQ medio total 286,4 min (± 44,8), el TQ medio de la cistectomía 86,2 min (± 25,6), el TQ medio de la derivación 123,7 min (± 28,6), el sangrado medio 321,4 cc (± 242,9) y el tiempo medio de ingreso 8,3 días (± 1,3). El 50% era un ASA I, el 37,5% ASA II y el 12,5% ASA III. En el 50% de los casos se realizó una histerectomía. En 5 casos (62,5%) se extrajo la pieza por el recto y en 3 casos (37,5%) por la vagina. La única complicación precoz fue una sepsis. No hubo conversión en la serie.

Conclusiones: La cistectomía total con ureterectomía y derivación urinaria continente por vía laparoscópica e intracorpórea es una alternativa eficaz y definitiva para el tratamiento de la CI rebelde al tratamiento conservador. Su dificultad técnica y su curva de aprendizaje limitan su reproducibilidad a centros con importante experiencia laparoscópica.

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Background

Bladder pain syndrome includes a considerable spectrum of urological symptoms that are difficult to categorize and diagnose. Definitions vary, but currently the most widely accepted is that of the International Continence Society.\(^1\) The diagnosis of interstitial cystitis, which is part of this heterogeneous clinical picture, has been reserved for patients with typical cystoscopic findings, such as glomerulations and Hunner’s ulcers.\(^2\) Interstitial cystitis (IC) is a clinical entity consisting of suprapubic pain and irritative urinary symptoms, with sterile urine and negative cytology, which mainly affects middle-aged (40–60 year) women (90%).\(^3\) Its etiology is unknown and its course is chronic and insidious, with a prevalence estimated at 197/100,000 women and 41/100,000 men.\(^4\)

The treatments described to date are empirically based and their focus is palliative, achieving only partial and temporary symptom relief in most cases. Surgery is reserved for patients who are refractory to conservative treatment, and these procedures range from endoscopic surgery to cystectomy.\(^5,6\)

The aim of this study is to present the results of surgical treatment in a series of 8 patients diagnosed with IC and who were refractory to medical treatment. These patients received a total cystectomy or anterior exenteration with ureterectomy and continent urinary diversion to the rectosigmoid pouch (Mainz pouch II), which was performed laparoscopically and entirely intracorporeally.

Material and methods

Between January 2001 and April 2009, 8 patients were operated who met the medical criteria of IC and the exclusion criteria according to the National Institute of Health\(^7\) and in whom conservative treatment failed. The primary indication was reduced bladder capacity (less than 100 cc) associated or not with a pain index greater than 8, according to the visual analog scale (VAS). No standardized questionnaire, such as the O’Leary questionnaire,\(^8\) was employed because we found no validated Spanish translations. All patients were given a full psychological assessment and were informed of the chances of surgical failure. In no case was a manometric study of the anal sphincter performed, and all patients were evaluated with colonoscopy.

The procedure was approved by the Ethics Committee, and all patients signed an informed consent form.

We performed 4 cystectomies and 4 laparoscopic anterior exenterations with urethral extirpation en bloc. The indication for cystectomy or exenteration alone depends on patient age and parity. The urinary diversion was to an entirely intracorporeal laparoscopic rectosigmoid pouch (Mainz pouch II).\(^9\)

Surgical technique

Intestinal preparation was performed with Fleet Oral\(^{10}\) 24 h before surgery, and 6 h before surgery a dose of low-molecular-weight heparin was administered adjusted...
according to body weight. For the induction of anesthesia, a first-generation cephalosporin and metronidazole was administered.

The cystectomy technique has been previously described. The patient is placed in a modified lithotomy position with the arms parallel to the body and in a 20° Trendelenburg position. With the surgeon to the left of the patient, a pneumoperitoneum is performed with a Veress needle at the supraumbilical level up to a pressure of 15 mmHg. The first 10 mm trocar is for the optics and is placed at the supraumbilical level. Four other working ports are placed: 2 10-mm pararectal and 2 5-mm parambical (Fig. 1).

Firstly, sectioning of the peritoneum is conducted at the fundus of the pouch of Douglas. This peritoneal incision is extended bilaterally until it reaches the umbilical ligament on both sides. The posterior lamella of the Denonvilliers' fascia is dissected, separating the vagina from the rectum. Subsequently, the anterior face of the bladder is dissected, the endopelvic fascia is opened bilaterally and the pubourethral ligaments are ligated. Vascular control of the anterior and posterior pedicles was conducted in 5 cases with Hem-o-lok® and bipolar cautery cord, in 2 cases with bipolar and in 1 case with endoGIA® stapler. The plane between the bladder and the anterior vaginal wall is dissected and the piece that will be inserted in a bag for extraction is fully released. In 6 cases, a simultaneous hysterectomy (anterior exenteration) was also performed. The piece was extracted through the rectum in 5 cases and through the vagina in 3 cases.

For urinary diversion, the intestine is incised at the rectosigmoid junction by its antimesenteric margin, 10 cm in the caudal direction and 10 cm in the cranial direction. The posterior wall of the rectum is sutured continuously to the sigmoid wall with a resorbable suture 3–0, thereby constituting the posterior wall of the reservoir. Ureter anastomosis was performed through a submucosal tunnel, and the ureters were left catheterized with an 8-Fr ureteral catheter, which exits through the rectum. For drainage of the reservoir, a 24-Fr silicone probe is placed through the rectum. Finally, the anterior wall of the reservoir is closed with a continuous and resorbable 3–0 suture, and a Jackson–Pratt drain is left in the bed (Fig. 2).

The following data were collected for the study: age, surgical risk according to the American Society of Anesthesiologists (ASA), total surgical time (ST), ST of the cystectomy, ST of the diversion, early and late complications, hospitalization time, bleeding and transfusion need, extraction route of the specimen and preservation of the uterus.

The postoperative clinical evaluation consisted of a psychological interview, a VAS and a subjective evaluation of symptoms and quality of life.

**Results**

The mean age of the patients was 54.25 years (±17.8), the mean total ST was 286.4 min (±44.8), the mean ST of the cystectomy was 86.2 min (±25.6), the mean ST of the diversion was 123.7 min (±28.6), the mean bleeding volume was 321.4 cc (±242.9) and the mean hospitalization time was 8.3 days (±1.3).

Fifty percent of the series was at ASA I, 37.5% at ASA II and 12.5% at ASA III. Fifty percent of the patients underwent hysterectomy en bloc (anterior exenteration). In 5 cases (62.5%), the specimen was extracted through the rectum and in 3 cases (37.5%) through the vagina.

The only early complication was a case of urinary sepsis, which was treated satisfactorily with antibiotherapy. Only 1 case required the transfusion of red blood cell concentrates (2 units). Starting in the early postoperative period, all patients received oral bicarbonate at a dosage of 3 g/day (to avoid the risk of hyperchloremic metabolic acidosis) and antibiotic prophylaxis with nitrofurantoin 50 mg/day. In the follow-up, 1 patient had distal ureteral stenosis, which was resolved endoscopically. Another patient had a chronic imbalance of hyperchloremic acidosis, which required a rediversion to an Indiana continent urinary reservoir. A radiological study was performed for all patients at 3 months to assess the reservoir and the integrity of the superior urinary route (Figs. 3 and 4).
Discussion

IC is a highly disbling disease that has a considerable impact on the quality of life of those who suffer from it, mainly middle-aged (40–60 years) women (90%).

Given that the etiology of IC is unknown, the treatments currently being used are directed toward relieving the symptoms and not to eradicating the cause.

Various therapeutic measures have been reported such as sacral root neuromodulation, behavioral treatments, dietary and physical therapy of the pelvic floor, oral treatments (gabapentin, amitriptyline, azathioprine, pentosan polysulfate and corticosteroids) and topical intravesical treatments (hydromidestentation, hyaluronic acid, heparin, bacillus Calmette-Guérin and dimethyl sulfoxide). In general, clinical improvement with these treatments is transient and partial.

It is estimated that conservative treatment fails in 10% of patients, who then require more aggressive management. To date, supratrigonal cystectomy and augmentation enterocystoplasty have been reserved for this 10% of patients whose symptoms are severe. The main argument in defense of this technique is the advantage represented by the preservation of the natural antireflux mechanism, thus preventing complications resulting from a ureteral anastomosis. On the other hand, it has been reported that in cases where a diseased trigone and urethra are preserved, the irritating and painful symptoms persist and can even be aggravated by the need for self-catheterization.

We are conscious of the fact that the treatment of a benign disease process should start with the most conservative approach possible and that radical surgery should be considered as the last option in our therapeutic arsenal. Nevertheless, we believe that total cystectomy with ureterectomy and laparoscopic intracorporeal continent urinary diversion results in a lower inflammatory response in the patient, smaller incisions and shorter exposure times for intestinal contents. We thereby achieve less postoperative ileus, lower analgesic requirements and shorter hospitalization times.

The most important limitation of this surgical series is the lack of an objective evaluation that allows us to determine with greater certainty, apart from the clinical evaluation, the response in terms of quality of life. This limitation is repeated in virtually all studies related to surgery in the treatment of this disease. The extensive review by Giannantoni et al. assessed 9 published studies regarding surgery in IC. Of these, 5 were retrospective and 4 were prospective, but only 2 studies used a validated questionnaire to assess the results. The symptom and problem score of the O’Leary Interstitial Cystitis Symptom Index (ICSI) and Problem Index (ICPI) 7 is recognized as a valid instrument for identifying symptoms of pain and the extent of the perception of the problem. We lack, however, a validated Spanish translation and are therefore limited in providing a more objective evaluation of the results.

Cystectomy and laparoscopic intracorporeal continent urinary diversion are technically possible, although their reproducibility is limited by their difficulty and steep learning curve; these techniques are therefore reserved to those institutions with extensive laparoscopic experience.
Although our series is small, it shows that the surgical technique employed is feasible, reproducible and constitutes an alternative for patients with severe IC and even for patients who require oncologic cystectomy.

Conclusions

Total cystectomy with ureterectomy and continent urinary diversion by laparoscopic and intracorporeal routes is an effective and definitive alternative for the treatment of IC refractory to conservative therapy. However, its technical difficulty and steep learning curve limit its reproducibility to institutions with significant experience in laparoscopic surgery.

Conflict of interest

The authors declare that they have no conflicts of interest.

References