



Case Report

Laparoscopic bladder auto-augmentation in an incomplete traumatic spinal cord injury

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Objectives: To assess the urodynamic and clinical outcome of a laparoscopic auto-augmented bladder.

Methods: Laparoscopic bladder autoaugmentation in a 27-year-old woman with an incomplete spinal cord injury at T12 level with urge incontinence caused by a hyperreflexic bladder.

Results: Six months later the patient voids by Valsalva's manoeuvre every 3 h and remains dry day and night. The radio-urodynamic study, performed 2 months later, revealed an intact bladder with a diverticulum of anterior wall and a capacity of 510 ml with filling rate of 100 ml/min without evidence of leakage of infusion water.

Conclusion: Laparoscopic retropubic auto-augmentation allows a brief hospital stay and minor postoperative discomfort. Moreover the laparoscopic approach should not complicate or preclude subsequent enterocystoplasty if necessary.

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Introduction

Initial treatment for patients with neurogenic bladder is the use of clean intermittent catheterization supplemented by anticholinergic medication. If medical therapy is ineffective, various surgical treatments are described in the literature.¹

The goal of augmentation cystoplasty is to increase functional capacity, lower storage pressure and eliminate uninhibited detrusor contractions or at least increase the volume at which they occur. Surgical options include enterocystoplasty using gastric, ileal or colonic segments, but they are invasive and associated with a high morbidity rate.²

Bladder auto-augmentation was first suggested by Cartwright and Snow in 1989:³ it involves removing the detrusor muscle over the dome of the bladder, allowing the underlying mucosa to bulge outward as a widemouthed diverticulum. Subsequently in 1993 Erlich and Gershman⁴ employed laparoscopic auto-augmentation in a child with neurogenic bladder. Recently McDougall⁵ introduced laparoscopic bladder auto-augmentation by an extraperitoneal approach. We report a case of a patient with a hyperreflexic bladder, intrinsic sphincteric deficiency (ISD) and

perineal insufficiency following an incomplete traumatic spinal cord injury, who underwent laparoscopic auto-augmentation by the extraperitoneal approach and later periurethral injection of collagen.

Case report

A 27-year-old woman was affected by an incomplete spinal cord injury at T12 level which occurred 9 months before. The patient reported urge incontinence, while physical evaluation revealed bilateral hypoaesthesia from S1 to S5 level, hyperreflexic knee reflexes and absent ankle reflexes. Urodynamic evaluation demonstrated: (1) the presence of intermittent urinary flow, detrusor instability at 200 ml of infusion with filling rate of 100 ml/min and leakage of infusion water at 306 ml of filling (Figure 1); (2) maximum closure urethral pressure (MCUP) of 24 cmH₂O, urethral functional length of 1.8 cm, abdominal transmission of 100% and voluntary pubo-coccygeal muscle contractions without increase of urethral pressure (Figure 2). After these evaluations a laparoscopic retropubic auto-augmentation was carried out and periurethral injection of collagen was performed 2 months later. The laparoscopic bladder approach was carried out in an extraperitoneal manner by realization of a standard pneumo-Retzius.

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Laparoscopic technique

With the patient under general anaesthesia, a 2 cm vertical incision was performed 4–5 cm under the umbilicus in the midline. A space within the fatty tissue of the retropubic space was created by blunt finger dissection and was then expanded by balloon distention according to the Gaur technique⁶ using a finger of a surgical glove inflated with 600 ml of saline solution. The first trocar was positioned and gas insufflation was performed. Two 10 mm ports and one 5 mm port were then inserted under direct laparoscopic visualization. After the bladder was completely freed, dissection of detrusor muscle to the level of the lamina propria of the anterior wall was carried out. Detrusorial flaps were then stabilized to the Cooper’s ligament on the side wall of the pelvis by 2/0 non absorbable suture. Finally, intraoperative flexible cystoscopy was performed in order to verify the integrity of the bladder mucosa.

Results

Operating time was 5 h. Estimated blood loss during the procedure was 80 cc. The patient resumed oral intake 12 h postoperatively and was discharged home with a Foley catheter on postoperative day 2 with a

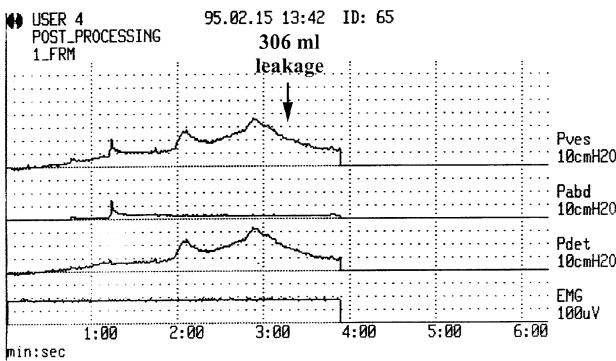


Figure 1 Detrusor instability at 200ml of infusion with filling rate of 100ml/min and leakage of infusion water at 306 ml of filling

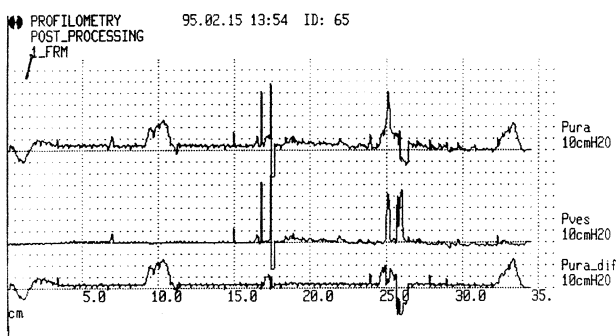


Figure 2 UPP reveals a maximum closure urethral pressure (MCUP) of 24 cmH₂O

maintenance dose of ciprofloxacin. Two weeks later the Foley catheter was removed. The radio-urodynamic study, performed 2 months later, revealed an intact bladder with a diverticulum of the anterior wall and a capacity of 510 ml with a filling rate of 100 ml/min, without evidence of leakage of infusion water (Figure 3). Six months later the urodynamic findings were unchanged compared with postoperative evaluation and the patient voids by Valsalva’s manoeuvre every 3 h remaining dry day and night.

Conclusion

The goal of bladder augmentation is to create a storage structure with an adequate capacity and low pressure. Various surgical gastrointestinal segments have been used for this purpose but these techniques are invasive and morbidity rate is high.⁷ A wide variety of metabolic disorders have been reported: altered electrolyte metabolism, altered hepatic metabolism, abnormal drug metabolism, calculus formation, malnutrition, growth retardation, osteomalacia and cancer. Urinary fistula, perforation, urinary tract infection are also possible.^{2,8}

An alternative technique for enlarging the bladder without enterocystoplasty was reported by Cartwright and Snow in 1989: they created a large bladder diverticulum by partial dissection of the detrusor muscle performing a bladder auto-augmentation. After this report, many authors reported good clinical results using this procedure.^{9,10}

The report by Cartwright and Snow included excision of the detrusor muscle from the bladder mucosa, suturing of the detrusor to the side walls of the pelvis and a psoas hitch. In our laparoscopic procedure we elected to do only one of these three manoeuvres (tacking the detrusor to the pelvic side wall), as reported by McDougall.⁵

We elected to perform the auto-augmentation through an entirely retropubic approach to facilitate

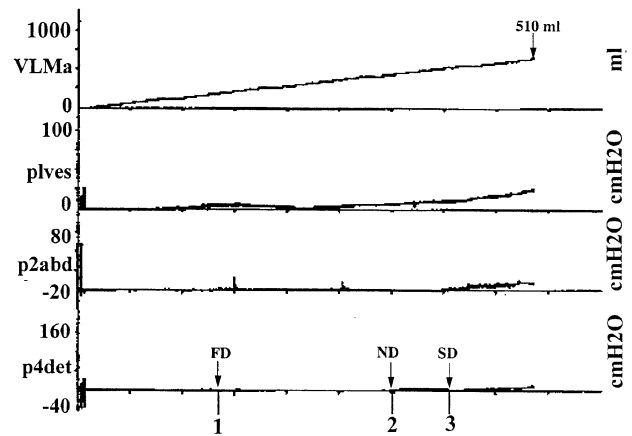


Figure 3 Cystometry demonstrates a capacity of 510 ml with filling rate of 100 ml/min without evidence of leakage

any later need for enterocystoplasty. We believe that by avoiding the peritoneal cavity the risk of postoperative bowel adhesions should be minimized.

In comparison with traditional bladder auto-augmentation the laparoscopic retropubic auto-augmentation allows a brief hospital stay and minor postoperative discomfort. Moreover the laparoscopic approach should not complicate or preclude subsequent enterocystoplasty if necessary.

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