



A Novel Management of Refractory Bladder Neck Contracture after Transurethral Resection of Prostate-Laparoscopic Wedge Resection of Bladder Neck with the Preservation of Posterior Urethral Bed: Experience of 16 Cases

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Abstract

Background: Refractory Bladder Neck Contracture (BNC) secondary to Transurethral Resection of Prostate (TURP) is an intractable problem with high recurrence rate. Several types of procedures with different surgical approaches have been described to relieve obstruction while the effects are not satisfactory.

Materials and Methods: A retrospective review of the medical records of 16 consecutive patients who underwent laparoscopic wedge resection of bladder neck with the preservation of posterior urethral bed from February 2018 to October 2020 was conducted. Laparoscopic wedge resection of bladder neck with the preservation of 5 to 7 o'clock at posterior urethral bed was performed in all cases.

Results: No intra-operative complications were noted. No conversion to open surgery was needed. During the 12 to 20 months of follow-up, all the patients acquired urinary patency, no incontinence or dysuria was recorded. No LUTS was observed. The average Qmax was 18 ml/s. There were no post-operative complications.

Conclusion: Preliminary data showed laparoscopic wedge resection of bladder neck with the preservation of posterior urethra bed is an effective method to deal with refractory BNC secondary to TURP.

Keywords: Benign prostatic hyperplasia; Bladder neck contracture; Minimally invasive surgery

Introduction

Benign Prostatic Hyperplasia (BPH) is one of the most common diseases in elderly male, which leads to severe lower urinary tract symptoms and significantly reduces quality of life. Transurethral Resection of Prostate (TURP) is recognized as the standard surgery for lower urinary tract symptoms secondary to BPH and it has demonstrated excellent safety and efficacy in clinical practice. Still, certain complex complications including urinary incontinence and urethral stricture occasionally occur. Among these, refractory Bladder Neck Contracture (BNC) is an intractable problem with high recurrence rate. Currently, there are no effective approaches to completely relieve the obstruction. Primary choices such as urethral dilation or catheter support are optional to patients with mild BNC. Transurethral Resection (TUR) or Bladder Neck Incision (BNI) is common minimally invasive surgical techniques while high recurrence rate is still a dilemma of these approaches. Recently, there have been attempts of bladder plastic surgery such as VY-plasty or T-plasty in clinical practice. Although the outcomes of these are encouraging, but plastic surgery

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inevitably causes more complications and the effect for severe BNC remains uncertain.

We proposed a novel management of refractory BNC after TURP: Laparoscopic wedge resection of bladder neck with the preservation of posterior urethra bed and retrospectively analyzed 16 cases with followed up urination excretion. The aim of this study is to describe our contemporary surgical technique and assess the outcomes after our surgery.

Materials and Methods

Study population

We retrospectively collected 16 consecutive patients with refractory BNC secondary to TURP at the sixth affiliated hospital, Shanghai Jiao Tong University from February 2018 to October 2020. All patients went through standard preoperative evaluation and signed consent of surgery.

Surgical technique

Patient positioning and trocar placement: After general anesthesia, the patient lays on the back with head low and high feet. Trocar position is the same as three or four ports of extra peritoneal laparoscopic radical prostatectomy.

Establish surgical field: After establishing pneumoperitoneum, open the retropubic space. Carefully remove adjacent connective and adipose tissue of the anterior wall of the bladder neck to fully expose scar tissue. Insert a metal detector through external urethral orifice and encounter an obstruction at the bladder neck. Shake the detector gently to determine the narrowest location of contracture. Distinguish scar tissue with normal mucosa according to the different tactile sensations.

Cut the scar tissue longitudinally along the midline: Cut the entire layer of scar tissue at the tip of the detector and open the bladder neck, and then suck out the remaining urine. Slightly open the endopelvic fascia along the surface of scar tissue, but no need to open as wide as radical prostatectomy. Then cut the scar tissue longitudinally up and down the midline until it reaches the normal mucosa.

Wedge resection: First, separate the upper edge of the scar tissue, then the lower edge. Then resect the scar tissue along the 5 and 7 o'clock directions of the posterior urethra bed respectively. The resection area should include all the scar tissue, but the posterior urethra of 5 to 7 o'clock direction should be remained.

Reconstruct the urethra: Close the incisions continuously with absorbable sutures to reconstruct the bladder neck and the posterior urethra.

Results

All patients received laparoscopic wedge resection of bladder neck and recovered successfully. No intra-operative complications were noted and no conversion to open surgery was needed. 16 pathology reports of the bladder neck demonstrated neoplasia of collagen fibrous tissue surrounding the urethra. During the 12 to 20 months of follow-up, all the patients acquired urinary patency and no incontinence or dysuria was recorded. The average Qmax was 18 ml/s. Cystoscopy was performed 6 months after the surgery and no recurrence of BNC was observed. During the surveillance, no patient complained of LUTS and no post-operative complications

were observed. No patient reported significant long-term bowel dysfunction and no patient complained of erectile dysfunction.

Discussion

There are numerous causes of dysuria after TURP, including urethral stricture, bladder contractile dysfunction, excessive amount of residual prostate gland, bladder neck and urethra edema, bladder neck stricture and contracture [1]. Mechanical injury, postoperative infection and proliferation of fibrous tissue are the main factors for BNC [2]. Currently, there is no standard treatment for post-TURP BNC. Urethral dilation or catheter support might be effective to mild stricture. When these methods end up invalid, Transurethral Resection (TUR) or Bladder Neck Incision (BNI) are alternative options for surgeons [3]. However, recurrence after TUR and BNI remains a vexing problem, and one of the 16 patients we reported experienced 7 times of TUR in total. Balloon dilatation has been proved to be useful to bladder-urethra anastomosis after radical prostatectomy, which has potential value in BNC treatment [4]. Urethral stricture resection and bladder neck plastic surgery is research hotspot in BNC. VY-plasty was the first surgical plastic method introduced by Young et al. in 1953. After this, robotic assisted VY-plasty was reported by Granieri et al. [5]. Over the past 5 years, a novel T-plasty was proposed and made progress. The rate of surgical effectiveness, appearance of complications and patient satisfaction of this surgery are quite encouraging [6]. In 2019, Shu et al. [7] made T-plasty minimally invasive through laparoscopy. However, no matter which plastic surgery, only part of the scar tissue is resected, thus plastic surgery is not effective to severe BNC, especially pinpoint contracture or atresia. Sleeve resection, which completely removes all the scar tissue, is an option to severe BNC and atresia [8]. Whereas, sleeve resection inevitably causes more complications as the resection range is wide and may result in greater tissue damage.

The laparoscopic wedge resection of bladder neck with the preservation of posterior urethra bed was globally first introduced by us and was a novel management of refractory BNC after TURP. The preservation of posterior bladder neck and posterior urethra bed has overwhelming advantages. Firstly, there is only less than 20% of scar tissue left (5 to 7 o'clock direction) in this surgery so that stricture is not likely to recur. Secondly, the partial bladder neck and posterior urethral separation makes it more convenient for urethral reconstruction because posterior urethra will not retract. Thirdly, the preservation of posterior urethral bed minimizes the damage of urinary control nerve and pelvic floor structure, which could avoid the appearance of incontinence and sexual dysfunction. Furthermore, there might be tight adhesion between posterior wall and the rectum especially after multiple TURP, and forcedly separate may cause rectum damage. The preservation of posterior urethra bed could minimize the risk of rectum injury. Also, the preserved posterior urethra bed could act as structural support for the normal urethral mucosa to more easily crawl, grow, and heal.

Although there are certain limitations of our study such as relatively small number of patients and short-time follow-up, preliminary data of 16 patients indicated superb promises in practice. We are optimistic that the novel surgical method we created may significantly improve the treatment of refractory BNC secondary to TURP.

Conclusion

Preliminary data showed laparoscopic wedge resection of bladder

neck with the preservation of posterior urethra bed is an effective method to deal with refractory BNC secondary to TURP. Additional patients and further long-time follow-up are needed to validate the effectiveness and safety of our surgery.

Authors' Contribution

Zhize Wang, Zitong Yang and Jihong Wang drafted this manuscript and contributed equally to this work. Yanfei Feng created the schematic diagram of the surgery. Jiajie Fang and Sihai Shao edited the video. Liping Xie and Jianjun Yu revised this work.

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