Primary Bladder Neck Obstruction in a Young Woman: A Novel Technique of Bladder Neck Incision Using Holmium Laser

Pankaj Panwar, MCh, Devanshu Bansal, MCh, Rakhul Lekha Raveendran, MCh, and Anant Kumar, MCh

Abstract

Background: Management of primary bladder neck obstruction (PBNO) in women is difficult. Surgical treatment in the form of bladder neck incision (BNI) is indicated in many cases. There is no defined consensus on the best surgical technique of BNI in women. We present a novel technique of BNI in such cases using pediatric cystoscope and holmium laser, which is a promising alternative to the existing management techniques.

Case Presentation: A 28-year-old lady complained of obstructive lower urinary tract symptoms. Serum biochemistry revealed azotemia. Further investigation utilizing a micturating cystourethrogram showed a closed bladder neck, and urodynamic studies revealed a high bladder outlet obstruction index suggestive of PBNO. BNI was effectively performed using pediatric cystoscope and holmium laser at 3, 9, and 12 o'clock positions. Postoperatively the patient had improving renal function and clinical improvement.

Conclusion: Use of pediatric cystoscope with holmium laser for BNI in females is a novel technique that offers the advantage of higher maneuverability in the female urethra, precise incision with protection of external sphincter from thermal damage, and avoidance of the complication of vesicovaginal fistula caused by posterior incisions.

Keywords: female primary bladder neck obstruction, bladder neck incision, pediatric cystoscope, holmium laser

Introduction

PRIMARY BLADDER NECK OBSTRUCTION (PBNO) is rare with unclear definition in the literature and previously described case reports only. Overall incidence of bladder outlet obstruction (BOO) in women with lower urinary tract symptoms is 3% to 8%. PBNO is seen in only 4.6% to 8% of women with BOO.¹ Various nomograms² have been described since then, but none can conclusively establish the diagnosis of PBNO. Surgical treatment is indicated in patients who fail medical therapy or develop complications of BOO. Variable techniques of bladder neck incision (BNI) in women exist in the literature but no consensus on any one technique. We report our technique of BNI in women by using pediatric cystoscope and holmium laser energy, which makes surgery easier and avoids any major complications.

Case Report

A 28-year-old unmarried woman presented to our outpatient department with complaints of obstructive lower urinary tract symptoms and malaise for the past 1 year. Her American Urological Association Symptom Score (AUASS) at pre-

sentation was 20 out of 35 with voiding symptom score of 14 of 35. Otherwise she was well, with no significant medical or surgical history and normal menstrual cycles. Her physical examination was unremarkable. Pelvic examination was normal. Her blood tests revealed serum creatinine of 3.8 mg % and ultrasound of kidney, ureter, and bladder showed bilateral hydronephrosis with postvoided residual (PVR) urine of 560 mL. However, her uroflowmetry (UFM) showed voided volume of 326 mL with $Q_{\max}$ of 10.4 mL/s. She underwent urethral dilatation followed by per-urethral catheter placement, subsequent to which her serum creatinine came down to 1.37 mg % and trial without catheterization (TWOC) was given. She was also started on alpha blockers. After 10 days of TWOC, her serum creatinine rose to 2.2 mg % and her symptoms relapsed. Micturating cystourethrogram showed closed bladder neck, trabeculated bladder with diverticula, and no vesicoureteral reflux (Fig. 1a, b). She voided with a weak stream with significant PVR. MRI of spine was normal. Subsequent urodynamic assessment showed maximal cystometric capacity of 749 mL, with no detrusor overactivity, decreased compliance, normal sensations, Pdet at $Q_{\max}$ of 120, with $Q_{\max}$ of 5.3 mL/s (Fig. 1c). Her BOO index was 109 and bladder contractility index was 146. A diagnosis of PBNO was

FIG. 1. (a, b) Micturating cystourethrogram showing unopened bladder neck with trabeculated bladder suggestive of PBNO. (c) Ur-dynamic study showing high voiding pressure with poor flow suggestive of BOO. BOO, bladder outlet obstruction; PBNO, primary bladder neck obstruction.

considered in light of the mentioned findings. After discussing all the risks and benefits of the procedure with the patient, cystoscopy and BNI were performed under general anesthesia. Intraoperatively the urethra appeared normal and bladder neck was clearly occlusive and high (Fig. 2a). BNI was done at 3, 9, and 12 o'clock positions until all bladder neck fibers were cut to sufficient depth without an attempt to see perivesical fat (Fig. 2b, c). The procedure was done using pediatric cystourethroscope 12.5F (Richard Wolf®) and holmium laser energy using 365 μ m fiber (Fig. 2d). Postoperatively, TWOC was given after 3 days and UFM was repeated, which showed $Q_{\max}$ of 19.8, voided volume of 228 mL, and PVR 32 mL (Fig. 3a). Her AUASS declined to 5 out of 35. Repeat UFM 1 month later showed a similar result (Fig. 3b) with serum creatinine declining further to 1.4 mg %. She is in our regular follow-up and doing well till now.

Discussion

Female PBNO is an idiopathic condition, resulting in inadequate relaxation of bladder neck during voiding. Women with PBNO typically present with obstructive voiding symptoms.

Several techniques for BNI have been described in the literature. But there is no consensus on the exact location, number of incisions and technology best suited for BNI. As complications of BNI in women can be quite serious, including vesicovaginal fistula (VVF), or loss of continence, the procedure needs to be done with utmost safety.

Use of laser energy for BNI has previously been described by Sharifiaghdas et al.³ The authors described BNI using 2 μ m 120 W continuous wave laser [RevoLix; LISA laser products, Katlenburg, Germany]. They analyzed 14 cases of PBNO who underwent laser BNI, their technique involved incising bladder neck at 5' and 7' o'clock positions and incision depth was quite superficial. They used 24F sized cystoscope to perform the procedure and assessed the adequacy of the procedure by easy passage of 16F Foley's catheter into the bladder. However, the median postoperative $Q_{\max}$ in their study was 11 (range 9.1–16). They also accepted that their incision depth was probably less to produce maximum objective benefit.

The senior author in this case has already published a study in which he analyzed outcomes of alpha blockers and BNI in women with PBNO.⁴ They previously performed BNI with pediatric resectoscope without laser and found less stress

FIG. 2. (a) Cystoscopy showing tight bladder neck s/o PBNO. (b, c) Picture after BNI at 12', 3', and 9' o'clock positions with wide bladder neck. (d) Pediatric cystoscope being used. BNI, bladder neck incision.

FIG. 3. (a) Immediate postoperative UFM showing $Q_{\max}$ 19.8 and (b) UFM 1 month later showing $Q_{\max}$ of 18.3 mL/s. UFM, uroflowmetry.

incontinence in these cases compared with that performed with adult resectoscope. The mean postoperative $Q_{\max}$ in their study was 15.4 ± 3.3 mL/s.

In the present case, we have emphasized the importance of pediatric cystoscopes for BNI in women. Using a pediatric cystoscope provides advantages in the form of better vision, less slippage of instrument, larger working area, and precise cutting in the female urethra. We used holmium laser for BNI to minimize the complications and prevent thermal damage to the external sphincter, which can cause postoperative stress incontinence. We also avoided cutting posteriorly to avoid complication such as VVF. Our patient represented a unique challenge in view of evidence of obstructive uropathy, young age, and high concern for complications. She had marked subjective and objective improvement after the surgery with no complications.

Patient Consent

Informed consent was obtained from the patient.

Conclusion

This case represents our continued efforts to standardize the technique of BNI in women with PBNO. Both pediatric cystoscopes and holmium laser are widely available and this technique looks safe and effective for BNI. Our case can be used as a guide for larger studies in future to further investigate the use of holmium laser for BNI in women with PBNO.

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No competing financial interests exist.

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Address correspondence to:

Pankaj Panwar, MCh
Department of Urology, Uro-Oncology, Robotics
and Renal Transplant
Max Group of Hospitals
Delhi
India

E-mail: drpankaj.cfa@gmail.com

Abbreviations Used

AUASS = American Urological Association Symptom Score
BNI = bladder neck incision
BOO = bladder outlet obstruction
DO = detrusor overactivity
MRI = magnetic resonance imaging
PBNO = primary bladder neck obstruction
PVR = postvoided residual
TWOC = trial without catheterization
UFM = uroflowmetry
VVF = vesicovaginal fistula

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