

# Balloon Dilatation for Prostatic Obstruction

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## SUMMARY

*Retrograde balloon dilatation of prostate was performed for prostatic obstruction under cystoscopic visual control, reusing the balloon dilatation catheter. All 31 patients were treated as in patients. Old, high surgical risk cases, because of their underlying medical problems, were selected for the procedure. General or epidural anaesthesia was used. All patients had urethral catheter for acute retention of urine. Successful results were noted in 26 cases (84%) for upto 3-18 months follow up. In 5 cases (16%), the procedure was unsuccessful, requiring trans-urethral resection of prostate in 3 cases (10%), and conservative management in 2 cases (6%).*

## INTRODUCTION

**P**rostatic hyperplasia is traditionally managed by trans-urethral resection of prostate (TURP) or trans urethral incision of prostate<sup>1,2</sup> or open prostatectomy or medical management with alpha-adrenergic blockers in poor surgical risks<sup>3</sup>. More recently prostatic urethral stents and local hyperthermia<sup>4</sup> have been used. Retrograde balloon dilatation of prostatic urethra was initially Burhenne, et al<sup>5</sup>. Balloon catheters are already being used in urology to dilate nephrostomy tracts, dilatation of urethral and urethral strictures We performed balloon dilatation of prostate on 31 patients. Improvement in subjective score was noted and assessed objectively, where required.

## SUBJECTS AND METHODS

Thirty one patients were treated with balloon dilatation of prostate during the period June 1990 to September 1991. The age ranged was 63 years to 93 years, (mean 79 years). All patients presented with Acute Retention of Urine following the symptoms of prostatism (Table 2), with mean symptom score of 18 (range 13-21). None had received any previous treatment for the same. All patients had benign prostatic hyperplasia. In all patients, routine pre operative urological work up was done. Prostate size was assessed clinically, by ultra sound and finally by cystoscopic examination. Flow rate was not done as all patients had urethral catheter for acute retention

of urine. Trial without catheter had failed at least once. The elderly, high risks and poor surgical candidates for routine surgical management, were chosen for balloon dilatation of prostate. All patients were admitted in the ward. All received antibiotics according to urine culture and sensitivity.

Gentamycin and Ampicillin or antibiotics according to urine culture and sensitivity were given to all the patients. All procedures were done under general or epidural anaesthesia. All patients were managed in cystoscopy position. Urethro-cystoscopy was performed to confirm the clinical findings and exclude other pathology. External sphincter was identified and 0.038 diameter floppy tip Teflon guide wire passed into the bladder, through cystoscope's instrument channel. Cystoscope was withdrawn leaving guide wire in place. Optilume Prostate Balloon Dilator, (American Medical System), with 75 Fr. (25 mm) diameter and 35 mm. long Dilating Balloon, was passed over the guide wire, into the urinary bladder. Cystoscope was reintroduced besides the catheter. Its Locater Balloon was positioned distal to external sphincter and inflated with saline under cystoscopic visual control. Dilating balloon was now inflated with saline to a pressure of 50 pounds per square inch (psi), for a time period of 15 minutes. All this procedure was done under cystoscopic vision to avoid slipping of dilating balloon into the bladder, by monitoring its locater balloon. After 15 minutes inflation, both balloons were deflated and balloon catheter along with the guide wire was withdrawn. Cystoscopic confirmation of

Table 1: Balloon dilatation prostate in 31 patients.

Case number	Age (years)	Prostate size (g)	Inflation Time (min)	Result
1.	78	<40	15	Excellent
2.	71	<40	15	Excellent
3.	93	<40	15	Excellent
4.	71	<40	15	Excellent
5.	80	<40	15	Fair
6.	78	<40	15	Excellent
7.	83	<40	15	Failure
8.	87	<40	15	Excellent
9.	84	<40	15	Excellent
10	77	<40	15	Excellent
11	73	<40	15	Failure
12	68	<40	15	Excellent
13	81	<40	15	Excellent
14	79	<40	15	Excellent
15	67	<40	15	Excellent
16	76	<40	15	Excellent
17	79	<40	15	Excellent
18	63	<40	15	Excellent
19	93	<40	15	Excellent
20	86	<40	15	Excellent
21	79	<40	15	Excellent
22	91	<40	15	Fair
23	75	<40	15	Excellent
24	69	<40	15	Excellent
25	78	<40	15	Excellent
26	89	<40	15	Excellent
27	83	<40	15	Excellent
28	78	<40	15	Excellent
29	68	<40	15	Excellent
30	90	<40	15	Excellent
31	84	<40	5	Failure

prostatic dilatation was done. During this procedure, on average two liters of saline irrigation was used. Finally a three-way 22 Fr. Foleys catheter was passed into the urinary bladder and saline irrigation started. The entire procedure took about thirty minutes. The Foleys catheter was removed 48 hours after the procedure when hematuria and oedema had resolved.

The procedure was not done if (1) median lobe was enlarged or (2) if marked lateral lobes were found extending into the bladder or (3) if prostate gland was more than 40 gms. or prostatic urethral length was more than 35 mm. or (4) if severe bladder trabeculation was found or (5) in-cases of neurogenic bladder or (6) if history of bleeding disorders was found. (7) In all cases trial without catheter had failed at least once. (8) Cases with urinary tract infection were not excluded as all of our patients were already catheterised for acute retention of urine.

## RESULTS

The results were categorised as Excellent if patients symptom score improved to less than nine, Fair if symptom score was more than nine but were not in acute retention of urine and Failure if patients went into acute retention of urine, (Table 4). 26 out of 31 patients (84%), treated with balloon dilatation of prostate had excellent results. 2 patients (6%) had fair result as noted by improvement in their urinary symptom score. They were assessed by ultrasound

Table 2: Scoring system for voiding symptoms.

Symptoms	Score
<b>Obstructive</b>	
Size of urine stream	0 - Normal 1 - Variable 2 - Weak 3 - Dribbling
Force of urine stream	0 - Normal 1 - Occasional Straining 2 - Always Straining
Hesitancy	0 - None 1 - Occasional 2 - Always
Intermittency	0 - None 1 - Occasional 2 - Always
Sensation of complete Evacuation of bladder	0 - Complete 1 - Incomplete 2 - Previous Urine Retention
Terminal dribbling	0 - None 1 - Occasional 2 - Always
<b>Irritative</b>	
Urgency	0 - None 1 - Occasional 2 - Always
Nocturia	0 - 0 To 1 Times 1 - 2 Times 2 - 3 To 4 Times 3 - > 4 Times
Day time frequency	0 - > 3 Hourly 1 - 2 To 3 Hourly 2 - 1 To 2 Hourly 3 - < 1 Hourly

examination for post micturition residue. If it was more than 60 ml, they underwent urethro-cystoscopy when prostatic urethra was found adequately dilated and hence were managed with medication only. 3 patients (10%) had failed treatment, requiring trans-urethral resection of prostate and were not offered repeat dilatation of prostate. The mean age of our patients was 79 years

(range 63 to 93 years). We reused same balloon dilatation catheter, after cold sterilisation, in all of our cases. The objective clinical out come was determined by ultra-sound for post micturition residue or urethrocytostopy, if indicated.

Mild hematuria, mostly alongside the catheter, was common, but it all cleared with in 24 hours, with saline irrigation and none required clot evacuation or blood transfusion. One patient (3%) with pre-existing urinary tract infection, developed acute epididymo orchitis. No other significant incidence of post operative infection was found, inspite of reusing the balloon catheter after cold sterilisation. (Table 3).

**Table 3: Complications of Balloon dilatation.**

Complications	No. of patients	Percent
Hematuria	31	100
Epididymo Orchitis	1	3
Incontinence	0	0
Impotence	0	0
Retrograde Ejaculation	0	0
Stricture Urethra	0	0
Turp Syndrome	0	0

**Table 4: Symptom score and ultrasonographic findings.**

Variable	Symptom score Mean No.	P. void Resid.on US Mean No.
Pre-operative	18 31	Not done
Post-operative		
1 Month	6 31	< 60 31
3 Months	4 23	< 60 23
6 Months	4 19	< 60 19
12 Months	3 16	< 60 16
18 Months	2 09	< 60 09

## DISCUSSION

Conventional management of symptoms related to prostatic enlargement is by trans-urethral resection of prostate, suprapubic prostatectomy and trans-urethral incision of the prostate. We used balloon dilatation technique under cystoscopic visual control for symptomatic prostatic obstruction. Balloon dilatation of prostate can also be done under fluoroscopic or ultrasound control<sup>6</sup>, Balloon dilatation technique is already being used frequently

in genito-urinary tract<sup>7,8</sup>, as well as in vascular tree<sup>9</sup>, and biliary tract<sup>10</sup>. In our series, we used 75 Fr. diameter, 35 mm. long dilating balloon which was inflated in prostatic urethra for fifteen minutes at a sustained pressure of fifty psi. The success of the procedure depends upon correct placement of dilating balloon in prostatic urethra and monitoring its locater balloon, to check against migration of the dilating balloon, resulting in failure of the procedure and damage to the external sphincter. On inflation of dilating balloon, the external sphincter was found to go into spasm, thus gripping the catheter shaft between the two balloons and avoiding migration of dilating balloon. Hence no traction to prevent balloon migration was required in any case.

Unlike other studies, where the same procedure was done under fluoroscopic control, requiring collaboration between radiologist and urologist, we used the technique of balloon dilatation of prostate under cystoscopic visual control<sup>11</sup>. None of our cases had incontinence or impotence which has been reported after surgical prostatectomy<sup>12</sup>. Inadvertent deflation of the dilating balloon during the procedure may result in extensive bleeding. It occurred in one of our patients after five minutes of inflation when the procedure was abandoned and resulted in failure of the procedure, but no excessive bleeding occurred. All the dilatation procedures were done over a guide wire to prevent Inadvertent sub-intimal passage of the catheter, resulting in urethral trauma. Post dilatation stenting was done with 22 Fr. three way siliconised foleys catheter. It was retained for 48 hrs. post-operatively, to permit resolution of oedema.

Hematuria has not been a problem in our series and none of our patients required blood transfusion post dilatation. In all patients, urethral catheter was removed forty eight hours after the procedure. All 31 patients were followed up at weekly interval post dilatation, for one month and then three monthly. The mean follow up was for 10 months (range 3-18 months). Several of our patients who had excellent initial results, were lost on follow up. All patients were interviewed regarding any residual symptoms four weeks after balloon dilatation. All cases were subjected to ultra sound examination, post balloon dilatation, to assess post micturition urine residue and if it was more than 60 ml., they had further urethro-cystoscopy. Five patients required urethro-cystoscopy out of which three patients underwent transurethral resection of prostate. During the first two weeks following the procedure, many patients

experienced mild to moderate improvement in their symptoms and gradually continued to improved during subsequent two weeks. Recent studies with follow up magnetic resonance imaging (MRI) of prostate after balloon dilatation, suggest that prostatic haemorrhage with subsequent fibrosis of the hyperplastic tissue occurs which results in decreased size of the prostate, compared to its pre dilatation size. The prostatic capsule and its immediate surrounding tissues remain unaffected by balloon dilatation<sup>13</sup>. However ultrasound monitoring during balloon dilatation of prostate reveals disruption of the anterior commissure prostate<sup>6</sup>.

High success rate in our series is because of careful case selection. However the number of cases is small with a relatively poor long term follow up of the treated patients. We believe that this procedure will have expanded application in future, beyond poor surgical risk patients. It is an ideal procedure for the younger patients with lesser risk of retrograde ejaculation. In other studies the procedure has been done on entirely outpatient basis under local anaesthesia or intravenous sedation<sup>14</sup>. The procedure did not require blood transfusions in our study. The procedure does not hamper subsequent transurethral resection of prostate if so required. The procedure does not provide specimen for histology in suspected cases of prostatic malignancy which should be confirmed by other means. There is risk of missing occult prostatic malignancy in 6 to 27% of the patients<sup>15,16</sup>. However it may be a procedure of choice in obstructive prostatic cancer which are on hormonal management<sup>17</sup>. It reduces duration of anaesthesia. Intraoperative irrigation is reduced, which is all the more important because of non availability and high cost of glycine as irrigation solution and thus avoiding the complication of trans-urethral resection syndrome which did not occur in any of our patients as we used saline for irrigation. The balloon dilatation catheter can be reused after cold sterilisation with minimal added morbidity while making it more cost effective.

Balloon dilatation of obstructive prostatic urethra, appears to be a simple, cost effective treatment modality with minimal morbidity. It warrants large prospective study with a long term follow up.

## REFERENCES

1. **Orandi A.** Transurethral incision of the prostate. *J Urol* 1973; **110**: 229.

2. **Edwards L, Powell C.** An objective comparison of transurethral resection and bladder neck incision in the treatment of prostatic hyperplasia, *J Urol* 1982; **128**: 325.

3. **Fleischmann JD, Catalona WJ.** Endocrine therapy for bladder outlet obstruction from carcinoma of the prostate. *J Urol* 1985; **134**: 498.

4. **Lindner A, Golomb J, Siegel Y, et al.** Local hyperthermia of the prostate gland for the treatment of benign prostatic hypertrophy and urinary retention: a preliminary report. *Br J Urol* 1987; **60**: 567-71.

5. **Burhenne HJ, Chisholm RJ, Quenville NF.** Prostatic hyperplasia: radiological intervention. *Radiology* 1984; **152**: 655-57.

6. **Sloan JB.** Prostatic balloon dilatation monitored by transrectal ultrasound, *Urology* 1991; **38**: 20.

7. **Smith AD, et al.** Percutaneous nephrostomy in the management of ureteral and renal calculi, *Radiology* 1979; **133**: 49.

8. **Clayman RV, et al.** Rapid balloon dilatation of the nephrostomy tract for nephrostolithotomy, *Radiology*, 1983; **147**: 884.

9. **Wierny L, Plass R, P.umann W.** Long term results in 100 consecutive patients treated by tranluminal angioplasty. *Radiology* 1974; **112**: 543.

10. **Burhenne HJ, Morris DC.** Biliary stricture dilatation: use of the Gruntzig balloon catheter, *J Can Assoc Radiol* 1980; **31**: 196.

11. **Klein LA, Leeming B.** Balloon dilatation for prostatic obstruction. Long term follow up. *Urology* 1989; **33**: 198.

12. **Melchoir J et al.** Transurethral prostatectomy: computerised analysis of 2,223 consecutive cases, *J Urol* 1974; **112**: 634.

13. **Johnson S, et al.** Magnetic resonance imaging of patients after balloon dilatation of the prostate, presented at American Roentgen Ray Society Meeting, California, San Francisco, May 1988.

14. **Daughtry JD, et al.** Balloon dilatation of prostatic urethra. *Urology*, 1990; **36**: 203.

15. **Agatstein EH, Hernandez FJ, Layfield LJ, Smith RB, deKernion JB.** Use of fine needle aspiration for detection of stage A prostatic carcinoma before transurethral resection of the prostate: a clinical trial. *J Urol* 1987; **138**: 551.

16. **Pritchett TR, Moreno J, Warner NE, Leiskovsky C, Nichols PW, Cook BA, Skinner DG.** Unsuspected prostatic adenocarcinoma in patients who have undergone radical cystoprostatectomy for transitional cell carcinoma of the bladder. *J Urol* 1988; **139**: 1214.

17. **Wendel EF et al.** The effect of orchietomy and estrogens on benign prostatic hyperplasia. *J Urol* 1972; **108**: 116.

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