

Original Research Article

Incidence And Evaluation Of Etiology Of Bladder Outlet Obstruction In Female Patients- A Prospective Observational Study.

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Abstract

Background: Bladder outlet obstruction in females remains a poorly understood condition and is much rarer as compared to males. More difficult is the objective diagnosis of this condition. The wide range in prevalence is probably because of multiple reasons; less reporting by female patients of lower urinary symptoms, empirically treating these patients with urethral dilatation, not suspecting the disease and hence not using uroflowmetry and pressure flow studies. So, the actual prevalence of bladder outlet obstruction in females remains underestimated.

Aim: To determine the incidence and etiology of bladder outlet obstruction in female patients.

Methods: In this prospective observational hospital-based study a profile of Female patients above 18 years with bladder outlet obstruction were included. All the patients underwent detailed clinical history, physical examination, urine analysis, uroflowmetry, ultrasonography as routine. All the patients were subjected to multichannel pressure flow studies. After identification of cause of bladder outlet obstruction as anatomical or functional, appropriate treatment was given to patients ranging from medical treatment to surgical procedure including urethral dilatation, cystoscopy, bladder neck incision, optic internal urethrotomy, urethroplasty, intra-sphincteric botulinum toxin injection, caruncle excision and anterior colporrhaphy. Patients were followed at 2 weeks, 1 month and 3 months and response to treatment was monitored by symptom score questionnaire (CLSS symptom score and QOL), PVR (in ml) and Qmax in ml/sec.

Results: Out of 54 patients, 31 (57.4%) patients had anatomical cause of bladder outlet obstruction (BOO) and rest 23 (42.6%) had functional etiology of bladder outlet obstruction (BOO). In anatomical group out of 54 subjects, 13 patients (24%) were found to have urethral stricture, 5 (11.5%) had cystocele, 4 (7.4%) had meatal stenosis, 3 (5.5%) had bladder neck stenosis, 3 (5.5%) had atrophic urethritis and 2 (3.7%) had caruncle as the cause of bladder outlet obstruction. In the functional group (n=23), 20 (37%) patients had dysfunctional voiding (DV) and 3 (5.5%) patients had primary bladder neck obstruction (PBNO).

Conclusion: BOO in females can either be due to an anatomical cause or functional cause. In our study a relatively higher percentage of patients were diagnosed with dysfunctional voiding and these patients also tend to present at a younger age. So, urodynamics should be done in female patients suspected to have BOO to rule out functional cause in absence of any obvious anatomical cause of obstruction. Treatment directed at the cause of the BOO shows better outcomes, with medical therapy (mainly alpha blockers) being main treatment modality in functional causes and surgical therapy in anatomical causes of obstruction.

Keywords: Bladder outlet obstruction in women, urinary retention in females, urodynamic diagnosis of bladder outlet obstruction

INTRODUCTION:

In female patients with Bladder Outlet Obstruction (BOO), lower urinary tract symptoms (LUTS) are often confusing and have no pathognomonic diagnosis. The symptomatology of BOO in females is complex and the classic voiding symptoms like straining, weak stream of urine, urinary hesitancy as seen in men are not seen in females leading to late reporting by female patients and difficulty in early diagnosis. [1] This even leads to delay in the treatment part for BOO in females. Prevalence rate of BOO is estimated to vary from 2.7% to 23% in women who complain of LUTS. [2]

The wide range in prevalence is probably because of multiple reasons; less reporting by female patients of lower urinary symptoms, empirically treating these patients with urethral dilatation, not suspecting the disease and hence not using uroflowmetry and pressure flow studies. So, the actual prevalence of bladder outlet obstruction in females remains underestimated. [3]

Bladder outlet obstruction (BOO) is defined by the International Continence Society as a “generic term for obstruction during voiding with reduced urine flow rate and/or presence of a raised post-void residual and an increased detrusor pressure.” [4,5]

The evaluation of BOO in female patients needs thorough clinical evaluation with understanding of symptomatology of obstruction, physical examination, frequency volume charting, urine analysis, ultrasonography, uroflowmetry, cystoscopy and/or pressure flow study to define a proper cause of obstruction. [5] Treatment of obstruction should hence be directed as per the etiology for the resolution of symptoms in most patients.

Anatomical obstruction can be either extrinsic or luminal. Functional obstruction is a common cause of BOO in females and can only be found during micturition and in the absence of anatomical abnormalities in the urinary system.

When accepted criteria for men are applied to women, the diagnosis of obstruction may often be missed, which is most likely due to differences in voiding dynamics like lower detrusor pressure required to void that may be due to the fact that many women void by pelvic relaxation or by abdominal straining (by habit) without need to generate significant detrusor or pressure to micturate. [3] So, voiding dynamics in female patients being complex due to multiple factors related to complex anatomy of pelvic floor and physiology of voiding in females, proper evaluation of the cause of obstruction is required.

METHODS:

The present prospective observational study was conducted at Kokilaben Dhirubhai Ambani Hospital and Medical Research Institute. A total of 54 cases were recruited during the period with objective evidence of bladder outlet obstruction in females based on inclusion and exclusion criteria after obtaining ethical clearance from Institutional ethical committee.

The female patients presenting with lower urinary symptoms in urology department were routinely evaluated as under:

A detailed history of every patient with particular reference to presenting complaints of obstructive voiding such as straining, bending forward to void, sensation of incomplete emptying, significant

hesitancy, prolonged flow or need to reduce associated prolapse manually to void; Irritative voiding symptoms like frequency, urgency, dysuria, nocturia.

CLSS questionnaire was given to be filled by the patient at initial encounter and on follow up at 2 weeks, 1 month and 3 months.

- Obstetric/menstrual history was taken.
- History of any drug intake.

All patients underwent General physical examination, Abdominal examination and Genito-urinary examination.

Laboratory investigations including Complete blood Count (CBC), Renal Function Test (RFT), Urine analysis and urine cultures (when indicated) were done. Ultrasound (USG) kidney, ureter and bladder (USG-KUB) was done especially for measurement of post void residual (PVR) urine. Less than 50ml was considered as insignificant.

Uroflowmetry; Flow rate (Qmax) of >12ml/second and voided volume of 150 ml was considered normal. Patients with Qmax<12 ml/second were designated as BOO. Urodynamic procedures were done in patients with flow rate <12ml/sec and/or significant PVR, in accordance with the guidelines of the ICS.

A multichannel urodynamic study (UD-2000, Medical Measures Systems B. V. Enschede, the Netherlands, including a pressure-flow study (PFS) , was conducted following the discontinuation of the potential medications that could possibly affect detrusor function for at least 3 days.

Management:

Definitive management depends upon the underlying cause of the disease. Immediate treatment consists of bladder drainage by passing a urethral catheter.

Follow up:

Subsequent to the definitive procedure, patients were followed up for a period ranging from 1 to 3 months. Symptom improvement, physical examination and ultrasound were the main diagnostic tool for follow up.

STATISTICAL ANALYSIS: -

Data were analysed using SPSS version 25 for Windows (version 25, 2017, IBM Corporation, Armonk, New York, United State). Normality of continuous parameters was assessed using Shapiro Wilk test. Independent sample T test was used for normally distributed data whereas Mann Whitney U test was used for non-normally distributed data. Wilcoxon Signed Rank test changes in parameters over the course of follow-up period. Cross tabulations with Fisher's Exact test was used to compare categorical data. Data presented as Mean±SD or frequency (%). p<0.05 was considered to be statistically significant. Graphs were plotted using Microsoft Excel.

Conflict of interest: nil

Funding: Nil

RESULTS:

Mean age of study participants was 52.9±16.5 years. Highest percentage of participants were in the age of 51-60 years and least percentage of participants were <30 years of age. Most common medical issue was diabetes mellitus in 18.5% participants followed by 11.1% suffering from hypertension, 3.7% having IHD and 5.6% suffering from hypothyroidism [Table 1].

Table 1: Age and medical history of study population

Age (years)	Frequency	%
<30	6	11.1
31-40	8	14.8

41-50	8	14.8
51-60	15	27.8
61-70	8	14.8
>71	9	16.7
Medical history		
Diabetes mellitus	10	18.5
Hypertension	6	11.1
IHD	2	3.7
Hypothyroidism	3	5.6

Out of 54 women, 19 were pre-menopausal and 35 were menopausal. About 33.3% had 2 parity and 29.6% had 3 parity, 22.2% had 1 parity, 5.6% had 4 parity and 3.7% had no parity [Table 2].

Table 2: Menstrual Status and history of parity of study participants

Menstrual status	Frequency	%
Pre-menopausal	19	35.2
Post-menopausal	35	64.8
Parity status		
Unmarried	3	5.6
0 parity	2	3.7
1 parity	12	22.2
2 parity	18	33.3
3 parity	16	29.6
4 parity	3	5.6

Out of 54 women, 31 (57.4%) had anatomical BOO and 23 (42.6%) had functional BOO. The main cause for anatomical obstruction was urethral stricture as seen in 13 patients and the main cause for functional obstruction was dysfunctional voiding as seen in 20 patients (Table 3).

Anatomical	Frequency	%
Urethral structure	13	57.4
Cystocele	5	41.9
Metal stenosis	4	16.1
Atropic Urethritis	3	12.9
Bladder Neck Stenosis	3	9.7
Urethral Caruncle	2	6.5
Cystocele with Senile Urethritis	1	3.2
Functional	23	42.6
Dysfunctional Voiding	20	87.0
Primary Bladder Neck Obstruction	3	13.0

Women with functional BOO had significantly lesser age as compared to women with anatomical BOO ($p < 0.05$) (Fig 1).

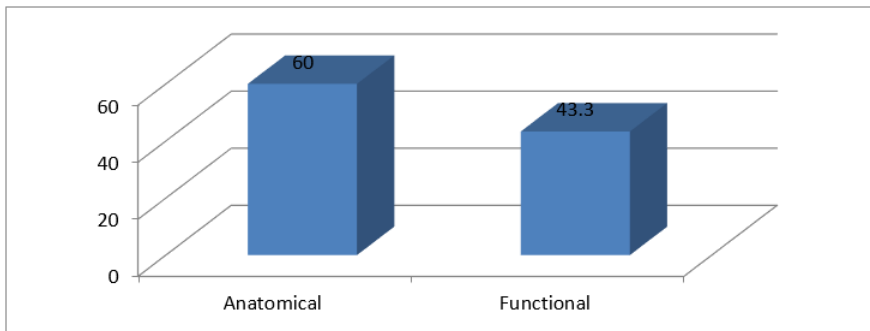


Fig 1.

The most common clinical symptoms were day time frequency (94.4%), nocturia (77.8%), urgency (77.8%), slow stream (72.2%), straining (74.1%), incomplete emptying (79.6%), intermittency (64.8%) and hesitancy (53.7%). Significantly higher percentage of patients with anatomical BOO had slow stream as compared to patients with functional BOO ($p < 0.05$). No other significant differences were observed in clinical symptoms between anatomical BOO and functional BOO ($p > 0.05$) (Fig 2).

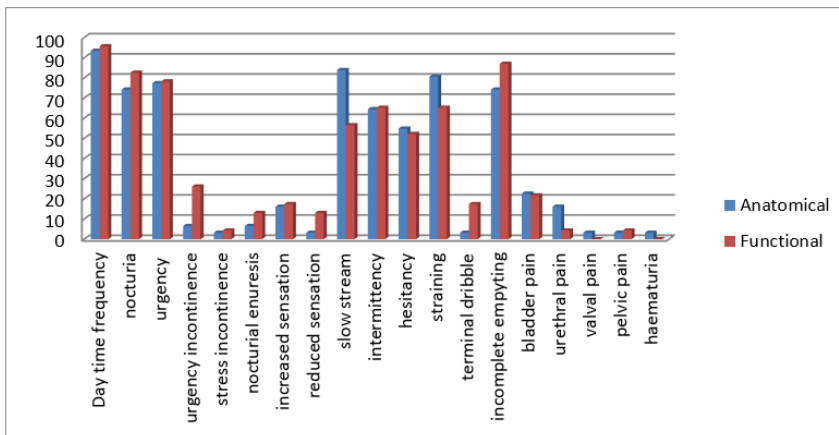


Fig 2.

From 54 patients, 27 underwent pelvic floor muscle training, 51 were on alpha blockers, 13 were on other medicinal treatment and 27 underwent surgery (Fig 3).

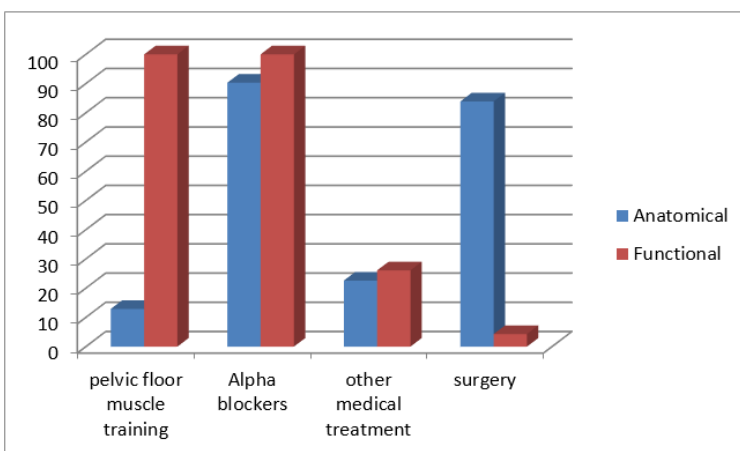


Fig 3.

DISCUSSION:

Bladder outlet obstruction (BOO) in female patients has a prevalence rate ranging from 2.7% to 23%. [2] The wide range is explained by the fact that the actual prevalence remains underestimated due to multiple reasons like less reporting by female patients with lower urinary tract symptoms (LUTS), empirically treating these patients by urethral dilatation, not evaluating the underlying cause, and because of lack of definitive diagnostic criteria for diagnosis. For the proper treatment of bladder outlet obstruction (BOO) in female patients, evaluation of the cause of obstruction includes thorough clinical evaluation with understanding of symptoms of obstruction, physical examination, frequency volume charting, urine analysis, ultrasonography, uroflowmetry, cystoscopy and/or pressure flow study. [5]

The cause of obstruction can be anatomical or functional [3] and the treatment is guided as per the underlying cause and treatment options can range from medical to appropriate surgical interventions. In our study after the evaluation of cause of BOO (whether anatomical or functional cause) treatment was given (medical or surgical or both) and response to treatment was monitored with CLSS and QOL score, PVR (ml) and Qmax (ml/s) before the treatment and then at 2 weeks, 1 month and 3 months.

The mean age of study participants was 52.9 ± 16.5 years (mean \pm SD) with the highest percentage of participants in the age group of 51-60 years with the minimum age of 19 and maximum age of 83. Majority of the patients (64.8%) were postmenopausal with 33.3% having parity of 2. In a study done by Malde et al (2019), [6] the mean age of the study group was 51 ± 15 . Groutz et al [7] studied 587 women and found that 38 (6.5%) of the study population had bladder outlet obstruction (BOO). The median age of patients was 63.9 ± 17.5 years. 29 (76%) patients were reported as postmenopausal. Blaivaset al, [8] reported mean parity of 1.8 ± 1.3 in the obstructed group.

In our study out of 54 patients, 31 (57.4%) patients had anatomical cause of bladder outlet obstruction (BOO) and rest 23 (42.6%) had functional etiology of bladder outlet obstruction. In 2013 in a study conducted by Brucker et al, [9] 157 female patients were studied of which 86 (54.5%) of patients had anatomical cause of bladder outlet obstruction and 71 (45.2%) had functional cause of bladder outlet obstruction.

The patients with functional group of bladder outlet obstruction had significantly less age (mean 43.3 ± 15.6) as compared to women with anatomical BOO (mean 66 ± 13.5) [$P < 0.05$]. The results were comparable to the study of Brucker et al [9] with median age of 62.4 ± 15.5 in anatomical group and 48.3 ± 17.3 in the functional group of bladder outlet obstruction ($P < 0.05$).

The most common clinical symptoms in our study were daytime frequency (94.4%), nocturia (77.8%), urgency (77.8%), slow stream (72.2%), straining (74.1%), incomplete emptying (79.6%), intermittency (64.8%) and hesitancy (53.7%). Robert et al, (10) noted frequency in 96%, urgency in 92%, nocturia in 75% of patients, hesitancy in 73% and straining in 69% of patients with bladder outlet obstruction (BOO). The prevalence of storage symptoms was in line with prevalence in literature (36%-99%). [10,7,11,12] The prevalence of voiding symptoms in our study was also in line with the reports in literature: 23-99%. [12,13]

There was no difference in the prevalence of storage symptoms in the patients with anatomical obstruction compared with those of functional obstruction in our study. Voiding symptoms (slow stream, straining, incomplete emptying and hesitancy) were more common in anatomical group than functional group. In Brucker et al, [9] study also there was a trend towards higher prevalence of voiding symptoms in patients with anatomical obstruction than functional obstruction (66.3% vs 52.1%, respectively; $P = 0.0715$).

In our study, anatomical group out of 54 subjects, 13 patients (24%) were found to have urethral stricture, 5 (11.5%) had cystocele, 4 (7.4%) had meatal stenosis, 3 (5.5%) had bladder neck stenosis, 3 (5.5%) had atrophic urethritis and 2 (3.7%) had caruncle as the cause of bladder outlet

obstruction. Brucker et al [8] reported urethral stricture in 16.6% (n=26/81), pelvic organ prolapses in 13.4% (n=21/86), anti-incontinence surgery in 19.7% and 7% other causes. Sachin Malde et al [6] reported stricture in 20%, cystocele in 12%, anti-incontinence surgery in 21% of cases (n=122 in the anatomical group) and 20% other anatomical causes. In our study, the functional group (n=23), 20 (37%) patients had dysfunctional voiding (DV) and 3 (5.5%) patients had primary bladder neck obstruction (PBNO). Brucker et al (33) reported dysfunctional voiding (DV) in 21.7%, 10.2% as primary bladder neck obstruction (PBNO) and 14% as sphincter obstruction. In literature the incidence of dysfunctional voiding (DV) ranges from 10.5-36.3%, (80) primary bladder neck obstruction (PBNO) in 5-8.7%. [14]

Fifty percent of the patients underwent surgical treatment and rest were managed by medical therapy and/or physiotherapy. In the non-surgical group (alpha blockers &/or PFMT &/or other medicines) i.e 27 patients, after a follow of 3 months there was significant decrease of 9.4 ± 4.3 and 2.7 ± 1.6 in CLSS and QOL score respectively. PVR decreased from baseline of 76 ± 40 ml to 25.8 ± 16 ml with average decrease of 48.4 ± 42.3 ; Qmax improved from 6.9 ± 2.9 ml/sec to 15.2 ± 3 ml/sec with an average improvement in the Qmax of 8.3 ± 3.8 . There was no significant difference in these parameters between anatomical obstruction and functional obstruction groups. In the surgical group after a follow up of 3 months there was a significant average decrease in the CLSS and QOL score after the surgical procedure by 11.4 ± 4 and 3.5 ± 1.4 respectively. PVR (ml) decreased from baseline of 90 ± 64 ml to 22 ± 14 ml with average decrease of 68.3 ± 65.9 . There was significant improvement in Qmax from 6.8 ± 3.2 to 16.5 ± 2.7 with an average improvement of 9.7 ± 4 .

CONCLUSION:

BOO in females can either be due to an anatomical cause or functional cause. In our study a relatively higher percentage of patients were diagnosed with dysfunctional voiding and these patients also tend to present at a younger age. So, urodynamics should be done in female patients suspected to have BOO to rule out functional cause in absence of any obvious anatomical cause of obstruction. Treatment directed at the cause of the BOO shows better outcomes, with medical therapy (mainly alpha blockers) being main treatment modality in functional causes and surgical therapy in anatomical causes of obstruction.

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