

Original Research Article

Prevalence of lower urinary tract symptoms in patients undergoing inguinal hernia repair

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ABSTRACT

Background: Lower urinary tract symptoms (LUTS) are frequently associated with inguinal hernias. It is important to recognise and treat bladder outlet obstruction in patients before inguinal hernia repair to prevent recurrence of hernia.

Methods: This prospective study was conducted at Maulana Azad Medical College. Hundred patients who presented with inguinal hernia repair were evaluated for LUTS using AUA scoring for urinary symptoms, uroflowmetry (Qmax) and post voidal residual urine using ultrasonography along with urine routine microscopic examination and urine culture and sensitivity.

Results: Eleven patients out of 100 who came for hernia repair had clinically significant LUTS due to benign enlargement of prostate (BEP) and required treatment for BEP but none of these 11 patients had urinary symptoms as primary complaint. Ten patients were found to have urinary tract infection without any urinary symptom. Three patients had urethral stricture out of which 2 had Qmax of <10 ml/second.

Conclusions: Significant number of patients (14 percent) with inguinal hernia had lower urinary tract symptoms. An effort should be made to identify LUTS in patients presenting with inguinal hernia before surgery and treat the cause of LUTS. Ten percent of patients had asymptomatic UTI with AUA score less than 8 but Qmax on uroflowmetry was in between 10-15 ml/second.

Keywords: Inguinal hernia, Bladder outlet obstruction, Lower urinary tract symptoms, Benign hypertrophy of prostate, Post voidal residual urine

INTRODUCTION

Inguinal hernia repair is one of the most common operations performed by general surgeons worldwide.¹ It is the most common subtype of abdominal wall hernias encountered by surgeons, which are almost 15-18% of all surgical procedures.² More than one million inguinal hernia repairs are being performed every year in the USA and Europe, and the figure is likely to be same for India.³

Patients with inguinal hernia (especially bilateral inguinal hernia) and complaints of benign hypertrophy of prostate

(BPH) or lower urinary tract obstruction must be evaluated for lower urinary tract symptoms (LUTS) and bladder outlet obstruction (BOO) and obstruction should be relieved before proceeding for definitive surgery of hernia.⁴ So it is important to recognize and treat LUTS before repair of inguinal hernia. This is because these patients with LUTS continue to strain during micturition after hernia repair leading to increase in intra-abdominal pressure which in turn can lead to more chances of recurrence of hernia. This study was designed to find out the prevalence of LUTS and BOO in patients undergoing inguinal hernia repair.

METHODS

This prospective cross sectional study was conducted in Department of General Surgery of Maulana Azad Medical College, New Delhi, India during the period October 2012 to March 2014.

Inclusion criteria

All patients more than 18 years of age coming to surgery OPD for inguinal hernia repair were included.

Exclusion criteria

Exclusion criteria were patients younger than 18 years of age; patient who had complicated inguinal hernias like obstructed, irreducible, strangulated hernia; patients who had recurrent hernia were also excluded.

Ethical clearance from hospital research committee was obtained before starting the study. Detailed informed consent was obtained and the patients had the right to opt out of the study without compromising their right of treatment. All the patients included in the study were screened for LUTS and BOO with following investigations:

- Urine routine and microscopic examination,
- Urine culture and sensitivity,
- AUA scoring,
- Uroflowmetry to measure peak flow rate (Qmax),
- Post voidal residual urine (PVRU) using ultrasonography (USG). Patients with urinary tract infections were treated as per culture sensitivity reports.

Patients with LUTS and BOO were:

- AUA score >8
- Patients showing growth on urine culture
- Uroflowmetry (Qmax) <15 ml/sec and
- Post voidal residual urine of more than 100 ml were further investigated to ascertain the cause of LUTS by
 - USG KUB for evaluation of urinary tract and prostate size,
 - Retrograde urethrogram (RGU) and micturating cystourethrogram (MCU) for urethral stricture or any other abnormality in the urethra in patients who had normal size prostate on USG with Qmax <15 ml/sec.
 - Cystourethroscopy in patients who showed abnormality in RGU and MCU.

All the patients were treated for hernia only after treating the cause of LUTS. Patients with features of benign hypertrophy of prostate (BPH) were treated conservatively with tamsulosin 0.4 mg daily at night for 6

weeks, if AUA score was 8 or more but less than 19 and repeated with investigations. If Qmax did not improve with medical management, patients were operated for BPH with transurethral resection of prostate (TURP) and then later operated for hernia once their Qmax was more than 15 ml per second. In patients with AUA score more than 19, patients underwent TURP followed by hernia repair. Patients with partial urethral stricture were operated with optical internal urethrotomy using cold knife first and then followed by hernia repair. All those patients who had positive urine culture revealed more than five pus cell per high power field (HPF) on microscopy. All patients who had urine culture positive were treated according to sensitivity report for a period of 10-14 days. All these patients underwent uroflowmetry at the end of antibiotic therapy to find out any difference in peak flow rate. USG KUB examination in these patients was within normal limits.

Statistical analysis

All the data was analysed using statistical software SPSS (version 17.0) and prevalence was calculated. The statistical significance of LUTS in inguinal hernia patients were calculated using binomial test (non-parametric test).

RESULTS

In 11 patients who were diagnosed to have BPH, only 7 patients had AUA score of more than 8 and the remaining 4 patients had AUA score less than 8. The 3 patients with partial urethral stricture had moderate symptoms as per AUA score (8-19). In total 10 patients had AUA score >8 (Table 1).

Table 1: Results of AUA score (n=100).

AUA score	N
<8	90
8-19	8
>19	2

Table 2: Results of uroflowmetry in patients diagnosed to have BPH and urethral stricture.

Qmax	In BPH patients	Urethral stricture
>15 ml/sec	0	0
10-15 ml/sec	5	1
<10 ml/sec	6	2

All the 11 patients with BPH had a Qmax of less than 15 ml/sec of which 6 patients had Qmax of <10 ml/sec. All 3 patients with urethral stricture had Qmax of <15 ml/sec, out of which 2 patients had <10 ml/sec. So all 14 patients had Qmax <15 ml/sec (Table 2).

Out of 11 patients with BPH, only 3 patients had PVRU of more than 100 ml and out of 3 patients with partial

urethral stricture, only 1 patient had PVRU of more than 100 ml (Table 3).

Table 3: Results of post void residual urine (PVRU).

Post void residual	In BPH patients	Urethral stricture
Urine		
<100 ml	8	2
>100 ml	3	1

Of the 100 patients studied, 10 patients had asymptomatic urinary tract infection (UTI) with *Escherichia coli* spp. and were treated according to culture and sensitivity. When analysed with binomial test (a non-parametric test) the p value is 0.001 (<0.05) and hence the prevalence of UTI in inguinal hernia patients is statistically significant. All these 10 patients were found to have AUA score less than 8. All these 10 patients were found to have Qmax 10-15 ml/sec before starting antibiotic therapy which became more than 15 ml/sec after treatment of urinary tract infection. Prostate size and post void residual urine were found to be within normal limits in these patients. Cystourethroscopy also did not reveal any abnormality (Table 4).

Table 4: Prevalence of UTI in hernia patients.

Urine culture and sensitivity	No. of patients
<i>E. coli</i>	10
No growth	90
Total	100

Prevalence of benign hypertrophy of prostate in hernia patients

Of the 100 patients studied 11 patients were diagnosed to have BPH (Table 5).

Table 5: Prevalence of BPH.

Patients	No. of patients
With BPH	11
Without BPH	89
Total	100

These 11 patients did not present with any chief complains of bothering urinary symptoms at the time of presentation for hernia repair however their AUA score was more than 8 in most of the cases.

When analysed with binomial test (a non-parametric test) the p value is 0.001 (<0.05) and hence the prevalence of BPH in inguinal hernia patients is statistically significant. All those patients who were found to have BPH were more than 50 years of age.

Prevalence of partial urethral stricture in hernia patients

Of the 100 patients studied 3 patients were diagnosed to have partial urethral stricture. These patients were planned for IOU before hernia repair. All the patients were asymptomatic but diagnosed on uroflowmetry (Qmax) and MCU/RGU. All the patients had Qmax <15 ml/sec and AUA score >8 (Table 6).

Table 6: Prevalence of partial urethral stricture.

Patients	No. of patients
With partial urethral stricture	3
Without urethral stricture	97
Total	100

These 3 patients did not present with any bothering or troublesome urinary symptom at the time of presentation however their AUA score was more than 8 in all cases. When analysed with binomial test the p value is 0.001 (<0.05) and hence the prevalence of partial urethral stricture in inguinal hernia patients is statistically significant. Etiology of stricture could not be established in these patients as none of them gave history of trauma, catheterisation or sexually transmitted disease. All these patients were less than 40 years of age.

Prevalence of LUTS in hernia patients

Of the 100 patients studied 14 patients were diagnosed to have LUTS (BPH and urethral stricture) (Table 7).

Table 7: Prevalence of LUTS.

Patients	No. of patients
With LUTS	14
Without LUTS	86
Total	100

These 14 patients did not present with any chief complains of urinary symptoms at the time of presentation however their AUA score was more than 8 in most of the cases. When analysed with Binomial test, a non-parametric test the p value is <0.05 and hence the prevalence of LUTS in inguinal hernia patients is statistically significant.

All patients included in the study underwent tension free mesh hernioplasty (Lichtenstein repair) and were followed for one year for any recurrence. None of the patient had recurrence during one year of follow up.

DISCUSSION

Inguinal hernia affects both men and women but is much more common in men and the incidence increases with age. The lifetime prevalence rate of inguinal hernia is 47% for men up to and including the age of 75.³ Repair of

an inguinal hernia is one of the most common operations among adults in the world today. The lifetime risk of undergoing such a repair is 27% for men and 3% for women.^{5,6} Inguinal hernia repair is the most common operations in general surgery in US and Europe. More than one million inguinal hernia repairs are being performed every year in US and Europe and the figure is likely to be same for India.³

Burcharth et al showed that, especially in men, however also in women the age-specific prevalence of inguinal hernia repair showed a bimodal distribution.⁷ In the present study, 79% of patients were under the age of 55 years and 21% of patients were above the age of 55 years. 6% of patients were above the age of 75. In our study, patients below the age of 18 years were not included in the study. Many of the patients have inguinal hernia associated with bothersome LUTS. So far no recommendations have been made for treatment protocol for such patients.

There are several reasons for a recurrence of inguinal hernia. Early recurrence could be due to poor surgical technique but for later recurrences, several different factors may be of importance like a defective collagen metabolism, leading to suboptimal wound healing might play a role, selection of patients with pre-existing conditions like LUTS, chronic cough, constipation, etc. A possible explanation for this association remains on the fact that patients with obstructive voiding dysfunction may need to strain to void. This effort over time may have a direct impact on the strength of the abdominal wall contributing to the development of inguinal hernia and recurrences if not treated preoperatively. So to prevent the recurrences, treating the predisposing cause also plays a vital role.

In the present study, we tried to find out the prevalence of LUTS in patients presenting to surgical OPD for hernia repair who otherwise apparently did not have any urinary symptoms. There are few similar studies present in the literature evaluating the correlation between the LUTS and presence of inguinal hernia done by Reis et al and Chaukulkar et al.^{8,9} Though these studies correlated the presence of inguinal hernia and severity of lower urinary tract symptoms, none of these studies have seen the prevalence of LUTS in inguinal hernia patients directly.

Reis et al studied the correlation between the presence of inguinal hernia and the intensity of lower urinary tract symptoms.⁸ In that study, 32 patients in the inguinal hernia group were evaluated for LUTS. This study showed that in inguinal hernia group, IPSS score of more than 7 was present in 28 (87.5%) patients. But our present study showed an AUA symptom score of more than 7 in only 10 (10%) patients. The main reason for the difference between the two studies is that, the patients selected were above 50 years of age in study by Reis et al, whereas in our study patients over 18 years of age are selected.⁸

Out of those 32 patients in the inguinal hernia group by Reis et al, mild, moderate and severe LUTS were present in 4 (12.5%); 16 (50%) and 12 (37.5%) patients respectively, assessed using IPSS scoring system.⁸ In our study of 100 patients, mild, moderate and severe LUTS were present in 50 (50%); 8 (8%) and 2 (2%) patients respectively using AUA symptom scoring system. Remaining 40% of patients in our study have no symptoms suggestive of LUTS.

In the study by Reis et al, the mean value of Qmax (ml/sec) is 11.4 ± 2.9 in the group of patients with inguinal hernia.⁸ But in our study, the mean value of Qmax (ml/sec) 18.2 ± 6.2 ml/sec.

In the study by dos Reis et al, the mean value of PVRU (ml) is 11.4 ± 2.9 in the group of patients with inguinal hernia.⁸ But in our study, the mean value of PVRU (ml) is 35.1 ± 35.0 ml.

The main reason for the difference between the two studies is that, the patients selected were above 50 years of age in study by Reis et al, whereas in our study patients over 18 years of age are selected.⁸

A study similar to present study was conducted with 50 patients by Chaukulkar et al.⁹ In this study, 25 patients with inguinal hernia are assessed for correlation with intensity of LUTS. Out of those 25 patients, 14 patients had IPSS more than 7, whereas in our study of 100 patients, 10 patients had AUA symptom score of more than 7.

In the study by Chaukulkar et al, the mild and moderate LUTS were present in 44% and 56% respectively assessed using IPSS scoring system.⁹ In our study of 100 patients, mild, moderate and severe LUTS were present in 50 (50%); 8 (8%) and 2 (2%) patients respectively using AUA symptom scoring system. Remaining 40% of patients have no symptoms suggestive of LUTS.⁶

In the study by Chaukulkar et al, the mean value of PVRU (ml) is 28.6 ± 20.3 . In our present study, the mean value of PVRU (ml) is 35.1 ± 35.0 . But in the study by Chaukulkar et al, only 25 patients with inguinal hernia are studied and also patients apart from BPH, like urethral stricture causing LUTS are excluded from the study.⁹

In our study, out of the 100 patients who presented to surgical outpatient department with only chief complaints of inguinal hernia, 10 (10%) patients were found to have asymptomatic UTI. These patients were treated with antibiotics according to culture and sensitivity before taking the patient for inguinal hernia repair. The prevalence of UTI among inguinal hernia patients found to be statistically significant. The presence of asymptomatic UTI in male patients presenting for inguinal hernia repair has not been studied and reported so far.

Out of the 100 patients, 11 (11%) patients were diagnosed to have benign hypertrophy of prostate and were planned for prostate surgery before inguinal hernia repair. This prevalence of BPH in inguinal hernia patients who presented only with chief complaints of inguinal hernia is statistically significant when need prior treatment for BPH before hernia repair analysed by Binomial test and they in order to prevent recurrence of hernia. All the patients with BPH were operated by TURP followed by inguinal hernia repair. None of them showed recurrences in the follow up for one year.

Out of the 100 patients, 3 (3%) patients were diagnosed to have partial urethral stricture and were planned for internal optical urethrotomy before inguinal hernia repair. This prevalence of partial urethral stricture in inguinal hernia patients who presented only with chief complaints of inguinal hernia is statistically significant when need prior treatment for partial urethral stricture before hernia repair analysed by Binomial test and they in order to prevent recurrence of inguinal hernia.

Out of the 100 patients studied, 14 (14%) of patients were found to have significant LUTS because of BPH and partial urethral stricture, which needs prior surgical management before subjecting the patient for inguinal hernia repair to reduce the chances of recurrence.

One of the peculiar finding in the present study was presence of asymptomatic UTI in 10% of patients with border line decrease in Qmax on uroflowmetry. The fact that Qmax improved after treatment of UTI might indicate UTI may lead to dynamic BOO resulting from hypersensitivity of detrusor muscle. However we were not able to find the source of UTI in these patients.

CONCLUSION

Significant number of patients (14% in this study) with inguinal hernia has lower urinary tract symptoms. An effort should be made to identify LUTS in patients presenting with inguinal hernia and treat the cause of LUTS before proceeding for IH surgery. Assessing LUTS and treating BOO before IH surgery can reduce post-operative complications like retention of urine and recurrence.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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