Medico Research Chronicles
ISSN NO. 2394-3971
DOI No. 10.26838/MEDRECH.2024.11.5.727
Contents available at www.medrech.com

Effect of Elective Inguinal Hernia Repair on Urinary Symptoms in Men

[1]Dr. Tazin Ahmed Adnan, [2]Dr. Iftakhar Al Mamun, [3]Dr. Md. Mizanur Rahman, [4]Dr. Md. Faysal Kamal, [5]Dr. Md. Based Ahmed Sarker, [6]Dr. SK. Mozammel Haque, [7]Dr. Md. Jobayer Hossain Taraq

1. Medical Officer, Department of General Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.
2. Medical Officer, Department of General Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.
3. Professor, Department of Urology, Dhaka Medical College Hospital, Dhaka, Bangladesh.
4. Medical Officer, Department of General Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.
5. Medical Officer, Department of General Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.
6. Medical Officer, Department of General Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.
7. Resident. Bangabandhu Sheikh Mujib Medical University. Dhaka, Bangladesh.

ARTICLE INFO | **ABSTRACT** | **ORIGINAL RESEARCH ARTICLE**

Article History
Received: July 2024
Accepted: Sept 2024
Key Words:
Inguinal Hernia, Repair, Urinary symptom, Men

Background: Urinary symptoms are frequently associated with inguinal hernias and urinary complications occur frequently following repair. Systematic assessment of post-operative urinary symptom burden in patients undergoing elective inguinal hernia repair was not evaluated yet. Therefore, the study was planned to determine the prevalence of urinary symptoms in men undergoing elective inguinal hernia repair.

Methods: This prospective observational study was conducted at the department of surgery in Dhaka Medical College Hospital (DMCH), for 12 months period. Patients with inguinal hernia who were admitted in DMCH were approached and selected in according to the inclusion & exclusion criteria. Before interviewing and before surgical procedure, informed consent was taken from each subject and ethical issues were ensured properly. The researcher did physical examination and assessment of urinary symptoms. Data were collected from a total 100 patients and recorded into a structured questionnaire. Collected data was analyzed by the SPSS 21.

Results: Mean age of the study populations was 60.36 ± 6.87 SD (years) [age range 41-73 years]. About 74% had unilateral inguinal hernia and other 26% had bilateral hernia. Out of 100 patients, 35%

patients used perioperative catheter. Only 4% patients had post-operative complications and 2% patients had the history of retention following surgery. The overall median preoperative AUASS score was 6 (range 3 – 28) which increased to 13 (5-33) 48 hours after operation. The increase was statistically significant ($p<0.001$). The increase in AUASS score noted across all categories of age, BPH, hernia, surgery, anesthesia and surgical technique. During 30 days post-operative follow up, eight patients were lost from follow-up and comparison between preoperative and 30 days post-operative AUASS score showed statistically significant improvement ($p<0.001$).

Conclusion: Significant improvements of urinary symptoms are seen following elective inguinal hernia repair. However, larger cohort study is needed to finalize the comment.

Corresponding author
Dr. T. A. Adnan*

2024, www.medrech.com

INTRODUCTION

Lower urinary tract symptoms (LUTS) increase with age. They have significant effects on quality of life in older men [1]. Apart from obstruction and autonomic over activity, multiple etiological factors especially the effect of aging on the nervous system and bladder plays a role for urinary complaints [2]. Nearly all men will develop histological benign prostatic hyperplasia by the age of 80, but the degree of prostatic enlargement resulting from the hyperplasia is highly variable. Historically, it has often been assumed that the pathophysiology of lower urinary tract symptoms (LUTS) in men is the result of bladder outlet obstruction associated with prostatic enlargement [3]. Traditionally, the diagnostic evaluation of patients with LUTS suggestive of bladder outlet obstruction (BOO) includes symptomatic evaluation [4]. Although symptom scoring systems have proved to be a useful tool to quantify clinical symptoms, several studies have shown that none of these scores correlate with BOO and Benign Prostatic Hyperplasia (BPH) related complications, furthermore they are not disease specific [4-7].

Prostate surgery is recommended for patients who have renal insufficiency secondary to BPH, who have recurrent UTIs, bladder stones or gross hematuria due to BPH, and those who have LUTS refractory to medical therapy [7]. No recommendations were made regarding men with concomitant evidence of Inguinal hernia and bothersome LUTS related to BPH. The prevalence of inguinal hernia increases with age, and inguinal hernias account for 75% of all abdominal hernias. It is difficult to determine the precise prevalence of inguinal hernias within the general community; however, they do occur more commonly in men with a lifetime risk of 27% [8]. Patients with inguinal hernia present higher urinary symptoms score when compared with patients without inguinal hernia [9]. Urinary symptoms are frequently associated with inguinal hernias and urinary complications occur frequently following repair.

The incidence of postoperative urinary retention following inguinal hernia repair is approximately 15% with the reported range from 2% to 30.0% [10-13]. The occurrence of postoperative urinary retention leads to increased cost and decreased quality of life, often resulting in prolonged indwelling catheter placement, unplanned admissions, or extended hospital length of stay [14]. Factor known to be significantly associated with postoperative retention include age, type of anesthesia, analgesia, and greater volume of intra-operative intravenous fluid

administration [14-19]. The American Urological Association Symptom Score (AUASS) is a validated 7-item survey used to assess the severity of 3 storage symptoms (frequency, urgency, nocturia) and 4 voiding symptoms (feeling of incomplete emptying, intermittency, straining, and a weak stream). Responses range from 0 for no symptoms experienced to 5 for almost always. The total symptom score is calculated and symptoms are considered mild if the total score is 1 to 7, moderate if 8 to 19, and severe if 20 to 35. The AUASS has been validated to identify men with lower urinary tract symptoms (LUTSs), as well as the success of therapies intended to treat voiding problems related to enlarged prostate and identified that the survey is sensitive to changes in time, thus making it an important tool to be used for other evaluative or predictive purpose [20].

The primary purpose of the study will be to determine the prevalence of urinary symptoms in men with inguinal hernia undergoing elective hernia repair and to see how inguinal hernia repair affects these urinary symptoms quantified through American Urological Association Symptom Score (AUASS).

METHODOLOGY

Following data collection, entered into a spreadsheet of Microsoft Excel 2010 data entry platform. The entered data then assessed for completeness, accuracy and consistency before analysis was commenced. Data analysis was carried out by using SPSS version 21. Exploratory data analysis was carried out to describe the study population where categorical variables were summarized using frequency tables while continuous variables were summarized using measures of central tendency and dispersion such as mean, median, percentiles and standard deviation. Change in AUASS from preoperative to 48 hours after surgery and 30 days after surgery, Wilcoxon signed-rank tests was used. Level of significance was set at 0.05 and $p < 0.05$ was considered significant. Data were presented in the forms of tables and graphs.

RESULT

Out of 100 patients with inguinal hernia, majority 62% were from age group above 60 years. The mean age of patients was 60.36 ± 6.87. Minimum age of the patients was 41 and maximum age of the patients was 73.

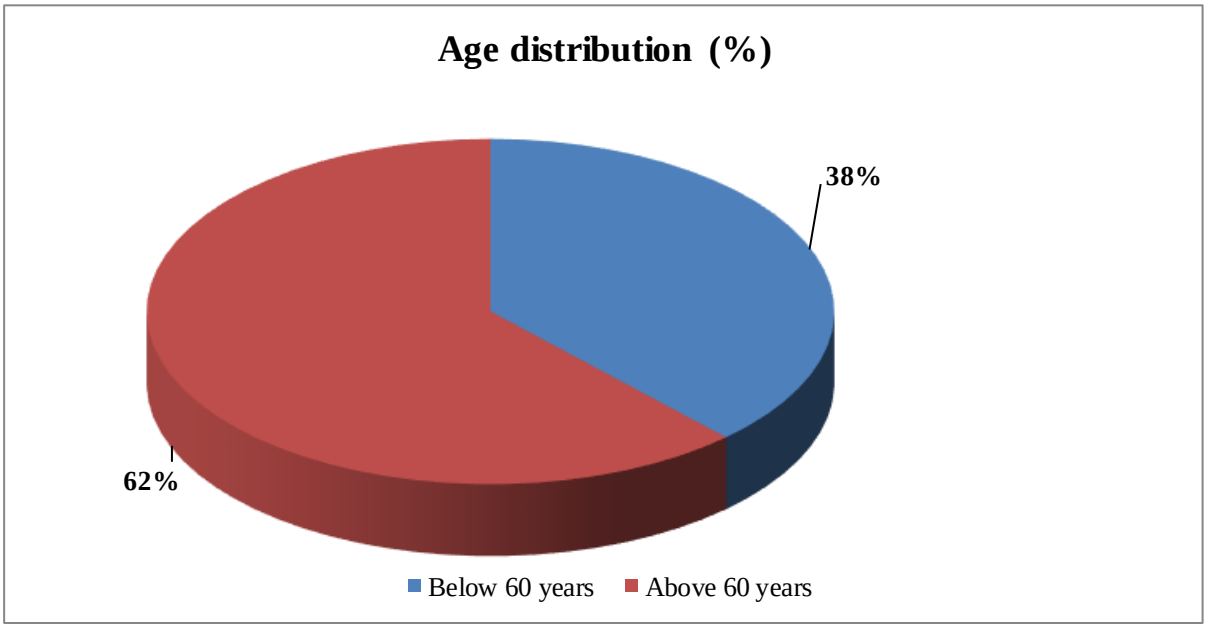

Figure-1: Distribution of inguinal hernia patients according to their age (n=100)

Table-1: History of BPH and medication use for BPH (n=100)

Variables	Percentage (%)
BPH	
Yes	18
No	82
One or more medicines for BPH	
Yes	20
No	80

Medical chart abstraction was performed to assess the history of benign prostatic hyperplasia (BPH) whether the patient was on medication for BPH. BPH was positive for 18% patients and 20% took one or more medication for BPH.

Figure-2 shows that out of 100 patients, the prostate-specific antigen (PSA) could be tested for 50 patients. Among them 93% had PSA less than 4. Other 7% had PSA greater than or equal 4.

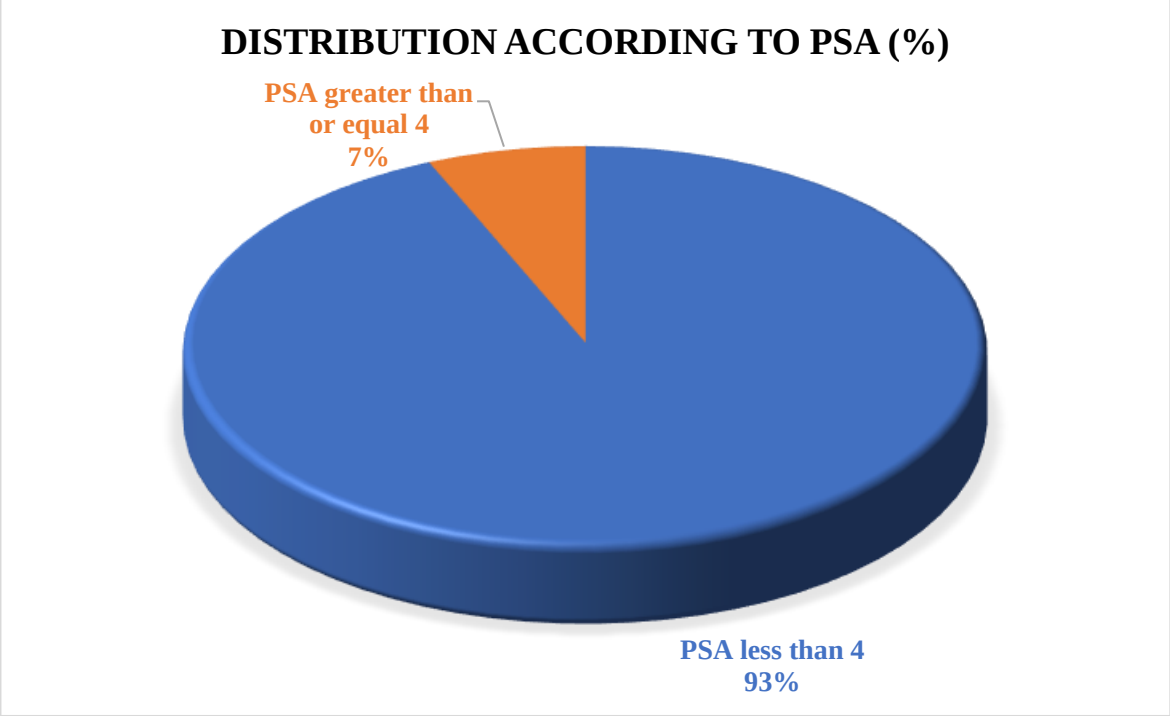

Figure-2: Distribution of patients according to their PSA category (n=50)

Figure-3 shows that among 100 patients, 74% had unilateral inguinal hernia and other 26% had bilateral hernia.

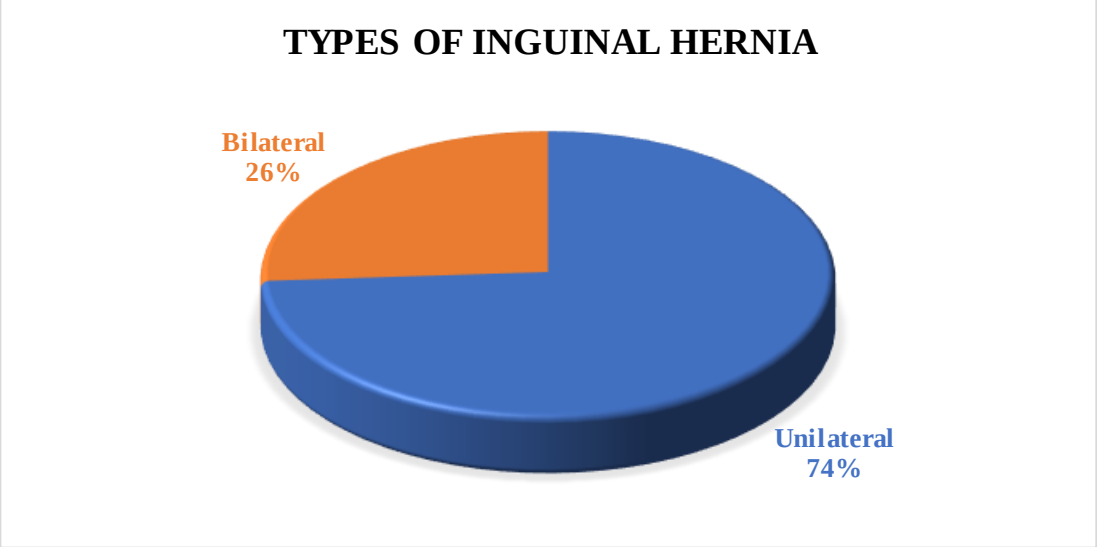

Figure-3: Distribution of patients according to their hernia type (n=100)

Figure-4 shows that American Urological Association Symptom Score (AUASS) is divided into three categories: mild (1 to 7), moderate (8 to 19) and severe (20 to 35). Majority 63% of patients had mild AUASS and only 7% had severe AUASS. The mean AUASS value was 8.44. The minimum value was 3 and maximum value was 28. Median preoperative value was 6.

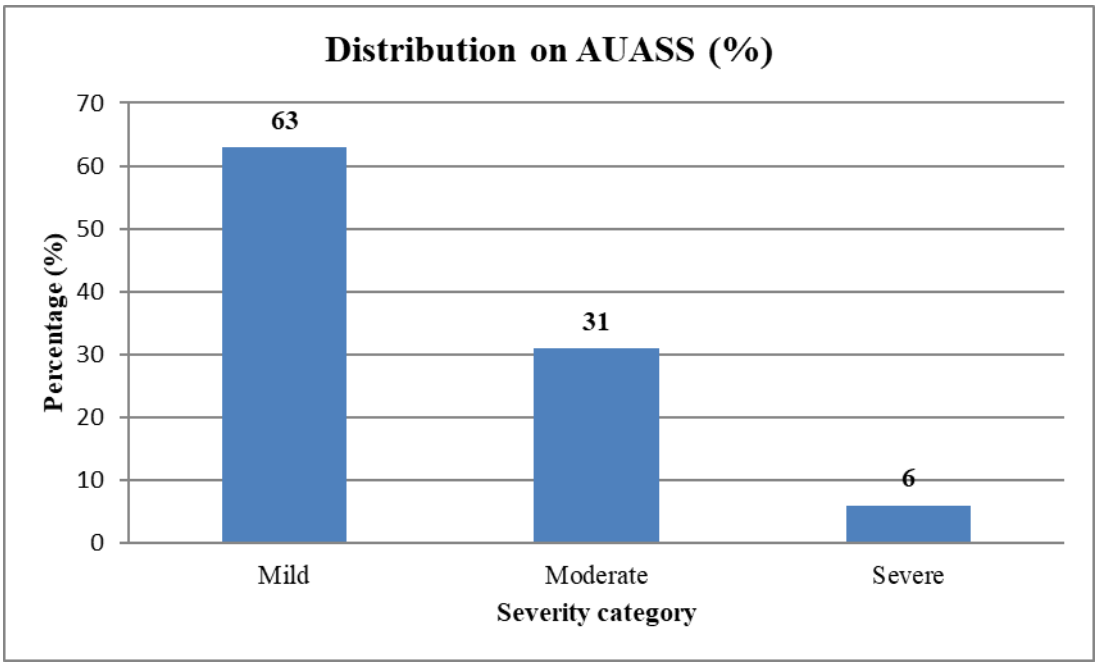

Figure-4: Preoperative distribution of patients according to AUASS (n=100)

Table-2: Operative data of study population (n=100)

Variables	Frequency	Percentage
Types of anesthesia		
Local	72	72
General	28	28
Length of Surgery		
Less than 1.5 hours	66	66
Greater than or equal 1.5 hours	34	34
Technique		
Open	72	72
Laparoscopic	28	28
Intraoperative Catheter Use	35	35
Intraoperative Fluid Administered		
Less than 1200 ml	66	66
Greater than or equal 1200ml	34	34

Table-2 shows that operative data of 100 study populations were collected including types of anesthesia, length of surgery, technique, any other procedure performed, intraoperative catheter used and intraoperative fluid administered. Among them, 72% patients had local anesthesia, 66% had less than 1.5 hours of surgery, for 72% patients open procedure was done, only 15% used other procedure, 35% patients used intraoperative catheter and 66% had less than 1200mL intraoperative fluid administered.

Table-3: Frequency of Postoperative data (n=100)

Post-operative data	Percentage
Perioperative Catheter Use	
Yes	35
No	65
Retention following surgery	
Yes	2
No	98

Table-3 shows that out of 100 patients, 35% patients used perioperative catheter. The retention following surgery and post-operative complication rate was very low. Only 4% patients had post-operative complications and 2% patients had the history of retention following surgery.

Table-4: Change in AUASS from preoperative to 48 hours after surgery (n=100)

Characteristics	Frequency(n)	Pre-operative AUASS Median (Min.-Max.)	48-hour Post-operative AUASS Median (Min.-Max.)	P-value
Overall	100	6(3-28)	13(5-33)	<0.001
Age				
<60 years	38	4(3-7)	7(5-24)	0.002
≥60 years	62	9(3-28)	15(8-33)	<0.001
History of BPH				
Yes	18	22(8-28)	29(16-33)	0.002
No	82	5(3-17)	12(5-24)	<0.001
Types of Hernia				
Unilateral	74	5(3-17)	11(5-24)	<0.001
Bilateral	26	12(8-28)	27(12-33)	0.001
Length of surgery				
<1.5 hours	66	4(3-7)	8(5-24)	<0.001
≥1.5 hours	34	11(3-28)	16(11-33)	<0.001
Length of anesthesia				
<2.5 hours	66	4(3-12)	7(5-30)	<0.001
≥2.5 hours	34	10(3-28)	15(8-33)	<0.001
Technique				
Open	72	5(3-17)	11(5-24)	<0.001
Laparoscopic	28	11(8-28)	26(12-33)	<0.001

Table-4 shows that the comparison between preoperative and 48 hours post-operative AUASS score in relation to age, history of BPH, types of Hernia, length of surgery, length of anesthesia and operative technique used. The overall median preoperative score was 6 (range 3 – 28) which increased to 13 (5-33) 48 hours after operation. The increase was statistically significant (p<0.001). The increase in AUASS score noted across all categories of age, BPH, hernia, surgery, anesthesia and surgical technique.

Table-5: Change in AUASS from preoperative to 30 days

Characteristics	Frequency(n) After 30 days	Pre-operative AUASS Median (Min.-Max.)	30 Days Post-operative AUASS Median (Min.-Max.)	P-value
Overall	92	6(3-28)	3(1-15)	<0.001
Age				
<60 years	36	4(3-7)	2(1-4)	<0.001

≥60 years	56	9(3-28)	4(2-15)	<0.001
History of BPH				
Yes	16	22(8-28)	6.5(3-15)	0.004
No	76	5(3-17)	3(1-10)	<0.001
Types of Hernia				
Unilateral	68	5(3-17)	3(1-10)	<0.001
Bilateral	24	12(8-28)	5(3-15)	<0.001
Length of surgery				
<1.5 hours	52	4(3-7)	3(1-8)	<0.001
≥1.5 hours	40	11(3-28)	6.5(2-15)	<0.001
Length of anesthesia				
<2.5 hours	62	4(3-12)	3(1-4)	<0.001
≥2.5 hours	30	10(3-28)	4(2-15)	<0.001
Technique				
Open	68	5(3-17)	3(1-10)	<0.001
Laparoscopic	24	11(8-28)	5(3-15)	<0.001
P-value is determined by Wilcoxon Signed Rank Test				

Table-5 shows that a follow up assessment using AUASS score was made after 30 days of operation. Eight patients were lost from follow-up. Table 5 shows the comparison between preoperative and 30 days post-operative AUASS score in relation to age, history of BPH, types of Hernia, length of surgery, length of anesthesia and operative technique used. The overall median preoperative score was 6 (range 3 – 28) which decreased to 3 (1-15) 30 days after operation. The improvement was statistically significant ($p<0.001$). The decrease in AUASS score was noted across all categories of age, BPH, hernia, surgery, anesthesia and surgical technique.

DISCUSSION

Urinary symptoms are frequently associated with inguinal hernias and urinary complications occur frequently following repair. Among the urinary complications, retention of urine is more common. The occurrence of postoperative urinary retention leads to increased cost and decreased quality of life, often resulting in prolonged indwelling catheter placement, unplanned admissions, or extended hospital length of stay [20,14]. This study was designed to evaluate the effect of elective hernia repair on urinary symptoms in men.

In this study out of 100 patients with inguinal hernia, majority 62% were from age group above 60 years. The mean age of patients was 60.36 ± 6.87. Minimum age of the patients was 41 and maximum age of the patients was 73. A study from Singh S et al shows 28 cases (51.85%) were in (45-65 years) age group followed by 17 cases (31.48%) in (15-44 years) group and 9 cases (16.67%) in > 65 age group. In that study the mean age was 49.48±17.00 years and median age was 54 years. The minimum age was 19 years and maximum age was 75 years [22] Another study by Gurjar et al., the age distribution show that incidence of hernia is increased with advancing of age and rate is more after age of 45 years [23]. These and many others studies support that incidence of inguinal hernia increases with the increased age.

Among 100 patients with inguinal hernia, majority 56% were from rural area and

other 44% were from urban area. Among them majority 66% were illiterate and 34% were educated. But no other study linked to residence and educational status. In that perspective the residence distribution and educational status of this study may only represent country distribution of population over rural and urban areas and educational status. These data have demographic value.

Medical chart abstraction was performed to assess the history of benign prostatic hyperplasia (BPH) whether the patient was on medication for BPH. In our study BPH was positive for 18% patients and 20% took one or more medication for BPH. Reed RD et al. reported among of his 101 patient 16 patients had history of BPH and 19 patients had history of BPH medications which is almost similar to our study. He also found patients who had a history of preoperative medication for benign prostatic hyperplasia (BPH) had a significantly higher AUASS preoperative score than those without medication (12 vs 5, respectively, P 5 .01) [21]. Studies have demonstrated a reduction in urinary retention following herniorrhaphy with the use of alpha blockers. A trial comparing prazosin with a placebo found a significantly lower incidence of urinary retention following hernia repair among the group treated with prazosin [23,12].

Out of 100 patients, the prostate-specific antigen (PSA) was tested for 50 patients. Among them 93% had PSA less than 4. This study is consistent with the study of Reed et al. He found 96 patients had PSA greater than 4 among of his patient of 101 [21].

Among 100 patients, 74% had unilateral inguinal hernia and other 26% had bilateral hernia. From the study of Singh S et al, there among 54 cases, 31 cases (57.41%) were right sided and 21 cases (38.89%) were left sided and 2 cases (3.70%) were bilateral. R: L ratio was (1.48:1) [55]

American Urological Association Symptom Score (AUASS) is divided into three categories: mild (1 to 7), moderate (8 to 19) and severe (20 to 35). Majority, 63% of our patients had mild AUASS and only 7% had severe AUASS. The mean AUASS value was 8.44. The minimum value was 3 and maximum value was 28. Reed RD et al reported only 2 patients (approximately 2%) experienced clinical urinary retention and requiring intervention with a urinary catheter. The median preoperative AUASS was 6. He also observed lower preoperative AUASS were more likely to have an increased score at 48 hours that mostly returned to or fell below baseline at 30 days.[54] In urology practice, the coexistence of inguinal hernia and LUTS is very common due to the involvement of the organs of the urinary tract in an inguinal hernia. Patients with inguinal hernia reportedly have higher urinary symptoms than those without inguinal hernia [24].

Out of 100 patients, 72% patients had local anesthesia, 66% had less than 1.5 hours of surgery, for 72% patients open procedure was done, only 15% used other procedure, 35% used intraoperative catheter and 66% had less than 1200mL intraoperative fluid administered. The retention following surgery and post-operative complication rate was very low. Only 4% patients had post-operative complications and 2% patients had the history of retention following surgery. Reed D et al reported out of 101 patient, general anesthesia was used in 99 patients, length of surgery was less than 1.5 hours in 50 patients, intraoperative catheter was used in his 37 patient and 50 patients had less than 1200 ml intraoperative fluid. The incidence of postoperative urinary retention was low in his prospective study. Additionally, he reported a patient undergoing laparoscopic repair, which was usually performed with a urinary catheter placed intraoperatively, experienced greater increase in symptoms from 4 to 11 compared with 7 to 10 for open repair [21]. In a study by

Roadman D et al intraoperative indwelling catheter was used in his 35 patients (54.7%). Overall, 64 (11.1%) of the 578 patients developed post-operative urinary retention [25]. The pathophysiology of postoperative urinary retention is multifactorial due to the complex nature of the micturition mechanism. Factors such as obstruction, neuromuscular disruption and local inflammatory factors and over distention of the bladder have been implicated in the pathogenesis of urinary retention. Prior studies have shown limiting fluid administration decreases the incidence of postoperative urinary retention. Several studies have also documented the adverse effects of both general and local anesthesia on the neuromuscular function of the bladder [26,10].

Table 4 shows the comparison between preoperative and 48 hours post-operative AUASS score in relation to age, history of BPH, types of Hernia, length of surgery, length of anesthesia and operative technique used. The overall median preoperative score was 6 (range 3 – 28) which increased to 13 (5-33) 48 hours after operation. The increase was statistically significant ($p<0.001$). These findings are comparable to the findings of Reed RD et al. In his study, the overall score increased from 6 to 10 ($P <.01$) [21].

An assessment using AUASS score was made after 30 days of operation. Eight patients were lost from follow-up in our study. The overall median preoperative score was 6 (range 3 – 28) which decreased to 3 (1-15) 30 days after operation. The improvement was statistically significant ($p<0.001$). Reed RD et al reported the change in AUASS from preoperative score to 30- day score is 6 to 3 (P, .0001) which is consistent with our study [21].

CONCLUSION

Overall developments of urinary symptoms after repair of inguinal hernia are very few. Moreover, it was observed that significant improvement of urinary symptoms occurs. However, the study result should be reproduced by further studies before use.

Limitation of the study

Single center study, Long-term follow up was beyond the scope, the gap between the estimated sample size and the patients.

REFERENCE

1. Parsons JK, Bergstrom J, Silberstein J, Barrett-Connor E. Prevalence and characteristics of lower urinary tract symptoms in men aged > or =80 years. Urology. 2008; 72:318–321.
2. Barry MJ. Evaluation of symptoms and quality of life in men with benign prostatic hyperplasia. Urology. 2001; 58:25-32.
3. Lepor H. Pathophysiology of Benign Prostatic Hyperplasia in the Aging Male Population. Reviews in Urology. 2005;7, S3-S12.
4. Yalla SV, Sullivan MP, Lecamwasam HS, DuBeau CE, Vickers MA, Carvalho EG Correlation of the American Urological Association symptom index with obstructive and nonobstructive prostatism. J Urol. 1995;153;674-9.
5. Chancellor MB, Rivas DA. American Urological Association symptom index for women with voiding symptoms: lack of index specificity for benign prostatic hyperplasia. J Urol. 1993;150: 1706-11.
6. Nitti VW, Kim Y, Combs AJ. Correlation of the AUA symptom index with urodynamics in patients with suspected benign prostatic hyperplasia. Neurourol Urodyn. 1994;13: 521-7.
7. McVary KT, Roehrborn CG, Avins AL, et al. American Urological Association Guideline: Management of Benign Prostatic Hyperplasia (BPH). Linthicum, MD: American Urological Association; 2010,18-19.
8. Wagner JP, Brunicardi FC, Amid PK, et al. Schwartz's Principles of Surgery, Tenth Edition. New York: McGraw-Hill Education. 2015, 1495.
9. Reis RB, Rodrigues Neto AA, Reis LO, et al. Correlation between the presence of

inguinal hernia and the intensity of lower urinary tract symptoms. Acta Cir Bras 2011;26(Suppl 2):125–8
10. Baldini G, Bagry H, Aprikian A, et al. Postoperative urinary retention: anesthetic and perioperative considerations. Anesthesiology 2009;110: 1139–57.
11. Go¨nu¨llu¨ NN, Du¨lger M, Utkan NZ, et al. Prevention of postherniorrhaphy urinary retention with prazosin. Am Surg 1999; 65:55–8.
12. Darrah DM, Griebling TL, Silverstein JH. Postoperative urinary retention. Anesthesiol Clin 2009;27: 465–84.
13. Antonescu I, Baldini G, Watson D, et al. Impact of a bladder scan protocol on discharge efficiency within a care pathway for ambulatory inguinal herniorrhaphy. Surg Endosc 2013;27: 4711–20.
14. Tammela T, Kontturi M, Lukkarinen O. Postoperative urinary retention. II. Micturition problems after the first catheterization. Scand J Urol Nephrol 1986;20: 257–60.
15. Linares Gil MJ, Esteve Go´mez A, Blanco Vargas D, et al. Factors associated with delayed postsurgical voiding interval in ambulatory spinal anesthesia patients: a prospective cohort study in 3 types of surgery. Am J Surg 2009;197: 182–8.
16. Ozgu¨n H, Kurt MN, Kurt I, et al. Comparison of local, spinal, and general anaesthesia for inguinal herniorrhaphy. Eur J Surg 2002;168: 455–9.
17. Jensen P, Mikkelsen T, Kehlet H. Postherniorrhaphy urinary retention–effect of local, regional, and general anesthesia: a review. Reg Anesth Pain Med 2002;27: 612–7.
18. Kozol RA, Mason K, McGee K. Post-herniorrhaphy urinary retention: a randomized prospective study. J Surg Res 1992;52: 111–2. Petros JG, Rimm EB, Robillard RJ, et al. Factors influencing postoperative urinary retention in patients undergoing elective inguinal herniorrhaphy. Am J Surg 1991;161: 431–3.
19. Barry MJ, Fowler FJ, O'Leary MP, et al. The American Urological Association symptom index for benign prostatic hyperplasia. The Measurement Committee of the American Urological Association. J Urol 1992;148: 1549–57; discussion, 1564.
20. Reed RD, Poston TL, Kerby JD, Richman JS, Colli JL, Hawn MT. Effect of elective inguinal hernia repair on urinary symptom burden in men. Am J Surg. 2014;208(2):180–6.
21. Singh S, Prakash R, Singh V, Singh S, Jan SJ. A clinical study of inguinal hernia with special reference to laparoscopic trans-abdominal pre peritoneal repair. Int Surg J. 2017;4(1):282–90.
22. Mohammadi-Fallah M, Hamedanchi S, Tayyebi-Azar A. Preventive effect of tamsulosin on postoperative urinary retention. Korean J Urol 2012;53: 419–23.
23. Sentürk AB, Ekici M, Sahiner IT, Tas T, Cakiroglu B. Relationship between lower urinary tract symptoms and inguinal hernia. Arch Ital di Urol e Androl 2016; 2016;88(4):262–5.
24. Roadman D, Helm M, Goldblatt MI, Kastenmeier A, Kindel TL, Gould JC, et al. Postoperative urinary retention after laparoscopic total extraperitoneal inguinal hernia repair. J Surg Res. 2018; 231:309–15.
25. Hudak KE, Frelich MJ, Rettenmaier CR, Xiang Q, Wallace JR, Kastenmeier AS, et al. Surgery Duration Predicts Urinary Retention after Inguinal Herniorraphy: A Single Institution Review. Surg Endosc. 2015;29(11):3246–50.