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An Observational Study to Assess the Correlation Between Inguinal Hernia and Intensity of Lower Urinary Tract Symptoms Due to Benign Prostatic Hyperplasia

Mohit B. Maniya[1], Nida Mohammed[2]

[1, 2]DNB General Surgery, Department of General Surgery, Sri Ramakrishna Hospital, Coimbatore, Tamil Nadu, India

Abstract: ***Background:*** *An inguinal hernia (IH) is a protrusion of abdominal-cavity contents, such as intestines, through the inguinal canal. LUTS occurs due to mechanical obstruction of outflow or due to bladder hypo contractility. In elderly male both these causes can be present alone or simultaneously. Traditionally, the diagnostic evaluation of patients with Lower urinary tract symptoms (LUTS) suggestive of bladder outlet obstruction (BOO) includes symptomatic evaluation.* ***Aims & Objectives:*** *To assess the correlation between BPH, Inguinal Hernia and the intensity of Lower urinary symptoms (LUTS) due to BPH.* ***Methodology:*** *A prospective observational study was conducted among 80 patients who had diagnosed inguinal Hernia with BPH and another 80 patients who had diagnosed inguinal Hernia without BPH came to Department of Surgery & urology, at Sri Ramakrishna Hospital, Coimbatore.* ***Results:*** *The majority cases were in age groups of 51-60 years and 61-70 years. Among Inguinal hernia with Lower urinary tract symptom patients, mean IPSS was significantly more than Inguinal hernia without Lower urinary tract symptom patients. In our present study among direct inguinal hernia group and indirect inguinal hernia group, there was no statistically significant difference between two groups in regards to type of inguinal hernia and IPSS score.* ***Conclusion:*** *On the basis of this study, it could be concluded that if patients with Inguinal Hernia (especially bilateral IH) had complaints of urinary symptoms related to BPH or other causes of Lower Urinary Tract Obstruction they must be evaluated for LUTS and BOO by USG-KUBP and uroflowmetry and relieve the obstruction before proceeding hernia management.*

Keywords: Inguinal Hernia, Lower Urinary tract, Infection, Benign Prostate Hyperplasia.

1. Introduction

An inguinal hernia (IH) is a protrusion of abdominal-cavity contents, such as intestines, through the inguinal canal. [1] Multiple etiologic factors are responsible for development of Inguinal hernia. Risk factors for the development of an IH include inheritance, [2] gender, [3] age, collagen metabolism, chronic cough, chronic constipation, and prostatectomy history, especially in retropubic open prostatectomy. Conversely, obesity decreases the occurrence of inguinal hernia. [4] There are several mechanisms for IH, such as Musculo-fascial weakness, anatomical variations, connective tissue alterations and high intra-abdominal pressure. [5] A study with a large population (1.5 million subjects) indicated that increased cumulative intra-abdominal pressure, like lifting, standing and walking, is related to the formation of IH; [6] furthermore, reducing daily cumulative intra-abdominal pressure could prevent IH surgery by 30%. [7] These include weakness of abdominal wall in elderly age, obesity and work-related causes.

The prostate is a male organ which is likely to be enlarged with advancement of age. Benign Prostatic Hyperplasia (BPH) is leading cause of Bladder Outlet Obstruction (BOO), [8] so Lower Urinary Tract Symptoms (LUTS) are mostly prevalent among elderly men. Benign Prostatic Hyperplasia is macroscopically characterised by an enlargement of the prostate gland and histologically by the progressive hyperplasia of the stromal and glandular prostatic cells. This is a non-malignant overgrowth of the prostatic tissue which leads to bladder outlet obstruction. Thus, BPH results in bladder outlet obstruction. Bladder outlet obstruction leads to LUTS and Inguinal Hernia (IH). [9]

Multiple etiologic factors have been described with the genesis of urinary symptoms. These including the effect of aging on nervous system and urinary bladder, metabolic derangements, changes in fluid regulation, obstruction and autonomic overactivity. [10] LUTS occurs due to mechanical obstruction of outflow or due to bladder hypo contractility. In elderly male both these causes can be present alone or simultaneously. Traditionally, the diagnostic evaluation of patients with Lower urinary tract symptoms (LUTS) suggestive of bladder outlet obstruction (BOO) includes symptomatic evaluation. [11] These symptoms are divided into Obstructive and Storage/ Irritative. Obstructive symptoms include hesitancy, poor stream, intermittent stream, straining, prolonged micturition, feeling of incomplete bladder emptying, dribbling at end of micturition. Storage/ Irritative symptoms includes frequency, urgency, urge incontinence, nocturia. The severity of LUTS is best measured using quantitative symptoms indices. [12]

Many symptom scoring systems have proved to be a useful tool to quantify these clinical symptoms. The most widely used scoring system is the International Prostate Symptom Score (IPSS), developed by American Urological Association (AUA) and adopted by World health Organization (WHO). It is a very useful tool to clinically asses intensity of LUTS symptoms and quality of life. Patients of Inguinal Hernia have higher IPSS score than patient without Inguinal hernia. With additional information of Prostate volume and value of Uroflowmetry in IPSS score can improve the sensitivity of study of correlation. [13] It is common for Urologists to face patients presenting with LUTS associated with Inguinal Hernia. However, the studies showing the correlation of BPH with Inguinal Hernia are scanty in the world and also in India.

Aims & Objectives: To assess the correlation between BPH, Inguinal Hernia and the intensity of Lower urinary symptoms (LUTS) due to BPH.

2. Methodology

A prospective observational study was conducted among 80 patients who had diagnosed inguinal Hernia with BPH and another 80 patients who had diagnosed inguinal Hernia without BPH came to Department of Surgery & urology, at Sri Ramakrishna Hospital, Coimbatore. Female patients, Age <40 year, Patient who had Urethral stricture, Prostatic Carcinoma, Recent History of Abdominal surgery (<1 year) or Patient already taking medication for BPH or already undergone Surgery for BPH were excluded.

An inform written consent was taken before including the patient as study participant. All patient with Inguinal hernia were divided in two group, Group 1 (study group) Inguinal hernia patients with clinical evidence of LUTS related to BPH and Group 2 (control group) Inguinal hernia patient with no clinical evidence of LUTS related to BPH. All patient with Inguinal hernia were assessed for Lower urinary tract symptoms By IPSS score guidelines and the duration of the symptoms were noted. Prostate volume (antero-posterior diameter x transverse diameter x longitudinal diameter x0.52) was measured by supra public sonography. The study was conducted with the approval of the Research Ethics committee of Sri Ramakrishna Hospital. Written informed consent was taken from all study participants.

Data entry & analysis: Data collected was entered in Excel 2019, and analysis of data were done using Statistical Package for Social Sciences for Windows, Version 22. The data on categorical variables were shown as n (% of cases), and the data on continuous variables were presented as mean, and standard deviation (SD). Comparison of the distribution of categorical variables were done using the Chi-Square test. Comparison of continuous variables were done by using student T test. The value <0.05 was considered as statistically significant.

3. Results

Table 1: Frequency Distribution of study participants according to Age

Age	IH with LUTS	IH without LUTS	P value
41-50	6 (7.5%)	6 (7.5%)	0.906
51-60	36 (45%)	33 (41.3%)	
61-70	29 (36.3%)	29 (36.3%)	
>70	9 (11.3%)	12 (15%)	
Total	80 (100%)	80 (100%)	

Chi square value is 0.559, df=3, P value <0.05 is statistically significant

Among Inguinal hernia with Lower urinary tract symptom patients, 36(45%) were aged 51-60 years, 29(36.3%) were aged 61-70 years, 9(11.3%) were aged >70 years and 6(7.5%) were aged 41-50 years. Among Inguinal hernia without Lower urinary tract symptom patients, 33(41.3%) were aged 51-60 years, 29(36.3%) were aged 61-70 years, 12(15%) were aged >70 years and 6(7.5%) were aged 41-50 years. There was no statistically significant difference between two groups in regards to age. [Table 1]

Table 2: Frequency Distribution of study participants according to IPSS

IPSS	IH with LUTS	IH without LUTS	P value
Mild	0	80(100%)	0.0001
Moderate	31(38.8%)	0	
Severe	49(61.3%)	0	
Total	80(100%)	80(100%)	

Chi square value is 160, df=2, P value <0.05 is statistically significant

Among Inguinal hernia with Lower urinary tract symptom patients, 31(38.8%) had moderate International prostate symptom score and 49(61.3%) had severe International prostate symptom score. Among Inguinal hernia without Lower urinary tract symptom patients, all 80(100%) had mild International prostate symptom score. There was a statistically significant difference between two groups in regards to IPSS. [Table 2]

Table 3: Descriptive statistics of study participants according to mean IPSS

IPSS	IH with LUTS	IH without LUTS	P value
Mean	22.93	0	0.0001
SD	6.3	0	

Student t test applied, P value <0.05 is statistically significant

Among Inguinal hernia with Lower urinary tract symptom patients, mean IPSS was 22.93 with a SD of 6.3. Among Inguinal hernia without Lower urinary tract symptom patients, mean IPSS was 0. There was a statistically significant difference between two groups in regards to mean IPSS. [Table 3]

Table 4: Descriptive statistics of study participants according to Q max (ml/sec)

Q max	IH with LUTS	IH without LUTS	P value
Mean	8.85	11.58	0.001
SD	1.87	1.32	

Student t test applied, P value <0.05 is statistically significant

Among Inguinal hernia with Lower urinary tract symptom patients, mean Q max was 8.85 with a SD of 1.87. Among Inguinal hernia without Lower urinary tract symptom patients, mean Q max was 11.58 with a SD of 1.32. There was a statistically significant difference between two groups in regards to mean Q max. [Table 4]

4. Discussion

The present study was a prospective observational study to assess the correlation between Inguinal Hernia and Intensity of Lower Urinary tract Symptoms due to Benign Prostatic Hyperplasia done in department of surgery in tertiary care hospital. In our present study among both Inguinal hernia with lower urinary tract symptoms patients and Inguinal hernia without lower urinary tract symptoms patients, majority were in age groups of 51-60 years and 61-70 years,

there was no statistically significant difference between two groups in regards to age. Similar findings were found in study done by Wu YH et al [14], majority of patients were aged above 40 years. In a study done by Reis RB et al [15], mean age among patients with inguinal hernia was 65.2 with a SD of 7.4 with a range of 55 and 81. In a study done by Parthiban SS et al [16], majority of study participants were middle aged personnel and were above age of 40 years. In a study done by Sentürk AB et al [17], The mean age was 61.38 ± 9.19 years in the BPH-IH group, versus 61.52 ± 7.47 years in the BPH group; the difference was not significant.

In our present study, according to lower urinary tract symptoms, most common symptom was increased frequency of micturition, followed by poor urine stream, incomplete emptying of the bladder, Nocturia, straining, urgency of micturition and intermittence. Despite many experts attempting to explain the association between LUTS-BPH and hernia formation, the relation between LUTS-BPH and IH might be more complicated and intertwined because both are affected by aging. [14],

In our present study among Inguinal hernia with Lower urinary tract symptom patients, majority had moderate International prostate symptom score, followed by severe International prostate symptom score and among Inguinal hernia without Lower urinary tract symptom patients, all had mild International prostate symptom score. there was a statistically significant difference between two groups in regards to IPSS. The presence of lower urinary tract symptoms and their intensity decides the intensity of IPSS and the more the IPSS the more were the Lower urinary tract symptoms.

In our present study among Inguinal hernia with Lower urinary tract symptom patients, mean IPSS was significantly more than Inguinal hernia without Lower urinary tract symptom patients. The presence of Lower urinary tract symptoms leads to increase in IPSS. In a study done by Senturk et al [17], among LUTS-BPH and IH, the mean IPSS in the BPH-IH group was 14.46 ± 8.64 (median: 13; range: 1-32), versus 16.02 ± 7.72 (median: 15.50; range: 5-30) in the BPH group; the difference was not significant ($p = 0.348$). In a study done by Parthiban SS et al [16], the results of the IPSS score revealed that 22 patients (35%) and 22 controls (35%) experienced moderate to severe symptoms, although there was no statistical significance between the two groups.

In our present study among Inguinal hernia with Lower urinary tract symptom patients, mean Q max was significantly less than Inguinal hernia without Lower urinary tract symptom patients. The presence of Lower urinary tract symptoms and based on their intensity leads to far more Qmax than patients without Lower urinary tract symptoms. In a study done by Reis RB et al [15], Q max among patients with inguinal hernia was 11.4 ml/sec with a SD of 2.9 ml/sec and patients without inguinal hernia group the Q max was 12.6 ml/sec with a SD of 3.1. In a study done by Parthiban SS et al [16], conducted a study at tertiary care hospital 11 of the cases, or 17 percent, and 13 of the controls, or 21 percent, had a Qmax value of less than 15, and there was no statistically significant difference between the two groups. In a study done by Sentürk AB et al [17], the mean flow rate (Qmax) was 13.78 ± 4.28 ml/sec (median: 15; range: 6-20) in the BPH-IH group, versus 13.04 ± 6.12 ml/sec (median: 12; range: 3-32) in the BPH group; again, the difference was not significant.

5. Conclusion

The association between Inguinal Hernia and Benign Prostatic Hyperplasia using International Prostate Symptom Score showed statistically significant association between the two groups (Inguinal hernia with Lower urinary tract symptom patients and Inguinal hernia without lower urinary tract symptoms patients). Their occurrence together was considered a chance co-existence rather than cause and effect. On the basis of this study, it could be concluded that if patients with Inguinal Hernia (especially bilateral IH) had complaints of urinary symptoms related to BPH or other causes of Lower Urinary Tract Obstruction they must be evaluated for LUTS and BOO by USG-KUBP and uroflowmetry and relieve the obstruction before proceeding hernia management. The complications of hernia in the form of obstruction or recurrence could be prevented by early diagnosis and treatment of Lower Urinary Tract Obstruction.

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