International Journal of Surgery and Surgical Research
www.surgeryjournals.net
Online ISSN: 2664-9179, Print ISSN: 2664-9160
Received: 10-11-2021, Accepted: 25-11-2021, Published: 11-12-2021
Volume 3, Issue 1, 2021, Page No. 38-41

A Study on association between benign prostatic hyperplasia and inguinal hernia

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Abstract
Objective: To find out whether there is any causal association between Benign Prostatic Hyperplasia and Inguinal Hernia
Materials and Methods: A prospective study in which 75 male patients aged more than 50 years admitted with inguinal hernia to the surgery male ward of KVG Medical college from 1st October, 2019 to 31st December, 2020 were selected as cases and a corresponding number of control subjects was selected randomly from the patients admitted to KVGMCH, Sullia for conditions other than inguinal hernias so as to make a control group of 75 subjects.
Results: No statistically significant association between Inguinal Hernia and Benign Prostatic Hyperplasia using International Prostate Symptom Score, Serum Prostatic Specific Antigen, Prostatic size was found.
Conclusion: Even though both Inguinal Hernia and Benign Prostatic Hyperplasia are seen with increased frequency in the aged male population, this study showed no statistically significant association between the two. Their occurrence together is considered a chance co-existence rather than cause and effect.

Keywords: inguinal hernia, benign prostatic hyperplasia

Introduction

Benign prostatic hyperplasia (BPH) is associated with unregulated proliferation of connective tissue, smooth muscle and glandular epithelium within the prostatic transition zone. It is a histologial diagnosis. Physical compression of the urethra and result in anatomic bladder outlet obstruction may be caused by BPH [1]. The occurrence of inguinal hernia and benign hyperplasia with accompanied urinary tract obstructive symptoms is found to be related to age. Benign obstructing prostate enlargement can also increase the risk of developing hernia and aggravate the symptoms related to hernia. Significant correlation between inguinal hernia and obstructing benign prostate enlargement may be expected on the basis of this evidence [2]. Inguinal hernia and symptomatic prostate enlargement are found together with a high incidence amongst elderly patients. Their occurrence together is considered a chance co-existence rather than cause and effect. Approximately 5% of the general population is affected by hernia. The incidence of inguinal hernia is found to be 15–25% in patients undergoing prostatectomy [3].The mechanisms which can explain the increased risk of subsequent Inguinal hernia in patients with LUTS-BPH are not clear. A possible hypothesis is that LUTS-BPH patients have to push or strain to begin urination, which leads to an increase in intra-abdominal pressure causing inguinal hernia [4].

Materials and Methods

Source of data

75 male patients aged more than 50 years admitted with inguinal hernia to the surgery male ward of KVG Medical college from 1st October, 2019 to 31st December, 2020 are selected as cases.

Inclusion criteria were,

1. 1.Male sex,
2. Age more than 50 years,
3. Those with inguinal hernia.

Exclusion criteria were,

1. 1.Female sex,
2. Age ≤ 50 years,
3. Known case of connective tissue disorders,
4. Known case of BPH, who are already on drugs or have had any form of surgery for BPH in the past.
5. Presence of complications of hernia, such as irreducibility, strangulation or obstruction.

The inclusion criteria for the controls include

1. 1.Male sex,
2. Age > 50 years,
3. Not seriously ill.

The exclusion criteria for the controls include

1. Female sex
2. Age ≤ 50 years,
3. Known case of connective tissue disorders,
4. Known case of BPH, who are already on drugs or have had any form of surgery for BPH in the past,
5. Presence of inguinal hernia unilateral, bilateral or recurrent,
6. History of surgery done for inguinal hernia in the past,
7. Seriously ill or bedridden patient

Study design

Prospective study

Sample size
150

Sampling procedure
First 75 male patients aged more than 50 years in order of their date of admission with inguinal hernia to male surgical ward of KVGMCH, Sullia between October 2019 and January 2021 are selected as cases.
Every week, after selecting cases, the corresponding number of control subjects was selected randomly from the patients admitted to KVGMCH, Sullia for conditions other than inguinal hernias so as to make a control group of 75 subjects Informed written consent was obtained from each of the cases and controls. All subjects were interviewed and examined. For this study three independent variable-

- International Prostate Symptom Score,
- Prostate specific antigen (PSA), and
- Prostate volume were taken and prevalence of BPH in cases and controls were found out for each of the three variables separately.

International prostate symptom score
Among the cases 22 subjects were not symptomatic, 25 were mildly symptomatic, 26 were moderately symptomatic and 2 were severely symptomatic at the time of admission. Among controls, 37 were not symptomatic 19 were mildly symptomatic, 15 were moderately symptomatic and 4 were severely symptomatic.
All subjects who were moderately or severely symptomatic were considered as having significant BPH. Hence there were 28 subjects among cases and 19 subjects among controls were having significant

BPH

Table 1

IPSS	CASE	CONTROL	TOTAL
>8	28	19	46
<8	47	56	103
TOTAL	75	75	150

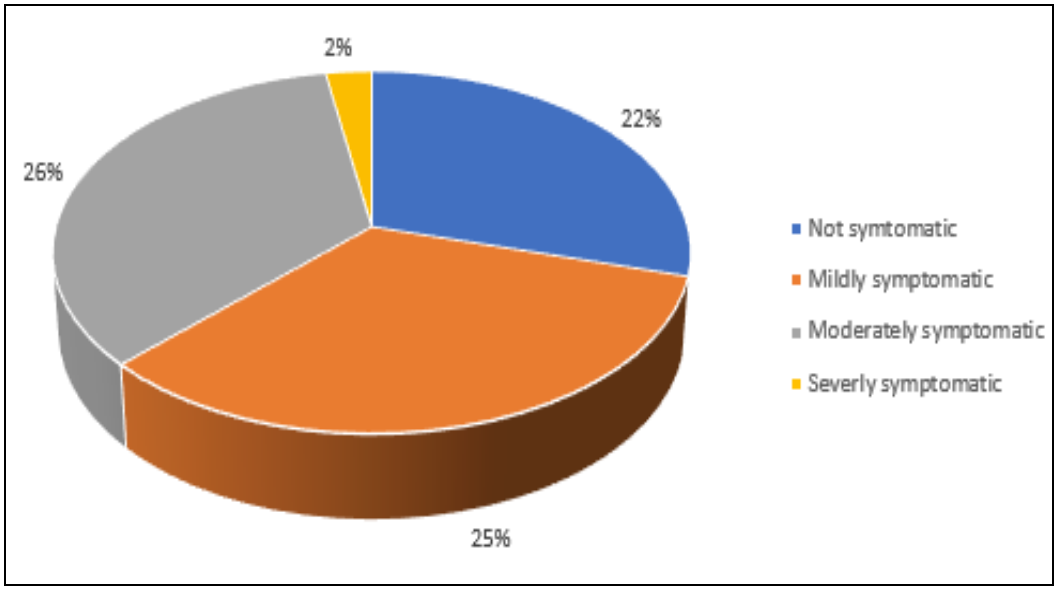

Fig 1: International Prostate Symptom Score of Cases

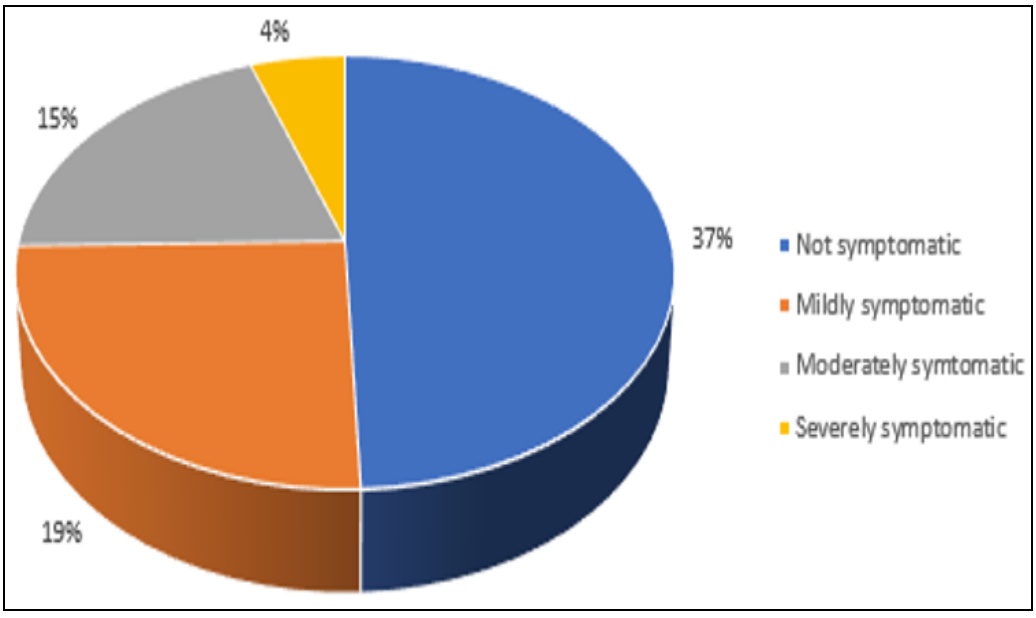

Fig 2: International Prostate Symptom Score of controls

Table 2

OBSERVED VALUE	EXPECTED VALUE	CHI SQUARE VALUE	TOTAL
28	46×75/150=23	$(28-23)^2/23=1.08$	2.55
19	46×75/150=23	$(19-23)^2/23=0.69$	
47	103×75/150=51.5	$(47-51.5)^2/51.5=0.39$	
56	103×75/150=51.5	$(56-51.5)^2/51.5=0.39$	

Chi square value-2.55 P value 0.466323

Among those scored >8 in IPSS 28 (0.57%) were cases and 19 (0.41%) were controls. However the difference was not found to be statistically significant.

Prostate volume

Among cases, 26 subjects were having prostate volume >25cc and 49 were having prostate volume ≤ 25cc. Therefore 26 of 75 cases were considered to have significant Benign Prostatic Enlargement. Among controls, 25 subjects were having prostate volume > 25cc and 50 were having prostate volume ≤ 25cc. Therefore 25 of 75 controls were considered to have significant

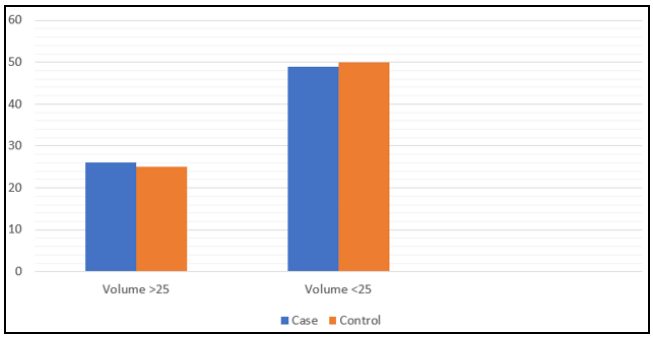

Fig 3: Prostate volume

Table 3: Benign Prostatic enlargement

PROSTATE VOLUME	CASE	CONTROL	TOTAL
>25	26	25	51
<25	49	50	99
TOTAL	75	75	150

Table 4

OBSERVED VALUE	EXPECTED VALUE	CHI SQUARE VALUE	TOTAL
26	51×75/150=25.5	$(26-25.5)^2/25.5=0.0098$	0.0296
25	51×75/150=25.5	$(25-25.5)^2/25.5=0.0098$	
49	99×75/150=49.5	$(49-49.5)^2/49.5=0.0050$	
50	99×75/150=49.5	$(50-49.5)^2/49.5=0.0050$	

Chi square value-0.0296 P value -0.9986

The difference in the number of cases and controls is not statistically significant.

Prostate specific antigen

Among the cases 14 subjects were having PSA > 4ng/ml and 61 were having PSA ≤ 4ng/ml. Therefore 14 out of 75 cases were taken as having significant Benign Prostatic Enlargement.

Among the controls 17 subjects were having PSA > 4ng/ml and 58 were having PSA ≤ 4ng/ml. Therefore 17 out of 75 controls were taken as having significant Benign Prostatic Enlargement.

Table 5

PSA	CASES	CONTROL	TOTAL
>4ng/ml	14	17	31
<4ng/ml	61	58	119
TOTAL	75	75	150

Table 6

OBSERVED VALUE	EXPECTED VALUE	CHI SQUARE VALUE	TOTAL
14	31×75/150=15.5	$(14-15.5)^2/15.5=0.145$	0.364
17	31×75/150=15.5	$(17-15.5)^2/15.5=0.145$	
61	119 ×75/150=59.5	$(61-59.5)^2/59.5=0.037$	
58	119 ×75/150=59.5	$(58-59.5)^2/59.5=0.037$	

Chi square value-0.364 P value-0.947

The difference in the distribution of the number of patients with PSA >4ng/ml between cases and controls (14 and 17 respectively) was not found to be significant.

Results

- Among the cases 62 were having unilateral hernia and 13 were having bilateral hernias. Right sided hernia was slightly more common than the left sided hernias (33 vs 29). Direct hernia was more common than indirect hernia in the age group (49 vs 26).
- No statistically significant association between Inguinal Hernia and Benign Prostatic Hyperplasia using International Prostate Symptom Score was found
- No statistically significant association between Inguinal Hernia and Benign Prostatic Hyperplasia using Serum Prostate Specific Antigen was seen.
- Prostatic size also did not show any statistically significant association between Inguinal Hernia and Benign Prostatic Hyperplasia.

Discussion

IH constitutes 75% of abdominal wall hernias and 97% of groin hernias. The risk factors for developing inguinal hernia can be divided into patient risk factors and external risk factors. Patient-dependent risk factors include male sex, older age, a patent processus vaginalis, chronic cough, systemic connective tissue disorders, and low BMI [6].

BPH is commonly occurs in the aging male population. The prevalence of BPH increases after the age of 40 years, and BPH prevalence has increased rapidly due to the aging of society [6].

For this study three independent variable–

- International Prostate Symptom Score,
- Prostate specific antigen (PSA), and
- prostate volume were taken

The cases in this study were patients with inguinal hernia

and controls did not suffer from inguinal hernia.

"Sentu¨rk achieved conclusions through IPSS in investigating the relation between LUTS-BPH and IH. Per a similar experiment, the patients above 50 years were divided into two groups, LUTS-BPH with IH (n = 50) and LUTS-BPH without IH (n = 50). There was no significant difference in IPSS between the two groups, but prostate volume was significantly enlarged in patients with LUTS-BPH and IH. The result may be accounted for by poor correlation between prostate size and LUTS, and small population size as well" [4]

"Reis *et al*. did not find a positive correlation between prostate volume and the presence LUTS but the presence of IH correlated with a higher IPSS" [7]

In this study the prevalence of BPH in cases and controls were found out for each of the three variables separately. The difference in the number of cases and controls for each variable was not found to be statistically significant.

Conclusion

Even though both Inguinal Hernia and Benign Prostatic Hyperplasia are seen with increased frequency in the aged male population, this study showed no statistically significant association between the two. Their occurrence together is considered a chance co-existence rather than cause and effect.

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