

Benign Prostatic Hyperplasia among Patients with Inguinal Hernia: A Descriptive Cross-sectional Study

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ABSTRACT

Introduction: Benign prostatic hyperplasia refers to the non-cancerous enlargement of the smooth muscle and epithelial cells within the prostatic gland transition zone in aging males, leading to the enlargement of the gland. Benign prostatic hyperplasia is common in the aging male population. The coexistence of inguinal hernia and lower urinary tract symptoms due to benign prostatic hyperplasia is common. The objective of this study was to find out the prevalence of benign prostatic hyperplasia among patients with inguinal hernia in a tertiary care centre.

Methods: A descriptive cross-sectional study was done among patients with inguinal hernia between 14 April 2023 to 13 April 2024 in a tertiary care centre after obtaining ethical approval from the Institutional Review Board. Male patients aged >50 years with a clinical diagnosis of inguinal hernia were included in the study. Patients who had any form of surgery for benign prostatic hyperplasia in the past, diagnosed cases of bladder outlet obstruction due to causes other than benign prostatic hyperplasia, diagnosed cases of prostate carcinoma, patients with femoral or other abdominal wall hernia, and recurrent hernia were excluded from the study. Convenience sampling technique was used. Point estimate and 95% confidence interval were calculated for binary data.

Results: Among 185 patients with inguinal hernia, 61 (32.97%) (26.20-39.75, 95% Confidence Interval) had benign prostatic hyperplasia. Among total inguinal hernia patients, 8 (4.32%) patients were asymptomatic, 116 (62.70%) were mildly symptomatic, 42 (22.70%) were moderately symptomatic, and 19 (10.3%) were severely symptomatic. In this study, 99 (53.5%) had a prostate volume of more than 20 cm³ and 86 (46.5%) had a prostate volume of less than 20 cm³.

Conclusions: The study concluded a similar prevalence of benign prostatic hyperplasia as per the International Prostate Symptom Score questionnaire among patients with inguinal hernia, as in other studies, and higher if defined as per radiological volume measurement.

Keywords: *hernia, inguinal, lower urinary tract symptoms, prostatic hyperplasia.*

INTRODUCTION

Inguinal hernias (IH) are common surgical issues, with a lifetime risk of 25% in men and 5% in women.¹ They are more frequent in men, and the risk increases with age.

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The cumulative prevalence in men grows from 5% in those aged 25-34 years to 45% in men over 75.² Risk factors for IH include male sex, older age, chronic cough, low BMI, smoking, and occupational exposure.³

Benign prostatic hyperplasia (BPH), a non-cancerous prostate enlargement, is common in aging men and leads to lower urinary tract symptoms (LUTS).⁴ BPH can contribute to bladder outlet obstruction, increasing the risk of inguinal hernia due to chronic straining.⁵ The coexistence of IH and BPH is frequent, especially in elderly men, and may be related to age.⁶

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This study aimed to find out the prevalence of benign enlargement of the prostate among patients with inguinal hernia in a tertiary care centre.

METHODS

This is a descriptive cross-sectional study done from 14 April 2023 to 13 April 2024 in the Department of General Surgery, National Academy of Health Sciences (NAMS), Bir Hospital, Mahabouddha, Kathmandu, Nepal after obtaining ethical approval from the Institutional Review Board (IRB) (Reference number: 873/2079/80) of NAMS, Bir Hospital on 13 April 2023. Male patients aged >50 years of age and with a clinical diagnosis of inguinal hernia were included in the study. Patients who had any form of surgery for BPH in the past, were diagnosed with bladder outlet obstruction (BOO) due to any causes other than BPH, diagnosed with prostate carcinoma, patients with femoral and other abdominal wall hernia, and having recurrent hernia were excluded from the study. Convenience sampling method was used for data collection. The sample size was calculated as follows:

Sample size calculation:

$$n = Z^2 \times p \times q / e^2$$

$$n = 1.96^2 \times 0.139 \times 0.861 / (0.05)^2$$

$$= 184$$

Where,

n= minimum required sample size

Z= 1.96 at 95% Confidence Interval (CI)

p= prevalence of 13.9%, taken from a similar study in the past³

q= 1-p

e= margin of error, 5%

Thus, the sample size was calculated to be 184. However, the final sample size taken was 185.

A predesigned proforma was used to collect samples. International Prostate Symptom Score (IPSS) was used to determine the severity of BPH.⁷ Radiological prostate volume is also used to assess the BPH among Patients.⁸ Data obtained was entered in Microsoft Excel 2016 and analyzed using IBM SPSS Statistics version 26.0. Point estimate and 95% Confidence Interval were calculated.

RESULTS

Among 185 patients with inguinal hernia, 61 (32.97%) (26.20-39.75, 95% CI) had benign prostatic hyperplasia. Among total inguinal hernia patients, 8 (4.32%) patients were asymptomatic, 116 (62.70%) were mildly symptomatic, 42 (22.70%) were moderately symptomatic, and 19 (10.3%) were severely symptomatic (Table 1).

Table 1. Severity of benign prostatic hyperplasia (n= 185).

IPSS severity	n (%)
Asymptomatic	8 (4.32)
Mild	116 (62.70)
Moderate	42 (22.70)
Severe	19 (10.27)

For this study, a prostate volume of ≤ 20 cm³ is considered normal, and a volume of >20 cm³ is taken as having radiological prostatomegaly (and as BPH). So, according to the prostate volume category, 99 (53.51%) patients had BPH while 86 (46.49%) patients did not have BPH.

Table 2. BPH as per radiological prostate volume (n= 99).

Age group (years)	n (%)
50-59	49 (49.49)
60-69	28 (28.28)
70-79	13 (13.13)
80-89	7 (7.07)
90 and above	2 (2.02)

DISCUSSION

Overall, 32.39% of inguinal hernia patients have BPH, and radiologically, 53.51% had prostate volumes over 20 cm³. Patients in this study were categorized by IPSS score, with 4.32% of patients being asymptomatic, 62.70% being mildly symptomatic, 22.70% being moderately symptomatic, and 10.3% being severely symptomatic.

Comparisons with other studies revealed variations. Reis et al. reported a higher prevalence of BPH (87.5%) in patients with inguinal hernia,⁹ while Parthiban SS et al. found similar clinical BPH prevalence (34%) but lower radiological BPH (31%).¹⁰ A Turkish study by Senturk et al. showed no significant relationship between BPH and inguinal hernia subtypes, with higher IPSS scores and prostate volumes than in this study.⁶ Differences may stem from varying criteria and study designs. When comparing this study with population-based studies on BPH prevalence, the Baltimore Longitudinal Study reported a median age of 58 years and a median prostate size of 28 cc, while this study found a median age of 60 years and a median prostate size of 21 cc, with a mean of 28.1 cc.¹¹ Garraway et al. identified a BPH prevalence of 25.3% in men aged 40-79 years in Scotland, using transrectal ultrasonography.¹² In another study by Mor et al., the incidence of prostatomegaly was 41% in men over 50, with clinical BPH prevalence based on IPSS severity at 66%, comprising 34% asymptomatic, 32% moderate, and 34% severe cases.¹³

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A 2020 study by Wu Y-H et al. in Taiwan followed 22,310 men with LUTS-BPH and 22,310 without, finding that men with LUTS-BPH had a two-fold increased risk of developing inguinal hernia (IH) over 10 years (HR: 2.25).¹⁴ Sanchez-Ortiz et al. (2016) analyzed 693 patients undergoing radical prostatectomy, noting that men with an IPSS ≥ 15 had a fivefold increased risk of hernia, with 22.4% requiring repair.¹⁵ A 2014 Chinese meta-analysis found a BPH prevalence of 36.6% in men aged 40+, while this study found a 33% overall prevalence, showing similar trends, but with no clear increase with age, likely due to a smaller sample size.¹⁶ Iranian studies also report varying prevalence rates.¹⁷ One explanation for the large variation in the reported prevalence is the lack of consensus on the definition and diagnostic criteria of clinical BPH in different studies.

This study is a single-centre based study, the patients were not randomly selected, instead, convenience sampling was done. The clinical criteria used to diagnose BPH (e.g., IPSS scores) may not capture all cases accurately, and moreover response bias on the side of the participant could affect the validity of prevalence estimates. Due to

resource limitations and ethical issues, transabdominal USG as a measure of prostate volume was used, which is not the standard of care. The study is cross sectional in nature, a longitudinal study would help find BPH incidence over time or provide information about the progression of the condition. Various confounding variables, such as family history or lifestyle factors, may have influenced the observed prevalence. Future studies should explore the progression of BPH in hernia patients and identify risk factors for its co-occurrence.

CONCLUSIONS

The study concluded a similar prevalence of benign prostatic hyperplasia among patients with inguinal hernia, as in other studies. Clinical screening with the IPSS questionnaire aids in the early detection of BPH, preventing complications like postoperative urinary retention in inguinal hernia patients. The coexistence of BPH and inguinal hernia may influence treatment decisions, and addressing both in the same surgery can reduce costs.

Conflict of Interest: None.

REFERENCES

1. Ashindoitiang JA, Ibrahim NA, Akinlolu OO. Risk factors for inguinal hernia in adult male Nigerians: a case-control study. *Int J Surg.* 2012;10(7):364–7. [[PubMed](#) | [Full Text](#) | [DOI](#)]
2. Abramson JH, Gofin J, Hopp C, Makler A, Epstein LM. The epidemiology of inguinal hernia. A survey in western Jerusalem. *J Epidemiol Community Health.* 1978 Mar;32(1):59–67. [[PubMed](#) | [Full Text](#) | [DOI](#)]
3. Ruhl CE, Everhart JE. Risk factors for inguinal hernia among adults in the US population. *Am J Epidemiol.* 2007 May 15;165(10):1154–61. [[PubMed](#) | [Full Text](#) | [DOI](#)]
4. Roehrborn CG. Definition of at-risk patients: baseline variables. *BJU Int.* 2006;97(Suppl 2):7–11. [[PubMed](#) | [Full Text](#) | [DOI](#)]
5. Lim KB. Epidemiology of clinical benign prostatic hyperplasia. *Asian J Urol.* 2017 Jul;4(3):148–51. [[PubMed](#) | [Full Text](#) | [DOI](#)]
6. Sentürk AB, Ekici M, Sahiner IT, Tas T, Cakiroglu B. Relationship between lower urinary tract symptoms and inguinal hernia. *Arch Ital Urol Androl.* 2016 Dec 30;88(4):262–5. [[PubMed](#) | [Full Text](#) | [DOI](#)]
7. Roy A, Singh A, Sidhu DS, Jindal RP, Malhotra M, Kaur H. New visual prostate symptom score versus international prostate symptom score in men with lower urinary tract symptoms: a prospective comparison in indian rural population. *Niger J Surg.* 2016 Jul-Dec;22(2):111-7. [[PubMed](#) | [Full Text](#) | [DOI](#)]
8. Mitterberger M, Horninger W, Aigner F, Pinggera GM, Steppan I, Rehder P, Frauscher F. Ultrasound of the prostate. *Cancer Imaging.* 2010 Mar 3;10(1):40-8. [[PubMed](#) | [Full Text](#) | [DOI](#)]

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9. Reis RB, Rodrigues Neto AA, Reis LO, Machado RD, Kaplan S. Correlation between the presence of inguinal hernia and the intensity of lower urinary tract symptoms. *Acta Cir Bras.* 2011;26 Suppl 2:125–8. [[PubMed](#) | [Full Text](#) | [DOI](#)]
10. Parthiban SS, Durairaj B. A study on association between inguinal hernia and benign prostatic hyperplasia. *International Surgery Journal.* 2019 May 28;6(6):2065–9. [[Full Text](#) | [DOI](#)]
11. Loeb S, Kettermann A, Carter HB, Ferrucci L, Metter EJ, Walsh PC. Prostate volume changes over time: results from the Baltimore Longitudinal Study of Aging. *J Urol.* 2009 Oct 1;182(4):1458–62. [[PubMed](#) | [Full Text](#) | [DOI](#)]
12. Garraway WM, Lee RJ, Collins GN. High prevalence of benign prostatic hypertrophy in the community. *Lancet.* 1991 Aug 24;338(8765):469–71. [[PubMed](#) | [Full Text](#) | [DOI](#)]
13. Mor A, Sharma SM, Mukherjee S, Jindal R. A clinico-pathological study and management of benign enlargement of prostate. *International Surgery Journal.* 2018 Mar 23;5(4):1275. [[Full Text](#) | [DOI](#)]
14. Wu YH, Juan YS, Shen JT, Wang HS, Jhan JH, Lee YC, et al. Lower urinary tract symptoms-benign prostatic hyperplasia may increase the risk of subsequent inguinal hernia in a Taiwanese population: a nationwide population-Based cohort study. *PLoS One.* 2020 Jun 8;15(6):e0234329. [[PubMed](#) | [Full Text](#) | [DOI](#)]
15. Carbonell JF, Sanchez JL, Peris RT, Ivorra JC, Del Baño MJ, Sanchez CS, et al. Risk factors associated with inguinal hernias: a case-control study. *Eur J Surg.* 1993 Sep;159(9):481–6. [[PubMed](#) | [Full Text](#)]
16. Wang W, Guo Y, Zhang D, Tian Y, Zhang X. The prevalence of benign prostatic hyperplasia in mainland China: evidence from epidemiological surveys. *Sci Rep.* 2015 Aug 26;5(1):13546. [[PubMed](#) | [Full Text](#) | [DOI](#)]
17. Safarinejad MR. Prevalence of benign prostatic hyperplasia in a population-based study in Iranian men 40 years old or older. *Int Urol Nephrol.* 2008 Dec 1;40(4):921–31. [[PubMed](#) | [Full Text](#) | [DOI](#)]

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