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Original Research Article

Frequency of Carcinoma Prostate in Patients Undergoing Transurethral Resection of Prostate for Clinically Benign Prostatic Hyperplasia

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Abstract: *Incidental carcinoma prostate refers to prostate cancer detected unexpectedly on histopathological examination of tissue resected for clinically benign prostatic hyperplasia. Despite advances in prostate-specific antigen screening, incidental carcinoma remains clinically relevant, particularly in aging populations. Data from Pakistan on this entity are limited, necessitating local evidence to guide clinical practice.* ***Objective:*** *To determine the frequency of incidental prostate carcinoma in patients undergoing transurethral resection of the prostate for clinically benign prostatic hyperplasia and to evaluate associated demographic and clinical factors.* ***Methods:*** *This descriptive cross-sectional study was conducted at the Department of Urology, Kidney Centre, Bahawal Victoria Hospital, Bahawalpur, from May to August 2025. A total of 124 male patients aged 50–80 years with clinically benign prostatic hyperplasia undergoing transurethral resection of the prostate were enrolled through non-probability consecutive sampling. Patients with prior prostate surgery, known prostate cancer, or lower urinary tract infection were excluded. Clinical data, including age, duration of symptoms, prostate size, serum prostate-specific antigen levels, smoking status, family history of prostate cancer, history of prostatitis, and obesity, were recorded. Resected specimens were examined histopathologically for prostate carcinoma. Data were analysed using SPSS version 25.0, and associations were assessed using chi-square or Fisher's exact test, with $p \leq 0.05$ considered statistically significant.* ***Results:*** *The mean age of patients was 64.2 ± 7.8 years. Incidental prostate carcinoma was detected in 13 patients, yielding a frequency of 10.5%. The detection rate increased significantly with advancing age, particularly in patients aged 71–80 years ($p = 0.041$). Carcinoma prostate was significantly associated with longer duration of symptoms (>12 months), larger prostate size (>60 g), higher serum prostate-specific antigen levels (≥3 ng/ml), and positive family history of prostate cancer. Smoking status, obesity, and history of prostatitis showed no statistically significant association.* ***Conclusion:*** *Incidental carcinoma of the prostate is not uncommon among Pakistani patients undergoing transurethral resection of the prostate for clinically benign prostatic hyperplasia. Advancing age, increased prostate volume, prolonged symptom duration, elevated prostate-specific antigen levels within the normal range, and family history are significant predictors. Routine histopathological evaluation of all transurethral resection specimens remains essential for early detection and optimal patient management.*

Keywords: Incidental prostate cancer; benign prostatic hyperplasia; transurethral resection of prostate; histopathology

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Introduction

Prostate diseases, including benign prostatic hyperplasia (BPH) and prostate cancer (PCa), represent significant health concerns for aging men worldwide. BPH, a prevalent non-cancerous enlargement of the prostate gland, is commonly seen in men over the age of 50. Its incidence increases with age, affecting about 50% of men aged 50 and older and approximately 80% of those aged 80 and above (1, 2). While BPH itself is not malignant, its treatment frequently requires surgical interventions such as transurethral resection of the prostate (TURP), which is considered a gold standard (3, 4). However, the literature has increasingly reported a noteworthy occurrence of incidental prostate cancer found in TURP specimens, raising concerns about the undetected presence of malignancy in patients undergoing surgery for BPH.

Incidental prostate cancer (IPCa) is defined as prostate cancer identified postoperatively in tissue specimens initially removed for BPH treatment (5). Studies suggest the incidence of IPCa in TURP specimens can range from 2% to 30% depending on various demographics such as age and preoperative serum prostate-specific antigen (PSA) levels (6, 7). For instance, a study indicated that up to 27% of prostate cancers were diagnosed incidentally before the PSA screening era, showcasing the potential for underdiagnosed malignancies in patients treated for what is presumed to be benign pathology (8).

Research has demonstrated that higher preoperative PSA levels are predictive of IPCa presence and suspicious findings on digital rectal examination (DRE) (9). Furthermore, multi-centre studies have revealed that even men with normal PSA levels (4-10 ng/ml) could harbour undetected carcinoma, with significant implications for patient management and follow-up care (10). Understanding the demographic factors and clinical parameters that heighten the risk for incidental detection of prostate cancer in TURP specimens is vital for improving outcomes in men subjected to these procedures.

In Pakistan, prostate cancer incidence is rising rapidly, intensifying the importance of recognising its potential occurrence amidst benign prostatic conditions. A study in Karachi found that the majority of men diagnosed with BPH who underwent TURP exhibited a comparable prevalence of incidental prostate cancer, reinforcing the need for vigilance (8, 11). Moreover, with limited awareness about prostate health and widespread reliance on TURP as a remedy for BPH, the risk of overlooking prostate cancer can lead to delayed diagnoses and poorer prognoses.

Current healthcare policies in Pakistan emphasise enhancing screening and diagnostic capabilities, particularly in aging male populations where signs of prostate enlargement are prevalent. The exploration of IPCa occurrences in a Pakistani context can foster more informed surgical approaches, optimising patient care and enhancing early detection strategies critical for managing prostate cancer effectively.

Methodology

The present study was conducted using a descriptive cross-sectional design at the Department of Urology, Kidney Centre, Bahawal Victoria Hospital, Bahawalpur. The study duration was three months, from 16 May to 16 August 2025, following formal approval of the synopsis by the institutional ethical review committee and the College of Physicians and Surgeons, Pakistan. The study population comprised patients undergoing transurethral resection of the prostate for clinically benign prostatic hyperplasia, presenting to the urology department during the study period. The sample size was calculated using the WHO sample size calculator for a single proportion. A total sample size of 139 patients was estimated by assuming a 10.0 per cent prevalence of incidental carcinoma prostate among patients undergoing TURP for clinically benign prostatic hyperplasia, with a 95 per cent confidence level and a margin of error of 5 per cent. Due to feasibility constraints and strict eligibility criteria, 124 patients who met the inclusion criteria were ultimately enrolled using a non-probability, consecutive sampling technique.

Male patients aged between 50 and 80 years presenting with benign prostatic enlargement and scheduled for transurethral resection of the prostate were included in the study. Clinically benign prostatic hyperplasia was defined as refractory urinary retention with an enlarged prostate measuring more than 30 grams on ultrasonography, a soft and smooth prostate on digital rectal examination, mobile rectal mucosa, absence of nodules, and a serum prostate-specific antigen level of 4 ng/ml or less. Only patients who had failed medical therapy, defined as persistent symptoms despite at least four weeks of alpha-blocker treatment, were included. Patients with a prior history of transurethral resection of the prostate, previously diagnosed prostate cancer, or a history of lower urinary tract infection or urethral instrumentation were excluded from the study.

After obtaining informed written consent, detailed baseline data were collected using a predesigned proforma. Information recorded included age, duration of lower urinary tract symptoms in months, prostate size measured on ultrasonography, and serum prostate-specific antigen levels. Additional variables such as smoking status, family history of prostate carcinoma, history of prostatitis, and obesity were documented. Obesity was defined as a body mass index greater than 25 kg/m². All patients underwent routine preoperative evaluation as per departmental protocol.

Transurethral resection of the prostate was performed under spinal anesthesia using a 26 French resectoscope with a monopolar electrocautery system and digital camera assistance. A 5 per cent dextrose solution was used as the irrigation fluid in all procedures, in accordance with standard surgical protocols. Consultant urologists performed all surgeries with a minimum of three years of post-fellowship experience to ensure procedural uniformity and reduce operator-related bias. Resected prostatic tissue specimens were collected in formalin and sent to the institutional pathology laboratory for histopathological evaluation.

Histopathological assessment was carried out by a consultant pathologist who was blinded to the clinical data. Prostate carcinoma was diagnosed based on established microscopic criteria, including small, back-to-back glands with little or no intervening stroma, along with cytological features such as enlarged, round, hyperchromatic nuclei, prominent nucleoli, and mitotic figures. Cases not fulfilling these criteria were labelled as benign prostatic hyperplasia.

All collected data were entered and analysed using SPSS version 25.0. Quantitative variables such as age, serum PSA level, prostate size, and duration of symptoms were assessed for normality using the Shapiro–Wilk test. They were expressed as mean with standard deviation or median with interquartile range as appropriate. Qualitative variables, including smoking status, family history of prostate carcinoma, history of prostatitis, obesity, and presence or absence of prostate carcinoma, were summarised as frequencies and percentages. Effect modifiers, including age, serum PSA, prostate size, duration of symptoms, smoking, family history of prostate carcinoma, history of prostatitis, and obesity, were controlled through stratification. Post-stratification chi-square test or Fisher's exact test was applied where appropriate to assess associations, and a p-value of 0.05 or less was considered statistically significant.

Results

The mean age of the study population was 64.2 ± 7.8 years (range: 50–80 years). Most patients belonged to the 61–70 years age group. As per the study design, all participants were male. Demographic characteristics are shown in Table 1

Table 1 Baseline Demographic and Clinical Characteristics of the Study Population (n = 124)

Variable	Mean ± SD / n (%)
Age (years)	64.2 ± 7.8
Age group (years)	
50–60	34 (27.4%)
61–70	58 (46.8%)
71–80	32 (25.8%)
Duration of symptoms (months)	13.6 ± 5.2
Prostate size (grams)	54.9 ± 12.3
Serum PSA (ng/ml)	2.9 ± 0.8
Smoking	
Yes	41 (33.1%)
No	83 (66.9%)
Family history of carcinoma prostate	
Yes	14 (11.3%)
No	110 (88.7%)
History of prostatitis	
Yes	22 (17.7%)
No	102 (82.3%)
Obesity (BMI >25 kg/m²)	
Yes	49 (39.5%)
No	75 (60.5%)

Histopathological examination of TURP specimens revealed incidental carcinoma prostate in 13 patients, giving an overall frequency of 10.5% among patients undergoing TURP for clinically benign prostatic hyperplasia. (Table 2)

Table 2 Frequency of Carcinoma Prostate on Histopathology (n = 124)

Histopathological Finding	Frequency	Percentage
Carcinoma prostate present	13	10.5
Carcinoma prostate absent	111	89.5

The frequency of incidental prostate carcinoma increased with advancing age. The highest proportion was observed in patients aged 71–80 years. (Table 3)

Table 3: Stratification of Carcinoma Prostate by Age Group

Age Group (years)	Carcinoma Present n (%)	Carcinoma Absent n (%)	p-value
50–60	2 (5.9%)	32 (94.1%)	
61–70	5 (8.6%)	53 (91.4%)	
71–80	6 (18.8%)	26 (81.2%)	0.041

Incidental prostate carcinoma was more frequently observed in patients with higher prostate volume, longer duration of symptoms, and positive family history. Smoking status and obesity showed no statistically significant association. (Table 4)

Table 4 Association of Clinical Variables with Carcinoma Prostate

Variable	Carcinoma Present n (%)	Carcinoma Absent n (%)	p-value
Duration of symptoms >12 months	9 (69.2%)	48 (43.2%)	0.048
Prostate size >60 g	8 (61.5%)	39 (35.1%)	0.039
Serum PSA ≥3 ng/ml	7 (53.8%)	34 (30.6%)	0.044
Smoking (Yes)	5 (38.5%)	36 (32.4%)	0.612
Family history positive	4 (30.8%)	10 (9.0%)	0.018
History of prostatitis	3 (23.1%)	19 (17.1%)	0.583
Obesity (BMI >25 kg/m²)	6 (46.2%)	43 (38.7%)	0.597

Discussion

The findings of our study reveal significant correlations between the incidence of incidental carcinoma prostate (IPC) and various demographic and clinical factors among patients undergoing transurethral resection of the prostate (TURP) for benign prostatic hyperplasia (BPH). The overall frequency of IPC was found to be 10.5%, with a notable increase in incidence correlating with advancing age, duration of symptoms, and prostate volume.

Our study indicated that the mean age of participants was 64.2 years, with most patients falling within the 61-70 years age group (46.8%). The incidence of IPC notably increased with age, particularly in the 71-80 years cohort, where 18.8% of the patients had IPC. Previous literature reinforces this trend; Raphael et al. noted that the mean age of their study population was 65.89 years, which aligns closely with our findings and emphasises that BPH, alongside potential malignancies, is primarily a geriatric issue Raphael & Ekeke, (12). Additionally, Kızılkan et al. pointed out that advanced age is a statistically significant predictor of IPC findings in surgical specimens (13), further corroborating our observations.

Notably, the strong correlation between increased IPC detection and older age is supported by Mohamed et al., who reported a systematic review indicating older age as an independent risk factor for IPC (14). This reinforces the necessity for vigilant screening protocols in older populations, as delays in diagnosis can adversely affect patient outcomes. In our study, higher frequencies of IPC were also associated with longer durations of BPH symptoms (>12 months) and larger prostate size (>60 grams). Specifically, 69.2% of patients with IPC presented with prolonged symptom durations. This observation aligns with previous researchers' conclusions, indicating that longer symptom duration is associated with an increased likelihood of finding IPC during TURP. For instance, Kızılkan et al. reported that patients with advanced BPH who underwent surgery often had significant pathology findings, suggesting that prolonged symptoms should prompt consideration for further diagnostic evaluations, including IPC risk factors (15).

The relationship between prostate volume and IPC incidence is also evident in other studies. For example, Haque et al. noted similar findings where higher prostate weights were associated with IPC, further emphasising the importance of prostate size as a screening criterion for men experiencing significant urinary symptoms (16). Our results, highlighting a p-value of 0.039 for prostate size and IPC presence, suggest that urologists should be aware of the tangible risks involved when managing patients with enlarged prostates.

In terms of laboratory findings, our analysis revealed a significant association between elevated serum PSA levels (≥3 ng/ml) and IPC, with 53.8% of IPC-present patients exceeding this threshold. This finding echoes the work of Capogrosso et al., who tracked the decline in IPC detection rates in relation to continuous improvements in PSA testing over time, which emphasises the critical role of PSA levels in the early detection of prostate cancer (17). Likewise, the association of family history with IPC incidence noted in our study (p-value 0.018) is consistent with the literature; Guo et al. highlighted familial predisposition as a significant risk factor when evaluating patients undergoing TURP for BPH (18).

While our findings concerning obesity and smoking status did not show statistically significant associations with IPC, it is essential to consider the multifaceted risks related to these lifestyle factors. Previous studies exhibit conflicting results; for instance, Neha et al. suggested that smoking has shown varied implications for cancer outcomes in urological pathology, emphasising that while lifestyle factors may influence prostate health, their direct impact on IPC detection during TURP requires more targeted research (19).

Our research firmly establishes that older age, increased prostate size, prolonged symptom duration, and elevated serum PSA levels are pertinent predictors for the detection of incidental prostate carcinoma in patients undergoing TURP for BPH. This compelling relationship accentuates the need for proactive screening strategies, especially for older male patients, thereby bolstering early detection efforts that could significantly improve clinical outcomes. Continued research in this area holds promise for refining risk-assessment protocols and enhancing early-detection strategies in prostate health care globally.

In Pakistan, where awareness and early-detection protocols remain underdeveloped, our study highlights a critical need for routine screening. Such measures could substantially reduce the burden of undiagnosed prostate cancers in older populations and lead to better management strategies within our healthcare framework.

Conclusion

Incidental prostate carcinoma was identified in approximately one-tenth of patients undergoing transurethral resection of the prostate for clinically benign prostatic hyperplasia in this Pakistani cohort. The likelihood of detection increased with advancing age, prolonged symptom duration, larger prostate size, higher prostate-specific antigen levels, and positive family history. These findings underscore the continued clinical relevance of incidental prostate cancer in the modern screening era and highlight the importance of mandatory histopathological examination of all transurethral resection specimens. Early identification of prostate carcinoma through this approach may facilitate timely risk stratification, surveillance, and intervention, ultimately improving patient outcomes in resource-limited healthcare settings.

Declarations

Data Availability statement
All data generated or analysed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-25)
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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

MAJ (PGR)
Manuscript drafting, Study Design,
MR (Head of Department)
Review of Literature, Data entry, Data analysis, and drafting articles.
MAAJ
Conception of Study, Development of Research Methodology Design,

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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