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Original Article

Histopathological Evaluation of TURP Chips and Their Clinical Correlation: A Tertiary Care Centre Experience

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ABSTRACT

Background: Histopathological examination of transurethral resection of prostate (TURP) chips plays a crucial role in distinguishing benign from malignant prostatic lesions and facilitates early detection of clinically unsuspected prostate carcinoma. Correlating histopathological findings with clinical and laboratory parameters enhances diagnostic accuracy and guides patient management.

Aim: To evaluate the histopathological findings of TURP chips and correlate them with the clinical profile of patients undergoing TURP at a tertiary care centre.

Materials and Methods: A hospital-based retrospective observational study was conducted among 50 patients who underwent TURP for clinically suspected prostatic enlargement. Clinical details including age, presenting complaints, serum prostate-specific antigen (PSA) levels, and ultrasonographic findings were collected from hospital records. TURP specimens were processed using standard histopathological techniques and stained with Hematoxylin and Eosin stain. Histopathological diagnoses were correlated with clinical parameters. Statistical analysis was performed using SPSS version 25.0, and a p-value of <0.05 was considered statistically significant.

Results: The mean age of the study population was 66.4 ± 8.7 years. Benign prostatic hyperplasia (BPH) was the most common histopathological diagnosis (60%), followed by BPH with chronic prostatitis (22%), BPH with acute inflammation (6%), high-grade prostatic intraepithelial neoplasia (4%), and incidental adenocarcinoma of the prostate (8%). Poor urinary stream was the most common presenting complaint (84%). Patients with adenocarcinoma demonstrated significantly higher serum PSA levels compared with benign lesions ($p<0.001$). All malignant cases were observed in patients aged ≥60 years and had PSA levels greater than 10 ng/mL. Significant associations were observed between histopathological diagnosis, advancing age, and elevated serum PSA levels.

Conclusion: Benign prostatic hyperplasia remains the predominant histopathological lesion in TURP specimens. However, incidental prostate carcinoma and inflammatory lesions continue to be encountered in routine practice. Histopathological evaluation of all TURP chips is indispensable for the early detection of occult malignancy and should be routinely performed to facilitate appropriate clinicopathological correlation and optimal patient management.

Keywords: *Transurethral resection of prostate, benign prostatic hyperplasia, incidental prostate carcinoma, histopathology, prostate-specific antigen, TURP chips.*

INTRODUCTION

The prostate gland is one of the most commonly affected organs in ageing men, with benign and malignant pathologies contributing significantly to lower urinary tract symptoms and morbidity worldwide. Benign prostatic hyperplasia (BPH) is the most prevalent non-malignant enlargement of the prostate and is a major cause of urinary obstruction in elderly males. The global prevalence of BPH increases progressively with age, affecting nearly 50% of men in their sixth decade and up to 80–90% of men above 80 years of age. Histopathological examination of prostatic tissue remains the gold standard for differentiating benign from malignant lesions and plays a vital role in guiding patient management and prognosis.[1]

Transurethral resection of the prostate (TURP) remains the standard surgical treatment for patients with symptomatic BPH who fail medical therapy. TURP chips obtained during the procedure provide valuable tissue specimens for histopathological evaluation. In addition to confirming benign hyperplasia, histopathological examination may reveal incidental prostatic adenocarcinoma, prostatic intraepithelial neoplasia, chronic prostatitis, granulomatous prostatitis, and other uncommon pathological entities. Therefore, routine microscopic examination of TURP specimens is essential for identifying clinically unsuspected malignancies and determining appropriate therapeutic interventions.[2]

Globally, prostate cancer is the second most commonly diagnosed malignancy and the fifth leading cause of cancer-related mortality among men. According to recent global cancer estimates, more than 1.4 million new cases of prostate cancer are diagnosed annually. Although prostate cancer predominantly affects Western populations, its incidence is increasing steadily in developing countries owing to improved diagnostic facilities, increased life expectancy, and growing awareness. Incidental carcinoma detected in TURP specimens continues to represent an important diagnostic finding, particularly in elderly patients undergoing surgery for presumed benign disease.[3]

In India, prostate-related diseases have emerged as an important public health concern among ageing males. The incidence of prostate cancer has shown a rising trend in several Indian population-based cancer registries, particularly in metropolitan cities such as Delhi, Bengaluru, Chennai, and Mumbai. Benign prostatic hyperplasia is also increasingly encountered in clinical practice due to the growing elderly population. Histopathological evaluation of TURP chips in the Indian setting has demonstrated varying frequencies of incidental prostate carcinoma and inflammatory lesions, underscoring the importance of routine pathological examination of all TURP specimens. [4]

Several studies have reported that incidental prostate carcinoma detected in TURP specimens ranges from 4% to 16%, depending on the study population and pathological criteria used. Such incidental malignancies are often clinically silent and may not be suspected preoperatively based on prostate-specific antigen (PSA) levels or imaging findings. Histopathological examination therefore serves as an indispensable diagnostic tool in identifying occult malignancies and facilitating early oncological intervention. [5]

Clinical correlation of histopathological findings with patient characteristics such as age, presenting symptoms, PSA levels, radiological findings, and postoperative outcomes further enhances the diagnostic and prognostic value of TURP specimens. Understanding the clinicopathological spectrum of TURP chips not only aids in appropriate patient management but also contributes to improving diagnostic protocols and treatment strategies in urological practice.[6]

Despite the widespread use of TURP, relatively limited Indian literature exists regarding the histopathological spectrum of TURP chips and their clinical correlations in tertiary care settings. Evaluating these pathological patterns is particularly relevant in the current era of increasing life expectancy and changing epidemiological trends of prostatic diseases. Therefore, the present study aims to evaluate the histopathological findings in TURP specimens and correlate them with relevant clinical parameters in patients undergoing TURP at a tertiary care center. The findings of this study are expected to contribute to better understanding of prostatic pathologies and their clinical implications in routine surgical practice.[7]

AIM

- To evaluate the histopathological findings of TURP (Transurethral Resection of Prostate) chips and correlate them with the clinical profile of patients who underwent TURP at a tertiary care center.

OBJECTIVES

1. To study the histopathological spectrum of lesions identified in TURP chips obtained from patients who underwent transurethral resection of the prostate.
2. To correlate the histopathological findings of TURP chips with clinical parameters such as age, presenting complaints, serum prostate-specific antigen (PSA) levels, and radiological findings.

MATERIALS AND METHODS

Study Design

- A hospital-based retrospective observational study was conducted.

Study Setting

- The study was conducted in the Department of Pathology in collaboration with the Department of Urology at a tertiary care teaching hospital.

Study Duration

- The study was conducted over a period of one year.

Study Population

- The study population comprised patients who underwent Transurethral Resection of the Prostate (TURP) for clinically suspected prostatic enlargement and whose specimens were received for histopathological examination in the Department of Pathology.

Sample Size

The sample size for the present study was fixed at 50 patients based on the feasibility of the study and the average number of TURP specimens received during the study period.

Sample Size (n) = 50

A total of 50 consecutive TURP specimens fulfilling the inclusion criteria were included in the study.

Sampling Technique

- Consecutive sampling technique was employed.

Inclusion Criteria

- Patients aged 40 years and above who underwent TURP for clinically suspected benign or malignant prostatic enlargement.
- TURP specimens received in the Department of Pathology during the study period.
- Patients with complete clinical and laboratory records.

Exclusion Criteria

- Inadequately preserved or fragmented TURP specimens unsuitable for histopathological evaluation.
- Patients with incomplete clinical data.
- Repeat TURP specimens from the same patient.
- Needle biopsy and radical prostatectomy specimens.

Study Procedure

After obtaining approval from the Institutional Ethics Committee, all eligible TURP specimens received during the study period were included in the study.

Clinical details of the patients were retrieved from hospital records and pathology requisition forms. The following information was collected:

- Age of the patient.
- Presenting urinary symptoms.
- Clinical diagnosis.
- Serum prostate-specific antigen (PSA) levels.
- Ultrasonography findings of the prostate.
- Histopathological diagnosis.

The TURP specimens were fixed in 10% neutral buffered formalin and subjected to routine gross examination. The number and weight of the TURP chips were recorded wherever available. Tissue processing was carried out according to standard histopathological laboratory protocols. Representative sections were embedded in paraffin blocks, sectioned appropriately, and stained using Hematoxylin and Eosin (H&E) stain.

All histopathological slides were examined under light microscopy and categorized according to the pathological diagnosis.

The histopathological spectrum included:

- Benign Prostatic Hyperplasia (BPH)

- BPH with chronic prostatitis
- BPH with acute inflammation
- Prostatic intraepithelial neoplasia (PIN)
- Incidental adenocarcinoma of the prostate
- Other pathological lesions identified in TURP specimens

Cases diagnosed as adenocarcinoma of the prostate were graded according to the International Society of Urological Pathology (ISUP) grading system and Gleason scoring system wherever applicable.

Statistical Analysis

The collected data were entered into Microsoft Excel and analyzed using the Statistical Package for Social Sciences (SPSS) software version 25.0. Continuous variables were expressed as Mean ± Standard Deviation (SD). Categorical variables were expressed as frequencies and percentages. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 50 TURP specimens received during the study period were included in the study. Histopathological findings were correlated with demographic characteristics, serum PSA levels, presenting complaints, ultrasonographic findings, and pathological diagnoses.

Table 1. Age-wise Distribution of Study Participants (n=50)

Age Group (Years)	Frequency (n)	Percentage (%)
40–49	5	10.0
50–59	12	24.0
60–69	18	36.0
70–79	11	22.0
≥80	4	8.0
Total	50	100

Mean Age = 66.4 ± 8.7 years

Interpretation

The majority of patients belonged to the 60–69 years age group (36%), followed by 50–59 years (24%). The mean age of the study population was 66.4 ± 8.7 years, indicating that TURP is predominantly performed among elderly males presenting with prostatic enlargement.

Table 2. Presenting Clinical Complaints Among Study Participants (n=50)

Presenting Complaints	Frequency (n)	Percentage (%)
Poor urinary stream	42	84.0
Increased frequency of micturition	34	68.0
Nocturia	30	60.0
Acute urinary retention	14	28.0
Burning micturition	9	18.0
Hematuria	5	10.0

Interpretation

Poor urinary stream was the most common presenting complaint (84%), followed by increased frequency of micturition (68%) and nocturia (60%). These findings are consistent with the clinical presentation of lower urinary tract symptoms associated with benign prostatic enlargement.

Table 3. Histopathological Spectrum of TURP Chips (n=50)

Histopathological Diagnosis	Frequency (n)	Percentage (%)
BPH	30	60.0
BPH with Chronic Prostatitis	11	22.0
BPH with Acute Inflammation	3	6.0
High-grade PIN	2	4.0
Adenocarcinoma Prostate	4	8.0
Total	50	100

Interpretation

Benign prostatic hyperplasia constituted the majority of cases (60%). Chronic prostatitis associated with BPH accounted for 22% of cases. Incidental adenocarcinoma of the prostate was identified in 8% of TURP specimens, emphasizing the diagnostic significance of routine histopathological evaluation.

Table 4. Serum PSA Levels and Histopathological Diagnosis

Histopathological Diagnosis	Mean PSA (ng/mL) ± SD
BPH	3.8 ± 1.4
BPH + Chronic Prostatitis	5.9 ± 2.3
BPH + Acute Inflammation	7.1 ± 2.6
High-grade PIN	9.8 ± 3.2
Adenocarcinoma	18.6 ± 5.7

- p-value = <0.001 (Highly Significant)

Interpretation

Patients diagnosed with adenocarcinoma demonstrated significantly higher serum PSA levels compared to benign lesions. The difference in PSA levels among various histopathological diagnoses was statistically significant, indicating its usefulness as a clinical predictor of malignant pathology.

Table 5. Association Between Age Group and Histopathological Diagnosis

Histopathological Diagnosis	<60 Years	≥60 Years	Total
BPH	12	18	30
BPH + Chronic Prostatitis	4	7	11
BPH + Acute Inflammation	1	2	3
PIN	1	1	2
Adenocarcinoma	0	4	4
Total	18	32	50

- $\chi^2 = 8.47$
- p-value = 0.037 (Significant)

Interpretation

All cases of adenocarcinoma were observed among patients aged above 60 years. Increasing age showed a statistically significant association with malignant histopathological findings, reinforcing age as an important risk factor for prostatic malignancy.

Table 6. Ultrasonographic Findings of Prostate (n=50)

Ultrasonographic Findings	Frequency (n)	Percentage (%)
Enlarged Prostate (>40 g)	36	72.0
Median Lobe Enlargement	18	36.0
Features Suggestive of BPH	41	82.0
Suspicious Malignant Features	4	8.0
Associated Bladder Wall Thickening	9	18.0

Interpretation

Ultrasonography predominantly revealed enlarged prostates suggestive of benign hyperplasia. Suspicious malignant features were observed in only a small proportion of patients, highlighting the indispensable role of histopathology in confirming malignancy.

Table 7. Correlation Between PSA Levels and Malignancy (n=50)

PSA Level (ng/mL)	Benign Lesions	Malignant Lesions	Total
<4	21	0	21
4–10	20	0	20
>10	5	4	9
Total	46	4	50

p-value = 0.001 (Highly Significant)

Interpretation: All cases of adenocarcinoma were associated with PSA levels exceeding 10 ng/mL. Elevated PSA levels showed a statistically significant association with malignancy and may serve as an important clinical indicator warranting careful pathological evaluation.

Table 8. Gleason Score and ISUP Grade of Adenocarcinoma Cases (n=4)

Gleason Score	ISUP Grade	Frequency
3+3=6	Grade 1	1
3+4=7	Grade 2	1
4+3=7	Grade 3	1
4+4=8	Grade 4	1

Interpretation
Among the four incidental adenocarcinoma cases identified, varying Gleason scores and ISUP grades were observed, indicating heterogeneity in tumour aggressiveness. Early detection of such lesions facilitates timely oncological management.

DISCUSSION

The present study evaluated the histopathological spectrum of TURP specimens and correlated the findings with age, clinical presentation, serum PSA levels, and ultrasonographic features in patients undergoing transurethral resection of the prostate. The mean age of the study population was 66.4 ± 8.7 years, with the majority of patients belonging to the elderly age group. Advancing age has consistently been identified as an important risk factor for both benign and malignant prostatic diseases. Varghese et al. reported that incidental prostate carcinoma was more commonly detected among patients aged 70–79 years, while Otto et al. demonstrated that patients with incidental carcinoma were significantly older than those with benign lesions.[8,9] Similarly, Perera et al. observed a higher incidence of incidental carcinoma among men older than 65 years.[10] In the present study, all adenocarcinoma cases occurred in patients aged 60 years and above, and age showed a statistically significant association with histopathological diagnosis, highlighting the importance of careful pathological evaluation in elderly patients undergoing TURP.

Poor urinary stream was the most common presenting complaint in the present study, followed by increased frequency of micturition, nocturia, and acute urinary retention. These findings are characteristic of lower urinary tract symptoms secondary to prostatic enlargement. Tombal et al. reported that obstructive urinary symptoms are frequently observed in patients undergoing TURP for presumed benign disease and that such symptoms are often indistinguishable between benign and malignant lesions.[12] Hence, clinical symptoms alone cannot reliably differentiate benign prostatic hyperplasia from incidental prostate carcinoma and should always be interpreted alongside histopathological findings.

Histopathological examination revealed benign prostatic hyperplasia as the predominant diagnosis, accounting for 60% of cases, followed by BPH with chronic prostatitis, acute inflammatory changes, high-grade prostatic intraepithelial neoplasia, and adenocarcinoma of the prostate. The overall incidence of incidental adenocarcinoma in the present study was 8%. This finding is comparable with several published studies. Varghese et al. reported an incidence of 5.2% in Indian patients, whereas Yoo et al. identified incidental carcinoma in 4.8% of TURP specimens.[8,13] Porcaro et al. reported an incidence of 6.6%, while Janjua et al. observed a higher incidence of 10.72% in their retrospective analysis.[15,16] Variations in incidental carcinoma rates across studies may be attributed to differences in patient demographics, PSA screening practices, preoperative biopsy protocols, and specimen sampling techniques. Nevertheless, these findings collectively support the continued practice of routine histopathological examination of all TURP specimens for the early detection of occult malignancy.

Inflammatory lesions constituted a significant proportion of the histopathological diagnoses in the present study. Chronic and acute prostatitis together accounted for 28% of the specimens. Robert et al. demonstrated that histological inflammation in benign prostatic hyperplasia is associated with increased prostate volume and greater symptom severity.[17] Prostatic inflammation has important clinical implications because it may elevate serum PSA levels and mimic malignancy both clinically and radiologically. Therefore, inflammatory lesions should always be considered while interpreting elevated PSA values in patients undergoing TURP.

Serum PSA levels demonstrated a progressive increase across various histopathological categories in the present study. Patients diagnosed with adenocarcinoma had the highest mean PSA levels, and all malignant cases were associated with PSA values exceeding 10 ng/mL. The association between serum PSA levels and histopathological diagnosis was statistically significant. Similar observations have been reported by Yoo et al., who identified serum PSA as an independent predictor of incidental prostate carcinoma in TURP specimens.[13] However, Thompson et al. demonstrated that prostate carcinoma may occasionally occur even in patients with PSA levels of 4 ng/mL or lower, indicating that PSA cannot be considered entirely cancer-specific.[18] Consequently, elevated PSA levels should prompt further evaluation but cannot replace histopathological examination for definitive diagnosis.

Ultrasonography predominantly demonstrated features suggestive of benign prostatic enlargement in the present study, whereas only a small proportion of patients exhibited radiological findings suspicious for malignancy. This observation highlights the limited ability of ultrasonography to detect clinically occult prostate cancer. Conventional imaging modalities are useful for estimating prostate size and identifying obstructive changes but may fail to detect small malignant foci within the transition zone of the prostate. Hence, radiological findings must be interpreted in conjunction with serum PSA levels and histopathological examination.

Among the adenocarcinoma cases identified in the present study, varying Gleason scores and ISUP Grade Groups were observed, reflecting differences in tumour aggressiveness. Epstein et al. established that the ISUP Grade Group system provides superior prognostic stratification and facilitates clinical decision-making in prostate carcinoma.[19] The detection

of higher-grade lesions among incidental cancers emphasizes that clinically significant malignancies may occasionally be identified in TURP specimens that were initially presumed to represent benign disease.

The management of incidental prostate carcinoma detected during TURP should be individualized based on tumour grade, serum PSA levels, imaging findings, patient age, comorbidities, and life expectancy. Abedi et al. recommended that treatment decisions should incorporate both pathological and clinical parameters when determining the suitability of active surveillance or definitive intervention.[20] Early identification of clinically significant incidental carcinoma may substantially improve patient outcomes by facilitating timely oncological evaluation and management.

Overall, the findings of the present study reaffirm that benign prostatic hyperplasia remains the most common histopathological diagnosis among TURP specimens. Nevertheless, clinically significant incidental carcinoma and inflammatory lesions continue to be detected in a meaningful proportion of patients. Routine and meticulous histopathological examination of all TURP chips, combined with appropriate clinicopathological correlation, remains indispensable for accurate diagnosis, prognostication, and optimal patient management.

CONCLUSION

Benign prostatic hyperplasia was the most common histopathological finding among TURP specimens in the present study. Incidental adenocarcinoma and inflammatory lesions were identified in a clinically significant proportion of patients. Advancing age and elevated serum PSA levels showed significant associations with malignant pathology. Clinical and radiological findings alone were insufficient to reliably predict underlying histopathological changes. Routine histopathological examination of all TURP chips is essential for the early detection of occult malignancy and premalignant lesions. Clinicopathological correlation facilitates accurate diagnosis and guides appropriate patient management and prognosis.

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