# Histopathological Study of Prostatic Lesions

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**Abstract:** Introduction: Prostatic lesions are extremely common in elderly men over the age 50. Prostatic carcinoma is the second most common cause of cancer related deaths and its incidence has been increasing in recent years due to early screening measures. Aim: The purpose of this study is to evaluate histopathological spectrum of prostatic lesions & to correlate them with clinical features and serum PSA level. Methods: A prospective study was conducted in pathology department at Smt. N.H.L. Municipal Medical College on a total 156 prostatic specimens. All specimens were processed by paraffin embedding method and stained by Hematoxylin and Eosin stain. Results: Out of 156 prostatic lesions studied, 112 (71.79%) were benign and 44 (28.21%) were malignant. Peak incidence of both benign and malignant lesions was noted in 7$^{th}$ decade. Most of the patients (82%) were presented with obstructive urinary tract symptoms. Amongst benign lesions, all were found to be of benign prostatic hyperplasia (BPH). Out of 44 cases of prostatic adenocarcinomas, 43 cases were of acinar type; whereas one case was of prostatic ductal adenocarcinoma. Majority of cases with malignant lesions had S.PSA level >10 ng/ml. Gleason score 7 was observed in 45.45% of all malignant lesions. Conclusion: A histopathological examination proves to be gold standard tool for the diagnosis and prognosis of prostatic lesions. S. PSA is an important screening test for early detection of prostatic cancer. [Sabalpara M Natl J Integr Res Med, 2019; 10(5):58-63]

**Key Words:** Histopathological, Benign Prostatic Hyperplasia (BPH), Prostatic Adenocarcinoma

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**Introduction:** The prostate is an accessory gland of the male reproductive system. The prostate consists of stromal and glandular components. The prostate is a retroperitoneal organ encircling the neck of bladder and urethra. Incidence of prostatic diseases increases with age. Because of its location, enlargement of gland leads to problems related to urinary obstruction.[1]Recently there has been a significant advancement in understanding of various prostatic diseases. Nodular hyperplasia (NH), prostatitis and andadenocarcinoma are the three frequently encountered prostatic lesions. NH being an extremely common problem in elderly men over the age of 50; is a hyperplastic process of stromal and epithelial elements of prostate[1]Diagnosis of acute bacterial prostatitis is necessary as it can be successfully treated with antibiotics.

The incidence of Prostatic Carcinoma is increasing owing to the westernization in Asian countries including India. Prostate cancer is the leading cause of cancer in men and is second only to lung cancer as a leading cause of cancer-related deaths in men.[2]Several factors including age, race, family history, hormone levels and environmental influences are suspected to play a role in the pathogenesis of prostate cancers.

This study was undertaken with following aims and objectives: To study histopathological spectrum of prostatic lesions with their relative frequencies. To study prostatic lesions with respect to various clinical parameters including serum PSA level. To evaluate Gleason's score in prostatic adenocarcinomas

**Materials and Methods:** A prospective study of prostatic lesions was carried out at pathology Department, Smt. N.H.L. Municipal Medical College, Ahmedabad during the period from June 2015 to September 2017. A total 156 cases were studied. All prostatic specimens like Trans urethral resection of prostate (TURP), Tru-cut core needle biopsy and Radical Prostatectomy were included in the study. Brief clinical data were noted from the case records, which included the age, presenting symptoms, serum PSA levels and clinical diagnosis.All the received specimens were macroscopically examined, fixed in 10% formalin, processed by routine paraffin embedding technique and stained withhematoxylin and eosin. Tissue sections were cut and examined to render thehistopathological diagnosis.The grading system for prostatic adenocarcinoma devised by Gleason was used. The primary and secondary patterns were combined to give a Gleason score. The clinical and histopathlogical data so obtained were analyzed and compared with other similar studies.

**Results :** Out of total 156 cases of prostatic specimens obtained, majority were core needle

biopsy [77 (49.36%)] & TURP specimens [74 (47.44%)] with only 5 (3.20%) being of radical prostatectomy (Table 1).

**Table 1: Spectrum of lesions observed in different types of prostatic specimens**

| | Tru cut core needle biosy | TU RP | Radical prostatectomy | No. of cases |
|---|---|---|---|---|
| Benign | 41 | 71 | 00 | 112 |
| Malignant | 36 | 03 | 05 | 44 |
| Total | 77 | 74 | 05 | 156 |

Most of the patients (82%) in our study presented with obstructive urinary tract symptoms viz. acute and chronic urinary retention, hesitancy, weak stream & terminal dribbling; while 18% had irritative symptoms viz. urgency, increased frequency, dysuria and nocturia. Only 05patients had history of fever.

Age group distribution of different prostatic lesions is shown in figure-1. Peak incidence of both benign and malignant lesions was noted in 7$^{th}$ decade; with mean age for benign and malignant lesions was 66.5 years and 69.1 years respectively.

**Figure 1: Age Distribution of Prostetic Lesion**

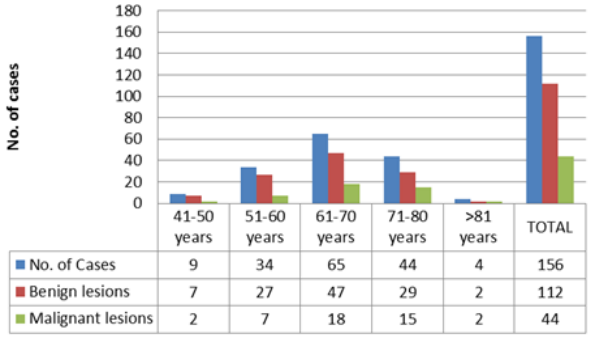


**Table2: Correlation of Serum PSA level with histopathological category**

| Serum PSA (ng/ml) | Benign | Malignant | Total No. of cases |
|---|---|---|---|
| <4 | 13 (11.61%) | 0 | 13 (8.33%) |
| 4-10 | 49 (43.75%) | 2 (4.55%) | 51 (32.70%) |
| >10 | 50 (44.64%) | 42 (95.45%) | 92 (58.97%) |
| Total | 112 (100%) | 44 (100%) | 156 |

Amongst the benign lesions, normal serum PSA was noted in 13 cases, modest elevation [4.1-10 ng/ml] was observed in 49 cases and marked elevation [>10 ng/ml] was observed in 50 cases. Amongst malignant lesions, no case with normal serum PSA level was noted. Modest elevation [4.1-10 ng/ml] was seen in 02 cases and marked elevation [>10 ng/ml] was seen in 42 cases (Table-2).

Histopathological spectrum of prostatic lesions comprised 112 (71.79%) benign lesions and 44(28.21%) malignant lesions. Amongst the benign lesions, BPH was the sole diagnosis. Some benign lesions were observed in association with BPH including; basal cell hyperplasia, squamous metaplasia, granulomatous prostatitis, acute prostatitis and prostatic intraepithelial neoplasia (PIN). Their relative proportion is depicted in Table-3.Amongst the malignant lesions, acinar type adenocarcinoma was the predominant lesion with only one case reported to be of ductal adenocarcinoma.Out of 44 cases of adenocarcinoma, 25 cases were showing perineural invasion(Table 3). Majority of cases (45.45%) showed Gleason score 7, with no case being fell in Gleason score of 2 to 5.

**Table3: Histopathological Diagnosis**

| Histopathological Diagnosis | | | Cases |
|---|---|---|---|
| Benign prostatic hyperplasia (BPH) | Associated findings with BPH | NO. OF CASES | 112 |
| | BPH with chronic inflammation | 89 | |
| | BPH with chronic inflammation & Basal cell hyperplasia | 16 | |
| | BPH with chronic inflammation &Squamous metaplasia | 02 | |
| | BPH with Granulomatous Prostatitis | 01 | |
| | BPH with acute Prostatitis | 02 | |
| | BPH with high grade PIN | 02 | |
| Acinar adenocarcinoma | | | 43 |
| Ductal adenocarcinoma | | | 01 |
| TOTAL | | | 156 |

Table 4 : Gleason Score in Adenocarcinoma, Prostate

| Gleason Score | No. of Cases | Percentage % |
|---|---|---|
| 2-5 | 0 | - |
| 6 | 8 | 18.18 |
| 7 | 20 | 45.45 |
| 8 | 8 | 18.18 |
| 9 | 7 | 15.92 |
| 10 | 1 | 2.27 |
| Total | 44 | 100 |

**Discussion:** Prostatism is common in the geriatric age group. Benign prostatic hyperplasia and carcinoma of the prostate are increasingly frequent with advancing age and are uncommon before the age of 40 years. In this study,Tru-cut core needle biopsies and TURP specimens were constituted the main study tools.Transurethral resection of prostate is done in patients having enlarged firm prostate with evidence of prostatic enlargement on sonography, as it is a simple procedure with fewer complications as compared to open prostatectomy. Core needle biopsy has the pivotal role to diagnose cancer because majority of prostatic cancers are acinar type adenocarcinomas arising from peripheral acinar region of prostate; which is easily accessible by needle biopsy. In the present study, majority (36 cases) of acinar adenocarcinomas were diagnosed by core needle biopsy specimens. Radical Prostatectomy was done only in 05 (3.20%) patients. As compared to western literature, prostatectomy is done less frequently in India. The possible explanation would be the fact that, open prostatectomy is the treatment of choice for early prostate cancer, and in India, because of lack of public awareness and proper screening methods; prostate cancer is often diagnosed at a late stage.

In the present study, peak incidence of benign & malignant prostatic lesions was observed in 7$^{th}$ decade. Similar findings were noted in the studies done by Gil et al[3] and Mital Yadav et al.[4]

Most of the patients (82%) with prostatic lesions presented with obstructive urinary tract symptoms. In the study done by Gaudinet et al.[5],Herawiet et al.[6]and Wade et al.[7],the major presenting symptoms wereobstructive urinary symptoms in more than 50% of patients. Our findings are in concordance with the above mentioned studies.

Wide variation in serum PSA level was observed in benign & malignant lesions in different studies. However, in majority of studies, cases of adenocarcinoma had S. PSA level > 10 ng/ml. According to a study conducted by Ghafoori M et al.[10], serum PSA threshold of 4 ng/ml is usually an indication for prostate biopsy. S. PSA level between 4 ng/ml and 10 ng/ml is considered as a grey zone with low sensitivity, but values above 10 ng/ml have a high sensitivity for prostate cancer. The sensitivity even reaches 100% if S.PSA values higher than 15 ng/ml is considered as threshold.[10]

**Table 5 : Correlation of Serum PSA Level with Histopathological Diagnosis**

| PSA Range ng/ml | Benign Prostatic Hyperplasia | | | Carcinoma Prostate | | |
|---|---|---|---|---|---|---|
| | Kshitij et al [8] | Prabhat et al [9] | Present Study | Kshitij et al [8] | Prabhat et al [9] | Present Study |
| 0-4 | 71.6% | - | 11.61% | 10.5% | - | - |
| 4-10 | 22.6% | 87.6% | 43.75% | 23.6% | 14.9% | 4.55% |
| >10 | 15.2% | 12.4% | 44.64% | 63.7% | 74.2% | 95.45% |

Prostate specific antigen (PSA) is secreted exclusively by prostatic epithelial cells. Approximately 30-50% of patients with benign prostatic hyperplasia have elevated serum PSA concentrations, depending on the size of the prostate, degree of obstruction and presence of associated chronic inflammation. In prostatic cancer, the PSA concentration is increased in 20-92% of patients, depending on the tumor volume. Measurement of the serum PSA is the most sensitive marker available for monitoring the progression of prostatic cancer. PSA is specific for prostatic tissue, but not specific for prostatic cancer. Umbehr MH et al. and Kiehl R et al. in their studies concluded that, BPH and prostatitis is associated with high serum PSA, when glandular epithelium is disrupted.[11,12] On the other hand, Papsidero LD et al. suggested that elevation of PSA is due to unknown substances released by epithelial cells in association with the inflammatory processes surrounding the affected area.[13] Hence, there is a need of estimation and interpretation of free PSA level to increase the diagnostic accuracy.

**Table 6 : Frequency of Benign and Malignant Lesions**

| Histopathological Category | W.Horinger et al[14] | Anna Pacelli et al [15] | Choi JH et al [16] | Kamil et al [17] | Present Study |
|---|---|---|---|---|---|
| Benign lesions | 73.1% | 81.7% | 82.8% | 67.2% | 71.79% |
| Malignant lesions | 26.9% | 18.3% | 17.2% | 32.8% | 28.21% |

In Present study, out of total 156 cases studied, 71.79% were benign and 28.21% were malignant lesions. Benign Prostatic lesions are common in comparison to malignant lesions. Our findings are comparable with all the above studies (Table- 6).

Some lesions are observed in association with BPH viz. basal cell hyperplasia, squamous metaplasia, and prostatitis. Within areas of BPH, stromal infiltrate of lymphocytes and plasma cells are commonly seen. However, in the majority of cases, these findings have not been identified with an infectious process or clinical symptoms of prostatitis. Because the histologic finding of chronic inflammation does not correlate with clinical prostatitis, we do not report surgical specimens as showing "chronic prostatitis" but, rather, as "chronic inflammation." Cases of nonspecific granulomatous prostatitis needs to be differentiated from other causes of granulomatous inflammation including tuberculosis.

Prostatic intraepithelial neoplasia (PIN) is considered a precursor lesion for adenocarcinoma. Prostatic intraepithelial neoplasia (PIN) consists of architecturally benign prostatic acini or ducts lined by cytologically atypical cells. While originally divided into different "grades," only high-grade PIN is diagnosed and reported in modern practice. The reproducibility and clinical significance of lower-grade lesions is questionable at best. Several studies have shown a statistical association between high-grade PIN and prostatic carcinoma.

In our study, prostate cancer was found in 44 (28.21%) cases. All these 44 cases were of prostatic adenocarcinoma. Majority were of acinar type. A single case of prostatic ductal adenocarcinoma was reported. In the study of Subathra and Sangeetha[19],Deshmukh*et al*.[20] and Jatav*et al*;[21] the frequency prostatic adenocarcinoma reported to be 7.4%, 9% and 9.7% respectively of all prostatic lesions. These studies also revealed acinar type of adenocarcinoma as the principal variant of prostatic cancer.

In the present study, Gleason Score of 2 to 5 was not found in any case and the most common Gleason Score reported was 7. Our findings are almost similar with the above two studies. In a recent update of Gleason scoring system, classic Prostatic ductal adenocarcinoma (e.g., cribriform and papillary pattern) are classified to Gleason pattern 4.[24] The presence of comedonecrosis in Prostatic ductal adenocarcinoma warrants the assignment of gleason pattern 5.[25]

**Table 7 : Comparison of Gleason Score of Adenocarcinoma in different studies**

| Gleason Score | Babaian RJ et al [22] | Falzarano et al [23] | Present Study |
|---|---|---|---|
| 2 | - | - | - |
| 3 | - | - | - |
| 4 | 1 | - | - |
| 5 | 63 | - | - |
| 6 | 114 | 21 | 8 |
| 7 | 151 | 34 | 20 |
| 8 | 9 | 2 | 8 |
| 9 | 26 | 4 | 7 |
| 10 | - | - | 1 |

Gleason pattern 1 and 2 were not encountered in our study, which could be explained by the following fact. In our study, most cases of adenocarcinoma were detected in needle biopsy specimens. According to Young et al.[26]and Epstein et al.[27] Pattern 1 and 2 are almost never diagnosed on needle biopsy. This is because the calibre of needle core does not generally enable all the edges of nodule to be seen. In addition, low-grade cancers are predominantly located anteriorly in the prostate within transition zone and tend to be small. So, there is poor reproducibility in the diagnosis of gleason grade 1 and 2 in specimens of core needle biopsy.

**Conclusion:**

In the present study, benign prostatic hyperplasia was the commonest lesion and most cases revealed associated chronic inflammation. Most common malignancy noted was acinar type of adenocarcinoma with predominant Gleason Score reported to be 7. The commonest age group of presentation for both carcinoma and

BPH was seventh decade and obstructive urinary symptoms were the most common mode of presentation. Histopathological examination proves to be gold standard for the diagnosis of prostatic lesions. Not only it diagnoses the lesion but also helps in the prognostification of lesion by detecting various morphological parameters like Gleason grade and score, perineural invasion, periprostatic invasion and association with high grade PIN. S. PSA is the most important screening test used in diagnosis and management of prostatic cancer.

## References


1. Epstein IJ. The lower urinary tract and male genital system. Kumar, Abbas and Fausto (editors). Robbins and Cotran Pathologic basis of disease. 7th ed, Saunders: 2004; 1023-1058.
2. Jemal A, Siegel R, Xu J, Ward E. Cancer statistics, 2010. CA Cancer J Clin. 2010; 60(5):277-300.
3. Gill MJ,Allepuz C, Lioja LA: A multicentric study on detection of prostate cancer by digital rectal examination and prostate specific antigen in men with or without urinary symptoms: European Urology:32;133-139,1997.
4. Mital Yadav, Hemina Desai, Hansa Goswami. Study of Various Histopathological Patterns in Prostate Biopsy. Int J Cur Res Rev:2007;9(21);58-63
5. Gaudin PB, Rosai Juan, Epstein JI.Sarcomas and related proliferative lesions of specialized Prostatic stroma: A clinicopathological study of 22 cases. Am J SurgPathol. 1998;22(2):148-162.
6. Herawi M, Epstein JI. Specialised stromal tumors of the prostate: A clinicopathologic study of 50 cases. Am J SurgPathol. 2006;30(6):694-704.
7. Wade JS, Raymond EL, Adriana OR, Peter WT, Shiming TU, Louis LP. Adult prostate sarcoma: The M.D. Anderson cancer centre experience. J Urol. 2001; 166(2):521-525.
8. Arora K, Sapre J, Agnihotri AS, et al. Utility of prostate specific antigen in different prostatic lesions, PSA assay. Pathology and Laboratory Medicine 2011;3(1):18-23.
9. Sharma P, Patel MM, Raval A, et al. Histopathological lesions in Transrectal ultrasound guided biopsies of prostate in patients with raised serum prostate specific antigen. IJSR 2014;3(11):2277-8179.
10. Ghafoori M, Varedi P, Hosseini SJ, Asgari M, Shakiba M. Value of [8]prostate-specific antigen and prostate-specific antigen density in detection of prostate cancer in an Iranian population of men. Urol J. 2009;6(3):182-88.
11. Umbehr MH, Gurel B, Murtola TJ et al. Intraprostatic inflammation is positively associated with serum PSA in men with PSA <4 ng/ ml, normal DRE and negative for prostate cancer. Prostate Cancer Prostatic Dis 2005;18:264-9. Crossref
12. Kiehl R, Lemos LD, Stavale JN, Ortiz V. Correlation between histologic grading and serum prostatic specific antigen in prostatic carcinoma. IntUrolNephrol 1994;26:665-8. Crossref
13. Papsidero LD, Kuriyama M, Wang MC et al. Prostate antigen: a marker for human prostate epithelial cells. J Natl Cancer Inst 1981;66:37-42. Crossref
14. Horninger W, Volgger H, Rogatsch H, Strohmeyer D, Steiner H, Hobisch A et al. Predictive value of total and percent free prostate specific antigen in high grade prostatic intraepithelial neoplasia lesions: Results of tyrol prostate specific Antigen Screening Project. J Urol 2001; 165: 1143-1145.
15. Pacelli A, Bostwick GD. Clinical significance of high-grade prostatic intraepithelial neoplasia in transurethral resection specimen. Urol 1997; 50: 355-359.
16. Choi JH, Kim JH, Park CH, Lee SC: Clinical value of prostatic biopsy in patientswith elevated serum PSA: Korean Journal of Urology,1996;37:1110-1116.
17. Kamil Cam, HakanOzveri, LeventTurkeri,AtifAkdas: The significance of hypoechoic lesion directed and transition zone biopsies in improving the diagnostic ability in prostate cancer: Brazilian Journal of Urology;27:222-226,2001.
18. Juan Rosai. Male reproductive system. Juan Rosai (editor). Juan Rosai and Ackerman`s Surgical Pathology. 11th ed, Missouri: Mosby: 2018; 1097-1134.
19. Subathra K, Sangeetha N. histopathological study of prostatic lesions and assessment with AGNOR index. Int J Pharm Bio Sci 2014;5:B253-60.
20. Deshmukh BD, Ramteerthakar NA, Sulhyan KR. Histopathological study of lesions of prostate-a five year study. Int J Health Sci Res. 2014;4:1-9.

21. Jatav J, Tomar KS, Pandit V, Iyenger S, Jain B. Characterization of prostatic lesions in surgically resected specimens. Indian J Appl Res 2015;5:444-6.
22. Babaian RJ, Grunow WA. Reliability of gleason grading system in comparing prostate biopsies with total prostatectomy specimens. Urology. 1985;25(6):564–567.
23. Falzarano SM, Navas M, Simmerman K, Klein EA, RubinMA, Zhou M. ERG rearrangements present in a subset of transition zone prostatic tumors. Modern Pathology,2010;20:1499-1506
24. Epstein JI. An update of Gleason grading system. J Urol2010;183:433-40
25. Epstein JI, Allsbrook WC Jr, Amin MB, et al. Update on the Gleason grading system for prostate cancer: results of an international consensus conference of urologic pathologists. Adv Anat Pathol 2003;13:57-9
26. Young RH, Srigley JR, Amin MB, Ulbright TM, Cubilla A. Tumors of the Prostate Gland, Seminal Vesicle, Male Urethra and Penis. Washington, DC: Armed Forces Institute of Pathology; 2000. Atlas of Tumor Pathology. 3rd series, fascicle 28:1-344.
27. Epstein JI. Diagnostic criteria of limited adenocarcinoma of the prostate on needle biopsy. Hum Pathol. 1995;26(2):223-229.

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