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Histopathological study of prostatic lesions at tertiary care centre

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Abstract

Introduction

Diseases of prostate gland are important source of morbidity and mortality in male patients. The number of cases has continuously increased over the past decades, partly due to the higher life expectancy. The spectrum of diseases consists of inflammatory conditions, hyperplasia and malignancy. Prostate biopsy is essential to detect cancer and other benign conditions. There are other modalities of diagnosis, comprising of radiology and prostatic biomarkers. However, biopsy with histopathological examination is the gold standard for final diagnosis.

Aims and Objectives

1. To study the incidence, age distribution, gross and histopathological features of lesions of prostate.
2. To classify tumours of prostate as per recommendations of WHO and to analyse cases of Adenocarcinoma of prostate according to Modified Gleason grading system.

Materials and methods: Total 160 cases of prostatic lesions from June 2019 to December 2019 including needle core biopsy and TURP chips were evaluated in this study. The received specimens were fixed in 10% neutral buffered formalin and routine paraffin processing followed by hematoxylin and eosin staining. All specimens were analysed with the following parameters: type of specimen, age, medical history, histopathological examination and final diagnosis.

Results and Conclusion: In the study of 160 cases, most common age group affected was 61-70 years. The youngest patient was 49 years old and the oldest was 90 years old. In our study, various histopathological patterns were observed, where BPH was the most common finding. We reported 23 cases of adenocarcinoma of prostate with application of modified Gleason grading system. Maximum number of cases of adenocarcinoma were seen in 61-70 years age group. It is necessary to study all prostate biopsies in order to identify premalignant lesions, proliferative activity and grade of inflammation. Histopathological diagnosis and grading play a definitive role in the management of prostatic carcinoma.

Keywords: Needle core biopsy, TURP, benign prostatic hyperplasia, prostate carcinoma

Introduction

In normal adult prostate is a pear-shaped glandular organ that weighs up to 20gms [1]. It is a retroperitoneal organ encircling the neck of bladder and urethra. It is an exocrine gland and forms a significant component of seminal fluid. In adult, prostatic parenchyma can be divided into four biologically and anatomically distinct zones or regions: peripheral, central, transitional and periurethral zones. Histologically it consists of glands lined by basal cuboidal cells and inner secretory columnar cells (double layered).[1] Most of the patients present with complaints related to micturition and incontinence. Of the diseases which affects the prostate, the most frequently encountered in clinical practice are Benign Prostatic Hyperplasia, Carcinoma of prostate and prostatitis [2].

Benign prostatic hyperplasia is the most common benign prostatic disease in men older than age 50 years and shows remarkable racial and geographical variations in incidence and mortality [3]. The clinical incidence of this disease is only 8% during the 4th decade, but it reaches 50% in the 5th decade and 75% in the 8th decade [1].

BPH is not premalignant lesion for the prostatic cancer but it may be related to prostate cancer arising in transition zone (Difenbach *et al*., 2002) [4].

In India, prostate cancers constitute about 5% of all cancers in male [5, 6]. Screening of prostatic lesions constitute estimation of Serum Prostate Specific antigen (S.PSA), digital rectal examination, and transrectal ultrasound, but biopsy remains the gold standard tool for

final diagnosis. Prior to the PSA era, up to 27% of prostate cancers were detected incidentally at the time of TURP [7]. The modified Gleason's system appears better to predict progression-free survival after radical prostatectomy than the original Gleason's system.

Materials and Method

The present study was conducted in the Department of Pathology, B.J. Medical College and Civil hospital, Ahmedabad from June 2019 to December 2019 and data were collected. A total of 160 cases of lesions of prostate were evaluated. The gross specimens received were of needle core biopsies and transurethral resection of prostate (TURP) chips. The received specimens were fixed in 10% neutral buffered formalin solution and routine paraffin processing followed by hematoxylin and eosin staining was done. All the specimens were analysed according to age, medical history, histopathological pattern and final diagnosis. Thorough examination of slides was done under light microscope. Various lesions of prostate were listed, diagnosed according to various histopathological patterns and were classified with reference to age. Following histopathologic assessment, the tumors were classified according to WHO recommendation, and histologic grading was done using modified Gleason's system.

Ethical Considerations

All procedures performed were in accordance with the ethical standards of the institution.

Observation and Results

In this study of six months, a total of 160 prostate specimens were studied which were received in the Histopathology section of Department of Pathology in B.J. Medical College & Civil hospital, Ahmedabad, Gujarat. Out of 160 specimens, 60(37.5%) were needle core biopsy specimens and 100(62.5%) were TURP specimens. The needle core biopsy specimens were in the form of elongated pieces of grey tan tissues ranging from 0.4-1 cm in size. The TURP specimens were in the form of multiple pieces, grey tan to grey pink in colour and soft to firm in consistency.

All prostatic specimens were broadly classified into benign 136(85%) and malignant 23(14.4%). We reported 1 (0.6%) case of Prostatic Intra-epithelial Neoplasia (PIN). Maximum cases of BPH 53(38.9%) were seen in the 61-70 years age group [Table 1]. A glandular-stromal pattern of hyperplasia (75%) was the most frequent histological pattern observed. Stromal pattern of hyperplasia (2%) was less commonly observed. In this, 103(64.3%) cases were of BPH only [Figure 1]. Cases of BPH with co-existing chronic prostatitis were 11(6.9%) [Figure 2] and that with acute prostatitis were 6(3.8%) [Figure 3].

Less frequent findings were BPH with basal cell hyperplasia 3(2%) [Figure 4] and BPH with squamous metaplasia 1(0.6%) [Figure 5].

We reported 23 cases of adenocarcinoma prostate with modified Gleason Grading system. Histopathology of biopsy received showed only single, separate, much more variable glands, closely packed but irregularly separated, ragged and poorly defined edge (Gleason's grade 3) [Figure 6]. Second most predominating pattern was fused glandular, cribriform pattern and hypernephroid (Gleason's grade 4) [Figure 7]. The most common score obtained was 7 in 11 cases out of the total 23 adenocarcinoma cases. [Table 3]. The most common predominant grades observed in this study were grade 3 and grade 4 [Table 4].

Discussion

A study of 160 cases of prostate biopsy was done, results were noted and comparison with other studies was undertaken as follows:

Age

Lesions of prostate are extremely common over the age of 50 years. The clinical incidence of this disease is only 8% during the 4th decade, but it reaches 50% in the 5th decade and 75%in the 8th decade [1]. BPH and carcinoma of the prostate are increasingly frequent with advancing age [8].

In present study, age group affected with prostatic pathology was 39-90 years. Maximum cases of BPH 53(38.9%) were seen in the 61-70 years age group similar to Matapurkar *et al*. [9]. Malignant lesions were encountered predominantly in age group 61-70 years that are similar to Sharma *et al*. [10].

Benign and Malignant

BPH and adenocarcinoma are the two most common conditions affecting prostate gland.

In present study malignant cases were 23(14.4%), benign cases were 136(85%) and we reported 1(0.6%) of PIN. In present study, the predominant lesion was BPH (64.3%) similar to Neha Angurana's study[11] (50.5%), followed by prostatic adenocarcinoma (14.4%) and BPH with chronic prostatitis (6.9%).

Microscopy & Histopathological Patterns

Benign Prostatic Hyperplasia: There is hyperplasia of glandular and stromal tissue with papillary buds, infoldings and cysts. In glandular-stromal pattern, proliferating glands and fibromuscular stroma were roughly in equal proportions. While in stromal pattern, the sections showed more stromal elements than glands or were made up almost entirely of stromal elements. Before the recognition of the hyperplastic nature of BPH, the prostatic enlargement in elderly men had been variously interpreted to reflect neoplastic process, compensatory hypertrophy, a response to inflammation or arteriosclerosis [12]. Pure stromal hyperplasia with nodule formation was first reported by Reischauer in 1925 [13]. Deming *et al*. [14] confirmed this observation and further regarded the glandular element of prostatic nodule as an event to the stromal stimulus to epithelial proliferation within adjacent ducts. The earliest change is the stromal proliferation which contains more smooth muscle and less elastic tissue than the normal stroma, followed by hyperplasia of the glandular component. The glands are dilated or even cystic and often contain corpora amylacea which is sometimes calcified. The epithelium ranges from flat to columnar. The cytoplasm is pale and nucleoli are inconspicuous. A continuous basal cell layer is present [13]. In present study, glandular-stromal pattern of hyperplasia (75%) was the most frequent histological pattern which was observed. Stromal pattern of hyperplasia (2%) was less common. Our study was in agreement with study done by Zeenath Begum, Abdul Hakeem Attar, Mandakini B. Tengli, Mohammed Mateen Ahmed (8%) in respect that glandular-stromal hyperplasia was most commonly noted [15].

Prostatitis: It shows inflammatory changes within the prostate glands.

Acute Prostatitis: There are neutrophils within acini and throughout stroma, intraductal desquamated cellular debris and stromal edema. Acute prostatitis is less commonly seen in prostatic specimens. In present study, 3.8% cases of acute prostatitis were observed.

Chronic Prostatitis: Chronic prostatitis is more common. Chronic inflammation typically involves the prostate in peri-glandular distribution and contains an admixture of plasma cells, lymphocytes and histiocytes. In present study BPH with chronic prostatitis was observed in 6.9% cases. Chronic prostatitis is most commonly observed in BPH which was also observed by Dr. Ashish Joshee, Dr. Kaushal C.L. Sharma in their study [16].

Types of Epithelial Hyperplasia: Various hyperplastic lesions of prostate include papillary, basal, cribriform, etc. Basal cell hyperplasia is usually seen in the transitional zone, but it may also occur in the peripheral portion of the gland. Microscopically it appears as small, generally solid nests of benign-appearing epithelial cells with minimal cytoplasm [1]. Cribriform hyperplasia is an uncommon and controversial form of hyperplasia [1]. In clear cell cribriform hyperplasia, cytoplasm of hyperplastic glandular cells often has a clear appearance [1]. In present study BPH with basal cell hyperplasia was reported in 2% cases. We did not report any case with clear cell cribriform hyperplasia.

Types of Metaplasia: Squamous metaplasia can be seen at the periphery of infarcts after TUR, as a result of hormonal manipulation, or sometimes with no obvious predisposing cause. In present study BPH with squamous metaplasia was observed in 1(0.6%) case.

Carcinoma Prostate: Carcinoma of prostate is the second most common malignancy in men, second only to lung cancers. Hormonal factors play important role in the development of prostatic carcinoma. A meta-analysis of previously published articles on hormonal predictors of prostate cancers conclude that men whose total testosterone levels are in the highest quartile are at 2.34 times more likely to develop prostate cancer [17]. 5-10% of prostatic carcinoma have a genetic link. A higher incidence has been seen in males with a first degree relative being affected [1].

The search for the precursor of prostatic adenocarcinoma has focussed in recent years on two distinct histopathological findings: Prostatic Intraepithelial Neoplasia (PIN) and Atypical Small Acinar Proliferation (ASAP).

Grossly, the gland is hard or firm yellow grey. The size varies ranging from minute focus to massive growths. On cut surface the carcinomatous foci appear as ill defined, greyish white areas merging into surrounding tissue.

Microscopic features favouring prostatic carcinoma

Architectural: Infiltrative patterns, small & crowded glands.

Nuclear: Prominent nucleoli, enlargement, hyperchromasia, mitotic figures, apoptotic bodies.

Cytoplasmic: Amphophilic cytoplasm, sharp luminal border [18].

Adenocarcinoma accounted for 14.4% of the cases in our study. Maximum number of cases were reported in 7th decade which is similar to studies conducted by Sharma *et al*. [10] and Matapurkar *et al*. [9].

Adenocarcinomas are classified taking into account the morphological appearance of glandular cells and the glandular pattern. Maximum number of cases showed Gleason's grade 3(45%) and 4(37%) which was comparable to Vollmer [19].

Predominant Gleason's score was 7(47.8%) in our study similar to Brawn *et al.* [20].

PIN is the currently preferred term for a process involving prostatic ducts and acini, which has also been described as ductal-acinar dysplasia. While originally divided into different grades, only high-grade PIN is diagnosed and reported.

In our study, we reported only 1(0.6%) case of PIN. The reported incidence of PIN is 2.3-5.5% in needle core biopsies and TURP specimens in other studies [21-23].

Conclusion

From above study, we conclude that prostatic lesions are more common in age group of 61-70 years. Benign conditions are more common than malignant conditions. Among the histological types of prostatic lesions, BPH is predominant type, followed by BPH with prostatitis. It is necessary to reassess periodically all prostate biopsies carefully in order to identify premalignant lesions, proliferative activity, grade of inflammation. Efforts should be made to apply modified Gleason's system in case of adenocarcinoma of prostate to improve management. Histopathological diagnosis and grading play an important role in the management of prostatic cancer. For satisfactory management of patient, a high degree of the awareness of the advances along with team approach has become imperative.

Table 1: Age wise distribution of cases

Age (years)	Benign	Malignant	PIN
41-50	19 (13.9%)	02 (8.7%)	-
51-60	40 (29.4%)	03 (13.4%)	-
61-70	53 (38.9%)	09 (39.1%)	01
71-80	18 (13.2%)	08 (34.7%)	-
81-90	06 (4.41%)	01 (4.3%)	-
Total	136 (~100%)	23 (~100%)	01

Table 2: Distribution of Histopathological lesions

Histopathological pattern	Number of cases	Percentage (%)
BPH alone	103	64.3
BPH with acute prostatitis	06	3.8
BPH with chronic prostatitis	11	6.9
Stromal hyperplasia only	03	2
BPH with squamous metaplasia	01	0.6
BPH with basal cell hyperplasia	03	2
Benign prostatic tissue	09	5.6
Prostatic intraepithelial Neoplasia (PIN)	01	0.6
Adenocarcinoma of Prostate	23	14.4

Table 3: Distribution of cases according to Gleason's score

Gleason's score	Number of cases	Percentage (%)
6	02	8.7
7	11	47.8
8	07	30.4
9	02	8.7
10	01	4.3
Total	23	100

Table 4: Distribution of cases according to Gleason's grade

Gleason's grade	Number of cases	Percentage (%)
1	-	-
2	4	17.3
3	10	43.4
4	8	34.7
5	1	4.3
Total	23	~100

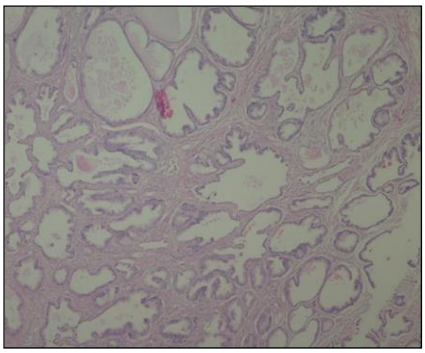

Fig 1: Benign prostatic hyperplasia (H&E stain) (10x)

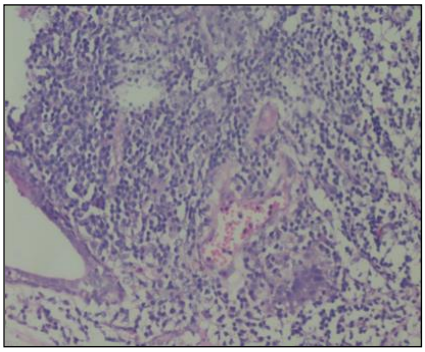

Fig 2: Chronic prostatitis (H & E stain) (20x)

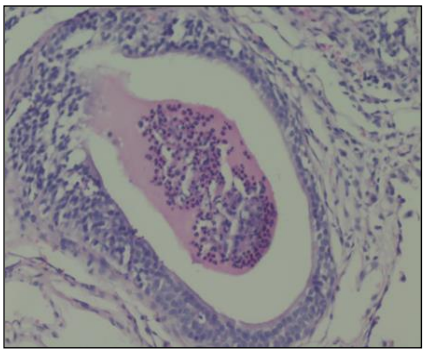

Fig 3: Acute prostatitis (H&E stain) (20x)

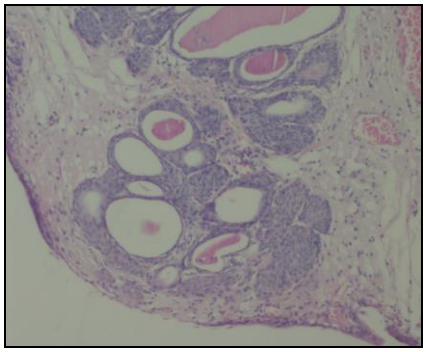

Fig 4: Basal cell Hyperplasia (H&E stain) (20x)

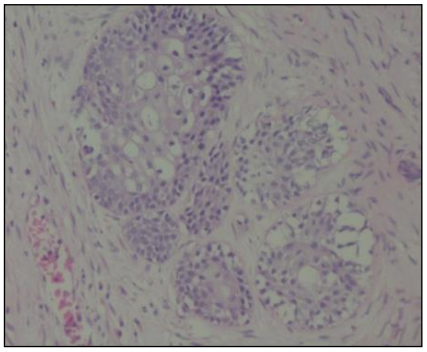

Fig 5: Squamous Metaplasia (H&E stain) (20x)

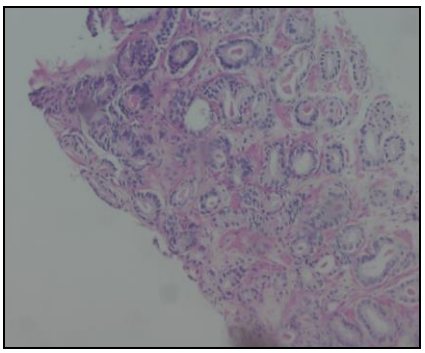

Fig 6: Adenocarcinoma of prostate Gleason's Grade (3+3) (H&E stain) (10x)

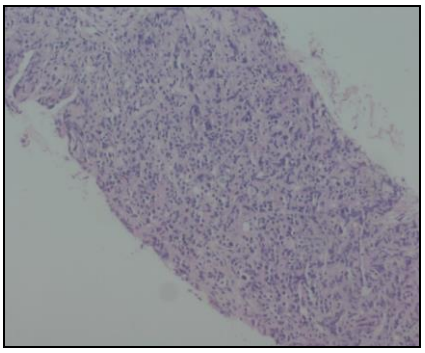

Fig 7: Adenocarcinoma of prostate Gleason's Grade (4+4) (H&E stain) (10x)

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