

Clinicopathological correlation of radical prostatectomy specimens

Neeraj Dhameja, Sandip Kumar, Sameer Trivedi¹, U. S. Dwivedi¹

Departments of Pathology and ¹Urology, IMS, BHU, Varanasi, Uttar Pradesh, India

Abstract

Introduction: Prostate cancer is the most common cancer in male, and histopathological examination of the prostatic tissue plays a very important role in diagnosis, prognosis, and management of patients with prostatic carcinoma.

Objective: To study the histopathological features of the radical prostatectomy specimens which decide prognosis and further management of patients with prostatic carcinoma and correlation with trucut biopsy.

Materials and Methods: Fourteen radical prostatectomy specimens were evaluated which were grossed by standard techniques, and histopathological parameters were evaluated on hematoxylin and eosin-stained sections.

Results: Histopathologically acinar carcinoma is the most common type of prostatic carcinoma though there may be other types also. In this study only acinar carcinoma was found in all cases. Gleason pattern 3 and 4 were the predominant primary and secondary patterns respectively. Previous trucut biopsies result were available in 5 cases and in 4 cases grades were same in trucut biopsies and radical prostatectomy specimens however, in one case Gleason score in radical prostatectomy specimen was upgraded. Detailed histopathological examination of radical prostatectomy specimens according to prescribed guidelines is essential so that further management can be decided. The number of cases in this study are less more cases should be evaluated.

Conclusions: Detailed histopathological examination of radical prostatectomy specimens including extent into surrounding structures helps in prognosis and further management of patients with prostatic carcinoma.

Keywords: Acinar adenocarcinoma, extraprostatic extension, Gleason grade, perineural invasion, radical prostatectomy

Address for correspondence: Dr. Neeraj Dhameja, Department of Pathology, IMS, BHU, Varanasi, Uttar Pradesh, India.

E-mail: neerajdhameja0610@gmail.com

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INTRODUCTION

Prostatic carcinoma is the most common cancer in males usually seen in elderly patients in the age range of 60–80 years. Patients present with symptoms of urinary obstruction and dysuria. On examination, prostate is enlarged and felt hard on digital rectal examination. Serum prostatic-specific antigen (SPSA) is elevated in patients

with carcinoma prostate and is used as a screening test; however, it can also be elevated in other conditions such as prostatitis and benign prostatic hyperplasia.^[1] Diagnosis of carcinoma prostate depends on histopathological examination of trucut prostatic biopsies. Whenever a patient presents with obstructive urinary symptoms, SPSA test is done, and if it is raised, then trucut prostatic

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biopsies are taken and histopathological examination is done. On histopathological examination, a diagnosis of prostatic adenocarcinoma is made and Gleason grading and scoring are done. Prognosis depends on staging and Gleason score. Gleason score is supposed to be the most important prognostic factor, and therapeutic decisions are made based on the Gleason score.^[2] Treatment options may be active surveillance if Gleason score is low; radical prostatectomy is performed in patients with disease limited to prostate and having life expectancy of >10 years.^[1] The Gleason score on trucut biopsies is correlated with Gleason score on radical prostatectomy specimen. There are guidelines by the International Society of Urological Pathology (ISUP) regarding reporting of prostatic trucut biopsies and radical prostatic specimens.^[3] Recently, the ISUP developed Gleason grade group based on the Gleason score, which also has prognostic and therapeutic implications.^[4] Proper grossing and reporting of radical prostatectomy specimens are very crucial for proper management of these patients.^[5-7]

MATERIALS AND METHODS

In this study, we evaluated 14 radical prostatectomy specimens done over a period of 5 years, and the patients' age ranged from 55 to 78 years (one 55 years, one 58 years, one 78 years, and rest ranged from 60 to 68 years). These specimens were grossed according to the standard protocols and were entirely embedded. Microscopic examination was done on hematoxylin and eosin-stained sections, and the number of parameters was reported according to the standard guidelines.

RESULTS

Grossly, tumor was identified in all specimens except one. On microscopic examination in all cases tumor identified was acinar adenocarcinoma. Carcinoma was involving almost whole of the prostate both right and left lobes, anterior and posterior quadrants from apex to base in 11 cases. In two cases, apex was free, rest of the prostate was involved by carcinoma, and in one case, only right lobe was involved at mid-level and near the base. Hence, in all cases, a rough estimation of tumor volume was made based on percentage of prostatic involvement (in majority of the cases, it was >90%). Gleason grading and scoring were done in all cases, and primary Gleason grade 3 [Figure 1] with secondary Gleason grade 4 [Figure 2] was the most common pattern seen in nine cases, one case had primary and secondary Gleason grades of 3 and 3, one had primary and secondary Gleason grades of 3 and 2 with tertiary pattern of 4, two cases had primary and secondary Gleason

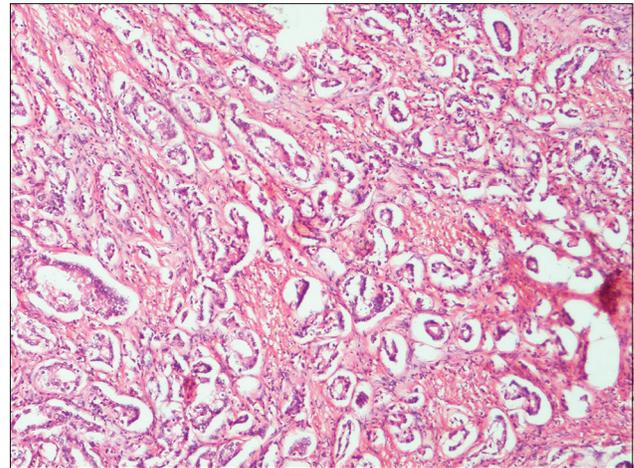


Figure 1: Prostatic carcinoma with Gleason grade 3 (H and E, 10 × 10)

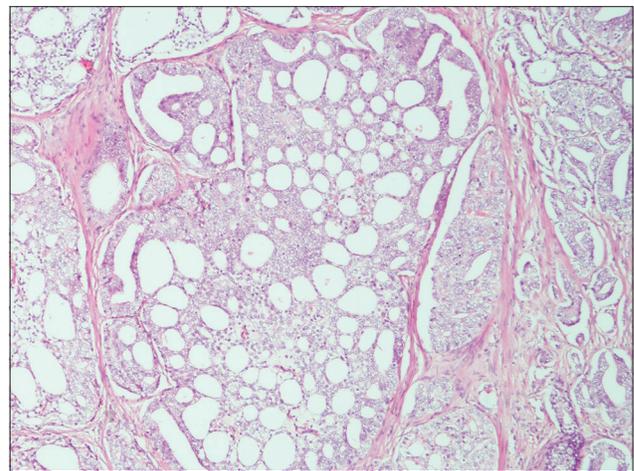


Figure 2: Prostatic carcinoma with Gleason grade 4 (H and E, 10 × 10)

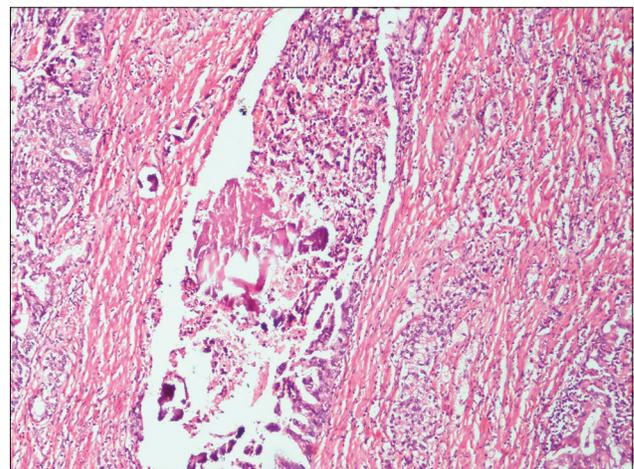


Figure 3: Gleason grade 5 with necrosis (H and E, 10 × 10)

scores of 4 and 3, and one case had primary and secondary Gleason grades of 5 and 4. Tertiary Gleason grade 5 with necrosis [Figure 3] was seen in two cases. Focal ductal pattern [Figure 4] was seen in one case, and high-grade

prostatic intraepithelial neoplasia [Figure 5] in three cases. Previous trucut biopsy diagnosis was available in five cases, and in four cases, the Gleason grade on trucut biopsy correlated with Gleason grade on radical prostatectomy specimen; however, in one case, Gleason grade on radical prostatectomy specimen was upgraded. Perineural invasion [Figure 6] was identified in all except one case. Lymphovascular invasion [Figure 7] was identified in three cases. Margin positivity [Figure 8] was seen in six cases (<3 mm), and focal extraprostatic extension [Figure 9] was seen in five cases. Bilateral seminal vesicles [Figure 10] were involved in seven cases, and only left seminal vesicle was involved in one case. Lymph nodes [Figure 11] were involved in six cases.

DISCUSSION

Prostate carcinoma is the most common cancer in male patients usually seen in elderly patients. Patients may be asymptomatic or present with obstructive urinary

symptoms. SPSA is elevated and is used as a screening test.^[1] Diagnosis depends on histopathological examination of trucut biopsies when SPSA level is found to be elevated. Usually, extended sextant biopsy is done mapping whole of the prostate. Prognosis and management depend on Gleason grade and score on prostatic biopsy. The patients with low Gleason score can be followed by active surveillance. Radical prostatectomy is done in patients who have disease limited within the prostate and having life expectancy of more than 10 years.^[1] The most common histological type is acinar adenocarcinoma.^[2] Doctor Gleason developed a system for grading prostatic biopsies.^[8] He divided prostatic biopsies into five grades based on architecture of the tumor glands. Grade 1 carcinoma has well-formed glands with a circumscribed appearance, grade 2 has well-developed glands with slight irregular borders, grade 3 with single infiltrating glands in between normal glands, grade 4 with fused glands or cribriform pattern, and grade 5 with single infiltrating

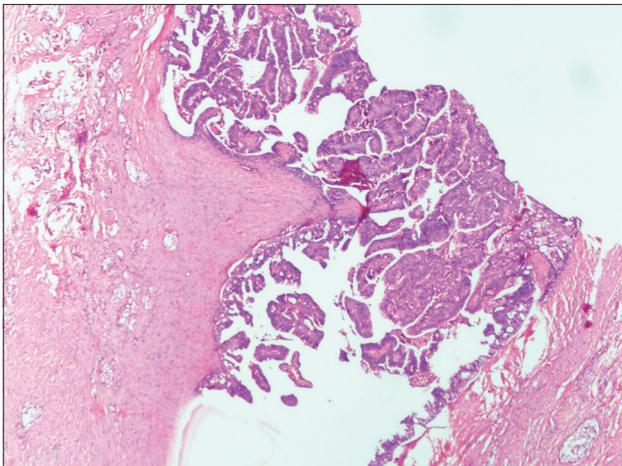


Figure 4: Prostatic carcinoma with ductal pattern (H and E, 4 × 10)

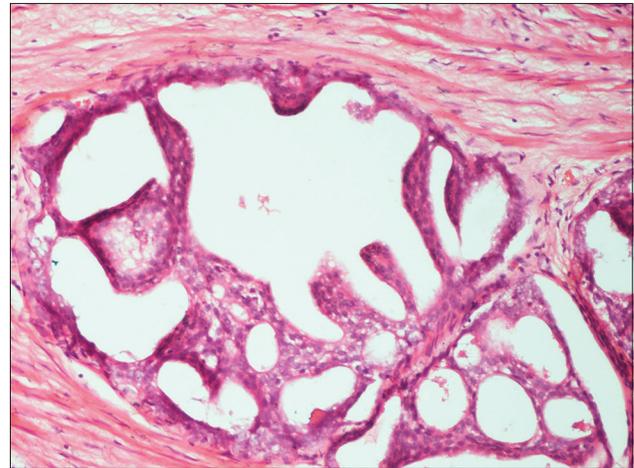


Figure 5: High-grade prostatic intraepithelial neoplasia (H and E, 20 × 10)

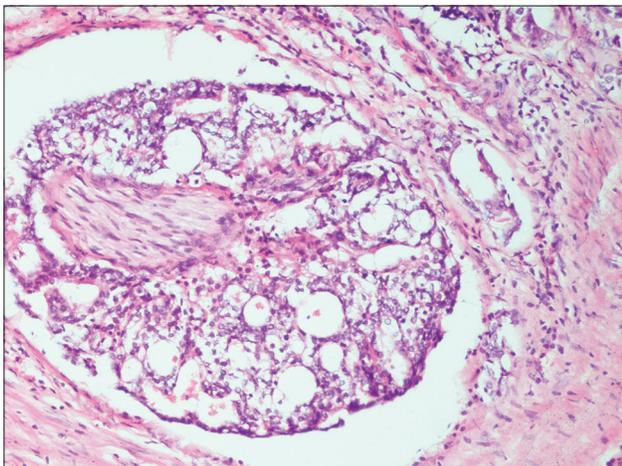


Figure 6: Perineural invasion (H and E, 20 × 10)

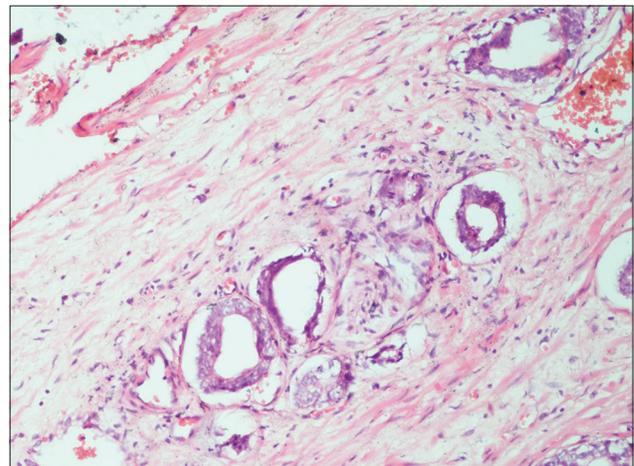


Figure 7: Lymphovascular invasion (H and E, 20 × 10)

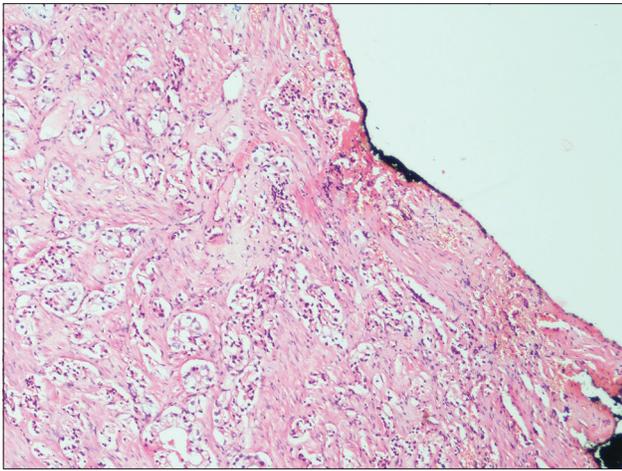


Figure 8: Margin positivity (H and E, 10 × 10)

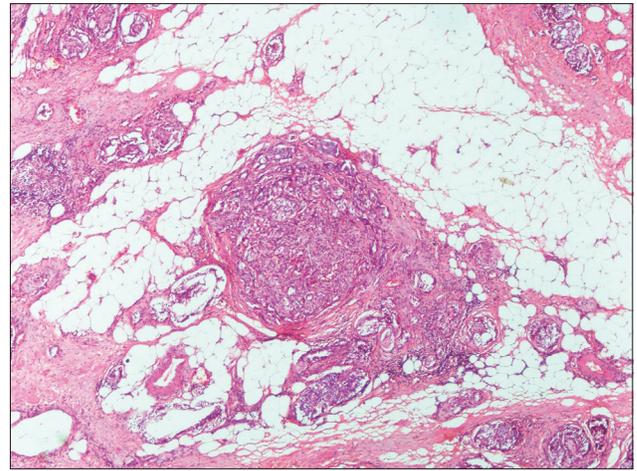


Figure 9: Extraprostatic invasion (H and E, 4 × 10)

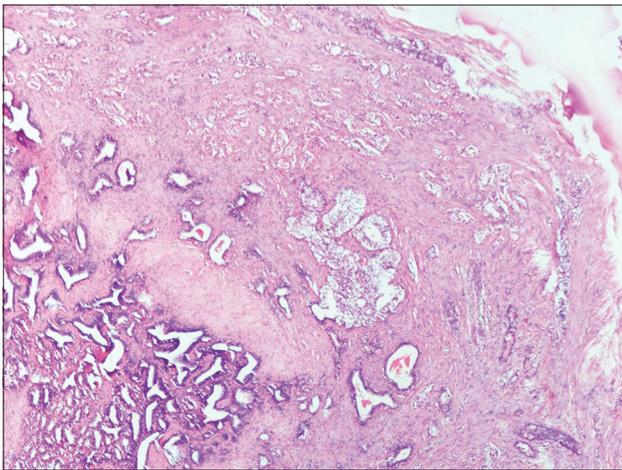


Figure 10: Seminal vesicle invasion (H and E, 4 × 10)

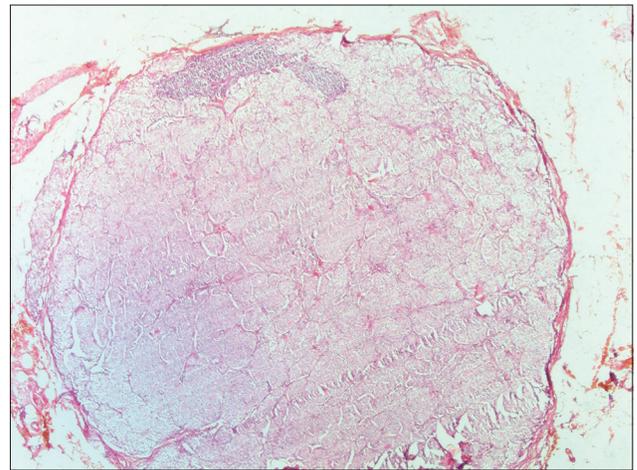


Figure 11: Lymph node metastasis (H and E, 4 × 10)

cells or sheets of cells.^[2,9] Gleason identified primary and secondary grades based on the predominant and the next predominant pattern, and on combining them, Gleason score was developed. Tertiary grade was seen in some cases and was the third predominant pattern. Later on, the ISUP modified Gleason grading in 2005^[3] and 2014,^[4] and separate guidelines have been given for trucut biopsies and radical prostatectomy specimen and also develop Gleason grade group. On trucut biopsies, a primary grade which is the predominant pattern and secondary grade which is the next predominant pattern are reported, and by combining them, Gleason score is given; however, when a tertiary pattern is present and it is of higher grade but less than 5%, then primary Gleason grade and tertiary grade are given, whereas in radical prostatectomy specimen, primary and secondary grades are reported along with tertiary grade if present.

Treatment options of prostatic carcinoma include active surveillance, radical surgery, radiotherapy, and

chemotherapy when metastasis is present. Handling of the radical prostatectomy specimen is very important, and there are guidelines regarding grossing of radical prostatectomy specimens. Some authors advocate complete embedding, while others advocate partial embedding.^[5-7,10-12] In our institute, we completely embed the prostatectomy specimen after proper orientation and inking of the external surface. There are various guidelines regarding parameters to be reported, while evaluating radical prostatectomy specimen. These parameters include Gleason grade, tumor volume, invasion of seminal vesicle, extraprostatic extension, margin positivity, involvement of apex, base (bladder neck), perineural invasion, lymphovascular invasion, and lymph node status.^[13,14] In the present study, acinar adenocarcinoma was seen in all cases, and primary Gleason grade 3 with secondary grade 4 was the most common grade. Tertiary grade 5 was seen in two cases. The Gleason grade of radical prostatectomy specimen was correlated with Gleason grade on trucut biopsy wherever available, and it was found to correlate

in all cases except one where the Gleason grade on radical prostatectomy specimen was upgraded. Other authors have also studied correlation of Gleason grade on radical prostatectomy specimen with that of trucut biopsy and have found different results. The study by Bulbul *et al.*^[15] found that Gleason score of 6 on needle biopsy was upgraded to 7 on radical prostatectomy specimen.^[15] The study by Cecchi *et al.*^[16] found poor correlation between needle biopsies and radical prostatectomy specimens. The study by Öztürk and Yikilmaz^[17] found discordance rate of 35.7% between Gleason scores of prostatic biopsies and radical prostatectomy specimens. The study by Awang *et al.*^[18] found that more than 60% of Gleason score of 6 on needle biopsy was upgraded in radical prostatectomy specimen. According to Montironi *et al.*,^[19] Gleason score of needle biopsy correlates with that of radical prostatectomy specimen; however, discrepancies may arise due to limited sampling in the needle biopsy. Other parameters such as tumor volume, perineural invasion, lymphovascular invasion, margin positivity, extraprostatic extension, and bilateral seminal vesicle and lymph node involvement were seen in 13, 3, 6, 5, 7, and 6 cases, respectively, in the present study. Margin positivity^[20] and extraprostatic extension^[21] are defined as tumor on the ink and adipose tissue, respectively. Seminal vesicle involvement is defined when tumor is identified in the muscular wall of the seminal vesicle.^[22] There are various methods described for tumor volume assessment.^[14,23] In the present study, tumor volume was assessed by percentage of the specimen involved by the tumor. Other parameters such as presence of high-grade prostatic intraepithelial neoplasia and ductal pattern were also evaluated and were seen in three and one cases, respectively. High-grade prostatic intraepithelial neoplasia has been associated with prostatic adenocarcinoma based on its presence in cases associated with prostatic adenocarcinoma and similar molecular abnormality and is characterized by severe atypia of the preexisting prostatic glands.^[24]

CONCLUSIONS

In the present study, detailed examination of the radical prostatectomy specimen was done, and all the relevant parameters were evaluated which provide prognostic information and decide further management and therapy.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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Dhameja, *et al.*: Clinicopathological correlation of radical prostatectomy specimen

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