

Knowing the Prognosis of Prostate Cancer from the Initial Core Needle Biopsy Report

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Radical prostatectomy is one of the most reliable treatments for localized prostate cancer,^[1] as it increases survival and decreases the risk of metastatic progression.^[2] Pathological findings in the resection sample are critical for prognosis and for determining suitability adjuvant treatment such as radiotherapy or hormonal therapy.^[3,4]

It has long been thought that the pathologic staging of prostate cancer and its prognosis can only be determined after radical prostatectomy; however, there is evidence on the possibility of establishing this prognosis from the initial study of the core needle biopsy, which would allow the doctor and the patient to prepare to assume the evolution of the disease from the moment of the initial diagnosis, allowing a greater period to take measures that facilitate coping with the disease.

Tumor quantification in core needle biopsy specimens is a powerful predictor of pathologic stage in radical prostatectomy and post-treatment outcome of virtually any variety. It is also a factor in determining the suitability of the patient for management in a surveillance protocol. Tumor quantification for surveillance protocols has used variables such as the absolute number of nuclei involved (two or three), the percentage of nuclei involved (<20% or <33% or <50%), and the highest percentage of any nuclei involvement (<50% of any nucleus; <30% or 6 mm of any nucleus).^[5] There are strong correlations between the absolute number of nuclei involved and the proportion of nuclei involved with the tumor volume in the prostate gland and with the pathological stage.^[6] There is also a strong correlation with the outcome in patients treated with radical prostatectomy or radiotherapy.^[7]

Core needle prostate biopsy specimens may contain periprostatic fat and, when affected by a tumor, this is equated with extraprostatic spread and a pathologic stage of at least pT3a. Ravery *et al.*^[8] published a report in which at the time of the sextant biopsy, the nuclei were directed to include extraprostatic tissue. In 75% of the cases in which capsular penetration into the nucleus was diagnosed, extraprostatic extension was confirmed in radical prostatectomy. In a series of 72 core needle biopsies with extraprostatic extension, Miller *et al.*^[9] reported that this finding is generally associated with high-grade, stage disease. The diagnosis of extraprostatic extension should be limited only to cases in which there is unequivocal fat involvement,^[10] which represents a substitute for extraprostatic extension.^[11]

In the study by Miller *et al.*,^[9] it was shown that the tumor associated with adipose tissue in the core needle biopsy correlates with extremely aggressive tumors rather than a simple tumor involving intraprostatic adipose tissue, that is, the presence of extraprostatic extension in core needle biopsy it is associated with a very poor prognosis.

Ravery *et al.*^[8] concluded that the presence of extraprostatic extension in core needle biopsy accurately predicts the presence of extraprostatic extension in the prostatectomy sample, with a positive predictive value of 94%.

That is, capsular status and extraprostatic extension can be determined in most core needle prostate biopsy specimens. This is important, since Sakai *et al.*^[12] demonstrated that capsular status is significantly related to lymph node metastases, seminal vesicle invasion, and tumor volume. Furthermore, capsular penetration is significantly associated with the biochemical recurrence-free survival rate; a similar

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finding was reported by Turk *et al.*^[13] who found that the Gleason score variables, prostate-specific antigen, and extracapsular tumor spread are statistically significant as predictive factors of biochemical recurrence. In the study by Hering *et al.*,^[14] the 10-year disease-free survival rate in patients with minimally invasive capsule was 72%.

According to Wheeler *et al.*,^[15] prostate cancer does not appear to metastasize in the absence of invasion into the capsule, regardless of the volume or grade of the intracapsular tumor. This suggests that, if capsular involvement can be identified in core needle biopsy, the patient's prognosis can anticipate the histopathological results of the prostatectomy.

The level of invasion in the fibromuscular band is an independent tumor behavior factor for positive surgical margin and biochemical recurrence in organ-confined prostate cancer. Patients with level 2 fibromuscular band (cancer cells confined to the prostate, within a more fibrous than muscular layer) had a higher risk of biochemical recurrence after prostatectomy.^[16] Therefore, Kim *et al.*^[16] concluded that the level invasion in the fibromuscular band could be used to stratify patients with pT2 disease and a poor prognosis.

According to the study by Theiss *et al.*,^[17] unlike capsular invasion alone, capsular penetration is an indicator of poor prognosis, which explains a reduction in survival expectancy and a higher rate of progression after radical prostatectomy.^[17] In both cases, capsular invasion or penetration can be identified in core needle biopsy.

The diagnosis of capsular invasion, capsular penetration, and extraprostatic extension by core needle biopsy carries a high probability of true extraprostatic extension.

Treatment could take the form of early detection and identification of prognostic factors, which help to predict the outcome in an individual case. A perfect prognosis could help select the treatment mode that would be most appropriate for treating an individual patient. Therefore, patients with a favorable outcome, if identified, would not need expectant therapy, while patients with a high risk of early metastasis or death would be placed in the more intensive surveillance and treatment follow-up group.^[18]

Subclassifying candidates for radical prostatectomy based on capsular status determined on core needle biopsy would provide valuable prognostic information.

In summary, the finding of extraprostatic extension in core needle biopsy is strongly associated with extensive high-grade prostatic adenocarcinoma, so its usefulness as a prognostic factor has great potential to anticipate the histopathological diagnosis of radical prostatectomy.

Recognition of tumor quantification, capsular invasion, or periprostatic fat before radical prostatectomy would allow the doctor and the patient to prepare themselves to assume the evolution and prognosis of the disease before prostatectomy and favor therapeutic decision-making, economic, and even family.

DECLARATION OF CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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