



Original Contributions

Needle biopsy findings in prostatic adenocarcinoma: experience at a tertiary care center in a developing country

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ABSTRACT

The objectives of this study are to report the findings in prostatic needle biopsies positive for cancer seen in our practice with regard to the frequency of cancer detected at various sites, the cancer volume, Gleason grade, presence of perineural invasion, and others; to correlate cancer volume with Gleason grade, perineural invasion, and serum prostate-specific antigen (PSA) levels; and to correlate Gleason grade with serum PSA levels. The study was conducted at The Section of Histopathology, Department of Pathology and Microbiology, Aga Khan University Hospital, Karachi, Pakistan. All consecutive needle biopsies received from January 1, 2011 to June 30, 2012, which were positive for prostatic adenocarcinoma, were included in the study. Statistical analysis was carried out using SPSS 19.0 software package (SPSS Hong Kong Headquarters, Quarry Bay, Hong Kong). A total of 97 needle biopsies positive for carcinoma in this period were included. Prostate-specific antigen levels were available in 60.8% cases and ranged from 5.0 to 1747 ng/mL. Tumor was bilaterally present in 54.6% cases. Tumor positivity in right apex, mid, and base was 52.6%, 54.6%, and 51.5%, respectively. Tumor positivity in left apex, mid, and base was 55.7%, 63.9%, and 59.8%, respectively. Average tumor volume in right apex, mid, and base was 51.2%, 50.6%, and 49.9%, respectively. Average tumor volume in left apex, mid, and base was 49.8%, 49.1%, and 51.6%, respectively. Gleason score was 6 in 52.6% cases and 7 in 28.9% cases. Perineural invasion was positive in 46.4% cases. High-grade prostatic intraepithelial neoplasia was seen in 4 (4.1%) of 97 cases. On statistical analysis, no significant correlation was found between tumor volume and serum PSA levels. However, significant correlation was found between tumor volume and Gleason grade and between tumor volume and presence of perineural invasion. No significant correlation was found between Gleason grade and serum PSA level. To our knowledge, these are the first reported findings in prostatic needle biopsies from Pakistan. Most prostatic carcinomas in our country are still diagnosed on transurethral resection specimens, and needle biopsies are quite uncommon. Findings in needle biopsies will help in predicting adverse prognostic factors on radical prostatectomies and in planning surgery accordingly.

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1. Introduction

Prostatic adenocarcinoma is the most common cancer in males in the United States, comprising almost 29% of all cancers [1]. It is also very common in Pakistan, and a study carried out in our department showed it to be the third most common malignancy in males comprising approximately 7% of all cancers [2]. However, it was the number one malignancy in males in the seventh and eighth decades of life comprising 15% and 25%, respectively [3].

In our country, transurethral resection (TUR) specimens are still the most common specimens from prostate and are widely used as both diagnostic and therapeutic modalities. Most prostatic carcino-

mas are still diagnosed on TUR specimens, and radical prostatectomy is very uncommon [4]. Transurethral resection is performed in patients with weak stream, dribbling, and others. Even serum prostate-specific antigen (PSA) levels are often not available as they have not been performed. If the TUR specimen shows cancer, patients undergo radiation and chemotherapy.

Currently, with the widespread worldwide use of serum PSA testing, a marked increase has been shown in the number of nonpalpable prostatic cancers diagnosed by needle/core biopsies [5]. However, this is still not the case in our country where few cases (in larger cities only) are diagnosed on needle biopsies. However, with expansion of medical facilities and increasing awareness about the disease, the frequency of serum PSA testing and number of needle biopsies performed are gradually increasing.

We report the tumor volume (percentage of each core occupied by cancer and total percentage of cancer in all the biopsies), Gleason grade, and presence or absence of perineural invasion. This

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quantification of the amount (percentage) of cancer found on needle biopsy that we report is based on international studies [6].

The aim of this study was to report the findings in prostate core biopsies received in our practice with regard to the frequency of cancer detected at various sextant sites; the cancer volume, that is, percentage of positive cores and total volume (percentage) of cancer in the entire specimen; Gleason grade; presence or absence of perineural invasion; and others. We also aim to correlate cancer volume with Gleason grade, serum PSA levels, and perineural invasion and to correlate Gleason grade with serum PSA levels.

2. Materials and methods

A total of 97 consecutive needle biopsy specimens positive for prostatic adenocarcinoma received in the Section of Histopathology, Department of Pathology, Aga Khan University Hospital, Karachi, Pakistan, were included in the study. Inclusion criteria were needle biopsy specimens positive for prostatic adenocarcinoma. Exclusion criteria were needle biopsy specimens negative for adenocarcinoma.

Statistical analysis was performed using a commercially available SPSS 19.0 software package (SPSS Hong Kong Headquarters, Quarry Bay, Hong Kong). Frequency and percentage were calculated for qualitative variables. Shapiro-Wilk test was applied to check the normality of the data. Independent-sample *t* test or Mann-Whitney *U* test was used to determine the difference in quantitative variables. Spearman rank correlation or Kendall τ test was applied to see the relationship between 2 variables. Binary logistic regression was applied to check the effect and risk ratio between the observations. $P \leq .05$ was taken as significant.

3. Result

A total of 97 sextant biopsy specimens positive for prostatic adenocarcinoma were included in the study. Ages of the patients ranged from 57 to 90 years, with mean and median ages of 68 and 69 years, respectively. Serum PSA levels were provided in 59 (60.8%) of 97 cases. Serum PSA levels ranged from 5.0 to 2747 ng/mL. Mean PSA level was 94.6 ng/mL. However, this result was eschewed by 2 cases in which PSA levels were extremely high (2747 and 628 ng/mL). If these cases are not included, then the mean PSA level in the remaining 57 cases was 29 ng/mL.

Tumor was present in right-sided cores only in 20 (20.6%) of 97 cases, in left-sided cores only in 24 cases (24.7%) and in both right- and left-sided cores in 53 cases (54.6%). Tumor was present in right

apex, right mid, and right base in 51 (52.6%), 53 (54.6%), and 50 (51.5%) cases, respectively. Tumor was present in left apex, left mid, and left base in 54 (55.7%), 62 (63.9%), and 58 (59.8%) cases, respectively.

Tumor volume in positive cores ranged from less than 5% to almost 100%. Tumor volume in positive right-sided cores averaged 52%. Tumor volume in positive left-sided cores averaged 50%. Overall average tumor volume in both right- and left-sided positive cores was 50%. Average tumor volume in right apex, right mid, and right base was 51.2%, 50.6%, and 49.9%, respectively. Average tumor volume in left apex, left mid, and left base was 49.8%, 49.1%, and 51.6%, respectively.

Gleason score was 5 in 2 (2.1%) of 97 cases, 6 (52.6%) in 51 cases, 7 (28.9%) in 28 cases, 8 (13.4%) in 13 cases, and 9 (3.1%) in 3 cases. However, 15 cases showed a different score in at least 1 core; these included 7 cases with predominant overall score 6, 5 cases with score 7, 2 cases with score 8, and 1 case with score overall 10.

Perineural invasion was present in 45 (46.4%) of 97 cases. It was present in right-sided cores only in 16 (35.5%) of 45 cases, in left-sided cores only in 13 cases (28.9%), and in both right- and left-sided cores also in 16 (35.5%) of 45 cases. Perineural invasion was present in right apex, right mid, and right base in 15 (33.3%), 12 (26.7%), and 10 (22.2%) of 45 cases, respectively. It was present in left apex, left mid, and left base in 16 (35.5%), 10 (22.2%), and 13 (28.9%) of 45 cases, respectively.

Overall in 97 cases, perineural invasion was seen on the right side only in 16.9%, on left side only in 13.8%, and bilaterally also in 16.9%. Overall, in 97 cases, perineural invasion was seen in right apex, right mid, and right base in 15.9%, 12.7%, and 10.6% cases, respectively. It was seen in left apex, left mid, and left base in 16.9%, 10.6%, and 13.8% cases, respectively.

High-grade prostatic intraepithelial neoplasia was seen in 4 (4.1%) of 97 cases.

Statistical analysis was carried out using SPSS version 19.0. No significant correlation was found between tumor volume and serum PSA levels ($P = .132$). Significant correlation was found, however, between tumor volume and Gleason grade ($P = .001$). Greater tumor volume was found to be associated with higher Gleason score. Significant correlation was also found between tumor volume and presence of perineural invasion ($P = .001$). Greater tumor volume was found to be associated with presence of perineural invasion. No significant correlation was, however, found between Gleason grade and serum PSA level ($P = .278$).

Correlation with radical prostatectomy specimens was available in 16 cases. The results are shown in the Table.

Table
Findings in radical prostatectomy specimens and their correlation with findings in corresponding needle (sextant) biopsy specimens (n = 16)

S. no	Overall tumor volume (%)	Extraprostatic extension	Inked margin	Seminal vesicle involvement	Highest Gleason grade	Perineural invasion	Overall tumor volume (%) sextant	Highest Gleason grade sextant	Perineural invasion sextant
1	45%	+	–	–	6	+	60%	6	+
2	30%	–	–	–	7	+	20%	8	–
3	60%	+	+	–	7	+	70%	7	+
4	30%	+	+	+	7	–	30%	7	–
5	70%	+	+	–	6	+	30%	6	–
6	5%	+	+	–	6	–	10%	6	–
7	35%	+	+	+	8	+	30%	7	–
8	10%	–	–	+	8	+	10%	8	+
9	85%	+	+	+	6	+	80%	6	+
10	30%	+	+	+	6	+	70%	6	–
11	30%	+	+	–	6	+	60%	7	–
12	70%	+	+	–	7	+	30%	7	+
13	20%	–	–	–	7	+	30%	8	–
14	40%	+	+	–	7	+	60%	7	+
15	90%	+	+	–	8	+	50%	8	+
16	20%	–	–	–	6	–	10%	6	–

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