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Correlation of serum PSA levels with Gleason score in patients with prostatic Adenocarcinoma

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Abstract
In order to see a relationship between gleason scores on histopathology and PSA levels, group of 200 men were studied which included obtaining there cumulative Gleason score and serum PSA levels before surgical intervention. Two groups were obtained, 178 cases with high (6-10) and 22 with low (2-5) Gleason score. Mean S.PSA levels in patients with high gleason score was 128ng/ml (normal range 0 to 5) and mean PSA levels for patients with low scores was 25ng/ml. The group with high gleason score showed greater increase in serum PSA levels than lower gleason score.

Keywords: serum PSA, Gleason, prostatic Adenocarcinoma

Introduction
Prostate cancer is one of the most common cancers in males. Prostate cancer tends to develop after the age of fifty in men that are generally slow growing. Although two-third cases of prostate cancers are slow growing, there are some cases of aggressive prostate cancers. Primarily, surgery, radiation therapy, and proton beam therapy are the current treatment options of prostate cancer. Also the choice of treatment depends on the stages of the disease progression, the level of prostate specific antigen (PSA), the Gleason score [1].
Biological activity of prostate cancer relates to its histological appearance. Histological appearance is graded as: well, moderately well, and poorly differentiated[2] Gleason's grading system is widely used [3, 4] and correlates well with mortality or morbidity including prediction of skeletal metastasis [5]. Prostate specific antigen (PSA) and prostate acid phosphatase (PAP), tumor markers of prostate carcinoma, have been used to confirm diagnosis and to monitor therapy of prostate carcinoma [6-9].

Materials and Methods
This study was conducted in post graduate department of pathology, GMC Srinagar from January 2019 to January 2020 and consisted of 200 cases. The mean age was between 60 to 85 years. Clinical evaluation, S.PSA levels were evaluated for all these cases which were obtained.

Result
Patients Gleason score were obtained and two groups obtained, 178 cases with high (6-10) and 22 with low (2-5) Gleason score. Mean S.PSA levels in patients with high Gleason score was 128ng/ml (normal range 0 to 5) and mean PSA levels for patients with low scores was 25ng/ml.

Table 1: Patients Gleason score were obtained and two groups obtained

Gleason score	Number of patients	PSA Levels (ng/mL)
3+3	60	40
3+4	20	48
4+3	30	56
4+4	15	70
4+5	3	85
5+5	2	105

Table 2: This table shows PSA cut off

PSA cut off	+ve case (percentage)
<4ng	15%
4.1-20ng	30%
20.1-50ng	42%
50-100ng	75%
>100ng	97%

Discussion

Histological recognition of prostate cancer depends on the overall assessment of the architecture and upon the cytology of individual cells. The prostate cancer cell cytoplasm may contain large amounts of acid phosphatase and prostate specific antigen (PSA). Using immunohistochemistry for these antigens it is possible to differentiate prostatic carcinoma cells from other tumour cells.

Grading is based on glandular differentiation and the system most commonly employed is the Gleason method. The grades are as follows:

- **Grade 1:** Well differentiated carcinoma with uniform gland pattern.
- **Grade 2:** Well differentiated with glands varying in size and shape.
- **Grade 3:** Moderately differentiated carcinoma with either (a) irregular acinae often widely separated or (b) well defined papillary/cribriform structures. This is the commonest pattern seen in prostate cancer.
- **Grade 4:** Poorly differentiated carcinoma with fused glands widely infiltrating the prostatic stroma.
- **Grade 5:** Very poorly differentiated carcinoma with no or minimal gland formation. Tumour cell masses may have central necrosis.

Premalignant changes in the epithelium are referred to as prostatic intraepithelial neoplasia (PIN). PIN is divided into low and high grade and includes the continuum from uncontrolled hyperplasia to the development of an anaplastic morphology with nuclear polymorphism and micro invasion of the basement membrane. PIN has been seen in over 70% of prostates with invasive prostate cancer [10, 11].

Prostate-specific antigen measurements appear to be positively correlated with Gleason scores.

It has been suggested that prostate cancer cells produce more PSA than normal cells [12] therefore, it is proposed that poorly differentiated prostate cancer cells may secrete and release greater amounts of PSA than well-differentiated ones.

Wei-jen shih *et al*. [13] in there study divided patients in two groups: high gleason score (6 to9) and low gleason score (2 to5). The mean PSA level for high gleason score group were 134.39ng/ml and mean PSA for low gleason score group were 23.62 n g/ml. In comparison our study showed mean PSA levels to be 128ng/ml for gleason score 6-10 and mean PSA levels to be 25 ng/ml for Gleason score 2-5.

Thus high gleason score group exibit high PSA compared with low gleason score.

C A Okolo *et al*. [14] in there study found that there was a positive correlation between serum PSA and Gleason grade as well as Gleason score in a cohort of Nigerian African men with prostate cancer. PSA levels were significantly lower in patients with stage B disease than in patients with stage D disease.

As per the study there are certain loopholes as far as PSA testing is concerned with the risk of over diagnosis. PSA can be elevated in other conditions like benign prostatic hyperplasia, prostate manipulations and prostatitis [15].

Morgan *et al*. [16] studied age specific range of PSA in 411 black men with PSA cut off of 4ng/ml. They found 40% of cancer would be missed with the use of traditional cut off value. In men aged >50% the possibility of prostate cancer in patients with serum PSA levels of 2.5-4ng/ml,>4ng/ml and>10ng/ml was 27%, 20-30% and 42-64% respectively.

In our study we found out that there was no determined cut off value for PSA as in our study in patients with psa levels > 50 about 25% were negative for malignancy and in patients with high PSA levels(>100 ng/ml), 3% patients were negative for malignancy. Therefore no exact cut off value could be determined for diagnosis of malignancy so we conclude from our study that HPE remains the gold standard for diagnosis of prostatic adenocarcinoma. PSA levels can be used as a prognostic marker and an adjuvant method for diagnosis and routine screening.

Conclusion

The results of this study indicate that Gleason score and PSA level measurements correlates significantly for prostatic adenocarcinoma.

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