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Research Paper

Assessment of Prostatic Biopsies in a Sample of Patients according to 2014 Modified Gleason Scoring and Grading Group

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ABSTRACT:

BACKGROUND:

Prostate cancer is the second most diagnosed malignancy in men and the sixth leading cause of cancer mortality among males worldwide. The incidence rate of prostate cancer varies across the regions and populations new cases of prostate cancer were registered worldwide, representing 7.1% of all cancers in men.

OBJECTIVE:

To assess prostatic biopsies from patients with prostatic cancer in a sample of Iraqi patients according to 2014 modified Gleason Grading and Grade groups, and to study the relation of Gleason grading and grade group with clinical and laboratory data available in patients case sheets (age and PSA level).

MATERIAL AND METHODS:

A cross sectional study conducted in Department of Pathology/College of Medicine /Al-Nahrain University for a period from January 2021 to march 2022. Cases and control were collected from Baghdad Medical City /Ghazi Al-Hariri Hospital for Surgical Specialties, cases included 94 patients had prostatic carcinoma and control group included 57 patients with benign prostatic hyperplasia.

RESULTS:

This study revealed the age distribution of patients with Benign Prostatic Hyperplasia ranged from (50-88) years and prostatic adenocarcinoma ranged from (50-82) years. Regarding prostatic specific antigen levels in prostatic adenocarcinoma 75 (79.8%) of cases had high prostatic specific antigen levels (4ng/mL or Higher) while in benign prostatic hyperplasia 22(14.6%) of cases had high prostatic specific antigen levels. The frequency of perineural invasion in studied sample 39.4%, while vascular invasion only 5.3%.

CONCLUSION:

There was no statistically significant association was found between Gleason score and age, the same applies to the Gleason grade group. Also no statistically, significant association was found between the Gleason grade group and prostatic specific antigen level, in addition, no correlation was found between Gleason score and prostatic specific antigen level. There is no correlation was found between Gleason score, and perineural invasion.

KEYWORDS: Gleason score, Gleason Grade, prostatic adenocarcinoma.

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INTRODUCTION:

Prostate cancer is a heterogeneous disease, with the clinical presentation ranging from localized and indolent to a rapidly progressing lethal metastatic disease. Although most diagnoses involve organ-confined disease, long-term oncological outcomes can vary greatly. The most important predictor of prostate cancer outcomes has been demonstrated to be the histological Gleason score. The Gleason grading system, based upon architectural features of prostate cancer cells, is the most widely used histological grading method for prostatic adenocarcinoma. The Gleason score closely correlates with clinical features and serves as an important prognostic index. [1,2]

Gleason grading of the prostate cancer represents one of the earliest and most successful applications of evidence-based medicine in routine clinical practice. For several decades, the original Gleason system was used to grade prostatic carcinomas based on architectural features, with excellent correlation with clinical outcomes. Indeed, much of the recent prostate pathology literature has focused on attempts to optimize pathologic grading and reporting of prostatic adenocarcinoma in support of ongoing

clinical efforts to select optimal treatment for patients by minimizing treatment-related morbidity while maximizing therapeutic benefit and quality of life. [3]

In order to facilitate better communication of the pathologic diagnosis to clinicians and patients, the International Society of Urological Pathology (ISUP) consensus recommends adoption of so-called grade grouping, as proposed by Epstein et al. The grade groups correspond well with patient prognosis and are reasonably straightforward to adopt, since they are based on Gleason score. [4]

Patients with higher Gleason score correlate with increased total PSA and decreased free PSA. Therefore, the free/total PSA ratio can be used for predicting the Gleason score. [5]

MATERIAL AND METHODS:

A cross-sectional study was conducted in the Department of Pathology/College of Medicine/ Al-Nahrain University for a period from January 2021 to March 2022. Cases and control were collected from Baghdad Medical City /Ghazi Al-Hariri Hospital for Surgical Specialties, cases included 94 patients who had prostatic carcinoma, and the control group included 57 patients with benign prostatic hyperplasia. The cases were collected from the request form, from 2019 to 2021.

Demographic, clinical, laboratory, histopathological changes, and final diagnosis were taken from patient's pathological reports. From each case, slides and paraffin block (if needed) were collected.

Re-sectioning done for each paraffin blocks for some cases with unavailable slides and revision of slides for histopathological diagnosis and assessment of Gleason Grade and Grade Group was done for adenocarcinoma cases.

RESULTS:

1. Histopathological Diagnosis

Regarding histopathological diagnosis, 57 (37.7%) cases were diagnosed with benign prostatic hyperplasia (BPH) , while 94 (62.3%) were diagnosed with prostatic adenocarcinoma, illustrated in figure .1

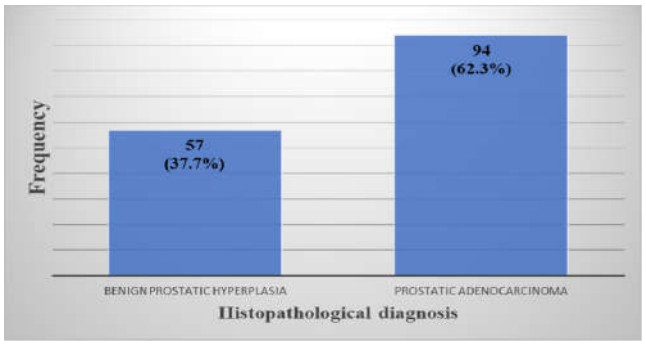

Figure 1: Histopathological diagnosis of the studied sample.

2. Age distribution of the studied sample

2.1 Age distribution of patients with benign prostatic hyperplasia

The age distribution of patients with BPH ranged from (50-88) years with a mean of (66.24 years ± 8.53 SD). Regarding age group distribution, 11 (19.0%) cases were in the age group (50-59 years), 25 (43.1%) cases were in the age group (60-69 years), 16 (27.6%) cases were in the age group (70-79 years), and 6 (10.3%) cases were in the age group (80-89 years); as illustrated in figure (2)

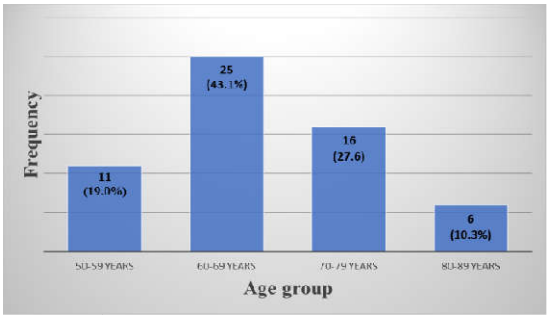

Figure 2: Age group distribution in patients with BPH.

2.2: Age distribution in patients with prostatic adenocarcinoma

The age distribution of the prostatic adenocarcinoma ranged from (50-82) years with a mean of (69.48 years ± 7.95 SD). The age group distribution of patients with prostatic carcinoma shows: 7 (7.4%) cases in the age group (50-59 years), 36 (38.4%) cases in the age group (60-69 years), 40 (42.6%) cases in the age group (70-79 years), 11 (11.7%) cases in the age group (80-89 years). figure (3)

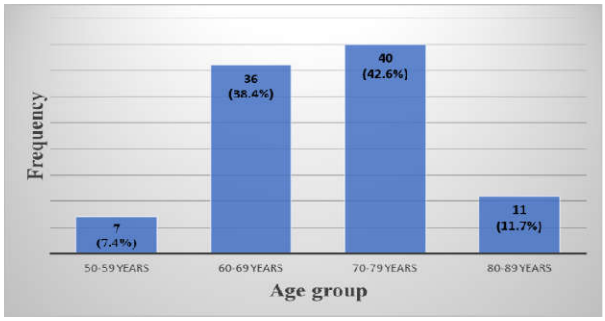

Figure 3: Age group distribution in patients with prostatic carcinoma.

3. PSA level

3.1 PSA level in patients with benign prostatic hyperplasia

Regarding PSA level in patients with benign prostatic hyperplasia, 11 (19.0%) had no detectable PSA level, 25 (43.1%) had low PSA level (< 4ng/ml), and 22 (37.9%) had high PSA level (> 4ng/ml); as illustrated in figure (4).

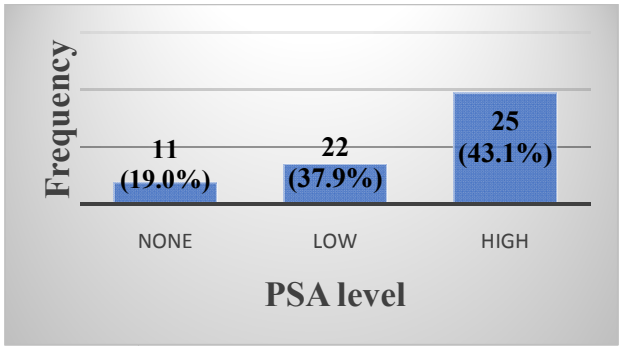

Figure 4: Distribution of PSA levels in patients with BPH.

3. 2 PSA level in patients with prostatic adenocarcinoma

Regarding PSA level in patients with adenocarcinoma, 9 (9.6%) had no detectable PSA level, 10 (10.6%) had low PSA level, and 75 (79.8%) had high PSA level; as illustrated in figure (5).

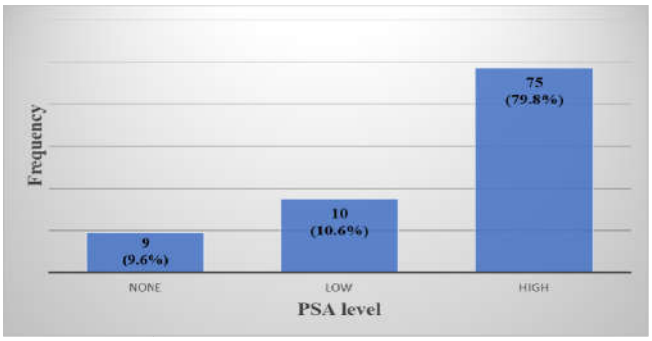

Figure 5: Distribution of PSA levels in patients with prostatic adenocarcinoma.

3.3 Gleason score of prostatic adenocarcinomas

Regarding Gleason score, 9 (9.5%) had a score of (3+3=6) 15 (16.0%) had a score of (3+4=7), (22.4%) had a score of (4+3=7). 36 (38.3%) had a score of (4+4=8), 7(7.4%) had a score of 4+5=9 and 6 (6.4%) had a score of (5+4=9); as illustrated in figure (6).

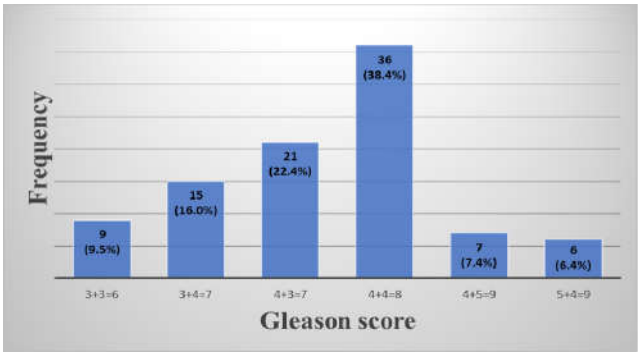

Figure 6: Gleason score distribution in the studied sample

3.4 Gleason grade group of prostatic adenocarcinomas

Regarding Gleason grade, 9 (9.6%) patients presented with grade 1, 14 (14.9%) patients presented with grade 2, 22 (23.4%) presented with grade 3, 37 (39.4%) presented with grade (4) 12 (12.8%) presented with grade 5; as illustrated in figure **(7)**

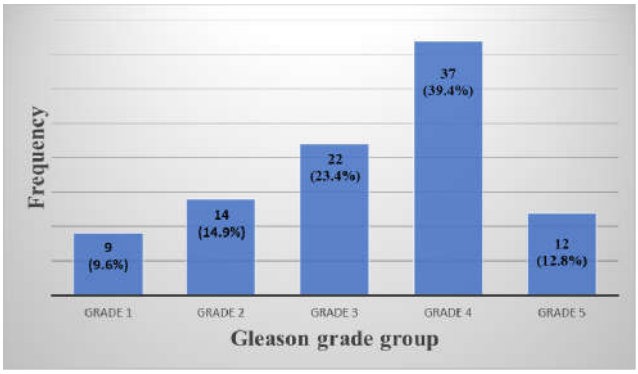

Figure 7: Gleason grade group of the studied sample.

3.5 Perineural invasion in patients with prostatic adenocarcinoma

Regarding perineural invasion in cases with prostatic carcinoma, it was present in 47 (39.4%) cases and absent in 57 (60.6%) cases; as illustrated in **figure (8).**

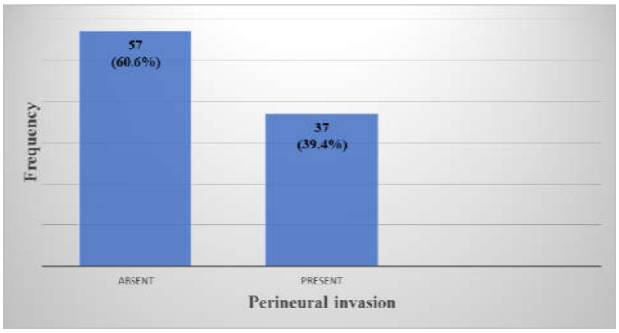

Figure 8: Perineural invasion in the studied sample.

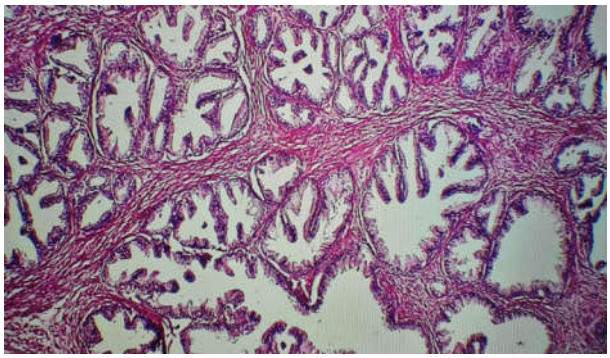

Figure 9: Benign prostatic hyperplasia, section shows variably sized glands lined by double cell layer (yellow arrow) with papillary infoldings (blue arrow) with proliferation of glands and fibromuscular stroma. (H&E,10X).

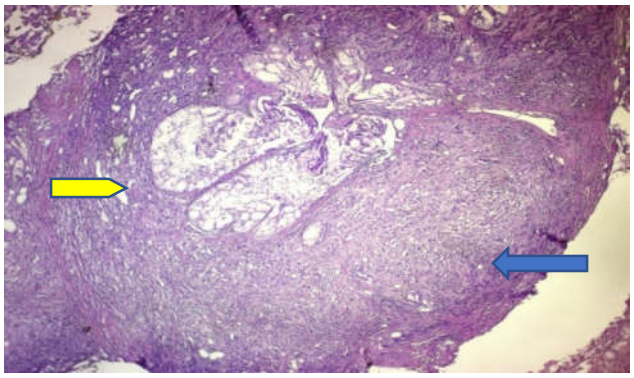

Figure 10: Prostatic adenocarcinoma Gleason score 5+4=9, Grade Group shows two patterns, cribriform pattern (glomerulation) (yellow arrow) and individual cells with Indian file (blue arrow). (H&E,4X).

DISCUSSION:

In this study we sought to provide more detailed information regarding age, and PSA variables and their relation to benign prostatic hyperplasia and prostatic adenocarcinoma in Iraqi population, this will help the clinicians to provide more oriented clinical decisions regarding further steps in management of prostatic tumors. There is a clear relationship between age and BPH [6]. Significant tissue remodeling occurs within the prostate of the aging male. It was proposed that prostate growth is caused by an imbalance between apoptotic and proliferative activities, with a net decrease in apoptotic activity. Histologic examination revealed decreased apoptotic activity in prostate glandular and basal epithelial cells. As a result, there is a tendency for prostate volume to increase with age [7]. As for prostatic carcinoma, men are more likely to have prostatic carcinoma with increasing age. However, when treatment modality alone or treatment modality and risk were controlled for, age was not an independent predictor of prostate cancer mortality. [8]. PSA fails to distinguish between benign prostatic hyperplasia and prostate cancer, resulting in a large number of unnecessary biopsies and missed cancer diagnoses [9]. And because of its increased levels in other prostate pathologies, the use of PSA alone as an initial diagnostic tool has become controversial over the last decade. A study that found a significantly higher increase in PSA in prostatitis and prostate cancer compared to controls and BPH supports this viewpoint [10]. This study emphasis was to clarify the relationship between Gleason score and Gleason grade group on one hand with other patients' parameters including: age and PSA on the other hand. In the present study there was no statistically significant association was found between Gleason score and Age, the same applies for Gleason grade group. Despite these advancements and guidelines, there is still a significant difference in Gleason grading, even among experienced pathologists. [11,12]

CONCLUSION:

Our data in the present study are partially consistent with those in previous studies in the literature. No correlation was found, neither between Gleason score and age, nor between Gleason grade group and age. For PSA levels, no relationship was found between its level and Gleason score, and the something applies for Gleason grade. In regard to prostate histopathology, although a significant correlation was found between it and PSA level, however, no correlation was found between it and age of the patient. These study's findings may provide very valuable information which may be of uttermost importance in diagnosis and further management of both BPH and prostatic adenocarcinoma.

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