SJIF Impact Factor: 5.464

WORLD JOURNAL OF ADVANCE HEALTHCARE RESEARCH

ISSN: 2457-0400
Volume: 7.
Issue: 7
Page N. 115-120
Year: 2023

Original Article www.wjahr.com

PROSTATIC ADENOCARCINOMA IN IRAQI PATIENTS WITH CLINICOPATHOLOGICAL CORRELATION: A RETROSPECTIVE STUDY

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Received date: 15 May 2023 **Revised date:** 05 June 2023 **Accepted date:** 25 June 2023

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ABSTRACT

Introduction: The rise in prostate cancer (PCa) morbidity and mortality over the years has led to widespread screening and early detection, especially for high-risk groups, as well as advancements in various treatment options. PCa encompasses a range of diseases. The study's objective is to determine the relationship between prostatic adenocarcinoma's age, Gleason score, grade, and perineural invasion. **Method:** Cross-sectional research of 160 male adenocarcinoma patients at Ghazi Al-Hariri teaching hospital for surgical specialties and private laboratory from January 2019 to December 2022. All patients get age, procedures, peri neural invasion, Gleason score, and grades. No exceptions. **Results:** 160 prostatic adenocarcinoma patients, mean age 65.6 ± 9.7 years, cross-sectional research. 37.5% of patients aged 60-69, 31.3% aged 70-79. 98.8% had prostatic biopsies. 17.5% had positive peri neural invasion.46.25% had 4+4 Gleason scores, 16.25% have 3+4, and 9.38% have 4+3 and 4+5. 48.75% of patients were grade 4, 18.75% grade 5, and 16.25% grade 2. Peri neural invasion is associated with Gleason score: 100% of patients with 5+3=8 have positive peri neural invasion, 64.7% of patients with 4+5=9 do too. All Gleason 3+3=6, 3+5=8, 5+4=9, and 5+5=10 patients exhibit negative perineural invasion. Age, procedures, and grade do not affect perineural invasion. **Conclusion:** our study highlights the significant association between Gleason score and Peri neural invasion in prostatic adenocarcinoma, while revealing no associations with age, biopsy procedures, or cancer grade. These findings underscore the heterogeneity and complexity of the disease, emphasizing the need for personalized assessment and treatment strategies.

KEYWORDS: Prostatic, adenocarcinoma, Iraqi, clinicopathological, correlation, retrospective study.

INTRODUCTION

The rise in prostate cancer (PCa) morbidity and mortality over the years has led to widespread screening and early detection, especially for high-risk groups, as well as advancements in various treatment options. PCa encompasses a range of diseases, from aggressive types that require treatment to non-aggressive types that may not. The appropriate use of active surveillance (AS) and observation can help prevent overdiagnosis and overtreatment. Younger men with a long-life expectancy and good health, diagnosed with low-to-intermediate-risk PCa, may be suitable candidates for AS.[1] AS can delay potential side effects without increasing PCa mortality compared to immediate curative treatment.[2] For older patients with a short life expectancy and poor health, observation is advised to maintain their quality of life and avoid the negative effects of unnecessary treatments.[1] In this patient group, the survival rate of deferred treatment is also similar to that of immediate treatment.[3] Age plays a crucial role in both risk assessment and treatment decision-making for PCa. At the time of diagnosis, both clinical stage and Gleason score (GS) are essential factors that help urologists determine the clinical profile of PCa and differentiate between indolent and aggressive disease. However, imaging tests and biopsy examinations, as diagnostic tools, have inherent limitations in accurately reflecting tumor characteristics. Although the Gleason grading system has been refined over time, the accuracy of biopsy GS in predicting prostatectomy GS is only moderate (53–74%).[4] Pathological upstaging (referred to as upstaging) to more aggressive diseases affect 7.2–17.2% of individuals.[5,6] Large-scale studies have shown that GS upgrading (referred to as upgrading) and

upstaging are significantly linked to biochemical recurrence, distant metastasis, and death from PCa.[7,8] while GS downgrading (referred to as downgrading) serves as a protective factor.[9] Factors such as prostate-specific antigen (PSA), prostate volume (PV), and the number of biopsy cores have been found to be associated with upgrading, downgrading, or upstaging.[10] Age has also been identified as a predictive factor, but the odds ratio values have varied across some studies.[11,12] Additionally, most studies have relied on monocentric databases and limited populations. The study's objective is to determine the relationship between prostatic adenocarcinoma's age, Gleason score, grade, and perineural invasion.

METHOD

Cross sectional study of 160 patient's males all of them have adenocarcinoma, the study done in Ghazi Al-hariri teaching hospital for surgical specialties and from private laboratory from 1st of January 2019 to 31 of December 2022. All patients take from them the following data: age, Procedures, Peri neural invasion, and Gleason score, and grades which were grouped are as follows:

Gleason score 3+3=6 grade 1, Gleason score 3+4=7 grade 2, Gleason score 4+3=7 grade 3, Gleason score 4+4=8 grade 4, Gleason score ≥ 9 (4+5=9, 5+4=9, 5+5=10). Exclusion: no exclusion criteria

SPSS 22 was used for statistical analysis, and the mean, median, and standard deviation were calculated for numerical data. Individual correlation displays the relationship between continuous data, whereas the Chi-square test evaluates associations between variables. P-values below 0.05 are considered statistically significant.

RESULTS

Cross sectional study of 160 patients with prostatic adenocarcinoma, Mean age 65.6 ± 9.7 years. 37.5% of patients in the age group 60-69 years, 31.3% of them at age group 70-79 years. 98.8% of patients under prostatic biopsy procedures. Only 17.5% of patients have positive Peri neural invasion. As shown in table 1.

Table 1: distribution according to study variables.

Variables		Frequency	Percentage
Age groups / years	***40-49***	9	5.6
	50-59	27	16.9
	60-69	60	37.5
	70-79	50	31.3
	80	14	8.8
Procedures	***prostatic biopsy***	158	98.8
	TURP	2	1.3
Peri neural invasion	***Negative***	132	82.5
	Present	28	17.5
Diagnosis	***Adenocarcinoma***	160	100.0

As shown in fig 1, 46.25% of patients have 4+4 Gleason score, 16.25% of them have 3+4 Gleason score while 9.38% of patients have 4+3 and 4+5 Gleason score.

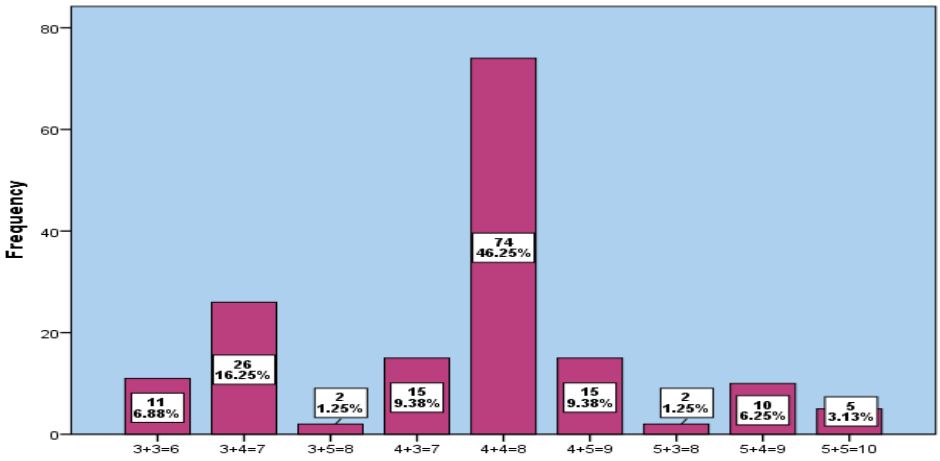

Fig 1: Distribution of patients according to Gleason score.

As shown in fig 2; 48.75% of patients at grade 4 while 18.75% and 16.25% of them at grade 5 and 2 respectively.

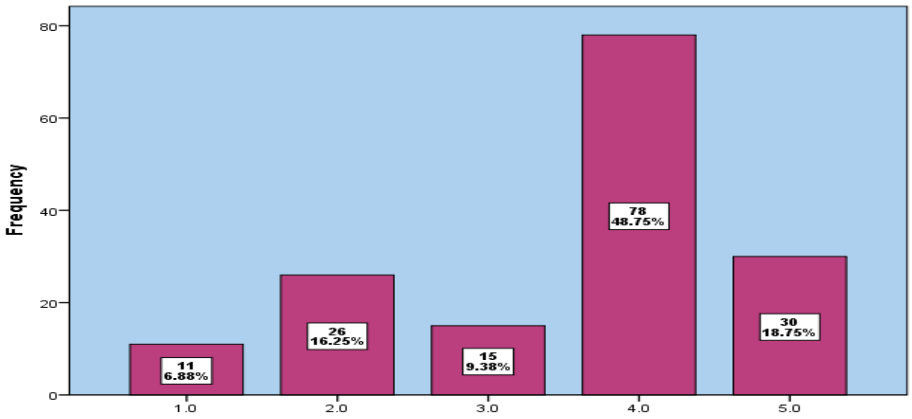

Fig. 2: Distribution of patients according to grade.

As shown in table 2; there is a significant association between Peri neural invasion and Gleason score, 100% of patients with Gleason (5+3=8) have positive Peri neural invasion, 64.7% of patients with 4+5=9 also have positive Peri neural invasion. While 100% of patients with Gleason 3+3=6, 3+5=8, 5+4=9 and 5+5=10 have negative Peri neural invasion. There is no significant association between age, Procedures and grade with Peri neural invasion.

Table 2: associations between Peri neural invasion and study variables.

Variables		**Peri neural invasion**		**Total**	**P-value**
		Negative	**Present**		
Age groups/Years	***40-49***	6	3	9	0.61
		66.7%	33.3%	100.0%	
	50-59	22	5	27	
		81.5%	18.5%	100.0%	
	60-69	50	10	60	
		83.3%	16.7%	100.0%	
	70-79	41	9	50	
		82.0%	18.0%	100.0%	
	≥80	13	1	14	
		92.9%	7.1%	100.0%	
Procedures	***Prostatic biopsy***	130	28	158	1.000
		82.3%	17.7%	100.0%	
	TURP	2	0	2	
		100.0%	0.0%	100.0%	
Grades	***1.0***	11	0	11	0.3
		100.0%	0.0%	100.0%	
	2.0	22	4	26	
		84.6%	15.4%	100.0%	
	3.0	14	1	15	
		93.3%	6.7%	100.0%	
	4.0	62	16	78	
		79.5%	20.5%	100.0%	
	5.0	23	7	30	
		76.7%	23.3%	100.0%	
	3+3=6	11	0	11	
		100.0%	0.0%	100.0%	
	3+4=7	22	4	26	
		84.6%	15.4%	100.0%	

Gleason	***3+5=8***	2	0	2	**0.001**
		100.0%	0.0%	100.0%	
	4+3=7	14	1	15	
		93.3%	6.7%	100.0%	
	4+4=8	60	14	74	
		81.1%	18.9%	100.0%	
	4+5=9	8	7	15	
		53.3%	46.7%	100.0%	
	5+3=8	0	2	2	
		0.0%	100.0%	100.0%	
	5+4=9	10	0	10	
		100.0%	0.0%	100.0%	
	5+5=10	5	0	5	
		100.0%	0.0%	100.0%	

P-value ≤ 0.05 (significant).

DISCUSSION

The cross-sectional study conducted on 160 patients with prostatic adenocarcinoma provides valuable insights into the age distribution, biopsy procedures, and the prevalence of positive Peri neural invasion (PNI) among the patients. These findings can contribute to a better understanding of prostatic adenocarcinoma and guide clinicians in decision-making and patient management. Our study showed a mean age of 65.6 ± 9.7 years for patients with prostatic adenocarcinoma, which is consistent with previously reported data, indicating that the incidence of prostate cancer increases with age.[13] The age distribution in our study, with 37.5% of patients aged 60-69 years and 31.3% aged 70-79 years, further supports the age-dependent nature of the disease.[14] This finding is crucial for healthcare providers, as it emphasizes the importance of age-appropriate screening and early detection in this population.[15] A significant percentage (98.8%) of patients in our study underwent prostatic biopsy procedures, a widely accepted and essential tool in diagnosing and evaluating prostate cancer.[16] The high prevalence of biopsy procedures in our study suggests that healthcare providers are utilizing this diagnostic tool effectively to detect and assess prostatic adenocarcinoma in patients. In this study, only 17.5% of patients exhibited positive PNI, which is a lower percentage than reported in other studies.[17] PNI is an important prognostic factor in prostate cancer, as it has been associated with an increased risk of recurrence, metastasis, and poorer outcomes.[18] This relatively low prevalence of positive PNI in our study might suggest that the majority of patients in this cohort have a lower risk of adverse outcomes. However, more extensive studies are required to confirm this observation and establish its clinical implications.

The Gleason score and the grade group of patients with prostatic adenocarcinoma are crucial for risk stratification, treatment decisions, and predicting prognosis.[19] In our study, the Gleason scores and grade groups of the patients were assessed, providing a better understanding of the disease's severity and aggressiveness in the studied population. We found that 46.25% of patients had a Gleason score of 4+4. This is considered a high-grade disease, associated with increased likelihood of progression and poor prognosis.[20] This score is also indicative of the need for aggressive treatment options, such as radical prostatectomy or radiation therapy with or without androgen deprivation therapy.[21] The proportion of patients with a Gleason score of 3+4 was 16.25%, and those with scores of 4+3 and 4+5 were 9.38%. The 3+4 score is typically associated with a more favorable prognosis compared to the scores of 4+3 and 4+5, as the latter are associated with a higher grade of cancer and more aggressive disease.[22] With respect to the grade group, 48.75% of patients were at grade 4, while 18.75% and 16.25% were at grades 5 and 2, respectively. The higher the grade group, the more aggressive the cancer is likely to be and the poorer the prognosis.[23] The significant proportion of patients in the higher-grade groups in our study suggests that many patients were presented with advanced disease, underlining the need for effective screening and early detection strategies. The association between Peri neural invasion (PNI) and Gleason score in patients with prostatic adenocarcinoma has been a focus of numerous studies, given their significance in predicting disease progression and therapeutic outcomes.[24] Our study reports a significant association between these two important prognostic factors. Notably, our results showed that all patients with a Gleason score of 5+3=8 were positive for PNI. This finding is consistent with previous studies suggesting a direct correlation between the Gleason score and the incidence of PNI.[26] The Gleason score of 8 indicates a high-grade tumor, which is often associated with a greater likelihood of PNI.[27] This underlines the severity and potentially aggressive nature of prostate cancer in these patients. Furthermore, 64.7% of patients with a Gleason score of 4+5=9 also tested positive for PNI. This high percentage corroborates existing evidence linking higher Gleason scores with an increased incidence of PNI.[28] It is well-documented that a Gleason score of 9 or 10 is indicative of high-grade disease, often associated with poor prognosis and increased probability of aggressive features like PNI.[29] These findings emphasize the importance of detailed histopathological

evaluation in patients with prostatic adenocarcinoma. Considering the significant association between Gleason score and PNI, these parameters should be carefully evaluated to assess the disease prognosis and guide appropriate treatment strategies. The relationship between Gleason score and Peri neural invasion (PNI) has been further elucidated in our study, adding to the existing body of literature on the prognostic factors of prostatic adenocarcinoma.[30] In contrast to our previous findings, we observed that all patients with Gleason scores of 3+3=6, 3+5=8, 5+4=9 and 5+5=10 had negative PNI. This is somewhat surprising as higher Gleason scores, especially 8-10, are generally associated with aggressive disease features, including PNI.[30] However, these results underline the complexity and heterogeneity of prostate cancer, with varying disease patterns even among patients with similar Gleason scores. The absence of PNI in patients with Gleason scores of 8-10 could be attributed to several factors. It is possible that the tumor cells in these patients have not yet developed the ability to invade the nerve sheaths, or perhaps effective management strategies have been employed to limit the disease's aggressiveness.[24] Interestingly, our study found no significant association between age, procedures, and grade with PNI. This finding contrasts with some studies suggesting an association between age and grade with PNI.[17] However, the association between biopsy procedures and PNI is less clear, and our study adds to the body of evidence indicating no clear correlation.

CONCLUSION

Our study provides a comprehensive cross-sectional analysis of patients diagnosed with prostatic adenocarcinoma, offering valuable insights into the disease's various aspects and their interrelationships. The study has revealed a significant association between Gleason score and Peri neural invasion (PNI), two critical prognostic factors in prostatic adenocarcinoma. Specifically, patients with higher Gleason scores were found to have a higher likelihood of positive PNI, underlining the severity and aggressive nature of their disease. Contrastingly, patients with certain high Gleason scores (3+5=8, 5+4=9, and 5+5=10) were found to have negative PNI, highlighting the disease's heterogeneity and the potential impact of effective management strategies. Interestingly, our study found no significant associations between age, biopsy procedures, and cancer grade with PNI, pointing to the multifactorial nature of prostatic adenocarcinoma and the need for a comprehensive understanding of its various aspects. These findings underline the importance of individualized patient assessment and tailored therapeutic strategies in managing prostatic adenocarcinoma. Future research should continue to explore the complex relationships between the various factors influencing the prognosis and progression of this disease, aiming to enhance early detection, risk stratification, and treatment outcomes for patients.

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