ORIGINAL ARTICLE

To Evaluate the Corelation between Age and Gleason Score in Patients with Prostate Cancer- A Tertiary Care Hospital Based Study

Aziz Abdullah[1], Navaira Ali[2*] and Zubda Malik[1]

[1]Department of Urology, Liaquat National Hospital and Medical College, Karachi, Pakistan
[2]Department of Oncology, Liaquat National Hospital and Medical College, Karachi, Pakistan

Abstract

Objective: The aim of this study is to evaluate the corelation between age and Gleason score in patients with prostate cancer.

Materials and Methods: From January 2009 to December 2021, 268 Asian Pakistani men who underwent prostate biopsy and were diagnosed with Prostate Adenocarcinoma have been included in this study, The age of patients ranged from 40 years to 94 years. The indications for biopsy were suspicious digital rectal examination and abnormally high PSA. The procedure was performed either transurethrally, transperineally or transrectally,

Results: A total of 268 patients were diagnosed with Prostate Adenocarcinoma, the age range was from 40 to 94 years. The median age was found as 68 years with an interquartile range of 15 years. The median Gleason score was found as 8 with an interquartile range of 7 scores. A negative weak corelation was found between the age of the patients at the time of diagnosis and the Gleason score (r= -0.013, p=0.832).

Conclusion: Though there are many studies that support the existence of corelation between increasing age and Gleason Score, our study, like a couple of others, showed no association between the two and a weak positive corelation. Our conclusion of the study is that while studying the relationship between the two, other variables like PSA, DRE findings and TNM classification of the tumor are also important. Hence, more work needs to be done in this regard.

Keywords: *Prostate cancer, Gleason score, age, corelation.*

INTRODUCTION

Prostate cancer is the most commonly occurring cancer, excluding skin cancer, in men worldwide [1]. The incidence of prostate cancer increases with age and the older the age is, the greater the chances of getting prostate cancer. Prostate cancer is considered to be a major issue in men's health. Overall, around 650,000 new cases of prostate cancer are diagnosed each year, around the globe. This accounts for 10% of the new cancer cases in men. Around 60% of all men diagnosed with prostate cancers are over the age of 65 [2, 3].

Generally, the earlier the cancer is diagnosed and treated, there are more chances that the patient will remain disease-free. 'Low-risk tumors' are the most common type of diagnosed prostate cancer. Many men with these low-risk tumors can safely undergo active surveillance only. Some men with the intermediate-risk disease can also be kept under surveillance. This means that the patients are kept under close monitoring without active treatment while still preserving their chance of long-term survival if cancer becomes aggressive enough to require treatment. This helps in evading possible side effects too.

*Corresponding author: Navaira Ali, Department of Oncology, Liaquat National Hospital and Medical College, Karachi, Pakistan; Email: navaira_ali@hotmail.com
Received: April 14, 2021; Revised: June 03, 2021; Accepted: June 08, 2021
DOI: https://doi.org/10.37184/lnjcc.2789-0112.3.7

According to the statistics, in the United States, older age men have seemingly more chances to be diagnosed with high-risk prostate cancer and have lower overall survival as well as cancer-specific survival [4-7]. Yet, the progression and course of cancer at any given grade and stage are not dependent on the chronologic age of the patient.

The chances of developing prostate cancer in men younger than 39 years are 0.005%. This increases to 2.2% in men between 40 and 59 years and to 13.7% in men who have ages between 60 and 79 years [8-10]. There is currently a 16.7% lifetime risk of developing prostate cancer which means 1 in 6 men will be affected by the disease, which is alarming. The probability of developing histological evidence of prostate cancer is even higher. As Carter and colleagues [11] showed in their study that 50% of men between 70 and 80 years of age showed histological evidence of malignancy. It has also been calculated that there is of 42% lifetime risk for developing histological evidence of prostate cancer in men who are 50 years of age [12].

The Gleason system uses the numbers 1 to 5 to grade the most common (primary) and second most common (secondary) patterns of cells found in a tissue sample.

The lowest score for prostate cancer is 6, which is low-grade cancer. A Gleason score of 7 is medium-grade cancer. A Gleason score of 8, 9, or 10 is high-grade cancer.

Generally, the higher the Gleason score, the more aggressive cancer. That means it's more likely to grow and spread to other parts of the body.

The aim of this study is to evaluate the association between age and Gleason score in patients with prostate cancer.

MATERIALS AND METHODS

From January 2009 to December 2021, 268 Asian Pakistani men who underwent prostate biopsy at Liaquat National Hospital's Urology OPD, and were diagnosed with Prostate Adenocarcinoma have been included in this study. The age of patients ranged from 40 years to 94 years. The indications were suspicious digital rectal examination and abnormally high PSA. The procedure was performed either transurethrally, transperineally or transrectally. The total Gleason score was calculated by adding the Gleason major and Gleason minor scores which are mentioned in the biopsy report.

SPSS version 25 was used for data compilation and analysis. The normality of the data was checked by the Kolmogorov-Smirnov test which indicates that the data was non-normal. Quantitative variables were presented as a median and interquartile range like age and Gleason score. Frequencies and percentages were computed for qualitative variables such as age groups and Gleason levels. As the data was non-normal so the non-parametric test *i.e.* Spearman's rho correlation was used for finding a relationship between quantitative variables. P ≤0.05 will be considered significant.

RESULTS

A total of 268 patients were diagnosed with Prostate Adenocarcinoma, the age range was from 40 to 94 years. The age and Gleason score for each variable was noted. The normality test shows significant results for age (p=0.003) and Gleason score (p<0.001) which describes that the data was non-normal. The median age was found as 68 years with an interquartile range of 15 years. Regarding the frequency of patients, the age groups are mentioned in Table **1**.

The median Gleason score was found as 8 with an interquartile range of 7 scores. Out of 268 patients, 133 (49.6%) patients had a Gleason score of less than 8 while 135 (50.4%) patients had a Gleason score of 8 or above. A relationship between the age of the patients at the time of diagnosis of prostate cancer and the Gleason score was found. According to our study, a negative weak correlation was found between the age of the patients at the time of diagnosis and the Gleason score (r= -0.013, p=0.832)

Table 1: Frequency of age categories of study subjects.

Age-groups	Frequency	Percent
<=50 years	13	4.9
51-60 years	58	21.6
61-70 years	104	38.8
71-80 years	79	29.5
>80 years	14	5.2

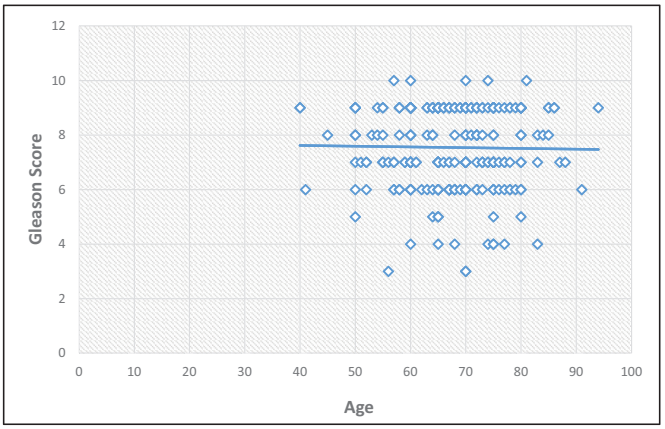

Fig. (1): Scatter plot showing a negative weak relationship between age and Gleason score.

DISCUSSION

The significance of age and its impact on the behavior and evolution of prostate cancer has been a topic of controversy. Multiple studies show that a higher Gleason score is associated with advanced age and more advanced local disease [13, 14].

Some recent studies have shown that there is a correlation between advanced age and a worse prognosis for prostate cancer using univariate analyses, there is a multivariate analysis using the Gleason score, clinical staging and PSA levels [15-17]. The incidence of prostate cancer increases significantly with respect to age. Prostate cancer is the third most common cause of cancer deaths among men aged above 80 years [18]. Men of advanced age are diagnosed more with higher grades and stages of prostate cancer than younger men. They are also less likely to receive curative therapy for their cancer [19]. There is a recent recommendation from The International Society of Geriatric Oncology that older men with prostate cancer should be managed by keeping in view their health status and not their age. This also suggests that men older than 70 years, healthy or fit, should be offered the same treatment options as younger patients [20].

Contrary to these studies, our study does not show a very strong association between age and Gleason score. There is though a weak corelation present between the two.

As age increases, the chances of having higher grades of Gleason score increases. Clonality is increased with age in blood and other adult tissues [21, 22]. This shows that aged tissues are maintained by fewer progenitor cells. The process of cell competition that enables normal epithelial cells to eliminate neighboring mutated cells [23], also termed as epithelial defense against cancer, declines with age [22]. Similarly, age-related immune dysfunction may reduce the efficiency of immune surveillance [24, 25], enabling the survival and expansion of pre-malignant cells.

In our study, though, the results have been found to be different. The results of our study do not show a significant p-value when increasing age and Gleason scores are compared. A similar study was done by Afshan *et al.* in Lahore in 2007. This study also showed that no relationship existed between age and Gleason score suggesting that varying degrees of severity in prostatic carcinoma may exist in all the age group categories in the study [26].

Schwartz and colleagues [27] reviewed the treatment decisions and factors influencing them in a cohort of men with localized prostate cancer. Age, comorbidity, and Gleason score were noticed to be independent predictors of suboptimal treatment. It was also concluded that the majority of men older than 70 years having moderately or poorly differentiated tumors and with no to mild comorbidity were given suboptimal treatment. Most of these men received undertreatment as watchful waiting therapy when potentially curative therapy could have been offered. By providing optimal treatment, better clinical outcomes could have been achieved. Hence, in older patients, good performance status with aggressive tumors, definitive treatment could be suggested, instead of palliative treatment, to improve quality of life, and decrease metastatic disease and side effects.

CONCLUSION

Though there are many studies that support the existence of corelation between increasing age and Gleason Score, our study, like a couple of others, showed no association between the two and a weak positive corelation. Our conclusion of the study is that while studying the relationship between the two, other variables like PSA, DRE findings and TNM classification of the tumor are also important. Hence, more work needs to be done in this regard.

ETHICS APPROVAL

For this type of study formal consent is not required.

CONSENT FOR PUBLICATION

Informed written consent was taken from the patients.

FUNDING

No funding was received.

CONFLICT OF INTEREST

The authors whose names are listed certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

ACKNOWLEDGEMENTS

None.

REFERENCES

1. Jemal A, Siegel R, Xu J, *et al.* Cancer statistics, 2010. CA Cancer J Clin 2010; 60: 277-300.
2. Fitzpatrick JM, Schulman C, Zlotta AR, Schroder FH. Prostate cancer: a serious disease suitable for prevention. BJU Int 2009; 103: 864-70.
3. Coleman MP, Quaresma M, Berrino F, *et al.* Cancer survival in five continents: a worldwide population-based study (CONCORD). Lancet Oncol 2008; 9: 730-56.
4. Richstone L, Bianco FJ, Shah HH, *et al.* Radical prostatectomy in men aged > or = 70 years: effect of age on upgrading, upstaging, and the accuracy of a preoperative nomogram. BJU Int 2008; 101: 541-6.
5. Konety BR, Cowan JE, Carroll PR. Patterns of primary and secondary therapy for prostate cancer in elderly men: analysis of data from CaPSURE. J Urol 2008; 179: 1797-803.
6. Ketchandji M, Kuo YF, Shahinian VB, *et al.* Cause of death in older men after the diagnosis of prostate cancer. J Am Geriatr Soc 2009; 57: 24-30.
7. KG Manton, JW Vaupel. Survival after the age of 80 in the United States, Sweden, France, England, and Japan. N Engl J Med 1995; 333: 1232-5.
8. American Cancer Society. Cancer Facts & Figures 2007. Atlanta, GA: American Cancer Society; 2007.
9. The Department of Defense Center for Prostate Disease Research. Oncology (Williston Park) 1999; 13: 1336.
10. Newcomer LM, Stanford JL, Blumenstein BA, *et al.* Temporal trends in rates of prostate cancer: declining incidence of advanced stage disease, 1974 to 1994. J Urol 1997; 158: 1127-30.
11. Carter HB, Piantadosi S, Isaacs JT. Clinical evidence for and implications of the multistep development of prostate cancer. J Urol 1990; 143: 742-6.
12. Scher HI, Isaacs JT, Zelefsky MJ, *et al.* Prostate cancer. In: Abeloff MD, Armitage JO, Lichter AS, *et al.*, Eds. Clinical Oncology. 2nd ed. New York, NY: Churchill Livingstone; 2000. pp. 1823-1884.
13. Lin DW, Porter M, Montgomery B. Treatment and survival outcomes in young men diagnosed with prostate cancer: a population-based cohort study. Cancer 2009; 115: 2863-71.
14. Sun L, Caire AA, Robertson CN, *et al.* Men older than 70 years have higher risk prostate cancer and poorer survival in the early and late prostate specific antigen eras. J Urol 2009; 182: 2242-8.
15. Barlow LJ, Badalato GM, Bashir T, Benson MC, McKiernan JM. The relationship between age at time of surgery and risk of biochemical failure after radical prostatectomy. BJU Int 2010; 105: 1646-9.
16. Antunes AA, Crippa A, Dall'Oglio MF, Nesrallah LJ, Leite KR, Srougi M. Age impact in clinicopathologic presentation and the clinical evolution of prostate cancer in patients submitted to radical prostatectomy. Int Braz J Urol 2006; 32: 48-55.
17. Antunes AA, Leite KR, Dall'Oglio MF, Crippa A, Nesrallah LJ, Srougi M. Prostate biopsy: is age important for determining the pathological features in prostate cancer? Int Braz J Urol 2005; 31: 331-7.
18. Jemal A, Siegel R, Ward E, *et al.* Cancer statistics, 2008. CA Cancer J Clin 2008; 58: 71-96.
19. Cooperberg MR, Cowan J, Broering JM, Carroll PR. Highrisk prostate cancer in the United States, 1990-2007. World J Urol 2008; 26: 211-8.
20. Droz JP, Aapro M, Balducci L, *et al.* Management of prostate cancer in older patients: updated recommendations of a working group of the International Society of Geriatric Oncology. Lancet Oncol 2014; 15: e404-14.

21. Jan M, Ebert BL, Jaiswal S. Clonal hematopoiesis. Semin Hematol 2017; 54(1): 43-50.

22. Liu N, Matsumura H, Kato T, *et al.* Stem cell competition orchestrates skin homeostasis and ageing. Nature 2019; 56 (7752): 344-50.

23. Kon S, Ishibashi K, Katoh H, *et al.* Cell competition with normal epithelial cells promotes apical extrusion of transformed cells through metabolic changes. Nat Cell Biol 2017; 19(5): 530-41.

24. Montecino-Rodriguez E, Berent-Maoz B, Dorshkind K. Causes, consequences, and reversal of immune system aging. J Clin Invest 2013; 123(3): 958-65.

25. Ovadya Y, Landsberger T, Leins H, *et al.* Impaired immune surveillance accelerates accumulation of senescent cells and aging. Nat Commun 2018; 9(1): 5435.

26. Kamran A, Riaz S, Rehman S. Relationship of Gleason's score with age, cellularity of tumor and PSA IHC stain in prostatic carcinoma. Proceed S.Z.P.G.M.J. 2007; 21(1): 15-22.

27. Schwartz KL, Alibhai SMH, Tomlinson G, *et al.* Continued undertreatment of older men with localized prostate cancer. Urology 2003; 62: 860-5.