



ISSN 2278 – 0211 (Online)

Review of the Pattern of Prostate Cancer Aggressiveness Using the Gleason Scoring System among Men Attending Abia State University Teaching Hospital Aba, South Eastern, Nigeria

Ibe I U

Consultant Urology, Department of Surgery,
Abia State University Teaching Hospital, Aba, Nigeria

Chikezie J A

Consultant Nephrologist, Department of Medicine,
Abia State University Teaching Hospital, Aba, Nigeria

Chukwuegbo C C

Consultant Histopathologist, Department of Histopathology,
Federal Medical Center Umuahia, Nigeria

Chikezie O C

Medical Officer, Department of Medicine,
Abia state University Teaching Hospital, Aba, Nigeria

Abstract:

Prostate cancer is the most common cancer among African – American men and the second most common cause of death in the western world.

It is the most common cancer among Nigerian men with increasing incidence, morbidity and mortality. The morbidity and mortality depend on the tumor aggressiveness.

The three most important prognostic parameters for this disease include

- *Tumor pathologic stage*
- *Tumor histologic differentiation (gleason score)*
- *Level of prostate specific antigen (PSA)*

These factors are needed in stratifying patients into risk groups. The gleason grading system, both in needle biopsy and radical prostatectomy specimens remains one of the most significant factors in the clinical decision making process.

Key Challenges of the biopsy based determination of prostate cancer aggressiveness include

- *Tumor heterogeneity*
- *Biopsy sampling error and variations in biopsy interpretations*

The resulting uncertainty in risk assessment leads to significant over treatment with associated cost and morbidity.

Keywords: *Prostate cancer, prostate biopsy, aggressiveness, gleason score and Aba*

1. Introduction

Traditionally, prostate cancer gradings were done using Gleason scoring system. It's a pathological grading system which assesses the two most common pathological architectural patterns of the prostate tissue for risk assessments.

The choice of radiation therapy, radical prostatectomy and other therapies is initially based on the Gleason system after needle biopsies.

In addition the treatment guidance, the Gleason score predicts

- Pathological stage
- Margin status after radical prostatectomy
- Potential biochemical failure
- Local recurrences
- Lymph node and distant metastases

The traditional Gleason scoring system was initiated by a surgeon in the 60s, created by a pathologist and developed by a statistician. It predated PSA testing, systematic needle biopsy and immunohistochemistry.

The traditional Gleason system has undergone a series of modifications initially by the veteran's administration cooperative urological research group and later by the international society of urological pathology following consensus meetings in 2005 and 2014. The reviews focused on borderline grades, scores with different Gleason scores, reporting of percentage pattern 4 and minor high grade patterns and intraductal carcinoma and new grading system.

2. Aims and Objective

- To determine the patter of prostate cancer aggressiveness using Gleason scoring system in men.
- To determine the age group at most risk of cancers of high grade variety.

3. Methodology

This study is a retrospective study. The case files of men who had undergone prostate biopsy over a 5 year period spanning January 2016 and December, 2020 in Abia State Teaching Hospital Aba, were retrieved. Their Bio data and histopathological results of their biopsies together with the Gleason scores of those who were positive for cancer (Adenocarcinoma).

The study involves men between the ages of 40 and 100 years. The pattern of severity using the Gleason score in each age group was ascertained.

4. Inclusion Criteria

- Patients with confirmed documented biopsy results of cancer of the prostate.
- Patients with elevated Prostate Specific Antigen (PSA) and abnormal prostate findings on digital rectal examination (DRE).

5. Results

The study is a retrospective study done within the period of 2016 to 2020, aimed at analyzing prostate cancer patterns in biopsies done and to review the age groups most vulnerable among men in ABA, South Eastern Nigeria. Case files were retrieved and their biodata obtained. A total of 198 biopsies were done.

From table 1, sample size was (n= 198) biopsies done. 100 (50.5%) came out histopathologically as adenocarcinomas, 58(29.3%) were nodular hyperplasia, 20(10%) were high grade PIN, with the least being Atypical Acinar proliferation at 5(2.52%).

Of the 100 confirmed cases of Adenocarcinoma 7% were low grade while 16% were intermediate grade, with the remaining 77 cases (77%) being high grade cancers.

Table 3 used the revision by ISUP/WHO patients with Gleason 7 and was subdivide into intermediate favorable with primary pattern 3 and intermediate unfavorable with primary pattern 4 , eventually reducing the high grade and very high grade to 70% compared to 77% in traditional Gleason system.

Age group (61-70) had the highest incidence with 33 cases, 3 were low grade , 7 as intermediate favorable with 2 intermediate unfavorable, leaving 21 as high grade cancers(63.5%).

- The age group 51-60 years, had 5 out of the 8 cases as high grade cancers (62.5%)
- Age group 81-90 years, had 12 out of 16 cases as high grade cancers (75%)

Cancers at the extremes of age below 50 years and above 90yeras were of the high grade variety.

The gleason group with the lowest incident was 3+3=6/10 group with 7 cases while that with the highest incidence was 5+4 =9/10 with 23 cases followed by 4+4=8/10 group with 19 cases (19%). Also cancers at the extremes below 50 years and above 90 years were of high grade variety, with the highest incidence of high grade cancers at 61-70 with 21 cases.

| S/N | Result | NO | PERCENTAGE |
|-----|-------------------------------------|-----|------------|
| 1. | Prostate Cancer (Adenocarcinoma) | 100 | 50.5% |
| 2. | Nodular Hyperplasia | 58 | 29.29% |
| 3. | High Grade Pin | 20 | 10% |
| 4. | Atypical Small Acinar Proliferation | 5 | 2.52% |

Table 1
N=198

5.1. Original Gleason System

| S/N | Gleason Score | Grade | No | Percentage |
|-----|---------------|--------------|----|------------|
| 1. | 3+3=6/10 | LOW | 7 | 7% |
| 2. | 3+4=7/10 | INTERMEDIATE | 16 | 16% |
| 3. | 4+3=7/10 | HIGH | 10 | 10% |
| 4. | 4+4=8/10 | HIGH | 20 | 20% |
| 5. | 4+5=9/10 | HIGH | 12 | 12% |
| 6. | 5+4=9/10 | HIGH | 21 | 21% |
| 7. | 5+5=10 | HIGH | 14 | 14% |

Table 2: Gleason Scoring Pattern

n=100

- Low grade 7 (7%)
- Intermediate Grade 16 (16%)
- High Grade 77 (77%)

| S/N | Risk Group | Group Grade | Gleason Score | No | Percentage |
|-----|-------------------------|-------------|---------------|----|------------|
| 1. | Low/Very Low | 1 | <6 | 7 | 7% |
| 2. | Intermediate Favourable | 2 | 7(3+4) | 16 | 16% |
| 3. | Unfavorable | 3 | 7(4+3) | 10 | 10% |
| 4. | High | 4 | 8(4+4) | 20 | 20% |
| 5. | Very High | 5 | 9-10 | 50 | 50% |

Table 3: ISUP/Who Group Grading

From the above the very high risk group constituted 50% of the cases while the total high risk Group was 70 % of the cases.

| S/N | AGE Group | Distribution of the Risk Groups | | | | | | | Total |
|-----|-----------|---------------------------------|-----|-----|-----|-----|-----|-----|-------|
| | | 3+3 | 3+4 | 4+3 | 4+4 | 4+5 | 5+4 | 5+5 | |
| 1. | | | | 1 | 1 | | | | 2 |
| 2. | | 1 | 2 | | 1 | 1 | 2 | 1 | 8 |
| 3. | | 3 | 4 | 6 | 10 | 4 | 9 | 3 | 39 |
| 4. | | 3 | 7 | 2 | 6 | 6 | 5 | 4 | 33 |
| 5. | | | 3 | 1 | 1 | | 6 | 5 | 16 |
| 6. | | | | | | | 1 | 1 | 2 |
| 7. | | 7 | 16 | 10 | 19 | 11 | 23 | 14 | 100 |

Table 4

From the above table, cancers at the extremes below 50 years and above 90 years were of high grade variety.

6. Discussions

Prostate cancer grading using the Gleason scoring system is a key component of prostate cancer diagnosis. In fact it is one of the most powerful predictors of outcome in prostate cancer disease. It is very useful for determining the behavior of prostate cancer.

The higher the Gleason score, the more likely the cancer will grow and spread rapidly score of 6 describes cancers that look similar to normal sense and suggest that the cancer is likely to grow slowly. A score of 7 suggest intermediate risk.

A score of 8 or higher describes cancers that are likely to spread rapidly. They are described as poorly differentiated or high grade.

According to David G. Bostwick, for Gleason score of 7, it is important to separate predominant pattern 3 from predominant pattern 4 (3+4=7/10 and 4+3=7/10) primary grade 4 indicates a likely hood of higher tumor stage and a higher probability of PSA recurrences after surgery than primary pattern 3.

Rasihah etal, 547 found out that patients with grade 4 cancers were more likely to have seminal vesicle involvement and extra prostatic extension and along with Gleason grade 5, a significantly shorter time to cancer recurrence.

The new prostate cancer grading system is an extension of the traditional system designed to provide the simplified and more accurate stratification system than the old system. The new system focused on better representation of low grade disease to reduce unnecessary treatment of indolent cancers.

It subdivides the prostate cancers into 5 categories using pathological characteristics. According to Ming Zhou etal, in the modified Gleason system, significant changes include one a stricter definition of Gleason pattern 3, cribriform glands and grading ill defined glands with poorly formed glandular lumina as pattern 4.

7. Conclusion

Prostate cancer is the most common male cancer in Aba South Eastern Nigeria, over 60% of the prostate cancers in Aba are high grade type cancers occurring at the extremes of ages less than 50 and above 90 years were found to be of high grade variety.

It is therefore necessary to institute aggressive investigative programs early enough in order to achieve early diagnosis and treatments including adjuvant treatment so as to reduce morbidity and mortality,

8. References

- W.A Sakr etal
- Prostate cancers; indicators of aggressiveness
- Eur Urol 1997

- iv. Joving Isola, Anss Aurinen, Marita Poutianen, Laura Kakkola, Tero A.H, Jarvinen Lisa.
- v. Predictors of biological aggressiveness of prostate specific antigen screening detected prostate cancer
- vi. The journal of Urol 165 (5) 2001
- vii. M.Shipitsin, C Small, S Choudhury, E Giladi
- viii. Identification of proteomic biomarkers predicting prostate cancer aggressiveness and lethality despite biopsy sampling error
- ix. Journal of Magnetic resonance imaging 35(1) 2012B5c1
- x. Liu etal
- xi. Prediction of prostate cancer aggressiveness with a combination of radiomics and machine learning bases analysis of dynamic contrast enhanced MRI
- xii. Clinical radiology 2019 November
- xiii. David G. Bostwick, Isabelle Meiers
- xiv. Neoplasms of the prostate
- xv. Urologic surgical pathology 2nd edition 2008
- xvi. D. Yaker , O A Debats, J. G. R Bomas, Martin G. Pieter Schouten C vos
- xvii. Predictive values of MRI IN localization staging volume estimation assessment of aggressiveness and guidance of radiotherapies and biopsies In prostate cancer Journal of Magnetic resonance imaging 35(1) 2012 B5c1
- xxviii. Ming Zhou, Jonathan I Epstein
- xix. Neoplasm of the prostate and seminal vesicles
- xx. Genitourinary pathology 2007
- xxi. Jeff Michal Ski, Deborah A. Kuban
- xxii. Clinical radiation oncology
- xxiii. 3rd edition, 2012.
- xxiv. Jeff M, Michal Ski, Louis Potters
- xxv. Clinical edition oncology 4th edition 2016
- xxvi. Emma Short, Murali Varma
- xxvii. Gleason grading of prostate cancer: A pragmatic Approach diagnostic histopathology volume 225 Issue 10 Oct. 2019 pg 371-375
- xxviii. Hepap B etal
- xxix. Modified Gleason Grading
- xxx. Histol histopathology 2009 PMID 19283673 review
- xxxi. Gollipats etal
- xxxii. Usual and unusual histologic patterns of high Gleason score
- xxxiii. 8-10 Adenocarcinoma of the prostate on needle biopsy
- xxxiv. Amj surg. Pathology 2012 PMID 22367295
- xxxv. Epstein J.I etal
- xxxvi. Contemporary Gleason grading of prostate carcinoma
- xxxvii. An update with discussion and practical issues to implement the 2014 international society of urologic pathology consensus conference on Gleason grading of prostatic carcinoma
- xxxviii. Amj surg pathology 2017 PMID 28177964
- xxxix. Hepap B etal
- xl. Clinical insignificance of prostate cancer. Are there morphological findings Urologe A 2009 PMID 18946693
- xli. Bjesterfled S
- xlii. Documentation Quality of histopathology reports of prostate needle biopsies a snap shot. Urologe 2014 PMID 25272987
- xliii. Srigley J.R etal
- xliv. Controversial issues in Gleason and international society of urological pathology
- xlv. (ISUP) prostate cancer grading: proposed recommendations for international implementation
- xlvi. Pathology 2019 PMID 31279442 review.
- xlvii. Hepap B etal
- xlviii. The value of the modified Gleason grading system of prostate Adenocarcinoma in routine urological diagnostics
- xlix. Urologe A 2007 Jan.