

Comparison of Old Gleason Score with Modified Gleason Score and Correlation of Needle Biopsy of Prostate with PSA

Naresh N Rai¹, Preetam Mandawat², Vinny Gupta³, Krishna Dubey⁴

ABSTRACT

Introduction: The prostate gland is a secondary sex, exocrine organ that is an integral part of the human male reproductive system. There are three main diseases of the prostate: prostatitis, benign prostatic hyperplasia, and prostate cancer. The new grading system for prostate cancer has obvious benefits that is: it has more accurate grade stratification than the current Gleason system. PSA is serine protease produced by ductal and acinar epithelial cells of normal, hyperplastic, and malignant tissue of the prostate. To study morphologic features of the benign and malignant lesions of prostate, histopathological correlation of benign and malignant lesions of prostate with serum PSA level, compare new Gleason grading system with old Gleason grading system.

Material and Methods: All the needle biopsies and TURP specimens submitted to the histopathology laboratory, Department of Pathology, Government medical college, Kota during the period from January 2014 to June 2016. We received total 445 prostate biopsies and TURP specimen from January 2014 to June 2016 at our department of pathology, Govt. Medical College, Kota and were examined with haematoxylin and eosin and compare new gleason grading system with old gleason grading system.

Results: On histopathological examination of total 441 cases, the majority of cases 323 (73.24%) were benign, 109 (24.72%) cases were malignant and 9 (2.04%) cases were pure inflammatory lesions.

Conclusion: We observed continuous and significant rising trend of prostate malignancy from year 2014 to June 2016. Prostatic carcinoma is the malignant neoplasm of aging men maximum number of prostatic carcinoma were found in age group 61-70 yr. Majority (14 cases; 12.84%) of carcinoma prostate cases were found to be associated with PSA level >100.0 ng/ml. In present study majority of cases had Gleason score 6 (48%) followed by Gleason score 7 (29%), Gleason score 8 (13%), Gleason score 5 (4%), Gleason score 9 (3%) and least one cases in Gleason score 2, 4 and PIN.

Keywords: Benign Prostatic Hyperplasia, Modified Gleason Scoring System, Prostate Cancer, Prostate - Specific Antigen (PSA), Prostatitis

has been implicated in the development of prostate cancer.¹ In 1966, Gleason created a unique grading system for prostatic adenocarcinoma based solely on architectural pattern using a five-tier scale in which the sum of the two most common grade patterns (grades) defined the final Gleason score (GS) of a given case.² A new contemporary prostate cancer grading system has been developed due to problems with the Current Gleason System. Scores 2-5 are currently no longer assigned and certain patterns that Gleason defined as score of 6 are now graded as 7, thus leading to contemporary Gleason score 6 cancers having a better prognosis than historic score 6 cancers. The new grading system for prostate cancer has obvious benefits:

Current research aimed to study morphologic features of the benign and malignant lesions of prostate, histopathological correlation of benign and malignant lesions of prostate with serum PSA level, compare new Gleason grading system with old Gleason grading system.

MATERIAL AND METHODS

All the needle biopsies and TURP specimens submitted to the histopathology laboratory, Department of Pathology, Government medical college, Kota during the period from January 2014 to June 2016. The clinical details, ultrasound findings, PSA levels, treatment received will be obtained.

All the needle biopsies and TURP specimens submitted to the histopathology laboratory, Department of Pathology, Government medical college, Kota during the period from January 2014 to June 2016. The tissue were fixed in 10% formalin followed with adequate fixation for about 12-24 hours then tissue were submitted for routine processing by paraffin embedding. Serial sections of approximately 5micron thick were cut and stained with hematoxylin and eosin and graded according to new Gleason grading

¹Senior Professor, Department of Pathology, GMC, Kota, Rajasthan,

²Senior Demonstrator, Department of Pathology, GMC, Kota, Rajasthan, ³Senior Demonstrator, Department of Pathology, GMC, Kota, Rajasthan, ⁴Senior Demonstrator, Department of Pathology, GMC, Kota, Rajasthan, India

Corresponding author: Dr Preetam Mandawat, Senior Demonstrator, Department of Pathology, GMC, Kota, Rajasthan, India

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INTRODUCTION

Prostate cancer is a considerable health risk for men throughout the world. A total of 70% of prostate adenocarcinomas occur in the peripheral zone, 20% in the transitional zone, and approximately 10% in the central zone. Prostate cancer develops after an initial transformation event, followed by mutations of various genes, including the genes for tumor protein p53 that can lead to tumor progression and metastasis. The enzyme 5-alpha reductase

system. The clinical details, ultrasound findings, PSA levels, treatment received will be obtained. The new Grading System includes:

Grade Group 1 (Gleason score ≤ 6) – Only individual discrete well-formed glands

Grade Group 2 (Gleason score 3+4=7) – Predominantly well-formed glands with a lesser component of poorly-formed/fused/cribriform glands

Grade Group 3 (Gleason score 4+3=7) – Predominantly poorly-formed/fused/cribriform glands with a lesser component of well-formed glands†

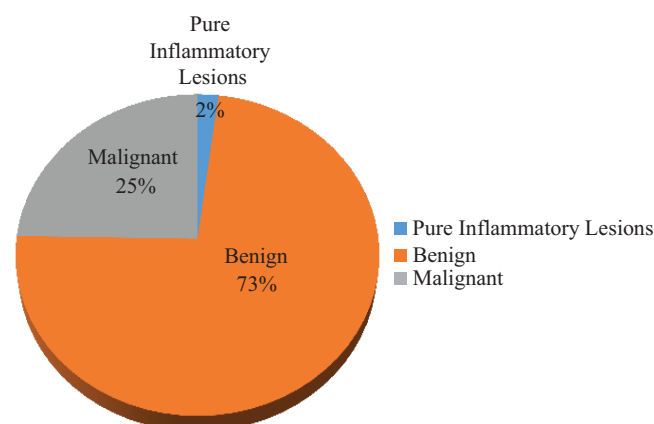
Grade Group 4 (Gleason score 8) - Only poorly-formed/fused/cribriform glands or - Predominantly well-formed glands with a lesser component lacking glands†† or - Predominantly lacking glands or with a lesser component of well-formed glands.

Grade Group 5 (Gleason scores 9-10) – Lacks gland formation (or with necrosis) with or without poorly-formed/

fused/cribriform glands.

RESULTS

We received total 445 prostate biopsies and TURP from January 2014 to June 2016 at our department of pathology, Govt. Medical College, Kota from the patients of various



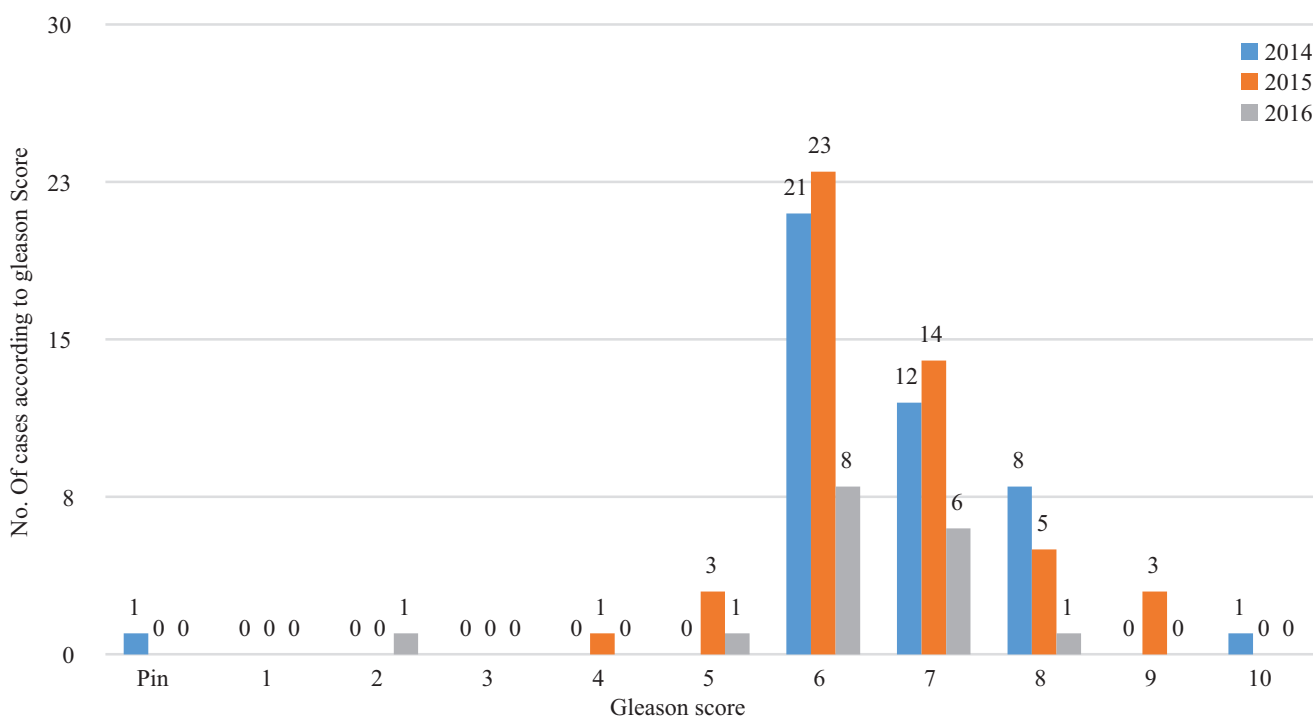
Graph-1: Incidence of cases

S. No.	Types of Lesions	Category	No. of Cases			Total	%
			2014	2015	2016		
1	Chronic Non Specific Prostatitis	P.I.	3	3	3	9	2.04
2	Granulomatous Prostatitis	P.I.				0	0.00
3	BPH	B	58	74	25	157	35.60
4	ANGIMYOMA	B	1			1	0.23
5	BPH with Chronic Non Specific Prostatitis	B	61	64	28	153	34.69
6	BPH with Granulomatous Prostatitis	B	2	1	1	4	0.91
7	BPH with marked hyperplasia	B	0	1	0	1	0.23
8	BPH with Focal Basal Cell Hyperplasia	B	0	1	0	1	0.23
9	BPH with Squamous Metaplasia	B	1	3	1	5	1.13
10	Prostatic Intraepithelial Neoplasia (PIN)	M	2	0	0	2	0.45
11	Small cell Carcinoma	M	0	2	0	2	0.45
12	Sarcoma	M	1	0	1	2	0.45
13	TCC	M	1	2	0	3	0.68
14	Adenocarcinoma Prostate	M	39	45	17	101	22.90
Total						441	100

Table-1: Distribution Of Various Prostatic Lesions From 2014 to 2016

Types of Prostatic Lesions	Year	Age Groups					Total
		<50	51-60	61-70	71-80	>80	
Pure Inflammatory Lesions	2014	0	1	1	0	1	3
	2015	0	1	1	1	0	3
	2016	0	0	3	0	0	3
	Total	0	2	5	1	1	9
	%	0	22.22	55.56	11.11	11.11	100
Benign	2014	6	34	42	30	10	122
	2015	8	35	55	40	8	146
	2016	2	12	24	12	5	55
	Total	16	81	121	82	23	323
	%	4.95	25.08	37.46	25.39	7.12	100
Malignant	2014	4	3	19	11	6	43
	2015	2	8	17	18	4	49
	2016	0	1	8	7	1	17
	Total	6	12	44	36	11	109
	%	5.50	11.01	40.37	33.03	10.09	100

Table-2: Age distribution of inflammatory, benign and malignant lesions of prostate



Graph-2:

hospitals of kota region. Out of this total 445 cases 441 cases were diagnosed and categorized in different categories of prostatic lesions, while for cases could not be diagnosed due to inadequacy of tissue submitted. So present study included total 441 cases (table 1 and graph 2).

Table-2 shows year wise distribution of various prostatic Lesions. Out of these various types of prostatic lesions, the majority 157 (35.6%) of lesions were BPH followed by 153 (34.69%) BPH with Chronic Non Specific Prostatitis. 101 (22.9%) cases of Adenocarcinoma Prostate followed by rest of all remaining types (table 2 and graph 2).

Urinary Hesitancy and Poor Stream was present in all patients of Carcinoma of Prostate. Urinary Hesitancy and Poor Stream was present in all patients of Carcinoma of Prostate. Urinary Hesitancy and Poor Stream was present in all patients of Carcinoma of Prostate.

On PR examination consistency of prostate was found hard in 19.27% while it was firm in 8.26% cases. Mucosa was adherent in 23.85% cses while it was free in 1.8% of cases. In 22.02% cases prostate was found fixed while it was mobile in 2.75% cases. Median groove was found obliterated in 16.51% cases while it was not obliterated in 5.5% case.

GRAPH -2 Distribution Of Malignant Cases According to Gleason Score From Year 2014 to 2016 (Total 109 cases)

In present study majority of cases had Gleason score 6 (48%) followed by Gleason score 7 (29%), Gleason score 8 (13%), Gleason score 5(4%), Gleason score 9 (3%) and least one cases in Gleason score 2, 4 and PIN (graph-2).

Re-classification as per Modified Gleason scoring system, majority of cases fell in prognostic Grade Group- 1 were 59 (54.12%), followed by Grade Group-2 were 23 (21.10%) cases, Grade Group-4 – 13 (11.92%), Grade Group-3- 8 (7.33%) and least 6 cases in Grade Group-5.

In this study total 441 patients of various type of prostatic lesions were included and correlation between needle biopsy of prostate or TURP and comparison of old Gleason score with modified Gleason score was studied.

On histopathological examination of total 441 cases, the majority of cases 323(73.24%) of cases were benign, 109(24.72%) cases were malignant and 9(2.04%) cases were pure inflammatory lesions.

We observed continuous and significant rising trend of prostate malignancy from year 2014 to June 2016. Prostatic carcinoma is the malignant neoplasm of aging men which is responsible for lower urinary tract symptoms, the maximum number of prostatic carcinoma were found in age group 61-70 year.

All the cases of carcinoma prostate had complains of urinary hesitancy and poor stream. Feeling of incomplete bladder evacuation and urinary urgency was present in 21(19%) patients. These symptoms were followed by hesitancy 20 (18%), frequency patients were 19 (17%), poor stream and urgency patients 17 (16%) and dysuria which were present in 12 (11%) cases while hematuria was present in 3(3%) cases. In present study majority of cases had Gleason score 6 (48%) followed by Gleason score 7 (29%), Gleason score 8 (13%), Gleason score 5 (4%), Gleason score 9 (3%) and least one cases in Gleason score 2, 4 and PIN.

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DISCUSSION

In our study we observed a continuous rising trend from year

2014 to 2016 for fraction of malignant prostatic lesions out of total prostatic biopsies submitted in respective years.

Lalitha K, Suman G, Pruthvish S, Mathew A, Murthy NS(2012), several Indian registries have revealed an increasing trend in the incidence of prostate cancer and the mean annual percentage change has ranged from 0.14-8.6.³

On histopathological examination of total 441 cases we found the majority 323 (73.24%) of cases were benign, 109 (24.72%) cases were malignant and 9 (2.04%) cases were pure inflammatory lesions.

In our study, most of the cases of carcinoma prostate patients were 44 (40.27%) in 61-70 year age group, followed by 36(30.03%) in 71-80 year age group, 12(11.09%) in 51-60 year age group and 11(10.09%) in >80 age group and least 6 cases in <50 year age groups.

According to Presti et al (2004), the probability of carcinoma prostate in men under the age of 40 is 1 in 10,000; for men 40-59 it is 1 in 103 and for men 60-79 it is 1 in 8.⁴

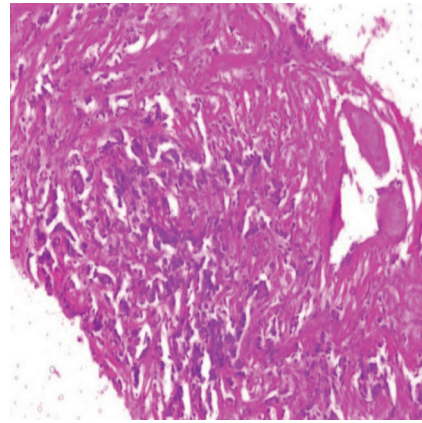
Carter et al (2002) stated that because of the significant risk of prostate cancer, prostate biopsy is recommended for all men who have digital rectal examination abnormality, regardless of the PSA level, because 25% of men with cancer have PSA level less than 4.0 ng/ml.⁵

Comparison with modified Gleason's Score, it was found that 59 cases (54.12%) had Conventional Gleason's Score of 6 or less. Out of these 53 cases (48.62%) had a score of 3+3=6, implying a higher grade on scale of 2-10 and thus poorer prognosis. Classifying these cases into Grade Group 1 as per modified Gleason's scheme put these cases into indolent or low grade cancers with considerably better prognosis. Out of the remaining 6 cases- 4 cases were assigned score of 5 and 1 case score of 2. These cases required no treatment. 1 case was that of PIN. Considering any type of cribriform (regular or irregular) glands to be assigned score of 4 would further modify grades of some cases. In our current series out of 53 cases with conventional Gleason score of 3+3=6 (Modified Gleason's Grade group 1)- 5 cases had regular cribriform glands as minor pattern and were re-classified as 3+4=7- thereby falling in Grade Group 2. 3 cases had regular cribriform glands as major pattern and were re-classified as 4+3=7- thereby falling in modified Gleason's grade group 3. 1 case had extensive regular cribriform glands and were re-classified as 4+4=8- thereby falling in Grade group 4.

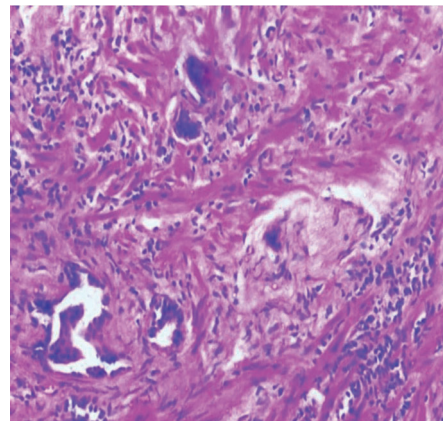
Nodular hyperplasia of prostate with chronic non specific prostatitis makes the majority of prostatic lesions. Our study shows that carcinoma prostate is more common in 61-70 year age group but it's incidence increasing in lower age groups also. The fraction of malignant lesions is much higher urban areas. Although serum PSA level >4 ng/ml is suggestive but not diagnostic for carcinoma of prostate as the higher levels of the same can also be seen in inflammatory conditions.

On Histopathological examination majority of carcinoma prostate were found to be G2 (51%) (moderately differentiated carcinoma) followed by poorly differentiated (G3-G4).

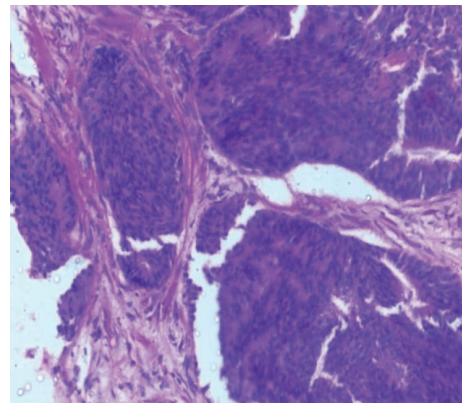
Modified Gleason score led to better prognostic in majority of cases. There is a need of strategy for diagnosis of maximum number of patients as early as possible by proper screening



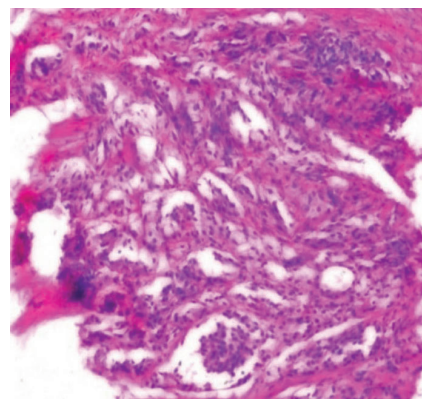
Adenocarcinoma of prostate-predominantly, Gleason score 4+3



Gleason score 4+5 Adenocarcinoma with perineural invasion (H&E 100X)



Grade group 4 (score 4+4)



Adenocarcinoma with glomeruloid glands and clear cells
Adenocarcinoma with cribriform pattern (H&E-100X)

programs (combination of serum PSA estimation, per rectal examination and USG) and prostatic biopsy in suspected cases so that mortality can be reduced and longevity of life can be increased in patients of prostatic pathology.

CONCLUSION

It is hereby concluded that there is a continuous and significant rising trend from 2014 to 2016 for fraction of malignant prostatic lesions out of total prostatic biopsies submitted in respective years *and* further studies are needed for finding out the factors responsible for this rising trend.

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