

## CORRELATION OF GLEASON GRADE IN PREOPERATIVE PROSTATE BIOPSY AND PROSTATECTOMY SPECIMENS

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**SUMMARY** – The aim of the study was to compare Gleason scores obtained from sextant preoperative prostate biopsy and radical prostatectomy specimens in patients with localized prostate cancer. Seventy-three patients with prostate biopsy and operated on at our hospital from 2000 till 2002 were included in the study. Definitive postprostatectomy Gleason score was accurately predicted by preoperative biopsy in 43.8% and undergraded by 1 grade in 39.7% of study patients. Although a fairly good concordance was recorded between Gleason scores obtained on biopsy and prostatectomy specimens, the problem of undergrading remains to be improved. The web-based free tutorial can improve the accuracy of Gleason grading by practicing pathologists. It is available at: [www.pathology.jhu.edu/prostate](http://www.pathology.jhu.edu/prostate).

**Key words:** *Prostatic neoplasms, pathology; Prostatic neoplasms, surgery; Prostatectomy; Forecasting*

### Introduction

Prostate cancer is the leading malignant diagnosis in the USA and the fourth in Croatia<sup>1,2</sup>. About 470 men die from prostate cancer in Croatia *per year*<sup>2</sup>. The widespread use of new screening tests increased the incidence of prostate cancer in the last decade of the 20<sup>th</sup> century. In 1997, the incidence of prostate cancer in Croatia was 26.4/100 000<sup>2</sup>. The most common type of prostate cancer is adenocarcinoma.

Cooperation between the clinical urologist and the pathologist plays a major role in the diagnosis of prostate cancer. Transrectal ultrasound-guided needle biopsy of the prostate, performed by the urologist, provides a limited amount of tissue for the pathologist to diagnose malignancy. Additional information such as digitorectal finding and level of prostate specific antigen (PSA) might prove helpful.

The pathologic stage and grade strongly influence therapeutic decision and outcome. Once the diagnosis has been established, these should be accurately determined. The most commonly used histologic grading system is Gleason grading system introduced in 1966, based on a low

power microscopic description of the architectural criteria of the cancer<sup>3</sup>. The Gleason biopsy grade has been shown to correlate with the disease extent<sup>4</sup>. A higher biopsy grade correlates with worse pathologic stage<sup>5</sup>. Gleason grading is rated from 1 (best differentiated cancer) through 5 (most poorly differentiated cancer). Gleason score (sum) was introduced to improve the grading performance. Gleason score represents a sum of primary grade (a pattern occupying the largest area of the specimen) and secondary grade (a pattern occupying second largest area of the specimen). Therefore, Gleason score can range from 2 (1+1) to maximum 10 (5+5). A Gleason score of 7 and greater is predictive of poorer prognosis<sup>6</sup>. Only 29% of these are organ confined cancers<sup>4</sup>.

The extent of prostate cancer is crucial for the choice of treatment, since only organ confined cancers should be operated on<sup>7</sup>. Most urologists hesitate to operate on poorly differentiated cancers even if they seem to be organ confined on digitorectal and TRUS (Transretal ultrasound) examination. This rises a question of reliability of Gleason grade established on biopsy specimen and its concordance with definitive pathologic grade established upon radical prostatectomy.

### Patients and Methods

The patients found eligible for the present study had clinically localized adenocarcinoma of the prostate and

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were treated with radical prostatectomy. The study included 73 preoperative sextant biopsies and their correlation with postprostatectomy specimens collected during the 2000-2002 period. Only the patients with prostate biopsy and specimen analysis performed at our institution were included in the study. Those who were operated on at our hospital but had prostate biopsy done elsewhere were excluded. The Gleason score recorded on biopsy specimens was compared with the Gleason sum recorded in postprostatectomy specimens (Table 1).

*Table 1. Patient distribution according to Gleason score (GS) in preoperative prostate biopsy and prostatectomy specimens (Gleason grading of preoperative biopsy specimens: accurate, overgraded by 1 or 2, and undergraded by 1 or 2 grades)*

Prostatectomy Gleason score	Accurate (matching with biopsy)	Biopsy overgraded		Biopsy undergraded	
		+1	+2	-1	-2
GS 5, n=14	8	3	2	1	0
GS 6, n=37	17	7	0	12	1
GS 7, n=19	4	0	0	10	5
GS 8, n=3	3	0	0	0	0
Total, N=73	32	10	2	23	6

## Results

The mean patient age was  $66.15 \pm 4.73$  years. All patients had their cancers graded as Gleason score 5 to 8. Preoperative biopsies predicted the postprostatectomy Gleason sum accurately in 43.8%, undergraded it in 39.7% and overgraded it in 16.4% of patients. The majority of undergraded cancers were undergraded by 1 grade (79.3%). Undergrading error was more frequent in Gleason scores 5 and 6.

## Discussion

Review of the literature reveals a fairly good concordance of Gleason sum on prostate biopsy specimens and postprostatectomy specimens<sup>8-10</sup>. There has been a good interobserver reproducibility of grading using Gleason system among uropathology experts and poorer reproducibility among general pathologists. Undergrading seems to be more of a problem than overgrading. To a certain extent it cannot be avoided due to sampling errors<sup>11</sup>. Undergrading is especially present when well differentiated tumors are found on biopsy. Gleason scores of 2, 3 or 4 on biopsy are graded as score 5 or 6 when reviewed by uropathology experts. Therefore, experts in this field recommend avoid-

ing Gleason score 2-4 assignment on needle biopsy materials<sup>12</sup>. Steinberg *et al.* showed matching of Gleason scores 2-4 in only 4 out of 87 cases at Johns Hopkins Hospital<sup>10</sup>. One should bear in mind that undergrading may adversely influence patient care, since watchful waiting is one of the treatment options in low grade, small volume prostate cancers in elderly patients. The same group of authors showed that 55% of prostate cancers graded as 2-4 on biopsy specimens were spread beyond the prostate (locally advanced) and 5% showed lymph node or seminal vesicle involvement. The accuracy rate recorded in our cohort was comparable to those reported in the literature on the same problem of undergrading. Although the overgraded tumors could adversely influence the treatment, they were less common and in our cohort did not exceed Gleason sum 6, which is considered still eligible for treatment with radical prostatectomy.

## Conclusion

Despite a fairly good concordance between biopsy and prostatectomy Gleasons scores, undergrading remains a major problem. Future studies correlating Gleason grade with PSA, amount of tissue obtained in biopsy specimen, and number of biopsies are needed to reveal the sampling effects and possible reduction in grading errors. The possible improvement in Gleason score grading could be achieved among practicing pathologists by use of free web-based tutorial available at: [www.pathology.jhu.edu/prostate](http://www.pathology.jhu.edu/prostate).

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#### Sažetak

### KORELACIJA IZMEĐU GLEASONOVA STADIJA U UZORCIMA DOBIVENIM PRIJEOPERACIJSKOM BIOPSIJOM PROSTATE I TIJEKOM PROSTATEKTOMIJE

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Cilj ove studije bio je usporediti Gleasonov zbroj dobiven prijeoperacijskom sekstant biopsijom i konačan nalaz nakon radikalne prostatektomije u bolesnika s lokaliziranim karcinomom prostate. U ispitivanje su bila uključena 73 bolesnika koji su podvrgnuti biopsiji i radikalnoj prostatektomiji u našoj ustanovi između 2000. i 2002. godine. Prijeoperacijska biopsija prostate točno je predvidjela konačan Gleasonov zbroj nakon prostatektomije u 43,8% bolesnika, dok je u 39,7% bolesnika Gleasonov zbroj bio podcijenjen za 1. Premda je nađena prilično dobra usuglašenost nalaza stupnja diferenciranosti tumora na bioptičkom i definitivnom materijalu, problem podcjenjivanja stupnja diferenciranosti još treba biti riješen. Točnija procjena Gleasonova zbroja može se postići uporabom i vježbom na besplatnoj Internet stranici: [www.pathology.jhu.edu/prostate](http://www.pathology.jhu.edu/prostate).

*Ključne riječi: Neoplazme prostate, patologija; Neoplazme prostate, kirurgija; Prostatektomija; Predviđanje*