



Risk factors that influence biopsy and surgical specimen Gleason score correlation

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■ ABSTRACT

Introduction: There have been reports demonstrating an increase in Gleason score of surgical specimen in relation to Gleason score obtained from biopsy in up to 40% of patients that underwent radical prostatectomy. Prostate biopsy risk factors that can increase definitive Gleason score of the surgical specimen are: the presence of intraepithelial neoplasia of the prostate, prostate volume, prostate specific antigen above 10 ng/mL, number of positive biopsy samples, and tumor percentage of the sample. The objective of the present study was to analyze the factors causing Gleason score to be higher in surgical specimen than in biopsy in radical prostatectomy.

Methods: Cases of patients having undergone radical prostatectomy over a period of 18 years were evaluated. The following variables were analyzed in 163 patients: prostate specific antigen, the presence of intraepithelial neoplasia of the prostate, positive biopsy samples, tumor percentage in the positive samples, and prostate volumes. Patients were divided into two groups according to whether there was an increase or not in Gleason score in relation to surgical specimen.

Results: Mean age was 64 years and mean prostate specific antigen was 13 ng/mL. The most frequent

■ RESUMEN

Introducción: Se ha reportado que hasta un 40 % de los pacientes sometidos a prostatectomía radical (PR) el puntaje de Gleason se incrementa en la pieza quirúrgica con respecto al mismo puntaje de las biopsias. Existen factores en las biopsias prostáticas que pueden incrementar el puntaje de Gleason definitiva de la pieza quirúrgica. Estos factores son: la presencia de neoplasia intraepitelial prostática (NIP), volumen prostático, antígeno prostático específico (APE) mayor de 10 ng/mL, número de fragmentos positivos de las biopsias y el porcentaje de tumor en los fragmentos. El objetivo de este estudio es analizar los factores que incrementan el puntaje de Gleason de las biopsias con la PR.

Métodos: Se analizaron los pacientes sometidos a PR en 18 años. Analizando el APE, la presencia de NIP, fragmentos positivos en las biopsias, porcentaje de tumor en los fragmentos positivos y el volumen prostático en 163 pacientes. Los cuales se dividieron en dos grupos; pacientes quienes incrementaron y no aumentaron el puntaje de Gleason de las biopsias con respecto a la pieza quirúrgica.

Resultados: La edad promedio fue de 64 años el APE promedio de 13 ng/mL. El puntaje de Gleason más

Gleason score in surgical specimen was 6. There was no change in Gleason score in 101 patients (61.9%) and there was an increase in Gleason score in 62 patients (38.1%). Prostate specific antigen and tumor percentage in positive biopsy samples showed no statistically significant relation in regard to biopsy Gleason score modification. Prostate volume under 60 g, the presence of intraepithelial neoplasia of the prostate in biopsies, and more than 50% positive samples were statistically significant in regard to higher surgical specimen Gleason score.

Conclusions: The presence of intraepithelial neoplasia of the prostate, prostate volume under 60 g, and more than 50% positive samples in prostate biopsies are factors that may have an influence on surgical specimen Gleason score increase in radical prostatectomy.

Key words: Gleason score, prostate volume, intraepithelial neoplasia, radical prostatectomy, Mexico.

frecuente fue de 6 en la pieza quirúrgica. Se encontró que 101 pacientes (61.9%) no modificaron su Gleason y 62 pacientes (38.1%) aumentaron el puntaje Gleason. Se demostró que el APE y el porcentaje de tumor en los fragmentos positivos no mostraron una relación estadísticamente significativa para modificar el puntaje de Gleason de las biopsias. Mientras que el volumen prostático menor de 60 g, la presencia de NIP en las biopsias y más del 50% de los fragmentos positivos, mostraron ser estadísticamente significativos para el incremento del Gleason en la pieza quirúrgica.

Conclusiones: La presencia de NIP, las próstatas con volúmenes inferiores a 60 g y los pacientes con más de 50% de fragmentos positivos en las biopsias prostáticas, son factores que pueden influir en el incremento del puntaje de Gleason en la PR.

Palabras clave: Suma de Gleason, volumen prostático, neoplasia intraepitelial, prostatectomía radical, México.



■ INTRODUCTION

For more than thirty years since its introduction, Gleason score continues to be an integral part of tumor aggression and patient prognosis determination. It has been reported that there is an increase in Gleason score of surgical specimen in relation to that found in previous biopsy in up to 40% of patients having undergone radical prostatectomy.¹ There are factors in prostate biopsies that can increase definitive Gleason score in the surgical specimen that are: presence of prostatic intraepithelial neoplasia (NIP), prostate volume, perineural invasion, prostate specific antigen (PSA) above 10 ng/mL, number of positive biopsy samples, and tumor percentage in samples.²⁻⁵ Gleason score increase in surgical specimen is directly correlated with a greater possibility of extraprostatic disease defined as lymphatic invasion and positive surgical margins or seminal vesicles in radical prostatectomy (RP).^{3,6-9} In 2009, Jones et al, from the Cleveland Clinic, reported on 1129 patients that, in a time frame of 7 years, underwent RP. There was Gleason score upgrade in 26% of those patients and in the multivariate analysis they showed that preoperative PSA, perineural invasion, and PIN were correlated with Gleason score upgrade in the definitive surgical piece.² Turley et al, in a multicenter study reported that there tended to be Gleason score upgrade in the definitive

histopathological result in prostates with volumes under 60 g.⁴

■ OBJECTIVE

The objective of the present study was to evaluate factors that increase Gleason score of the definitive surgical specimen in RP in relation to Gleason score reported in biopsy.

■ METHODS

One hundred and seventy-five patients having undergone radical prostatectomy (RP) due to prostate cancer (CaP) in the time frame from 1991 to 2009 in a single institution were identified. Patients with complete case records and all variables analyzed were included in the study. Patients presenting with CaP in TNM stages pT1a, pT1b, disappearing CaP, patients not undergoing RP at the authors' institution, and those patients whose Gleason scores were lower after RP with respect to biopsy (12 patients) were excluded from the study. A total of 163 case records were evaluated and were divided into 2 groups: the group of patients presenting with no Gleason score modification and the group with Gleason scores that were higher after RP with respect to biopsy Gleason score.

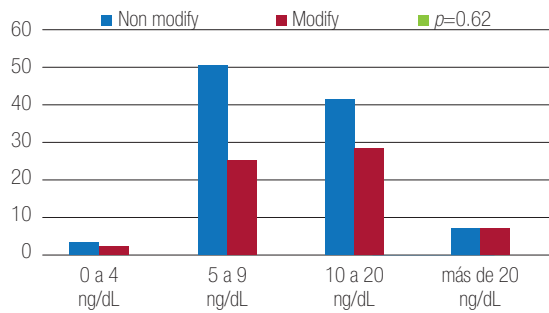


Image 1. Gleason score and relation to PIN.

The variables analyzed were a) PSA, separated into the four categories of 0 - 4, 5 - 9, 10 - 20, and above 20 ng/mL; b) the presence of PIN in biopsy samples, c) tumor percentage reported in biopsy core above or below 50%, d) number of positive samples, considered as above or below 50% of total biopsy samples. Finally, definitive surgical specimen volume with a value above or below 60 g was analyzed. An open, retrospective cross-sectional study was carried out and analyzed with descriptive statistics, measures of central tendency and dispersion, chi-square test, and Cox multivariate analysis. Statistical significance was considered when $P < 0.05$.

Statistical calculations were carried out using Windows *Stata/SE* Ver. 9.1 software (Stata Corp LP).

RESULTS

Mean age was 64 years (48-79 year range). Mean PSA was 13 ng/dL (1.4 -100 ng/dL range). The most frequent Gleason score in the surgical specimen was 6 (51.9%). There was no Gleason score modification in 101 patients (61.9%) and it was upgraded in 62 patients (38.1%) (Table 1). No significant relation was found between PSA levels and Gleason score upgrade. The majority of patients were in the groups presenting with PSA values from 5 ng/mL to 20 ng/mL (144 patients). The presence of PIN in biopsies was found to have a relation to Gleason score upgrade. Up to 60% of patients with Gleason score upgrade presented with PIN (Image 1). No statistically significant relation was found between number of positive prostate biopsy samples and Gleason score upgrade in surgical specimen ($P = 0.025$). When Gleason score upgrade was analyzed with respect to number of positive samples, original Gleason score was modified in 59% of patients with more than 50% positive samples

Table 1. Gleason score modification.

PIN	Without PIN	PIN
Not modified	89 (88.1%)	12 (11.9%)
Modified	25(40%)	37 (60%)
$p= 0.000$	114 (100%)	50 (100%)

($P = 0.00$) (Image 2). With regard to prostate volume, Gleason score was found to be upgraded in 68.8% of patients with prostates under 60 g ($P = 0.00$) (Image 3).

No statistically significant results influencing Gleason score upgrade were found in the abovementioned variables when multivariate Cox analysis was carried out.

DISCUSSION

Gleason score is one of the most important prognosis factors in CaP patients. A correlation between biopsy and surgical specimen in 28-58% of cases is reported in the literature. This increase in the definitive surgical specimen in relation to biopsy has been reported to be from 27-40%.^{1,3} In the present analysis, there was a Gleason score upgrade in 38% of patients. Kojima reported that up to 47% of patients with PSA above 10 ng/mL tended to have a Gleason score upgrade as did 32% of patients with PSA from 4-10 ng/mL.⁵ No statistically significant relation between PSA and Gleason score upgrade was found in the present study. In some studies, a relation between PIN in biopsy and Gleason score upgrade in radical prostatectomy surgical specimen has been shown.^{2,6} The present study was able to demonstrate a significant relation between PIN in biopsy and Gleason score upgrade. Stav, Mortensen and Osorio demonstrated, in different studies, that the number of positive samples as well as tumor percentage in those samples, were directly related to increase in surgical specimen Gleason score.^{7,8,10-12} In the present analysis there was significant increase in Gleason score in patients with more than 50% positive samples, without being able to obtain a statistically significant result in positive core percentage. Similarly, and in correlation with that reported by Turley, there was significant Gleason score upgrade in patients with prostate volumes under 60 g.⁴

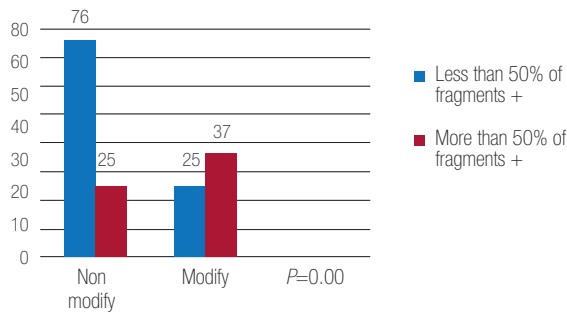


Image 2. Gleason score and relation to number of biopsies.

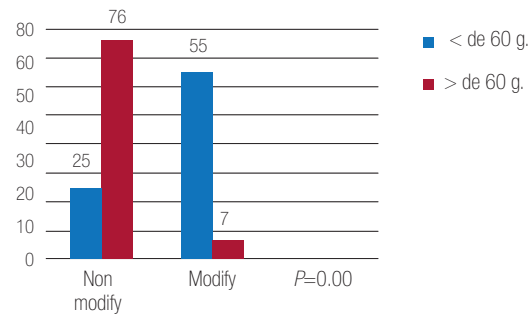


Image 3. Prostate volume and relation to Gleason score.

CONCLUSIONS

The presence of PIN, prostate volume under 60 g, and patients with more than 50% positive prostate biopsy samples, are factors that can influence Gleason score upgrade in definitive histopathological result of radical prostatectomy. These factors should be taken into account as indicators of Gleason score upgrade in surgical specimen.

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