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ORIGINAL ARTICLE

Gleason sum upgrading between biopsy and radical prostatectomy in Chinese population: Updated nomograms☆

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KEYWORDS
Biopsy;
Gleason score;
Nomogram;
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Abstract

Introduction: To assess the risk factors of Gleason sum upgrading between biopsy and radical prostatectomy (RP) and update the nomogram for the prediction of Gleason sum upgrading.

Methods: The study cohort consisted of 237 Chinese prostate adenocarcinoma patients who underwent 10-core prostate biopsy and subsequently received RP in Huashan Hospital from February 2011 to May 2015. The main outcome of our study was Gleason sum upgrading between biopsy and RP pathology. Univariate and multivariate logistic regression models were conducted to explore the potential predictors, and ultimately to build the nomograms. The prediction model was further evaluated for its ability to predict significant upgrading in patients with biopsy Gleason sum < 8.

Results: In the main cohort of all the patients, Gleason sum upgrading was observed in 62 (26.16%) patients. The pre-operative prostate-specific antigen (PSA) level, biopsy Gleason sum, and digital rectal examination were used in building the nomogram, which was validated internally with a bootstrap-corrected concordance index of 0.787. In the sub-cohort of 115 patients with standardized biopsy details, Gleason sum upgrading was observed in 31 (26.96%) patients. The pre-operative PSA level, biopsy Gleason sum, and number of positive cores were used in the nomogram, which was also validated internally with a bootstrap-corrected concordance index of 0.833. These two nomograms both demonstrated satisfactory statistical performance for predicting significant upgrading.

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Conclusions: Updated nomograms to predict Gleason sum upgrading in Chinese population between biopsy and RP were developed, demonstrating good statistical performance upon internal validation.

PALABRAS CLAVE
Biopsia;
Puntuación de Gleason;
Nomograma;
Adenocarcinoma de próstata;
Prostatectomía radical

Infragradación de la biopsia de próstata respecto a la pieza de prostatectomía la población China: nomogramas actualizados

Resumen
Introducción: Evaluar los factores de riesgo de la supragraduación de la suma de Gleason en la prostatectomía radical (PR) y actualizar el nomograma para la predicción de la infragraduación de la biopsia respecto a la pieza de prostatectomía radical.
Métodos: La cohorte del estudio consistió en 237 pacientes chinos con adenocarcinoma de próstata que fueron sometidos a biopsia de próstata de 10 cilindros y posteriormente fueron sometidos PR en el Hospital Huashan, entre febrero de 2011 y mayo de 2015. El principal objetivo de nuestro estudio fue el estudio de la supragraduación de la suma de Gleason respecto a la biopsia en la muestra de PR. Se realizaron modelos de regresión logística univariante y multivariante para explorar los potenciales factores predictivos, y en última instancia para construir los nomogramas. El modelo de predicción se evaluó por su capacidad para predecir la supragraduación significativa en pacientes con suma de Gleason de biopsia < 8.
Resultados: En la cohorte principal se observó supragraduación de la suma de Gleason en 62 (26,16%) pacientes. El nivel de antígeno específico de próstata (PSA) preoperatorio, la suma de Gleason de biopsia y el tacto rectal se utilizaron en la construcción del nomograma, que fue validado internamente con un índice de concordancia corregido por bootstrap de 0,787. En la subcohorte de 115 pacientes con datos estandarizados de biopsia se observó supragraduación en 31 (26,96%) pacientes. El nivel preoperatorio de PSA, suma de Gleason de biopsia y el número de cilindros positivos se utilizaron en el nomograma, que también fue validado internamente con un índice de concordancia de corregido por bootstrap de 0,833. Estos 2 nomogramas demostraron un rendimiento estadístico satisfactorio para predecir supragraduación significativa.
Conclusiones: Se desarrollaron nomogramas actualizados para predecir la supragraduación de la suma de Gleason de la biopsia respecto a la PR, que demostraron un buen rendimiento estadístico tras la validación interna.

Introduction

Prostate adenocarcinoma is the most common prostate cancer. In clinical practice, prostate adenocarcinoma is graded by the Gleason system, which was developed in 1966 by Dr Donald Gleasonm,[1] a pathologist from Minneapolis, USA. Using low-power microscopy, prostate adenocarcinoma is graded from 1 to 5 according to its gland-forming differentiation. Both specimens from prostate biopsy and radical prostatectomy (RP) will be graded with a certain Gleason score (GS).

However, previous researches indicated that there existed the possibility of mismatch of GS after RP compared with biopsy.[2,3] Approximately one third of patients would have a diagnosis of more aggressive prostate adenocarcinoma with a higher GS at RP than was diagnosed at biopsy.[4–6] In clinical practice, GS is one of the most important parameters for consideration when urologists offer the suitable treatment choices to the patient. The change of GS after RP, especially upgrading of GS, might alter the treatment option, since some surgical interventions would have been avoided if patients were diagnosed with high-risk prostate adenocarcinoma at biopsy.

In order to avoid overtreatment caused by Gleason sum (sumGS) upgrading between RP and biopsy, several models have been developed to predict the probability of sumGS upgrading in European or American patients in the last decade.[5,6] These models were designed to reduce unnecessary surgeries and make more economic-effective treatment decisions. PSA screening is widely practiced in western countries, and the mean PSA value of these studies was mostly less than 10 ng/mL. However, PSA screening is not as widely carried out in China as in western countries, which leads to the fact that quite a few patients have a relatively higher PSA value at diagnosis.

Last year, Wang et al. carried out the first study aiming to build a nomogram for the prediction of SumGS upgrading in prostate adenocarcinoma in the Chinese population.[4] Patients included in that study were admitted due to clinical symptoms such as urinary frequency, urgency, dysuria, and hematuria from 2006 to 2011. However, since PSA screening is becoming popular and widely accepted in China, more and more patients referred to the hospital for further examination due to elevated PSA value. We would like to build a new nomogram based on the database of the last five years in our center.