

Prognostic Factor of Prostate Adenocarcinoma before and after Radical Prostatectomy at a University Hospital

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Abstract: Introduction: Gleason score is a prognostic factor that assists in the determination of treatment for prostate cancer. The aim of the present study was to investigate the prognostic factor of prostate adenocarcinoma related to the Gleason score before (biopsy) and after radical prostatectomy (RP). Methods: A total of 206 patients with localized prostate adenocarcinoma submitted to RP between 2001 and 2008 at a university hospital were analyzed. Results: The predominant total Gleason score was 6 after biopsy and 7 following RP. The 3+3 pattern after biopsy and 3+4 pattern after RP. Biochemical recurrence was found following RP in 34.9% of cases. In 49% of cases, the Gleason score was lower after biopsy than after RP ($p < 0.0005$). Considering the group with biochemical recurrence, disagreement was found between the Gleason scores after biopsy and post-radical prostatectomy among 68% of the patients and the Gleason score was lower after biopsy than after post-radical prostatectomy in 18.4% ($p = 0.62$). Conclusions: The correlation between the Gleason score during prostate biopsy and the score of the specimen submitted to anatomopatological analysis following RP was an important prognostic factor of prostate adenocarcinoma before and after RP and should be considered when choosing the treatment approach.

Keywords: adenocarcinoma, prostatic neoplasms, prognosis, prostatectomy

Introduction

Prostate adenocarcinoma is the second most frequent malignant tumor in men. It is considered cancer of senior citizens, as three quarters of cases occur at the age of 65 years or older. In Brazil, the increase in the incidence of prostate adenocarcinoma, with an estimated 52,350 new cases in 2010, may be partially explained by advancements in diagnostic methods and improvements in the quality of information systems (Brasil, 2010).

The natural progression of prostate adenocarcinoma exhibits clinical variability, running the gamut from an indolent, silent illness to a rapid, aggressive disease with metastasis to the lymphatic system and bones and a mean survival rate of 24 to 36 months after the detection of bone invasion. This disease accounted for an estimated 27,000 cases of death in 2010 in the United States (Otis, 2009).

With early detection exams, a reduction has occurred in the mortality rate due to prostate adenocarcinoma. The standard digital prostate exam and the determination of the serum prostate-specific antigen (PSA) enable the detection of the disease in the early phase, thereby allowing the patients the opportunity to undergo curative treatment. When these exams show an abnormality, a transrectal biopsy of the prostate is needed to confirm the occurrence of cancer, determine its histological type and classify cell differentiation using the Gleason grading system (Wolf, 2010).

The Gleason score is an important preoperative prognostic tool that assists in the determination of the treatment for prostate adenocarcinoma. The combination of this score, preoperative PSA and the digital exam is considered a predictive preoperative factor for determining tumor staging. A correlation has been found between the prostate biopsy score and

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specimens submitted to anatomopathological analysis following radical prostatectomy (Humphrey, 2004) However, studies in the literature have demonstrated discrepancies between the Gleason score after biopsy and the anatomopathological findings of tissue from radical prostatectomy (Altay, 2001; Gregori, 2001; Prost,2001) The under-classification of the Gleason score during prostate biopsies, especially in well-differentiated tumors, requires further study, as it can influence the form of treatment, resulting in unnecessary short-term and long-term complications.

The aim of the present study was to investigate the prognostic factor of prostate adenocarcinoma before and after radical prostatectomy at a university hospital considering the Gleason score of the prostate biopsy and anatomopathological analysis of tissue following radical prostatectomy.

Methods

A total of 206 patients with prostate adenocarcinoma submitted to prostatectomy at a university between 2001 and 2008 were analyzed retrospectively. This study received approval from the local institutional review board.

The diagnosis was performed through a transrectal biopsy for the determination of histological type and classification using the Gleason Grading System. The patients were first submitted to computed tomography (CT) of the abdomen and bone scintigraphy for confirmation of the localized disease.

Specimens from radical prostatectomy were analyzed at the Pathology Sector of the university for the determination of the histological pattern, Gleason classification and staging using the tumor-nodule-metastasis (TNM) system for prostate cancer (Ohori, 2004).

The following data were collected from the patient charts: date of diagnosis, age, abnormal prostate exam, preoperative PSA, Gleason score of prostate biopsy, staging determined by CT and bone scintigraphy, surgical treatment period, Gleason score of the anatomopathological specimen from radical prostatectomy, TNM staging and biochemical follow up (PSA).

The data were analyzed through descriptive statistics and *mu* tests for the calculation of mean, the Sign test for the median, the Student's t-test and the calculation of Spearman's correlation coefficients. For the evaluation of the level of agreement between Gleason scores after biopsy and after radical prostatectomy, the Kappa (*k*) coefficient was used following the criteria proposed by Landis and Koch: $k \leq 0$ = inadequate; 0.00 to 0.20 = very weak agreement; 0.21 to 0.40 = weak agreement; 0.41 to 0.60 = moderate agreement; 0.61 to 0.80 = substantial

agreement; and 0.81 to 1.00 = excellent agreement.

Results

Mean patient age was 66 ± 5.66 years and median serum PSA at the time of diagnosis was 8.4 mg/dL. The digital prostate exam was abnormal in 30.1% of patients. Staging exams (bone scintigraphy and CT) confirmed the absence of metastasis in all patients.

The predominant median total Gleason score was 6 after biopsy and 7 following radical prostatectomy. The 3+3 pattern after biopsy and 3+4 pattern following radical prostatectomy corresponded to 30.1% and 26.2% of cases, respectively (Table 1). Biochemical recurrence was found following radical prostatectomy in 34.9% of cases. Mean time during follow up after radical prostatectomy for the detection of recurrence was 14.34 months.

In 70.3% of cases, disagreement was found between biopsy and post-radical prostatectomy; in 49% of cases, the Gleason score was significantly lower after biopsy than after radical prostatectomy ($p < 0.0005$). Considering the group with biochemical recurrence, disagreement was found between the Gleason scores after biopsy and post-radical prostatectomy among 68% of the patients and the Gleason score was lower after biopsy than post-radical prostatectomy in 18.4%, but this difference did not achieve statistical significance ($p = 0.62$) (Table 2).

Based on the criteria proposed by Landis and Koch, weak agreement was found between the total Gleason score after biopsy and following radical prostatectomy ($k = 0.142$) (Landis, 1977). The *mu* test revealed that the mean total Gleason score after biopsy was significantly lower than the mean score following radical prostatectomy ($p < 0.0005$). There was no evidence of a correlation between the difference in total Gleason scores after biopsy/radical prostatectomy and biochemical recurrence ($p = 0.132$). Spearman's correlation coefficients demonstrated no evidence of a correlation between the difference in the Gleason score after biopsy/radical prostatectomy and age group ($p = 0.153$) or total PSA level ($p = 0.699$).

Discussion

The Gleason Grading System is an important method for determining the prognostic factor and assisting in the treatment of prostate adenocarcinoma. The Gleason score combined with the determination of serum PSA and the findings of the standard digital prostate exam can predict the tumor stage and the occurrence of lymph node metastasis (Landis,1977). However, studies have shown discrepancies between biopsy score and score of tissue specimens submitted to anatomopathological analysis following radical prostatectomy (Altay, 2001; Gregori, 2001; Prost,2001). The under-estimation of the Gleason

score after a biopsy is a common occurrence in patients with prostate adenocarcinoma, with rates reported in the literature ranging from 32.4 to 46.6% (Tavangar, 2004; Montesino,2004).

In the present study, a high level of disagreement was found between the scores after biopsy and radical prostatectomy (70.3% cases), with the predominance of a lower Gleason score after biopsy than radical prostatectomy (49.0% cases). Nonetheless, no significant correlation was found between the difference in the total Gleason score after biopsy/radical prostatectomy and age or total PSA level. This disagreement can have substantial clinical meaning in prediction the oncologic result (Montesino, 2004) and caution should be exercised when choosing the course of treatment.

The literature reports biochemical recurrence rates ranging from 27 to 53% (Fukagai,2001; Serkin,2010; Swanson,2011). In the present study, the recurrence rate was 34.9%, which is compatible with the aforementioned range, and disagreement between the total Gleason score after biopsy and radical prostatectomy was found in 68% of these patients. However, no significant correlation was found between the difference in score after biopsy/radical prostatectomy and biochemical recurrence.

Conclusions

The present findings demonstrate that the correlation between the Gleason score during prostate biopsy and the anatomopatological analysis of specimens taken after radical prostatectomy was an important prognostic factor of prostate adenocarcinoma before and after radical prostatectomy at a university hospital and should be considered when choosing the treatment approach.

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Table 1 – Demographic, laboratory and pathological data on patients studied

Data	Mean	SD	Median	Min	Max
Age	66.2	5.6	67	48	85
PSA	11.75	11.2	8.4	1.0	89
Gleason at biopsy	6.2	1.1	6	3	9
Postoperative Gleason	6.8	1.0	7	3	9

SD = standard deviation; Min = minimum; Max maximum

Table 2 – Comparison of biochemical recurrence and agreement between Gleason scores at biopsy and after radical prostatectomy

Biochemical recurrence	Absent	Present	Total
Biopsy/radical prostatectomy disagreement	96 (66.2)	49 (33.8)	145
Biopsy/radical prostatectomy agreement	38 (62.3)	23 (34.7)	61

p = 0.62; data in parenthesis correspond to percentages