



Prostate-specific antigen percentage: An early predictive tool after iodine-125 interstitial brachytherapy for prostate cancer

Mauro Paoluzzi^{1,*}, Andrea Losa², Valentina Cerboneschi³, Caterina Colosimo³, Nicola Fontana¹, Paola Mangili⁴, Marcello Mignogna³, Luciano Nava², Valentina Ravaglia⁵

¹Operative Unit of Urology, Department of Surgery, San Luca Hospital, Lucca, Italy

²Operative Unit of Radiotherapy, Department of Oncology, San Luca Hospital, Lucca, Italy

³Operative Unit of Urology, Department of Surgery, San Raffaele Turro Hospital, Milan, Italy

⁴Operative Unit of Medical Physics, Department of Oncology, San Raffaele Turro Hospital, Milan, Italy

⁵Operative Unit of Medical Physics, Department of Oncology, San Luca Hospital, Lucca, Italy

ABSTRACT

BACKGROUND: After interstitial prostate iodine-125 brachytherapy (BT), prostate-specific antigen (PSA) evolution in time could predict overall biochemical relapse, but, considering the single patient, it is influenced by the presentation PSA amount and by the prostatic volume. It is also challenging to differentiate a PSA bounce from a biochemical relapse.

PURPOSE: To determine the usefulness of PSA percentage (PP) defined as the rate between PSA presented by a patient at time “t” and the PSA that the same patient had presented at the time of diagnosis (t₀) assumed as 100% in predicting biochemical relapse and in differentiating them from PSA Bounces.

METHODS AND MATERIALS: We included 721 patients from Milan S. Raffaele Turro (399) and Lucca Campo di Marte (then S. Luca) Hospital (322). The mean age of patients was 66.5 years (range, 50–79). Mean followup was 150 months (range, 24–180). For each patient, PSA was recorded before and after iodine-125 BT, and PPs were calculated. Cox regression model, relative operating characteristic curves, and Kaplan–Meier regression model were elaborated, and a cutoff of 20% was defined.

RESULTS: We observed that PP >20% is an independent variable highly associated with relapse risk ($p < 0.0001$) with a sensitivity of 79.7%, a specificity of 82%, and an hazard ratio of 12.1, since the 6 months of followup. A PSA increase above the nadir should be because of bounce (sensitivity and specificity of 81.4%, $p < 0.0001$) if patient had experienced at 6 months a PP <20%.

CONCLUSIONS: PP might represent an early and useful tool, predictive of clinical outcome in patients after BT for prostate cancer. © 2017 American Brachytherapy Society. Published by Elsevier Inc. All rights reserved.

Keywords:

Prostate cancer; Interstitial brachytherapy; Biochemical failure; PSA percentage; PSA bounces

Introduction

The clinical management of patients previously submitted to interstitial prostate iodine-125 (¹²⁵I) brachytherapy (BT) for clinically localized prostate cancer is challenging, especially within the first 2 years after the implant: in fact the behavior of the only individual predictive biochemical marker available (prostate-specific antigen [PSA]) has to be interpreted

kinetically, and its dynamic variations could be complicated by bounces in a not negligible percentage of cases (1–3).

PSA percentage (PP) could be defined as the rate between PSA presented by a patient at time “t” and the PSA that the same patient had presented at the time of diagnosis (t₀) assumed as 100%.

This was defined by our group in the attempt to find a clinical parameter to followup the patients treated in our center, considering that, although a PSA decreasing is expected, it is impossible to define a specific threshold value, as happens after surgery, that could evidence a sure biochemical relapse, and that also rebiopsy in suspected cases is almost useless in this hot period as early pathologic interpretation of the specimens is affected by poor sensitivity and specificity (4–6).

Received 11 February 2017; received in revised form 9 May 2017; accepted 12 May 2017.

* Corresponding author. Operative Unit of Urology, Department of Surgery, San Luca Hospital, V.le G. Lippi Francesconi, Lucca 55100, Italy. Tel.: +39-3478620445; fax: +39-05839701.

E-mail address: mauro.paoluzzi@uslnordovest.toscana.it (M. Paoluzzi).

Furthermore, the quantitative definition of biochemical relapse itself has changed in time from the American Society for Radiation Oncology (ASTRO) to Phoenix criterion increasing confusion and anxiety among patients (7) and sometimes causing unnecessary second line treatments.

In 2011, the Lucca BT Team (urologist and radiotherapist) reviewed PSA modification of 253 consecutive patients who underwent BT for clinically localized prostate cancer at Campo di Marte Hospital (8).

The relative mean PSA values over a period of time were recorded and connected in specific curves: analyzing those curves, we deduced four main assessments:

1. Higher amounts of PSA modifications occurred within the first 24–36 months after treatment.
2. Patients who presented a biochemical or clinical relapse showed a PSA decrease less fast and consistent than patients who remained disease free.
3. The difference in the mean PSA curves between the two groups reached statistical meaning 6 months after treatment.
4. For each point of both curves, it was evident a wide dispersion of the individual values, which did not allow to determine a threshold amount suitable for clinical use.

The adoption of PP led to an evident reduction of the dispersion of those values and to a definition of a cutoff (20%) that showed statistical significance at the sixth month followup.

Although the results were encouraging, our work had several weak points; for example, it was a single center experience, and the group of patients with biochemical recurrence was quite small.

The present study was designed in an attempt to confirm previous findings on a wider series of patients from two clinical centers, studied with a longer followup.

Methods and materials

We considered 721 patients previously submitted to ¹²⁵I BT for clinically localized prostate cancer (322 patients were treated in Lucca at Campo di Marte then S.Luca hospital and 399 in Milan in S. Raffaele Turro hospital).

The mean age of patients was 66.5 years (range, 50–79). For each patient, we recorded clinical stage, PSA, Gleason score, International Prostate Symptoms Score, and International Index of Erectile Function (5 items) scores before treatment.

Mean followup was 150 months (range, 24–180).

Technique of implant

All treatments were performed following a single-step procedure using the Variseed program (Varian Medical System Inc., Palo Alto, CA). Initially, the seeds used were Oncura Rapid Strand (Oncura Inc., Arlington Heights, IL)

coupled with free seeds delivered with a mick device, where and if necessary. Thereafter both centers adopted a strand-assembling device, Bard Quicklink system (C. R. Bard Inc., Murray Hills, NJ). All the procedures were ultrasound guided with 7.5 MHz endorectal biplanar probe (B&K Medical, Peabody, MA).

Followup

Until 2005, CT-guided postplanning was performed at $t < 60$ days in the attempt to verify postoperative dosimetry minimizing modifications due to residual prostatic swelling or shrinking (9, 10), then we preferred to rely on intraoperative real-time dosimetry (11–14) for quality control of the treatments. Clinical visits and PSA dosage were carried out every 3 months within the first year after treatment and every 6 months thereafter.

Patient selection criteria

For the present study, we considered two groups of patients: the first, $n = 671$ patients (mean age, 67.5 years; range, 51–77) biochemically disease free (DFree), the second group $n = 50$ (mean age, 69.7 years; range, 50–79), who had presented biochemical recurrence within their followup, independently on the time of the onset of the relapse itself (BRelapse). Biochemical relapse was assessed according to the Phoenix criterion (PSA nadir + 2 ng/mL), coupled, when feasible, with a histopathological confirmation on rebiopsy.

The mean time of biochemical relapse was 32 months (range, 12–90).

Exclusion criteria

Patients, who underwent palladium BT or had received neo adjuvant or adjuvant androgen deprivation therapy, were excluded from the present study, as different radiological activity of Pd and androgen deprivation therapy assumption could influence PSA kinetic after BT.

Patients submitted to second line therapies after ASTRO biochemical recurrence were excluded as well.

Statistical analysis

PSA amount and PP curves, as far as their coefficients of variation (CVs), were calculated, and their statistical meanings were analyzed.

Relative operating characteristic curves were calculated to identify the PP cutoff value with the best prognostic power (cutoff = 20%).

A multivariate survival analysis (Cox regression model) was performed, to assess PP 20%-related risk of relapse (anytime and at 6 months), then we plotted Kaplan–Meier disease-free survival curve with the log-rank test. Statistical meaning of the results was also controlled after patients' stratification for age, pretreatment PSA, and prostate

Download English Version:

<https://daneshyari.com/en/article/5696972>

Download Persian Version:

<https://daneshyari.com/article/5696972>

[Daneshyari.com](https://daneshyari.com)