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Prostate Cancer

Needle Core Length is a Quality Indicator of Systematic Transperineal Prostate Biopsy

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Abstract

Objective: To analyse the length of needle cores sampled as a quality indicator in systematic transperineal prostate biopsy. We assessed the correlation of core length with the other clinical and topographic parameters.

Material and methods: We prospectively evaluated data from 509 consecutive patients who underwent a first set of transrectal ultrasound-guided transperineal prostate biopsy for suspected prostate cancer. Fourteen cores were sampled from each patient. Needle cores were stretched and placed in tissue cassettes between two nylon meshes according to the pre-embedding methods of prostate needle biopsy specimens. For single biopsy core, the measurement of length (in millimetres) and any percentage of cancer in the biopsy specimen were reported.

Results: The mean length of 7,126 analysed cores was 14.14 ± 4.35 mm. All cores were longer than 10 mm. The mean length of needle cores sampled did not correlate with patient age, total prostate-specific antigen value, digital rectal examination, and prostate volume. The whole mean length of the six samples from the peripheral zone of the right lobe was higher than the mean corresponding value of the six samples from the left lobe peripheral zone ($p < 0.001$). The transperineal approach allows a greater sampling of the prostate apex than of the midgland and prostate base ($p < 0.001$).

Conclusions: The length of the needle cores sampled during transperineal prostate biopsy fulfils the parameters of quality required by pathologists for an appropriate evaluation of the biopsy specimen.

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1. Introduction

The length of cores sampled during prostate biopsy is a parameter that can affect prostate cancer detection rate [1,2]. The biopsies provided by the urologists should be of adequate length and quality. A core length >10 mm is usually considered a quality indicator of prostate needle biopsies [2,3]. Shorter than this, the biopsies should be considered inadequate for a correct histological evaluation and not diagnostic [3]. The core length depends on bioptic needle characteristics and may be influenced by the site of specimens sampled and the method of needle core pre-embedding [1,4–6].

Data concerning biopsy core length come from studies that exclusively analyse patients who have undergone transrectal prostate biopsy. Studies that assess the quality of cores sampled during transperineal prostate biopsy are not available in the literature. This lack is understandable considering the limited spread of this latter bioptic technique in the United States and Europe [7].

The transperineal access of the bioptic needle along the prostate longitudinal axis could allow a more effective and selective sampling of the prostate peripheral zone than with the transrectal approach [8,9]. A further advantage of the transperineal approach could be an easier sampling of the anterior zone, which could be particularly useful in the re-biopsy planning [10].

In the present study, we analysed the length of needle cores sampled during transperineal prostate biopsy to verify their responsiveness to quality criteria. We also assessed the correlations between core length and the other clinical and topographic parameters.

2. Materials and methods

From October 2002 to October 2004, we prospectively evaluated data from 509 consecutive patients with suspected prostate cancer who had undergone a first set of transrectal ultrasound (TRUS)-guided transperineal prostate biopsy in our department. All patients provided written consent to perform the procedure and to the use of the clinical and pathological data for clinical field research. International review board approval was not required.

For each patient the following clinical variables were evaluated: age, digital rectal examination, total prostate-specific antigen value, and prostate volumes estimated by TRUS (with the ellipse method: length × depth × width × $\pi/6$). The biopsy was conducted on patients placed in the lithotomy position with a single transperineal access 1.5 cm above the anal sphincter on the median line. In all cases an anaesthetic block of the periprostatic plexus was performed by administering 2 mL of 1% mepivacaine at the prostate apex. A 17-gauge coaxial needle (TruGuide Bard, 13 cm long) was inserted up to the prostate apex through the anesthetised perineal path under TRUS guidance (Siemens Sonoline Omnia Diagnostic Ultrasound System, with a 7.75-MHz linear probe). On the removal of the blunt tip stylet, the guiding cannula of the coaxial needle was used as transperineal metallic path for repeated atraumatic passage of the biopsy needle (Tru-Cut 18 G, cutting length of 23 mm) [11].

Fourteen cores were sampled in every patient: double sextant biopsy from the peripheral zone and two cores from the transitional zone (Fig. 1). Needle cores were stretched and placed in tissue cassettes between two nylon meshes according to the pre-embedding methods of prostate needle biopsy specimens described by Rogatsch et al. [5]. Each sampled core was numbered and identified by site and prostate lobe. The core biopsies were distributed in couples on labelled tissue cassettes. Afterwards the tissue cassettes were submitted in containers filled with 10% buffered formalin. After fixation and dehydration, all tissue cores were embedded in paraffin blocks and then sectioned by histotechnologists. The histologic diagnoses were performed by two expert uropathologists (Guido Martignoni and Maurizio Pea). For a single biopsy core, the length in millimetres and any percentage of cancer in the biopsy specimen were measured. The percentage of cores' fragmentation and the rate of cores without prostatic tissue were reported. The tumour grade differentiation was assigned with the Gleason grading and scoring system.

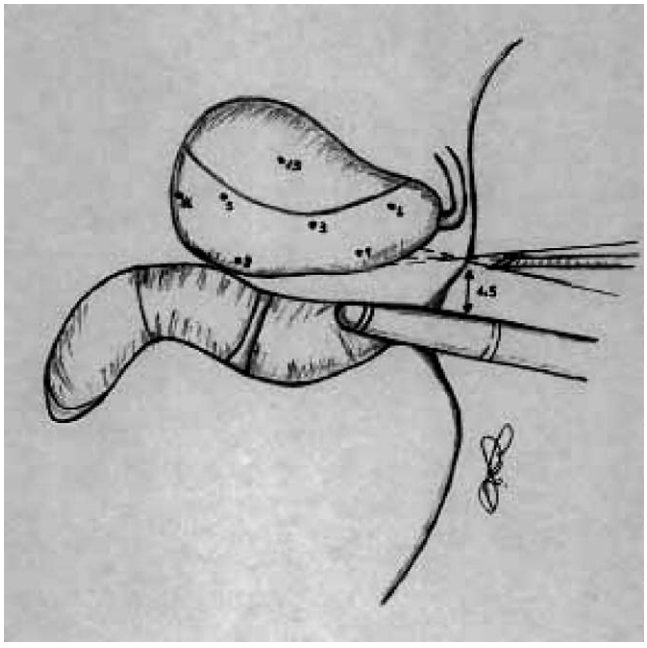

Fig. 1 – site of core sampling at the right prostate's lobe. Cores 1, 3, and 5 correspond to the traditional sextant biopsy protocol. Cores 7, 9, and 11 refer to the additional, peripheral, lateral sextant. Core 13 comes from the transitional zone. The coaxial needle, which allows the atraumatic passage of biopsy needle, is inserted 1.5 cm above the anal sphincter on the median line under local anaesthesia.