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Original Research Article

Prostate cancer topography

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ARTICLE INFO

Article history:
Received 30 March 2014
Received in revised form
29 September 2014
Accepted 17 March 2015
Available online 19 April 2015

Keywords:
Prostate biopsy
Prostate cancer topography

ABSTRACT

Introduction: Prostate cancer is becoming a challenge for modern medicine. It is the second leading cause of cancer-related morbidity and mortality in men, second only to lung cancer. In 2012, 417 000 new cases were registered and 92 000 deaths were reported in Europe. Early detection of prostate cancer allows for complete recovery. Basic diagnostic procedures involve digital rectal examination (DRE), assessment of the serum total prostate specific antigen (PSA) level and transrectal ultrasound (TRUS). Abnormalities detected in these examinations necessitate prostate biopsy.

Aim: To evaluate prostate cancer topography based on biopsy.

Material and methods: Spatial distribution of cancer foci in the prostate was analyzed retrospectively in 246 male patients who had undergone TRUS-guided prostate biopsy. The median age of the study population was 69.7 years. The PSA levels ranged from 0.59 ng/mL to 676.6 ng/mL and the average level was 34.3 ng/mL. During the peribiopsy period, 750 mg of ciprofloxacin was introduced to prevent inflammation, and 100 mg of diclofenac was applied per rectum an hour prior to the procedure to reduce pain.

Results and discussion: In all 246 patients, tissue core samples were obtained from the prostate, sufficient for histopathological assessment and cancer diagnosis.

Conclusions: TRUS-guided prostate biopsy is an effective method for detecting and locating prostate cancer. Tissue core samples obtained during prostate biopsy serve as sufficient diagnostic material for a histopathologist. In our study population, cancer was located most frequently in the middle part of the prostate gland.

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http://dx.doi.org/10.1016/j.poamed.2015.03.011

1. Introduction

Prostate cancer is becoming a challenge for modern medicine. It is the second leading cause of cancer-related morbidity and mortality in men, second only to lung cancer. In 2012, 417 000 new cases were registered and 92 000 deaths were reported in Europe.[1] Early detection of prostate cancer allows for complete recovery. Basic diagnostic procedures involve digital rectal examination (DRE), assessment of the serum total prostate specific antigen (PSA) level and transrectal ultrasound (TRUS). Abnormalities detected in these examinations necessitate prostate biopsy. It is recommended to perform TRUS-guided prostate biopsy. Transperineal prostate biopsy is also acceptable. Transperineal biopsy is the only procedure available following rectal amputation. The efficacy of transrectal and transperineal access in detecting prostate cancer is comparable.[2] The standard, recommended procedure involves obtaining 8 biopsy samples. Additional biopsy samples are taken from suspicious lesions detected in TRUS. Saturation biopsy is a specific type of prostate biopsy, during which more than 20 samples are taken from the prostate. This procedure is recommended when prostate cancer is suspected, but is not confirmed by standard biopsy. However, TRUS-guided prostate biopsy performed in the apex, middle part and base of the prostate remains a standard procedure.[3] The obtained samples are placed in separate containers with 4% formaldehyde and sent for histopathological assessment.

The core length is significant for detecting cancer. The longer the core, the larger the percentage of correct diagnosis.[4] Recently, unsatisfactory efficiency of US-guided biopsy in detecting prostate cancer has been discussed. It is believed that small foci are undetectable in US examination. Some authors claim that diagnosing prostate cancer based on biopsy results is a work of chance. Consequently, it is believed that many cancer cases remain undetected despite the fact that the larger number of biopsy core samples taken from the prostate increases the rates of cancer detection.[5] The latest achievement in prostate biopsy is the use of magnetic resonance imaging (MRI). This method upgrades the detectability of prostate cancer with a smaller number of samples taken. When applying this method, samples are taken only from those areas that seem suspicious in MRI. However, TRUS-guided prostate biopsy still remains a standard procedure for detecting prostate cancer.[6,7]

2. Aim

Assessing the spatial distribution of cancer foci in particular parts of the prostate can be important for planning a biopsy, when DRE and TRUS results are not diagnostic and the PSA level is suggestive of cancer. Our study aimed at examining cancer foci topography in the prostate.

3. Material and methods

Spatial distribution of cancer foci in the prostate, confirmed histopathologically, was analyzed retrospectively in 246 male patients who had undergone TRUS-guided prostate biopsy. The median age of the study population was 69.7 years. The PSA levels ranged from 0.59 ng/mL to 676.6 ng/mL and the average level was 34.3 ng/mL. Suspicious lesions in the prostate were detected in 157 patients during rectal examination, and in 89 cases the lesions did not suggest cancer. TRUS revealed cancer-like lesions in 158 patients, in 28 patients the lesions were determined as non-diagnostic, and in 60 cases prostate cancer was not suspected based on TRUS. The obtained biopsy core samples from the prostate were placed in separate containers with 4% formaldehyde.

During the peribiopsy period, 750 mg of ciprofloxacin was introduced to prevent inflammation,[8] and 100 mg of diclofenac was applied per rectum an hour prior to the procedure to reduce pain.

4. Results and discussion

Prostate cancer was diagnosed in 246 patients based on 626 biopsy samples. The locations of cancer foci in the gland were as follows: in the left lobe: base – 108, middle part – 123, apex – 96 foci; in the right lobe: base – 98, middle part– 114, apex – 87 foci. There were 28 biopsy samples with cancer foci more in the left lobe than in the right one. The most frequent location of cancer foci was the middle part of the prostate. Because of cancer multifocality in the majority of cases, the observed slight predominance in the middle part does not suggest a specific predisposition for cancer location in any particular part of the prostate. In their studies, other authors also reported cancer multifocality, but with a different distribution of the most frequent focal locations. In the study by Gołąb et al.,[9] saturation biopsy revealed the most frequent cancer locations placed circumferentially and near the prostate apex (34% of positive biopsy samples), less frequently near the base and in the middle part (22% of positive biopsy samples). A similar spatial distribution of cancer, accounting for the percentage of positive samples, was observed in repeat saturation biopsy.[9] Djavan et al.[3] in their analysis of biopsy results of 1 051 patients with PSA total levels between 4 ng/mL and 10 ng/mL detected cancer based on initial biopsy in 22% of cases, and in 10% in repeat biopsy, with a higher rate of apico-dorsal location of cancer foci. Takahashi et al.[10] in his comparative study of prostate cancer grade, stage, and location in patients from the United States and Japan detected a significantly higher rate of transition zone (TZ) locations in Japanese men. He recommends TZ biopsy as a standard procedure for Japanese males. In the last period there prevails tendency to limit the number of biopsy punctures in favor of targeted biopsy sites identified on the basis of multi parametrical MRI. This approach is designed to reduce the number of unnecessary biopsies and reduce the rate of complications.[11] Our work demonstrated that prostate cancer is a cancer of a multifocal. Arrangement of the lesions in the prostate here is no particular predilection for places. Cancer multifocality indicates therapeutic procedures. The best treatment results are obtained with radical prostatectomy or radiotherapy. Focal treatment should be applied for well-documented single cancer foci.

5. Conclusions

1. TRUS-guided prostate biopsy is an effective method for detecting cancer.
2. Tissue core samples obtained during prostate biopsy serve as sufficient diagnostic material for a histopathologist.
3. In our study population, cancer was most frequently located in the middle part of the prostate.

Conflict of interest

None declared.

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