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Oncology: Prostate/Testis/Penis/Urethra

Core Length in Prostate Biopsy: Size Matters

Can Öbek^a  , Tüncüt Doğanca^a, Sinan Erdal^{a,b}, Sarper Erdoğan^{a,b}, Haydar Durak^c

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Purpose

The diagnostic yield of prostate biopsy is limited. Increasing the number of cores enhances the cancer detection rate by sampling additional sites and obtaining more tissue. An alternative way to inspect more tissue would be to obtain longer cores. However, the impact of biopsy core length on cancer detection rate is an undervalued topic. We assessed the role of biopsy core length in prostate biopsy and determined the minimal tissue length to serve as quality assurance.

Materials and Methods

We retrospectively analyzed the records of 331 patients who underwent transrectal ultrasound guided initial prostate biopsy with 12 to 18 cores. The biopsy procedure and pathological evaluation were standardized. Core length was compared in patients with vs without cancer. Statistical analysis was done to determine a minimally acceptable cutoff for biopsy length.

Results

We analyzed data on 245 patients. The overall cancer detection rate was 30.2%. Mean core length in patients with vs without cancer was 12.3 ± 2.6 vs 11.4 ± 2.4 mm ($p = 0.015$). Thus, core length was significantly longer in patients with cancer. Core length greater than 11.9 mm was associated with an increased prostate cancer detection rate (OR 2.57, 95% 1.46–4.52). The cancer detection rate for cores less vs greater than 11.9 mm was 23% vs 39%.

Conclusions

Needle core length is an important morphometric parameter of transrectal prostate biopsy that directly influences the cancer detection rate. Results suggest a core length of greater than 11.9 mm as a cutoff for quality assurance.

Section snippets

Materials and Methods

We retrospectively evaluated the prospectively maintained a database on 331 consecutive patients who underwent transrectal ultrasound guided transrectal prostate biopsy between March 2008 and September 2010. Biopsy was done with the patient in the lateral decubitus position with periprostatic nerve block, as previously described, or under procedural sedation and analgesia with midazolam and remifentanyl.¹⁰

The same Pro-Mag™ biopsy gun with a 25 cm 18 gauge Tru-Cut® needle was used in each case....

Results

Biopsy that sampled 12 to 18 cores was done in 255 patients. Three patients with incomplete data and 7 diagnosed with atypical small acinar proliferation were excluded from analysis. Thus, data on 245 patients were evaluated. Average age was 65.6 ± 8.4 years, average PSA was 9.5 ± 10.5 ng/ml and average prostate volume was 44.4 ± 22.5 cc. Prostate examination was abnormal in 66 men (28%), benign in 170 (72%) and unavailable in 9.

Pathological analysis revealed cancer in 74 patients and benign...

Discussion

Prostate cancer is the most common visceral cancer in males in the Western world. Thus, it remains a major health concern. The mainstay of diagnosis is histopathologically based on tissue obtained via prostate biopsy. The diagnostic yield of a single prostate biopsy set is low with reported results in the range of 25% to 45%.^{1, 2, 3, 4, 5} Efforts to increase the prognostic capability of prostate biopsy have mainly focused on increasing the number of cores, which allows for sampling more...

Conclusions

Needle core length is an important morphometric parameter of transrectal prostate biopsy that directly influences the cancer detection rate. Our results suggest a core length of greater than 11.9 mm as a cutoff value for quality assurance. Efforts should be made to obtain cores exceeding this length....

Acknowledgments

Sakine Demir, Nuray Ağdaş, Aynur Kılıçkaya, Gülnur Öztürk Ayaz and Kadir Demirbaş assisted with biopsies....

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2020, Journal of the Mechanical Behavior of Biomedical Materials

Citation Excerpt :

...Previous studies have shown that longer and less fragmented biopsy samples result in more accurate diagnosis (Ubhayakar et al., 2002). Regardless, current ECB needles are inconsistent in their performance, requiring multiple needle insertions to obtain a sufficient amount of tissue particular in the biopsy of diseased tissue, resulting in increased cost, and repeated separate biopsy procedures to obtain an accurate diagnosis (Ubhayakar et al., 2002; Iczkowski et al., 2002; Öbek et al., 2012; Pritzker and Nieminen, 2019; Hoang et al., 2018). Similar to ECB needles, there are several other needle types such as side cut needles, conical needles, helical needles, etc., where a better understanding of the needle forces acting on the needle's cutting edges has informed needle design to improve the efficiency and consistency of biopsy procedures (Moore et al., 2010; Han et al., 2012a; Giovannini et al., 2019)...

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2019, European Urology Oncology

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2016, International Journal of Mechanical Sciences

Citation Excerpt :

...For example, prostate cancer patients under the active surveillance protocol require the prostate needle biopsy every 6–12 months to monitor the progress of the cancer [1–4]. The needle biopsy tissue length greatly influences the prostate cancer detection rate [5–8]. Iczkowski et al. [5] observed an increasing trend in the probability of cancer detection with biopsy core length ranging from 1 mm to 28 mm....

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Does Core Length Taken per cc of Prostate Volume in Prostate Biopsy Affect the Diagnosis of Prostate Cancer?

2016, Clinical Genitourinary Cancer

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...We performed 12 to 16 core biopsies, depending on the prostate volume, from the peripheral zone that includes the far lateral area and the apex of the prostate. Although there are studies that have revealed that a greater core length increases the rates of prostate cancer diagnosis,^{10,11} there have also been studies suggesting that the diagnosis of prostate cancer is not affected by core length.²³ In a study by Öbek et al evaluating the results of transrectal ultrasound-guided prostate biopsies in 245 patients, it was reported that the mean core length was found to be 12.3 mm in patients with cancer and 11.4 mm in patients without cancer....

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Urologist's Impact on Needle Core Prostate Biopsy Histopathologic Variables Within a Single Institution

2016, Urology

Citation Excerpt :

...Biopsy location impacts core length as mid-gland and base cores were longer than apical cores.¹² Öbek et al performed a similar retrospective evaluation in the context of a 12-18 core scheme at a single center.¹⁴ Core fragments were excluded from analysis as well as patients diagnosed with ASAP...

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