Characteristics of Prostate Cancers Missed by the Transrectal Biopsy Approach: Analysis of Positive Core Location by Transperineal Biopsy

Introduction and Objective: Several studies have reported that transrectal biopsy schemes can miss one-third of cancers. The length of the biopsy needle notch is 17 mm; therefore, undersampling of the anterior prostate in prostates with larger volumes is probable because the biopsy needle cannot reach the anterior prostate. Cancers missed by the transrectal approach were investigated by analyzing the location of positive cores diagnosed by transperineal biopsy.
Materials and Methods: There were 391 men <75 years old who underwent 14- to 18-core transperineal biopsies. PSA values were <20.0 ng/mL. The parasagittal antero-posterior distance of the prostate (a-p length) was measured by transrectal ultrasound. Furthermore, the prostate was divided into four regions: front of the anterior prostate (FA), back of the anterior prostate (BA), front of the posterior prostate (FP), and back of the posterior prostate (BP). If the needle did not reach over the middle of the prostate (a-p length >34 mm), the FA and BA regions could not be sampled. If the needle did not reach over three quarters of the prostate (a-p length >22.7 mm), the FA region could not be sampled.
Results: Prostate cancer was diagnosed in 145 of the 391 patients (37.1%). From the analysis of a-p length and prostate volume in 150 cases, an a-p length of 34 mm corresponded to a prostate volume of 53.6 mL, and an a-p length of 22.7 mm corresponded to a prostate volume of 22.9 mL. In the 130 cases with a prostate volume >53.6 mL, 31 cases were positive for cancer, and 7 cases of cancer were located in the FA and BA regions. In the 253 cases with a prostate volume between 22.9 mL and 53.6 mL, 110 cases were positive for cancer, and only 9 cases were located in the FA region. Four of these 16 cancer cases in the FA and/or BA with a prostate volume >22.9 mL (length >22.7 mm) had one or two positive cores and a Gleason score ≤6.
Conclusion: The present simulation model revealed that approximately 11% of all cancers were missed with transrectal biopsy. Most of the missed cancers were low-risk.