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Pathological features of the index and non-index lesions in radical prostatectomy specimens: Implications for focal therapy

K. Kanao, K. Kajikawa, I. Kobayashi, M. Sumitomo

*Aichi Medical University, Nagakute, Japan*

**Introduction:** It has been suggested that focal therapy to the largest (index) lesion is sufficient in multifocal prostate cancer (PCa) because non-index lesions are unlikely to contribute to disease progression. However, pathological features of the index and non-index lesions in prostate cancer are not fully evaluated. In this study, we compare the pathological features of index tumor in radical prostatectomy specimens with that of non-index tumors using three-dimensional (3D) reconstructed computer models.

**Methods:** A total of 51 PCa surgical specimens were retrospectively analyzed. All foci in each prostate were outlined on pathology slides, digitally scanned and exported to 3D slicer software (www.slicer.org) to reconstruct 3D PCa models. All tumors were individually identified by the software. Gleason score and pathological stage were also individually determined. All tumor volumes were calculated using the program in the software. When multifocal disease was observed, the index tumor was considered the largest tumor as measured by volume, without considering its Gleason score. The pathological features of index tumor were compared with that of non-index tumors.

**Results:** A total of 236 tumors were detected in 51 specimens. The median number of tumors per specimen was 4.6 (range 1-13). The median tumor volume was 0.035 mL (range 1.2 x 10^-4 to 7.2), and the median volume of the largest (index) tumor was 1.2 mL. Thirty-seven index tumors and 6 non-index tumors had a volume of ≥0.5 mL. Forty-six (90.2%) of 51 index tumors were graded highest Gleason score in the specimen. Nine index tumors and 3 non-index tumors were staged as pT3. But all index tumors had the highest stage in the specimens.

**Conclusion:** The results of this study suggest that most of index tumors have the highest Gleason score and pathological stage.