Evaluation of the tumor volume from surgical specimens after radical prostatectomy and its clinical impact on the prognosis of patients with localized prostate cancer

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Objectives: To predict the prognosis of localized prostate cancer (PCa) patients and evaluate the actual contribution of tumor volume (TV) to the prognosis of PCa.

Patients and Methods: We prospectively measured TV using surgical specimens obtained after radical prostatectomy in 2,316 patients with localized PCa. We also evaluated the clinical effect of TV on postoperative biochemical recurrence using Kaplan-Meier analysis and Cox-proportional model.

Results: The mean prostate volume of the entire cohort was 36.5 cc, and the mean TV was 5.9 cc. Significant positive relationships existed between TV and increment of risk group based on the D’Amico criteria and National Comprehensive Cancer Network guidelines ($P < 0.001$). The high TV showed

significantly worse pathologic outcomes than the low TV in terms of high rates of extra-capsular extension, seminal vesicle invasion, and positive surgical margin ($P < 0.05$). The patients with high TV had significantly shorter biochemical recurrence-free survivals than those with low TV ($P < 0.001$). Finally, based on multivariate Cox-proportional analyses, TV was revealed to be an independent predictor of postoperative biochemical recurrence as both categorical (hazard ratio [HR]: 1.42, 95% confidence interval [CI]: 1.13–1.78, $P = 0.003$) and continuous variables (HR: 1.04, 95% CI: 1.04–1.05, $P < 0.001$).

Conclusions: TV was revealed to be an independent prognostic factor in the postoperative biochemical recurrence. Patients with a high number of positive core and longer tumor length were significantly related to higher TV.