

## Significance of Tridimensional Volume of Tumor in Breast Cancer Compared to Conventional TNM Stage

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**Abstract :** Backgrounds/Aims: Patients with breast cancer are currently classified according to TNM stage. Nevertheless, the actual volume would be mis-estimated, and it would bring on inappropriate diagnosis. Tridimensional volume-stage derived from the ellipsoid formula was presented as useful measure. Methods: The medical records of 480 consecutive breast cancer between January 2001 and March 2013 were retrospectively reviewed. All patients were divided into three groups according to tumor volume by receiver operating characteristic analysis, and the ranges of each volume-stage were that V1 was below 2.5 cc, V2 was exceeded 2.5 and below 10.9 cc, and V3 was exceeded 10.9 cc. We analyzed outcomes of volume-stage and compared disease-free survival (DFS) and overall survival (OS) between size-stage and volume-stage with variant intrinsic factor. Results: In the T2 stage, there were patients who had a smaller volume than 4.2 cc known as maximum value of T1. These findings presented that patients in T1c had poorer DFS than T2-lesser (mean of DFS 48.7 vs. 51.8,  $p = 0.011$ ). Such is also the case in OS (mean of OS 51.1 vs. 55.3,  $p = 0.006$ ). The cumulative survival curves for V1, V2 compared T1, T2 showed similarity in DFS (HR 1.9 vs. 1.9), and so did it for V3 compared T3 (HR 3.5 vs. 2.6) significantly. Conclusion: This study demonstrated that tumor volume had good feasibility on the prognosis of patients with breast cancer. We proposed that volume-stage should be considered for an additional stage indicator, particularly in early breast cancer.

**Keywords :** breast cancer, tridimensional volume of tumor, TNM stage, volume stage

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