

Tumor-stroma Ratio is an Independent Predictor for Survival in Esophageal Squamous Cell Carcinoma

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Objective

Tumor-stroma ratio (TSR) has been identified as a new and practicable prognostic histological characteristic of solid tumors. The aim of this study was to evaluate the prognostic value of TSR in resected esophageal squamous cell carcinoma (ESCC).

Materials

A total of 95 patients who underwent esophagectomy for ESCC were included in this study. TSR was assessed visually on the Haematoxylin-Eosin (H&E) stained tissue sections of surgical specimens by two independent observers. Patients with more than 50% intra-tumor stroma were quantified as stroma-rich group and those with less than 50% as stroma-poor group.

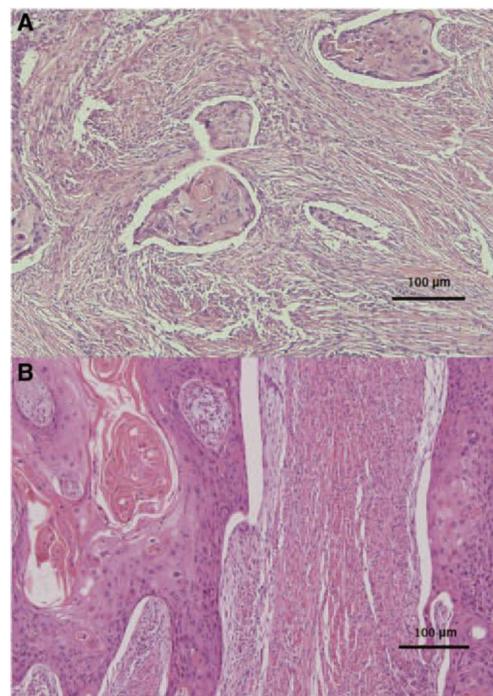


FIGURE 1. Hematoxylin and eosin stained 5 µm sections of esophageal squamous cell carcinoma (original magnification $\times 100$). *A*, Example of stroma-rich (stroma ratio $\geq 50\%$). *B*, Example of stroma-poor (stroma ratio $< 50\%$).

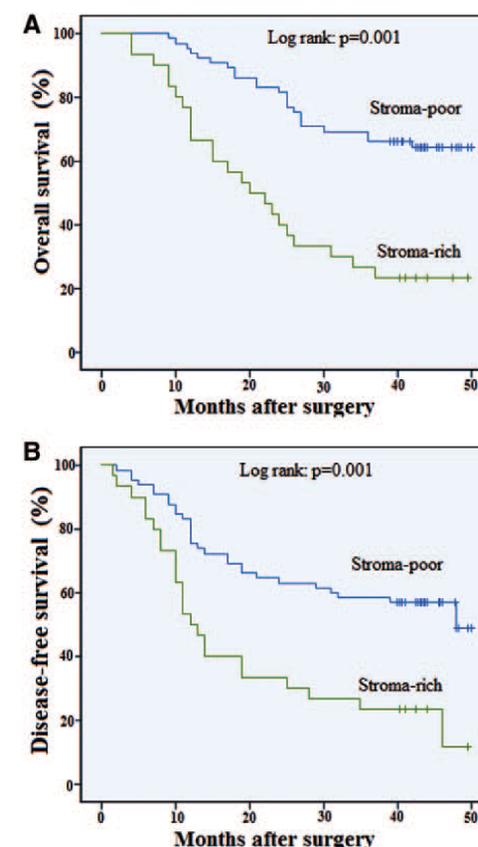


FIGURE 2. Kaplan-Meier curves for survival of all 95 patients with esophageal squamous cell carcinoma (stroma poor versus stroma rich). Both 3-year overall survival (*A*) and disease-free survival (*B*) between two groups remained statistically significant.

Results

The 3-year overall survival rate and disease-free survival rate were 64% and 57% in the stroma-poor group, and 23% and 23% in the stroma-rich group, respectively. Both 3-year overall survival rate and disease-free survival rate in the stroma-poor group were significantly better than those in the stroma-rich group ($P < 0.01$). In a multivariate analysis, TSR was identified as a highly significant prognostic factor for 3-year overall survival (HR 3.450; $P = 0.001$) and 3-year disease-free survival (HR 2.995; $P = 0.001$), independent of pTNM stage and radicality of the primary tumor.

Conclusions

Stroma-rich tumors were associated with poor prognosis and an increased risk of relapse, which may serve as a new prognostic histological characteristic in ESCC. TSR is simple and quick to determine, reproducible, and could be easily incorporated in routine histological evaluation.