

Exploration of High-Risk Pathological Factors in Postoperative Stage I Lung Adenocarcinoma: A Single-Center Retrospective Study

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Background

The 9th edition of the AJCC TNM staging system for lung cancer demonstrates that even after radical resection of stage IA lung cancer, a considerable proportion of patients experience recurrence or death within 5 years. Whether postoperative adjuvant therapy is required for stage IA lung cancer remains unanswered. Some studies have shown that postoperative adjuvant therapy for stage IA lung cancer with high-risk factors can improve disease-free survival and even overall survival. Although pathological high-risk factors are not independent indications for postoperative adjuvant therapy, they remain important bases for guiding treatment and judging patient prognosis.

Objective

To retrospectively analyze high-risk pathological factors affecting survival in patients with stage I lung adenocarcinoma who underwent radical surgical resection at our center.

Methods

We collected cases of stage I lung adenocarcinoma that underwent radical surgical resection at our center from 2013 to 2018. All HE slides were reviewed by subspecialty pathologists, and high-risk factors recommended by the IASLC were recorded, including histological grade of early invasive non-mucinous adenocarcinoma, spread through air spaces (STAS), tumor necrosis, pleural invasion, and lymphovascular invasion. Patient survival information was obtained through electronic medical record review and telephone follow-up.

Results

A total of 559 cases of stage I lung adenocarcinoma were collected. Univariate survival analysis showed that Grade ($p<0.001$), STAS ($p<0.001$), and tumor necrosis ($p=0.008$) were significant factors affecting disease-free survival (RFS). Patients with G3 (poorly differentiated), STAS, and necrosis had shorter RFS. Grade ($p<0.001$) and tumor necrosis ($p=0.008$) were also significantly associated with overall survival (OS), cases with G3 and necrosis having shorter OS.

Multivariate survival analysis showed that Grade was an independent prognostic factor for both RFS ($p=0.01$) and OS ($p=0.046$), and tumor necrosis was an independent prognostic factor for OS ($p=0.012$).

Further univariate survival analysis of 343 cases of stage IA lung adenocarcinoma showed that Grade ($p=0.006$) and STAS ($p=0.0101$) were significantly associated with RFS, with G3 and STAS stage IA lung adenocarcinoma patients having shorter RFS. Grade ($p=0.00288$) was also significantly associated with overall survival (OS). Multivariate survival analysis showed that STAS was an independent prognostic factor for RFS in stage IA lung adenocarcinoma, with STAS patients having higher recurrence risk.

Conclusion

IASLC histological grade is an independent prognostic factor for RFS and OS after radical resection of stage I lung adenocarcinoma, while tumor necrosis is an independent prognostic factor for OS. STAS is an independent prognostic factor for RFS in stage IA lung adenocarcinoma.

Clinical implication: These findings suggest that to improve overall survival or prevent tumor recurrence, more aggressive postoperative adjuvant strategies may be needed for stage I lung adenocarcinoma with either G3 or tumor necrosis, even stage IA lung adenocarcinoma with STAS.

Picture 1. Survival curves of Stage IA [include RFS and OS curves by Grade and STAS]

