Development and validation of a radiomics nomogram for progression-free survival prediction in stage IV EGFR-mutant non-small cell lung cancer

Jiangdian Song[1, 2], Yali Zang[2*], Weimin Li[3], Wenzhao Zhong[4], Jingyun Shi[6], Di Dong[2], Zaiyi Liu[5], Jie Tian[2*]

[1]Sino-Dutch Biomedical and Information Engineering School, Northeastern University, Shenyang 110819, China;

[2]Key Laboratory of Molecular Imaging, Institute of Automation, Chinese Academy of Sciences, Beijing 100190, China;

[3]West China Hospital, Chengdu, 610041, China

[4]Guangdong Lung Cancer Institute, Guangdong Academy of Medical Sciences, Guangzhou, 510080, China

[5]Department of radiology, Guangdong General Hospital, Guangdong, 510080, China

[6]Department of radiology, Shanghai Pulmonary Hospital, Shanghai, 200433, China

ABSTRACT

Accurately predict the risk of disease progression and benefit of tyrosine kinase inhibitors (TKIs) therapy for stage IV non-small cell lung cancer (NSCLC) patients with activing epidermal growth factor receptor (EGFR) mutations by current staging methods are challenge. We postulated that integrating a classifier consisted of multiple computed tomography (CT) phenotypic features, and other clinicopathological risk factors into a single model could improve risk stratification and prediction of progression-free survival (PFS) of EGFR TKIs for these patients.

1. INTRODUCTION

Patients confirmed as stage IV EGFR-mutant NSCLC received EGFR TKIs with no resection; pretreatment contrast enhanced CT performed at approximately 2 weeks before the treatment was enrolled. A six-CT-phenotypic-feature-based classifier constructed by the LASSO Cox regression model, and three clinicopathological factors: pathologic N category, performance status (PS) score, and intrapulmonary metastasis status were used to construct a nomogram in a training set of 115 patients. The prognostic and predictive accuracy of this nomogram was then subjected to an external independent validation of 107 patients.

PFS between the training and independent validation set is no statistical difference by Mann-Whitney U test (P = 0.2670). PFS of the patients could be predicted with good consistency compared with the actual survival. C-index of the proposed individualized nomogram in the training set (0·707, 95%CI: 0·643, 0·790) and the independent validation set (0·715, 95%CI: 0·650, 0·782) showed the potential