Abstract: P1172

Title: ARTIFICIAL INTELLIGENCE FOR PROGNOSIS PREDICTION OF NATURAL KILLER/T-CELL LYMPHOMA BASED ON MAGNETIC RESONANCE IMAGING

Abstract Type: Poster Presentation

Session Title: Aggressive Non-Hodgkin lymphoma - Clinical

Background:

Natural killer/T-cell lymphoma (NKTCL) often presents with extra-nodal involvement of nasal region, thus the prognostic system for NKTCL needs to be further optimized. Magnetic resonance imaging (MRI) of nasopharynx is a routine examination performed for newly-diagnosed NKTCL, however, the information in MRI images might be underused. Artificial intelligence (AI) can identify features from microimaging structures in pixel-level, and has shown great potential in assisting clinical decision making.

Aims:

Based on nasopharynx MRI images and clinical data from nine medical centers from China, we performed a multicenter retrospective study to construct an AI-based prognostic system for NKTCL.

Methods:

In total, 288 pathologically-proven NKTCL patients with available pretreatment nasopharynx MRI were included, and divided into the training (n=134), internal validation (n=58), and external validation (n=96) datasets. We used segmented, axial, T1-weighted contrast-enhanced MRI images to construct the prognostic system. The regions of interest of NKTCL lesions were manually segmented. Radiomic features were extracted, screened, and the "MRI score" was obtained after inputting the selected features into a Random Survival Forest model based on progression-free survival. The "total score" was obtained after inputting the MRI score and clinical parameters of each patient into the RSF model. The performance of the prognostic systems was then validated in independent datasets, and compared with several clinical used prognostic models by time-dependent area under curve (AUC) and concordance-index (C-index).

Results:

The overall score achieved satisfactory performance in internal and external validation set. The 3-year time dependent AUC in the internal and external validation set were 0.863 (95% CI, 0.747 - 0.939) and 0.774 (95%CI, 0.678 - 0.853) for PFS, while 0.830 (95% CI, 0.708 - 0.916) and 0.776 (95%CI, 0.679 - 0.854) for OS. In the internal and external validation set, the AUCs of the total score were significantly higher than the international prognostic index (IPI), the Korean prognostic index (KPI), and the prognostic index of natural killer lymphoma (PINK) (all $p < 0.05$). In the external validation set, comparing to the IPI, KPI, and PINK, the C-indexes of the total score were significantly higher in predicting PFS (C-index [95% CI]: total score, 0.774 [0.711-0.838] vs. IPI, 0.617 [0.483-0.752], $p = 0.010$; vs. KPI, 0.678 [0.568-0.789], $p = 0.027$; vs. PINK, 0.649 (0.538-0.759), $p = 0.014$). However, when comparing to the IPI and PINK in the internal validation set, the total score showed only numerically but not statistically differences ($p=0.071$ for IPI, and $p=0.051$ for PINK).

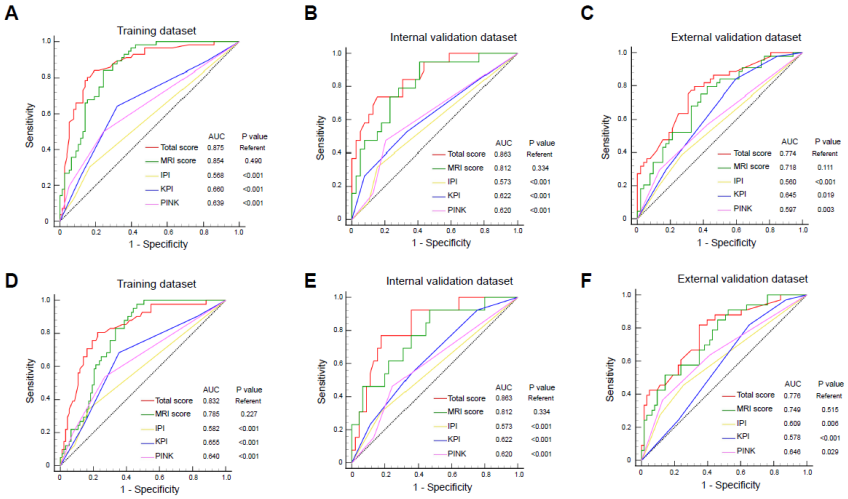

Figure 1. Three-year time dependent ROC curves.

Summary/Conclusion:

Our findings suggested that the proposed AI systems exhibited potential value in the prognosis prediction for NKTCL, and might serve as a complement to current clinical risk stratification methods.

Keywords: Non-Hodgkin's lymphoma, Artificial intelligence, NK-T cells, Magnetic resonance imaging