Abstract: P1047

Title: AIPSS-MF MACHINE LEARNING MODEL AS USEFUL PROGNOSTIC SCORE COMPARED TO IPSS IN THE SETTING OF MYELOFIBROSIS PATIENTS TREATED WITH RUXOLITINIB

Abstract Type: Poster Presentation

Session Title: Myeloproliferative neoplasms - Clinical

Background:

Among myeloproliferative neoplasms (MPNs), myelofibrosis (MF), divided into primary (PMF) or secondary (SMF), is characterized by variable overall survival (OS), with a range from <2 to 20 years. In addition to the classic IPSS, MYSEC-PM, and DIPSS, new model scores are continuously proposed to improve the ability to better identify patients with the worst outcome. In this context, the Artificial Intelligence Prognostic Scoring System for Myelofibrosis (AIPSS), based on machine learning, at diagnosis, and the Response to Ruxolitinib after six months (RR6) during the ruxolitinib treatment, could play a pivotal role in stratifying these patients, better than the classic models.

Aims:

This retrospective observational report aimed to validate this artificial intelligence model in patients with MF who started ruxolitinib treatment, comparing it to the standard prognostic scores (IPSS and MYSEC-PM) and the more recently developed one (RR6), considering the possible difficulties existing in having genetic data available, especially in small centers.

Methods:

Our cohort was based on 103 adult (>18 years) patients affected by myelofibrosis; 57 (55.3%) with PMF and 46 (44.7%) with SMF. Patient demographic data and laboratory parameters were recorded at diagnosis, just before ruxolitinib was started, and after 3 and 6 months of treatment. The mOS (defined as the time from MF diagnosis to death from any cause) was 95.04 months.

The discriminative capacity of the models was evaluated with out-of-bag estimates of the concordance index (C-index). The precision of the AIPSS-MF score compared to the other prognostic model was assessed using cross-validated time-dependent areas under the curve (AUCs) and evaluated in four different time points (2.5, 5, 7.5, and 10 years) derived from Cox survival models.

Results:

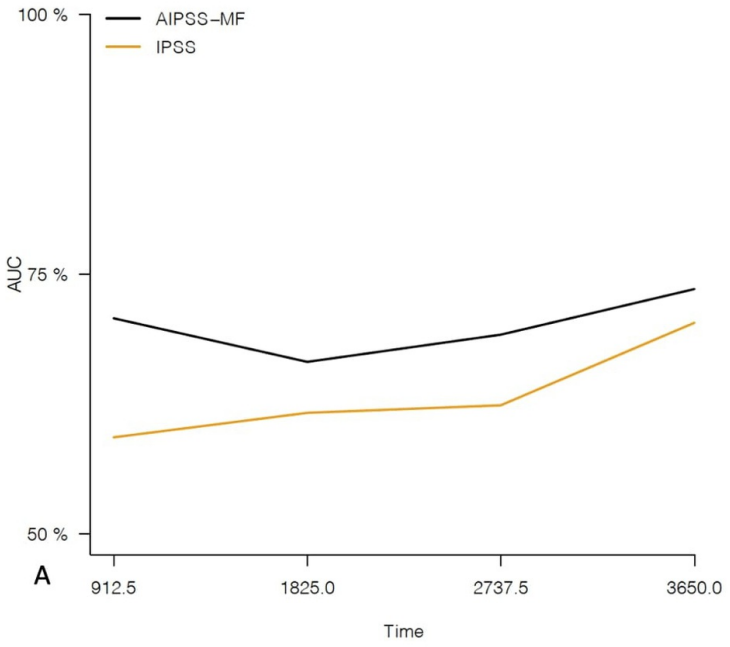
At diagnosis, in the whole cohort, the AIPSS-MF performs better than the widely used and recognized IPSS (Figure 1A). Splitting patients into PMF and SMF, the AIPSS-MF model confirms its superiority versus IPSS for patients with PMF (C-index 0.636 versus 0.596). In the SMF setting, due to the small sample size, adequate patient stratification is not possible because, during bootstrapping, we assist in a model failure. However, the AIPSS-MF model, compared to MYSEC-PM, maintains a better ability to predict OS at diagnosis (C-index 0.616 versus 0.593).

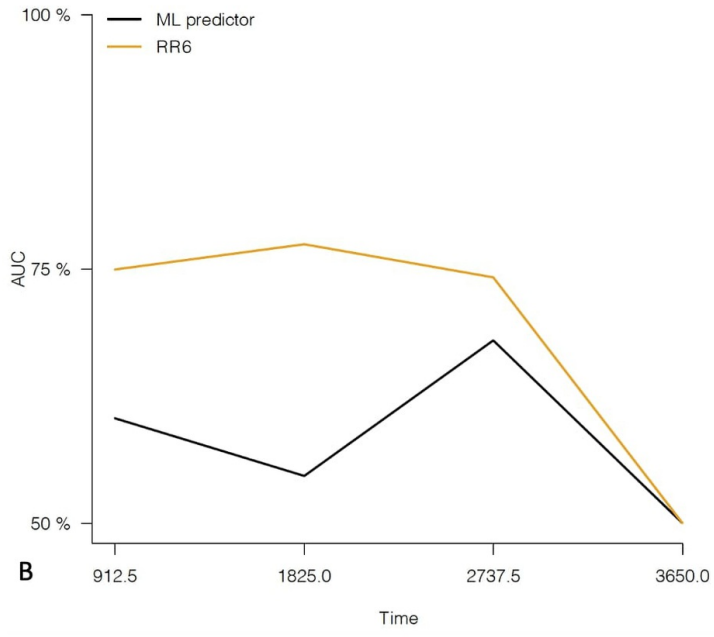
On the other hand, the analyses performed 6 months after ruxolitinib therapy started confirmed the leading role of RR6 in predicting an inadequate response by these patients to JAKi therapy. The RR6 model achieved a higher AUC at all evaluated times points compared with the AIPSS-MF, reaching a superimposable rate for both models at 10 years (Figure 1B). The 2.5 and 5-year AUCs of the RR6 model were 75.30% and 77.53%, compared to 60.42% and 54.17% of the artificial intelligence model. The C-index confirmed the superiority of RR6 (0.682 versus 0.571).

Summary/Conclusion:

Based on these findings, the new AIPSS-MF prognostic score, when applied to a selected population, confirms that

it can adequately stratify this subgroup of patients already at diagnosis better than standard model scores. Moreover, as expected, RR6 confirmed its superiority in shorter follow-ups, being a model precisely built to identify poor responders to ruxolitinib.





Keywords: Myelofibrosis, Prognosis, Ruxolitinib