Background Biomarkers of immune checkpoint inhibitor (ICI) efficacy can be used for patient selection. PD-L1 expression in tumor tissue is used to determine eligibility for combination or monotherapy in 1st line NSCLC.1–2 The liquid-biopsy mass spectrometry-based PIR test was developed to capture the role of patient biology on ICI outcomes.3 The test, stratifying patients into Resistant, Intermediate, and Sensitive groups, was associated with outcome in nivolumab treatment in 2nd line NSCLC patients.3 In this study, we blind validated PIR classifications in two large clinical studies (POPLAR4 and OAK5) of advanced NSCLC patients treated in the second or third line with atezolizumab.

Methods Pretreatment serum samples from patients assigned to receive atezolizumab in the two studies (POPLAR [NCT01903993] and OAK [NCT02008227]) underwent PIR testing blinded to all clinical data. Association of test classification, as Sensitive vs Not Sensitive (Resistant+Intermediate) and Resistant vs Not Resistant (Sensitive+Intermediate), with overall survival (OS) and progression-free survival (PFS) was investigated using Cox proportion hazards models in univariate and multivariate analysis.

Results PIR classifications were generated for 133 (POPLAR) and 403 (OAK) samples; the remaining available samples failed QC, mainly due to hemolysis. PIR classified the POPLAR samples as 53 (40%) Resistant, 25 (19%) Intermediate, 55 (41%) Sensitive and the OAK samples as 154 (38%) Resistant, 89 (22%) Intermediate, and 160 (40%) Sensitive. In both cohorts, OS and PFS were better in the Not Resistant vs Resistant group (figure 1). OS and PFS were superior in the Sensitive vs Not Sensitive group in the POPLAR cohort (figure 2). Multivariate analysis within the OAK cohort showed that test classification predicted OS when adjusted for baseline factors, including PD-L1 negative vs positive, with hazard ratio 0.51 (95% confidence interval (CI) 0.40–0.65) for Resistant vs Not Resistant and 0.65 (CI: 0.50–0.83) for Sensitive vs Not Sensitive.

Conclusions The PIR test stratified outcomes for patients treated with atezolizumab in second and third line NSCLC even when adjusted for PD-L1 expression. The combination of both tumor and host biomarkers appears to provide a more specific prognosis of NSCLC treated with ICIs.

Trial Registration clinicaltrials.gov NCT01903993 and NCT02008227

REFERENCES

Ethics Approval The OAK study was done in 194 academic medical centers and community oncology practices across 31 countries worldwide. The study was done in full accordance with the guidelines for Good Clinical Practice and the Declaration of Helsinki. All patients gave written informed consent. The POPLAR trial was done at 61 academic medical centers

Abstracts
and community oncology practices across 13 countries in Europe and North America. The study was done in full accordance with the guidelines for Good Clinical Practice and the Declaration of Helsinki. Protocol (and modification) approval was obtained from an independent ethics committee for each site. Patients gave written informed consent.