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O0655 Evaluating performance and utility of a novel host-protein assay in mild acute infections

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Background: A novel assay (ImmunoXpert™) that integrates the circulating levels of three host-response proteins (TRAIL, IP-10, and CRP) was developed to assist in differentiation between bacterial and viral etiologies. The assay was previously validated in independent clinical studies across various clinical syndromes and patient populations. Here we sought to evaluate the assay performance and potential utility in mild upper respiratory tract infections (URTI).

Materials/methods: We performed a meta-analysis of 464 patients with clinical suspicion of URTI enrolled in three multi-center clinical studies that evaluated assay performance in patients with acute infections: 'Curiosity' study (Oved et al., PLoS One 2015), 'Opportunity' study (Van Houten et al., Lancet ID 2016), and 'Pathfinder' study (Srugo et al., Pediatrics 2017). The comparator method was based on expert panel adjudication, with the panelists blinded to the ImmunoXpert™ result. Diagnostic performance was evaluated by comparing assay and comparator method outcomes. Prescription of antibiotic to viral URTIs was monitored to assess the assay's potential utility.

Results: Unanimous panel adjudication was attained for 61 bacterial (13%) and 241 viral (52%) patients, while no consensus was reached in 162 cases (35%). The assay distinguished between bacterial and viral URTIs with a sensitivity of 92% (95% CI: 82%- 98%) and specificity of 93% (88%-96%) with 11% equivocal assay results. Overall the assay outperformed other routine laboratory tests including: white blood cell count (cut-off 15,000 cells/µl, sensitivity 48% (35%-60%), $P<10^{-6}$; specificity 85% (80%-90%), $P<0.05$); CRP (cutoff 40 mg/L, sensitivity 82% (72%-92%), $P=0.16$, specificity 79% (74%-84%), $P<10^{-4}$); and procalcitonin (cutoff 0.5 ng/ml, sensitivity 22% (11%-32%), $P<10^{-14}$, specificity 80% (74%-85%), $P<0.001$). Out of the 241 patients unanimously assigned viral by the expert panel, 62 were given antibiotics, indicating a 26% rate of antibiotic overuse. The assay correctly assigned a viral diagnosis to 48 out of these 62 patients, indicating assay's potential to reduce antibiotic overuse by 77%. The most commonly misused antibiotics were penicillins and macrolides (Figure 1).

Conclusions: The novel assay demonstrated high diagnostic performance and potential to help clinicians avoid prescribing antibiotics for viral URTIs. Further clinical utility studies are warranted to examine the assay's impact on antibiotic administration practices.

Figure 1. Distribution of antibiotic classes that would potentially be avoided by implementation of the novel host-immune assay.