A HOST-PROTEIN TEST BASED ON TRAIL, IP-10 AND CRP DIFFERENTIATES BETWEEN ADENOVIRAL AND BACTERIAL-ADENOVIRAL CO-INFECTIONS IN CHILDREN WITH POSITIVE PCR-ADENOVIRUS DETECTION

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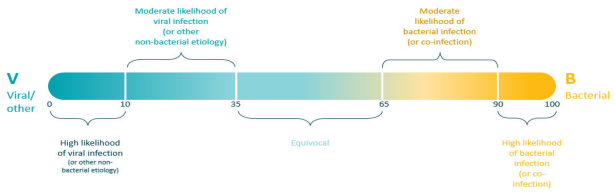
Background

Adenovirus is one of the major pathogens causing acute pediatric respiratory illness that often mimics bacterial infection, making it challenging to differentiate adenoviral infection from adenoviral-bacterial co-infection. A host-protein test that produces a bacterial likelihood score (BV score) for differentiating bacterial from viral infection integrates the expression levels of TNF-related apoptosis-induced ligand, interferon gamma-induced protein-10, and C-reactive protein. BV exhibited a negative predictive value (NPV) of 98% in prior studies. Here we evaluate BV score's performance in children with adenovirus PCR detection.

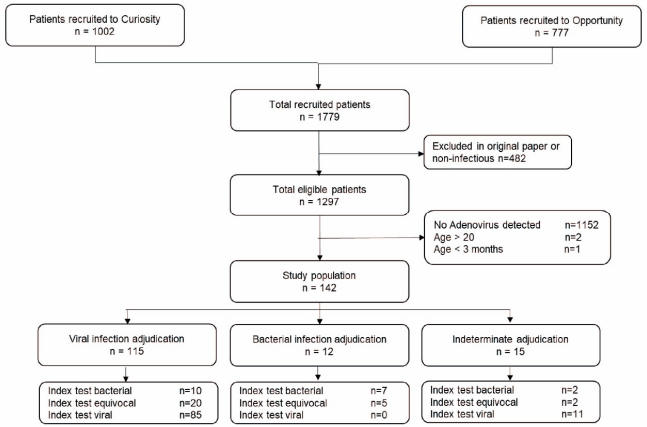
What is the BV score?

- A new host-protein score based on TRAIL, IP-10 and CRP.
- Diagnostic accuracy established in multiple clinical validation studies[1–4]
- Recently cleared by the FDA.
- Its intended use is in conjunction with clinical assessments and other laboratory findings as an aid to differentiate bacterial from viral infection for patients over 3 months of age.



Methodology

A retrospective analysis from two prospective cohort studies was performed on children aged 3 months to 20 years with adenovirus PCR positive infection. Reference standard infection etiology was adjudicated by independent experts based on clinical, laboratory, microbiological, and radiological data. The BV score ranges from 0 to 100 and provides three results: viral (0-34), equivocal (35-65) and bacterial (66-100). Experts were blinded to BV score results.



Results

Out of 1779 children, 142 had an adenovirus PCR positive nasopharyngeal swab. The median age of the cohort was 1.2 (IQR 1.2) years, 50.7% were male and 52.8% were hospitalized. 12 cases were adjudicated by the expert panel as bacterial, 115 as viral and 15 were indeterminate. The BV score attained sensitivity of 100.0% (95% CI 100.0%-100.0%) specificity of 89.5% (83.2%-95.8%), and NPV of 100.0% (92.6%-100.0%). The equivocal rate was 19.7%.

BV Score Performance - The higher the score the higher likelihood of co-infection

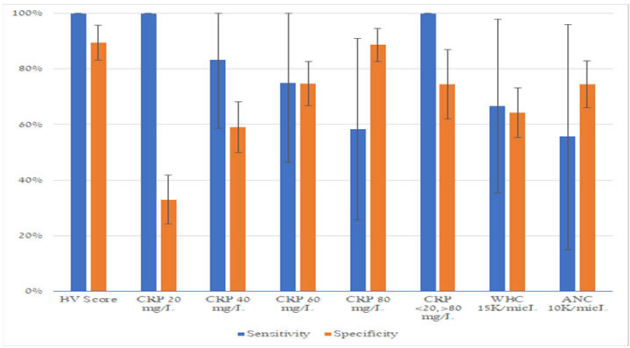
Score bin	No. of patients, n			% of cohort			% of bin		Bacterial likelihood ratio (95% CI)
	All	B	V	All	B	V	B	V	
90 ≤ s ≤100	8	4	4	6.3	33.3	3.5	50.0	50.0	9.58 (2.74 - 33.51)
65 < s <90	9	3	6	7.1	25.0	5.2	33.3	66.7	4.79 (1.37 - 16.76)
35 ≤ s ≤ 65	25	5	20	19.7	41.7	17.4	20.0	80.0	2.40 (1.10 - 5.22)
10 < s <35	35	0	35	27.6	0.0	30.4	0.0	100.0	0.00 (0.00 - NaN)
0 ≤ s ≤10	50	0	50	39.4	0.0	43.5	0.0	100.0	0.00 (0.00 - NaN)
Total	127	12	115	100.0	100.0	100.0			

Sensitivity – 100%

Specificity – 89.5%

NPV – 100%

Compared with other common Biomarkers



Conclusion

The BV score accurately differentiates between adenoviral and bacterial-adenoviral co-infection in children with PCR-positive adenovirus detection, supporting potential to improve appropriate antibiotic use in this population.

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