Host Protein Bio-Array Distinguishing Bacterial and Non-Bacterial Sources Provides Similar Diagnostics in Immunosuppressed Patients Presenting to the ED with Sepsis

D Robinson[1,2], M Sheraton[1,2] , N Sepulveda[1,2], J Boyle[1,2], A Kane[1,2], J Furbacher[1,2], M Vu[1,2], D Ticas[1,2], B Karfunkle[1,2], C Bakunas[1,2], C Gardiner[1,2]

1) Texas Emergency Medicine Research Center, McGovern Medical School, Houston, TX
2) McGovern Medical School at The University of Texas Health Science Center at Houston (UTHealth), Department of Emergency Medicine, Houston, Texas

UTHealth McGovern Medical School
The University of Texas Health Science Center at Houston

Introduction

Research Question: BV test accuracy in **immunosuppressed (ISD) vs. immunocompetent (ICT)** sepsis patients.

Population Affected: Oncology patients with sepsis, high risk due to **ISD status**.

Significance: Early bacterial vs. non-bacterial differentiation optimizes treatment, **reduces antibiotic misuse**.

What's Known: MeMed BV® (FDA-approved) uses **TRAIL, IP-10, CRP**; **BV >65 (bacterial), <35 (viral)**; validated in **ICT patients**.

Knowledge Gap: BV score reliability in ISD is unknown.

Study Goal: Assess BV test performance in **ISD patients**, bridging the diagnostic gap.

Methods

- **Hypothesis:** No significant difference in BV scores and protein levels between **ISD** and **ICT** patients with sepsis.
- **Study Design:** Case-controlled series comparing **MeMed BV®** in **ISD vs. ICT** patients in the **ED**, alongside standard sepsis workup.
- **Diagnosis: Bacterial vs. Non-Bacterial** by Blood **Cultures, Labs and Imaging**.
- **Data:** BV scores & proteins (**TRAIL, CRP, IP-10**).
- **Analysis: Non-parametric Kruskal-Wallis test** comparing BV performance in **ISD vs. ICT**.

Results

No statistically significant differences in BV scores or host proteins between **ISD and ICT groups** when presenting with **sepsis of unknown etiology**.

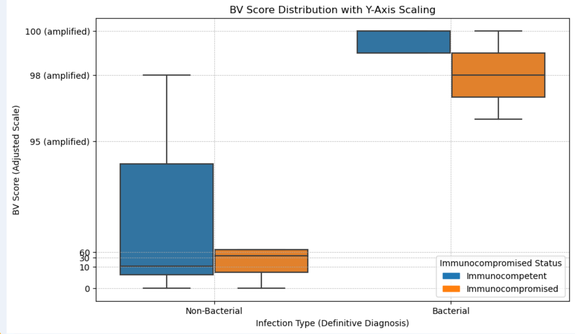
Bacterial Group (n=13):

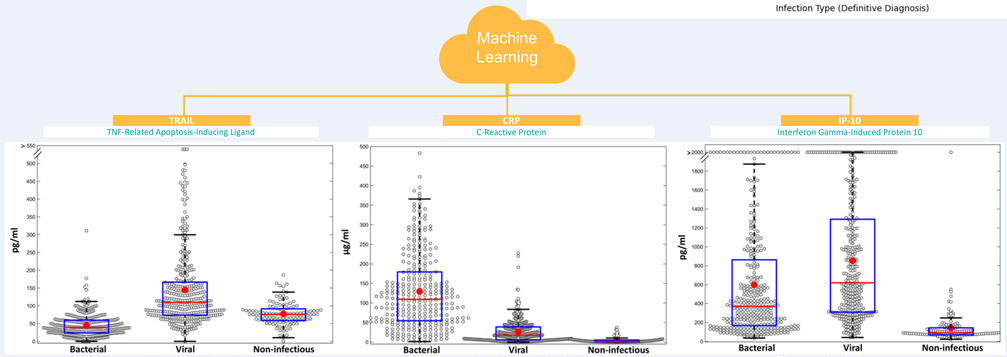
BV Score: H = 0.95, p = 0.33, **TRAIL:** H = 3.17, p = 0.07, **CRP:** H = 1.84, p = 0.17, **IP-10:** H = 3.23, p = 0.07

Non-Bacterial Group (n=6):

BV Score: H = 0.03, p = 0.87, **TRAIL:** H = 0.01, p = 0.94, **CRP:** H = 0.24, p = 0.62, **IP-10:** H = 0.11, p = 0.74

Variable	H-statistic (Bacterial)	p-value (Bacterial)	H-statistic (Non-Bacterial)	p-value (Non-Bacterial)
BVScore	0.95	0.33	0.03	0.87
TRAIL (pg/ml)	3.17	0.07	0.01	0.94
CRP (mg/L)	1.84	0.17	0.24	0.62
IP-10 (pg/ml)	3.23	0.07	0.11	0.74

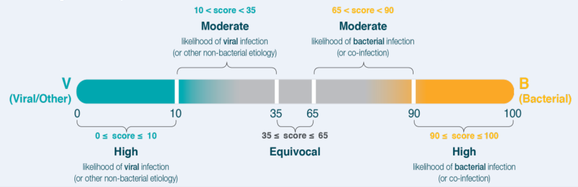




Elevated in **Viral** infections
Avg. Time to peak 0-6 hours

Elevated in **Bacterial** infections
Avg. time to peak 36-50 hours

Elevated in **infections**
Avg. time to peak 12 hours



Conclusion

- **BV test performed similarly** in **ISD and ICT groups**.
- **Host-response diagnostics** may aid in **bacterial vs. non-bacterial differentiation**, regardless of **ISD status**.
- **Early diagnosis** could enhance **decision-making and care quality** for **immunosuppressed sepsis patients**.
- **Further research** with **larger, diverse ISD populations** is needed to assess potential trends.

References

1. John E. Schneider & Jacie T. Cooper (2022) Cost impact analysis of novel host-response diagnostic for patients with community-acquired pneumonia in the emergency department, Journal of Medical Economics, 25:1, 138-151, DOI: 10.1080/13696998.2022.2026686

2. Tegethoff, Sina A., et al. "TNF-related apoptosis-inducing ligand, interferon gamma-induced protein 10, and C-reactive protein in predicting the progression of SARS-CoV-2 infection: a prospective cohort study." International Journal of Infectious Diseases 122 (2022)

3. Oved K, et al. (2015) A Novel Host-Proteome Signature for Distinguishing between Acute Bacterial and Viral Infections. PLOS ONE10(3):e0120012. https://doi.org/10.1371/journal.pone.0120012

Questions ?

Dr. David Robinson MD MS MMM FACEP
: david.j.robinson@uth.tmc.edu
: +1 (713) 500-7873