USING MEMED BV™ TO REDUCE ANTIBIOTIC USE FOR LOW-RISK CAP

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Introduction

In the United States, pediatric community acquired pneumonia (CAP) remains one of the most prevalent and costly indications for pediatric evaluation in a medical setting. Respiratory viruses are the most isolated source in pre-school aged children diagnosed with community acquired pneumonia; however, because of the difficulties differentiating its etiology, most children are still treated with antibiotics. Various serum markers have been trialed to aid in this dilemma without consistent success.

The MeMed BV™ test is an immunoassay that intends to aid in the differentiation between bacterial and viral infection. The test generates a single numeric score. At predefined cut-offs of <35 for viral disease and >65 for bacterial disease, the test has a performance sensitivity and specificity of 94% and 94.1% respectively with a PPV of 74.3% and NPV of 98.9%.[1] MeMed BV™ has recently been granted broad FDA approval in September of 2021.

Objective

We aimed to use MeMed BV™ to aid in the reduction of antibiotic treatment in children with low risk, uncomplicated community acquired pneumonia in our emergency department.

Methods

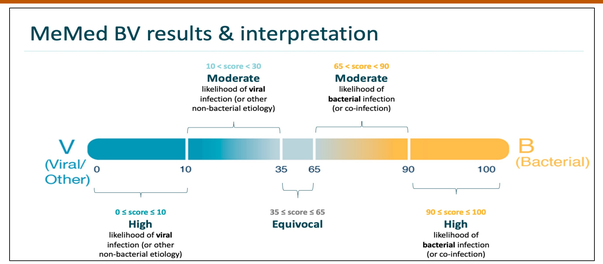
This was a two-part prospective, single site study. In the first phase, a baseline frequency of antibiotic administration by our ED providers was evaluated. In the second phase, patients with radiographic pneumonia who qualified for the study were identified, and serum was drawn for the MeMed BV™ test. The resulting score determined if antibiotics were recommended.

The inclusion criteria:

- children with concerns for radiographic pneumonia
- discharged home or admitted to the general medicine floor
- age > 6mo to <5 years
- received at least 2 vaccines against both HiB and pneumococcus

Exclusion criteria:

- received any antibiotics in the past 14 days
- a history of aspiration pneumonia or chronic complex conditions
- complicated pneumonia as defined by the IDSA guidelines
- any other indication for antibiotics
- prior enrolment in the study



Results

Of the 54 patients enrolled in phase one, 49 (91%) received antibiotics. There were 8 failure events, which was defined as initiation of antibiotics within 7 days of enrollment for worsening respiratory symptoms or unplanned visit to a medical provider due to worsening respiratory symptoms. Of the 40 patients enrolled in phase two, 22 (55%) received antibiotics with 5 failure events ($p < 0.001$ for antibiotic reduction).

Table 1. Demographic Data

Age:	Total	Pre-intervention, N (%)	Post-intervention, N (%)
6mo - 1yo	11	9 (17%)	2 (5%)
1yr - 2yr	28	15 (28%)	13 (33%)
2yr - 3yr	23	11 (20%)	12 (30%)
3yr - 4yr	20	10 (18%)	10 (25%)
4yr - 5yr	12	9 (17%)	3 (7%)
Total	94	54	40
Sex:			
Female:	41	19 (35%)	22 (55%)
Male	53	35 (65%)	18 (45%)
Race:			
White	73	41 (76%)	32 (80%)
Black or African American	9	6 (11%)	3 (8%)
Asian	5	3 (6%)	2 (5%)
Other	7	4 (7%)	3 (7%)
Ethnicity:			
Not Hispanic or Latino	32	19 (35%)	13 (33%)
Hispanic or Latino	54	30 (56%)	24 (60%)
Other	8	5 (9%)	3 (8%)
Insurance Status:			
Medicaid	66	38 (70%)	28 (70%)
Private insurance	24	15 (28%)	9 (23%)
Uninsured	4	1 (2%)	3 (7%)
Admission Status:			
Admitted to med/surg	43	18 (33%)	25 (63%)
Discharged home	51	36 (67%)	15 (37%)
Follow-up Response:			
No response at follow-up	5	5 (9%)	0 (0%)

Table 2. Primary Measures

Treatment Group	Pre-intervention	Post-intervention	p-value
Total N	54	40	
Antibiotics prescribed, N (%)	49 (91%)	22 (55%)	<0.001

Table 3. MeMed BV Test Results

Groups	Post-intervention	Viral, (<35)	Bacterial, (>65)	Equivocal, (35 to 65)
Total N (%)	40	14 (35%)	18 (45%)	8 (20%)
Antibiotics prescribed, N (%)	22 (55%)	1 (7%)	17 (94%)	4 (50%)

Table 4. Failure Events

	Pre-intervention	Post-intervention	p-value
Total	54	40	
Failure events, N (%)	8 (15%)	5 (13%)	1.00
Antibiotics prescribed N (%)	49 (91%)	22 (55%)	
Failure events, N (%)	7 (14%)	3 (14%)	1.00
Antibiotics not prescribed N (%)	5 (9%)	18 (45%)	
Failure events, N (%)	1 (20%)	2 (11%)	1.00

Conclusion.

These data suggest that using a serum biomarker, such as MeMed BV™, for differentiating bacterial from viral pneumonia in young children, may reduce unnecessary antibiotic prescriptions without an increase in failure rates.

[1] *Papan C, Argentiero A, Porwoll M, et al. A host signature based on TRAIL, IP-10, and CRP for reducing antibiotic overuse in children by differentiating bacterial from viral infections: a prospective, multicentre cohort study. Clin Microbiol Infect. May 2022;28(5):723-730. doi:10.1016/j.cmi.2021.10.019.*