The utility of respiratory viral panel testing for nosocomial fever in the neonatal intensive care unit

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OBJECTIVES

- To evaluate whether the respiratory viral panel (RVP) PCR test is associated with use of antibiotics in patients who develop a fever in the neonatal ICU

BACKGROUND

- Patients in the neonatal intensive care unit (NICU) often develop fevers during their inpatient stay.
- Many neonates are empirically started on antibiotics due to their fragile clinical status.
  - They might be tested with cultures, respiratory viral panels, and imaging.
- It is unclear what the impact of viral PCR testing is for neonates who develop a fever while inpatient.
- A study done on ventilated children in the PICU with lower respiratory tract infection
  - Found that respiratory viral PCR did not affect antibiotic prescription.
- There are been no studies to date on the utility of viral PCR testing in the NICU.
- It is important to decrease exposure of children to antibiotics with a viral infections.
- Continued antimicrobial use may lead to colonization with multidrug resistant organisms and adverse effects from antimicrobial exposure.

METHODS

- Retrospective chart review on patients admitted to the Level 4 NICU of the University of Maryland Medical Center
  - From November 2015 to June 2018
- Inclusion criteria
  - All neonates who developed a fever 48 hours into their admission
- Collected demographic information, length of stay, fever work-up and diagnostics (including labs, cultures, RVP), inpatient diagnosis of fever, and antibiotic use
- Statistics
  - Descriptive, Fisher exact test, linear regression, and Welch's ANOVA
  - All data analysis was conducted using SAS version 3.71 and Excel

References

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Neonates with a **negative** respiratory viral PCR test result were **more likely to receive antibiotics for a fever**.

Table 1: Participant characteristics

Characteristic	n (%)
Mean age (days) ± SD	73 ± 22
Female	157 (45)
Black	164 (47)
White	112 (32)
Hispanic or Latino	30 (9)
Mean length of stay (days) ± SD	96 ± 4

Table 2: Diagnostic studies

Risk factors	Positive n (%)	Total n
Blood culture	6 (6.3)	96
Urine culture	8 (12.9)	62
Sputum culture	12 (38.7)	31
CSF culture	1 (5.6)	18
Other viral studies	1 (7.1)	14
Wound culture	2 (40.0)	5

Table 3: Management of fever

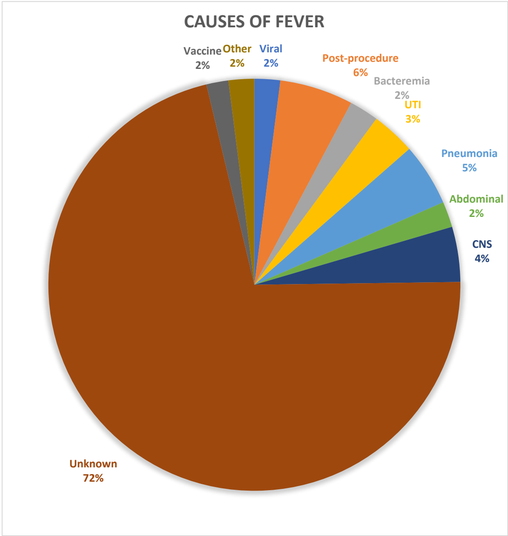
	n (%)
Mean WBC (10^9/L)	15.0 ± 0.7
Mean positive CRP (mg/L)	4.6 ± 0.6
RVP sent within 7 days of fever	30 (8.6)
Positive RVP	2 (6.7)
Antibiotics not started	78 (39.4)
Antibiotics started	208 (60.0)
Already on antibiotics	61 (17.6)
Mean days of antibiotics	7.5 ± 0.5

RESULTS

- 347 febrile episodes among patients in the NICU
- 30 total RVP samples analyzed
  - 2 were positive (6.7%)
- Neonates were more likely to get started on antibiotics if they had a negative RVP compared to those without a negative RVP
  - 89% vs 11%, p-value <0.0001
- Patients with a positive RVP had a decreased length of stay compared to those without a positive RVP
  - 30.3 ± 8.7 vs 96.8 ± 71.3, p-value 0.01
- On multivariate linear regression
  - A positive RVP was not associated with length of stay.

CONCLUSION

- Neonates with a negative respiratory viral PCR test were more likely to get started on antibiotics.
- Respiratory viral PCR testing could be used as a tool to promote antibiotic stewardship in the NICU



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