Introduction

- Fever is a marker of insignificant viral infection, as well as more serious bacterial sepsis

- Children at risk of severe infections may present with non-specific symptoms / signs

- Seeking markers of invasive disease as well as culture positivity for organisms has been a goal of Paediatricians for many years
Introduction

- Prior research and literature review - No clear role for the use of biomarkers to predict SBI in febrile children
- Research focus - Determining the site and nature of SBI in febrile children (< 5 years of age), using multiple testing modalities
- Correlated clinical picture + duration of hospitalisation + biomarker testing results

Methods: This study

- Prospective, cross-sectional
- Febrile children <5 yrs old
- Presenting to SBAH over 1 yr
- Evaluated clinically for symptoms / signs of sepsis
- Biomarker testing:
  ✓ FBC & diff, CRP, PCT
  ✓ Urine dipsticks
  ✓ CXR
  ✓ CSF cell count & culture
  ✓ Blood culture and/or
  ✓ Cultures of urine, stool or sputum
Days of stay – 63 Subjects

- <3 days
  - 26/63 (41.3%)

- ≥3 days
  - 37/63 (58.7%)

- ≥3 & ≤5 days
  - 4/63 (6.3%)

- > 5 days
  - 33/63 (52.4%)

Results

- Temperature
  - Average 38.5°C
  - Minimum temp 38°C
  - Maximum temp 40°C

- Urine dipsticks
  - 12/63 positive (19%)
  - 0/12 positive dipsticks cultured organism in urine (0%)
  - ? Validity of dipsticks vs formal sample
  - 7/51 neg dipsticks cultured organism on urine (13.7%)
HIV status

- HIV + 8/63 (12.7%)
- 7/8 + organism (88%)
- 2/8 + multiple organisms (25%)

- CMV, CNS (blood), AFB +, TB culture + (sputum)
- Klebsiella pneumoniae (blood), Adenovirus (stool)

Significant organisms cultured

Figure 18: Significant cultured organisms

- 15 Bacterial
- 15 Viral
White Cell Count

- **WCC**
  - done 60/63 (95.2%)
  - increased in 12/60 (20%)
  - decreased in 2/60 (3.3%)
  - abnormal in 14/60 (23.3%)
  - wide range 2-58 x10^9/L (average WCC 13)

![Figure 7: White cell count (WCC)](image)

CRP & PCT

- **CRP**
  - done 59/63 (93.7%)
  - >10 mg/L in 43/59 (72.9%)
  - wide range 12-336 (average CRP 64.5)

- **PCT**
  - done 25/63 (39.7%)
  - >2µg/L in 15/25 (60%)
  - wide range 4-728 (average PCT 55)

![Figure 8: CRP and PCT](image)
**Statistical Significance**

<table>
<thead>
<tr>
<th>Table 6</th>
<th>Duration of Stay (p-value)</th>
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<tbody>
<tr>
<td>Temperature</td>
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<tr>
<td>White cell count</td>
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<td>CRP</td>
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<td>PCT</td>
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<table>
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<th>Table 12</th>
<th>Blood culture (p-value)</th>
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<tbody>
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<td>Temperature</td>
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<tr>
<td>White cell count</td>
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<td>CRP</td>
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<td>PCT</td>
<td>0.572</td>
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<td>Duration of stay</td>
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**Lumbar Puncture**

- CNS symptoms 44/63 (69.8%)
- CNS symptoms + LP done 19/44 (43.2%)
  - 2/19 culture positive (10.5%)
  - 6/19 (31.6%) positive according to criteria
  - 2/6 (33.3%) CSF PCR positive (HSV & Enterovirus)
- Clinically septic + LP done 16/53 (30.2%)
  - 2/16 positive (12.5%) + CNS symptoms
- Total LP done: 22/63 (34.9 %)
  - 2/22 (9.1%) culture positive
  - 7/22 (31.8%) positive according to criteria

**Figure 12: CSF results**

- Negative
- Positive
### Statistical Significance

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<td>Urine culture</td>
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<td>Stool culture</td>
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<table>
<thead>
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<th>Table 26</th>
<th>Urine culture</th>
<th>CSF culture</th>
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<tr>
<td>Urine dipsticks</td>
<td>0.9858</td>
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<td>CNS symptoms</td>
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<td>0.2778</td>
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### Admission Diagnosis

**Figure 16: Admission diagnosis**

- BPN/Pneumonia: 19
- AGE: 11
- URT/Tonsilitis: 7
- UFI: 7
- Meningitis: 6
- Febrile convulsion: 4
- Bronchiolitis: 2
- Possible TB: 2
- PCP: 1
- Malaria: 1
- Sepsis: 1
- Kawasaki disease: 1
- Bacterial peritonitis: 1

**Figure 17: Source of sepsis**

- Identifiable source of sepsis: 61 (97%)
- Non-identifiable source of sepsis: 2 (3%)
Conclusion

• Fever or degree of fever does not predict severity of infection, nor source of infection, nor duration of hospitalisation
• Elevated biomarkers (WCC, CRP, PCT) are not related to duration of hospital stay nor do they predict a positive blood culture
• Biomarkers have not been shown to be effective in predicting SBI’s in febrile children under 5 years
• This study suggests that clinical suspicion of serious infection and appropriate action are as valuable as extensive testing