How do blood cultures sent from a paediatric accident and emergency department influence subsequent clinical management?

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Methods: All children who attended the department over a seven month period and had blood culture investigations were identified. Case notes of patients who had any growth on blood culture were reviewed to determine whether the organism was felt to be pathogenic and how the result affected clinical management.

Results: 1159 children had blood cultures sent, 26 of these grew an organism that was felt to be pathogenic. However, only five significantly influenced clinical management.

Conclusions: Blood cultures sent from an accident and emergency department rarely influence clinical management. A more focused approach to bacteriological investigation is recommended.

Methods

All children, including self referrals and GP referrals to medicine and surgery, who attended a busy paediatric A&E department over a seven month period and had blood culture investigations were identified. This was done by interrogating the database at the local microbiology department for all samples received from the hospital and correlating that with the computerised attendance list for the department. Case notes of patients who had any growth on blood culture were reviewed to determine whether the organism was felt to be pathogenic and how the result affected clinical management.

Statistical analysis was performed using Fisher's exact test.

Table 1: Table showing significance of age as a predictor of a pathogenic isolate from blood cultures

<table>
<thead>
<tr>
<th>Age Category</th>
<th>p Value</th>
<th>Odds ratio 95% CI for odds ratio</th>
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</thead>
<tbody>
<tr>
<td>Under 12 months</td>
<td>0.025</td>
<td>2.56 1.18 to 5.75</td>
</tr>
<tr>
<td>Under 24 months</td>
<td>0.045</td>
<td>2.48 1.07 to 5.75</td>
</tr>
<tr>
<td>Under 36 months</td>
<td>0.069</td>
<td>2.41 0.96 to 6.039</td>
</tr>
</tbody>
</table>

Discussion

Blood culture investigations performed in a paediatric A&E department are costly and only yield a positive result that
changes clinical management in less than 0.5% of patients. This is similar to yields reported in adult emergency department and perioperative patients. A previous small study showed no difference in the outcome of children with a febrile illness who did not have a blood culture taken, however an earlier study identified a small but significant number of children with complications of bacteremia that would not have been detected without blood culture analysis. We did not undertake to investigate the effects of positive cultures felt to be attributable to non-pathogenic organisms/contaminants but previous studies have shown that these have a considerable financial impact.

Increasing availability and accuracy of polymerase chain reaction testing for bacterial DNA and assays for specific bacterial antigens permit rapid identification of common causative organisms (for example, meningococcus, pneumococcus, and haemophilus) although offer no means of determining antibiotic sensitivity. It is clearly important to isolate pathogenic organisms both to permit epidemiological study and to determine the range of antibiotic sensitivity, particularly with increasing antibiotic resistance. However, in many patients with positive blood cultures the causative organism had already been identified from other bacteriological investigations by the time the blood culture result was available. This suggests that where a specific bacterial disease is suspected a focused approach to bacteriological investigation should be used (for example, sending cerebrospinal fluid in suspected meningitis, urine in suspected urinary tract infection) rather than relying on blood cultures.

**CONCLUSION**

Blood cultures have a very low yield and often do not influence the clinical management of the paediatric emergency department patient. They should be reserved for use in the investigation of younger children, particularly those aged less than 12 months, who have no focal signs of infection to explain their fever and appear clinically unwell.

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**Contributors**

Both authors conceived of the original idea for the paper. PL collected the data and performed the analysis. Both authors contributed to the final version of the paper.

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**REFERENCES**