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Original Article

Assessment of bacterial infections in children- A clinical study

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***ABSTRACT*:**
Background: Fever is a common clinical symptom in children and is one of the leading causes for medical consultation and hospital admissions. The present study was conducted to assess bacterial infections in children. **Materials & Methods:** 54 children having serious bacterial infections (SBI) with fever was included. 2 ml of blood was obtained for hematological and biochemical investigations and 3–4 ml to 10 ml for blood culture according to child's age. Clinical profile was recorded. **Results:** out of 54 children, males were 34 and females were 20. Common diagnosis was bronchopneumonia in 5, urinary tract infection in 4, severe acute malnutrition in 10, enteric fever in 7, bacterial meningitis in 2, bronchiolitis in 15, dysentery in 4 and upper respiratory tract infection in 5 patients. **Conclusion:** Common bacterial infection in children was bronchopneumonia, urinary tract infection, severe acute malnutrition, enteric fever, bacterial meningitis and bronchiolitis.
Key words: Enteric fever, Bacterial meningitis, Bronchiolitis.

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INTRODUCTION

Fever is a common clinical symptom in children and is one of the leading causes for medical consultation and hospital admissions. Globally, 5.4 million children die before the age of 5 years and approximately 50% of the mortality is caused by infectious diseases, many of which present with fever.[1] The underlying infectious disorder causing fever in children can range from mild and self-limiting illness such as upper respiratory tract infection to more serious viral and bacterial illnesses. Distinguishing between the benign self-limiting illness that is manageable at home and those that require hospitalization is the primary challenge for pediatricians and primary care physicians.[2]

SBI are associated with significant morbidity and mortality in children. Meningococcal disease (MCD) - septicaemia or meningitis caused by Neisseria meningitidis - is the most common fatal bacterial infection in UK children.[3] Whilst its incidence in the UK has declined following the introduction of the conjugate vaccine against serogroup C12, it remains higher than that of other European countries. Delays in the treatment of MCD and other severe sepsis increase mortality, and the likelihood of long- term disability.[4]

Pneumonia and urinary tract infection (UTI) are the most common SBIs seen in the children's Emergency Department. Whilst the introduction of effective vaccines against Haemophilus influenzae type b (Hib) and Streptococcus pneumoniae has reduced the contribution of these bacterial pathogens to the burden of bacterial pneumonia, complications from pneumonia remain an important cause of hospital admission in the UK.[5] The present study was conducted to assess bacterial infections in children.

MATERIALS & METHODS

The present study was conducted among 54 children having serious bacterial infections (SBI) with fever. The presence of SBI was confirmed by presence of at least one of the following criteria: 1) blood culture positive; 2) a child was considered to have bacterial pneumonia: if the child presented with breathlessness and had blood culture positive or if along with breathlessness, chest X-ray showed consolidation and C reactive protein (CRP) value was more than 1000 µg/dl.

Data such as name, age, gender etc. was recorded. Two milliliter (ml) of blood was obtained for hematological and biochemical investigations and 3–4 ml to 10 ml for blood culture according to child's age. Clinical profile was done. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of children

Total- 54		
Gender	**Males**	**Females**
Number	34	20

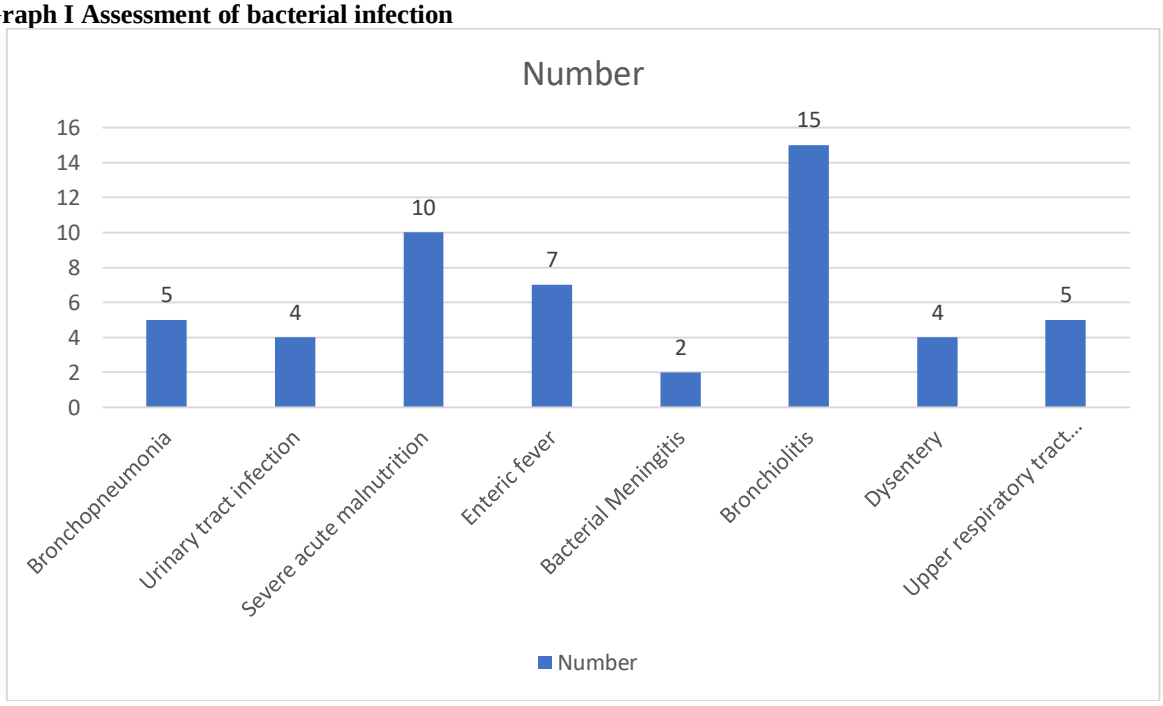
Table I shows that out of 54 children, males were 34 and females were 20.

Table II Assessment of bacterial infection

Diagnosis	Number	P value
Bronchopneumonia	5	0.03
Urinary tract infection	4	
Severe acute malnutrition	10	
Enteric fever	7	
Bacterial Meningitis	2	
Bronchiolitis	15	
Dysentery	4	
Upper respiratory tract infection	5	

Table II, graph I shows that common diagnosis was bronchopneumonia in 5, urinary tract infection in 4, severe acute malnutrition in 10, enteric fever in 7, bacterial meningitis in 2, bronchiolitis in 15, dysentery in 4 and upper respiratory tract infection in 5 patients. The difference was significant (P< 0.05).

Graph I Assessment of bacterial infection



DISCUSSION

Globally, pneumonia remains the single most important cause of childhood death. Childhood UTI exerts a significant and increasing burden on hospital services. In the UK, hospital admission rates of children with UTI increased by 39% between 2001 and 2011.[6] UTI may be associated with septicaemia and meningitis, particularly in young infants or immunocompromised children. Approximately one third of children with UTI involving the upper urinary tract subsequently develop renal scars.[7]

The prompt recognition and treatment of SBI improves outcomes, and forms the basis of management in sepsis. Clinical guidelines commonly refer to the 'golden hour' of sepsis management. This is the recommendation that antibiotics are commenced within one hour of recognition of severe sepsis, based upon the demonstration of increasing mortality for every hour of delayed therapy.[8] In children with suspected sepsis in the ED, average time to administration of antibiotics is more than 2 hours from arrival. In the case of MCD, delays to antibiotic administration are associated with increased mortality,

while prehospital antibiotics reduce the likelihood of death.[9] The signs and symptoms of MCD are non-specific early in the disease process and rapidly progressive. Approximately one half of children with MCD are not identified at first contact with medical services.[10] The present study was conducted to assess bacterial infections in children.

In present study, out of 54 children, males were 34 and females were 20.

Craig et al conducted a two year prospective cohort study to evaluate current processes by which young children presenting with a febrile illness but suspected of having serious bacterial infection are diagnosed and treated, and to develop and test a multivariable model to distinguish serious bacterial infections from self limiting non-bacterial illnesses. They had follow-up data for 93% of the 15 781 instances of febrile illnesses recorded during the study period. The combined prevalence of any of the three infections of interest (urinary tract infection, pneumonia, or bacteraemia) was 7.2% (1120/15 781, 95% confidence interval (CI) 6.7% to 7.5%), with urinary tract infection the diagnosis in 543 (3.4%) cases of febrile illness (95% CI 3.2% to 3.7%), pneumonia in 533 (3.4%) cases (95% CI 3.1% to 3.7%), and bacteraemia in 64 (0.4%) cases (95% CI 0.3% to 0.5%). Almost all (>94%) of the children with serious bacterial infections had the appropriate test (urine culture, chest radiograph, or blood culture). Antibiotics were prescribed acutely in 66% (359/543) of children with urinary tract infection, 69% (366/533) with pneumonia, and 81% (52/64) with bacteraemia. However, 20% (2686/13 557) of children without bacterial infection were also prescribed antibiotics. On the basis of the data from the clinical evaluations and the confirmed diagnosis, a diagnostic model was developed using multinomial logistic regression methods. Physicians' diagnoses of bacterial infection had low sensitivity (10-50%) and high specificity (90-100%), whereas the clinical diagnostic model provided a broad range of values for sensitivity and specificity. They concluded that Emergency department physicians tend to underestimate the likelihood of serious bacterial infection in young children with fever, leading to undertreatment with antibiotics. A clinical diagnostic model could improve decision making by increasing sensitivity for detecting serious bacterial infection, thereby improving early treatment.

We observed that common diagnosis was bronchopneumonia in 5, urinary tract infection in 4, severe acute malnutrition in 10, enteric fever in 7, bacterial meningitis in 2, bronchiolitis in 15, dysentery in 4 and upper respiratory tract infection in 5 patients. Trautner et al[12] determined the risk of serious bacterial infection in children with hyperpyrexia and whether clinical presentation can identify hyperpyrexic patients at risk for serious bacterial infection. Data were collected prospectively on all children <18 years of age presenting to a pediatric emergency department during a 2-year period with rectal temperatures of ≥106°F. History, physical examination, complete blood cell counts, blood cultures, and nasopharyngeal viral cultures were obtained on all of the patients. Of 130, 103 children had hyperpyrexia (1 per 1270 patient visits). Of the 103 subjects, 20 had serious bacterial infection, and 22 had laboratory-proven viral illness (including 1 subject with bacterial/viral coinfection). The presence of a chronic underlying illness was associated with an increased risk of serious bacterial infection. The presence of rhinorrhea or any viral symptom was associated with a decreased risk of serious bacterial infection, although diarrhoea itself was associated with an increased risk of serious bacterial infection. Age, maximum temperature, and total white blood cell count were not predictive of either bacterial or viral illness.

CONCLUSION

Authors found that common bacterial infection in children was bronchopneumonia, urinary tract infection, severe acute malnutrition, enteric fever, bacterial meningitis and bronchiolitis.

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