ORIGINAL RESEARCH

Evaluation of bacterial infections in children

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ABSTRACT

Background: One of the most frequent presenting ailments of children seen in Pediatric emergency is fever. The present study was conducted to evaluate serious bacterial infections (SBI)in children.

Materials & Methods:74 children having serious bacterial infections (SBI)of both genders was included and clinical profile of each patient was recorded.

Results: Out of 74 children, males were 44 and females were 30. Common diagnosis was enteric fever in 12, bacterial meningitis in 3, bronchiolitis in 12, dysentery in 8, upper respiratory tract infection in 7 patients, bronchopneumonia in 6, urinary tract infection in 4 and severe acute malnutrition in 22 cases. The difference was significant (P< 0.05).

Conclusion: In children common bacterial infection found was bronchopneumonia, urinary tract infection, severe acute malnutrition, enteric fever, bacterial meningitis and bronchiolitis.

Key words: Bronchiolitis, Bacterial meningitis,Enteric fever

Introduction

One of the most frequent presenting ailments of children seen in Pediatric emergency is fever. There is a dearth of data from poor nations, however in the US, fever accounts for over 20% of visits to the Pediatric emergency department. Both infectious (bacterial, viral, or parasitic) and non-infectious (autoimmune, environmental, or drug-related) factors can produce fever.[1] Due to their underdeveloped immune systems and lack of localizing symptoms, young infants (0-90 days) are more vulnerable to severe bacterial infections (SBI), which include bacteremia, meningitis, pneumonia, and urinary tract infections. According to reports, 7-11% of early neonates get SBI.[2] Significant morbidity and mortality are linked to SBI in children. The most prevalent and often fatal bacterial infection in children in the UK is meningococcal disease (MCD), which is septicaemia or meningitis brought on by Neisseria meningitidis.[3] Although it has decreased in the UK since the serogroup C12 conjugate vaccination was introduced, its incidence is still higher than in other European nations. Treatment delays for MCD and other severe sepsis raise fatality rates andraise the risk of long-term impairment.[4] The most frequent SBIs seen in the emergency room for children are pneumonia and urinary tract infections (UTI). Although the burden of bacterial pneumonia has decreased due to the development of effective vaccinations against Streptococcus pneumoniae and Haemophilus influenzae type b (Hib), complications from pneumonia still occur.[5]The present study was conducted to evaluateserious bacterial infections (SBI)in children.

Materials & Methods

The present study comprised of74 children having serious bacterial infections (SBI)of both genders.Parental consent was obtained before starting the study. Data such as name, age, gender etc. was recorded. A child was considered to have bacterial pneumonia: if the child presented with breathlessness and had a blood culture positive or if along with breathlessness, chest radiograph showed consolidation and Creactive protein (CRP) value was more than 1000 µg/dl. 5 ml of venous blood was collected forhaematological and biochemical investigations. Clinical profile of each patient was recorded. Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table: I Distribution of children

Total- 74		
Gender	**Males**	**Females**
Number	44	30

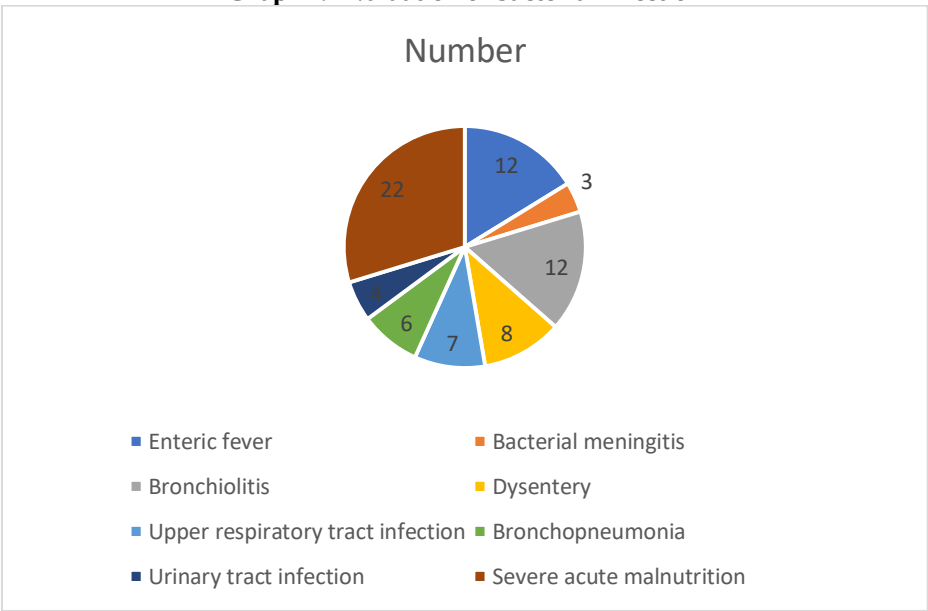
Table I: shows that out of 74 children, males were 44 and females were 30.

Table II: Evaluation of bacterial infection

Diagnosis	Number	P value
Enteric fever	12	0.05
Bacterial meningitis	3	
Bronchiolitis	12	
Dysentery	8	
Upper respiratory tract infection	7	
Bronchopneumonia	6	
Urinary tract infection	4	
Severe acute malnutrition	22	

Table: II, graph I shows that common diagnosis was enteric feverin 12, bacterial meningitis in 3, bronchiolitis in 12, dysenteryin 8, upper respiratory tract infection in 7 patients, bronchopneumonia in 6, urinary tract infection in 4 and severe acute malnutrition in 22 cases.The difference was significant (P< 0.05).

Graph I: Evaluation of bacterial infection



Discussion

Pneumonia continues to be the leading cause of death in children worldwide. Hospital services are under severe and growing pressure from pediatric UTI. Between 2001 and 2011, the UK's hospital admission rates for kids with UTI rose by 39%.[6] Particularly in small infants or kids with impaired immune systems, UTI may be linked to septicemia and meningitis. Kidney scarring occurs in about one-third of kids who have an upper urinary tract infection.[7] The early diagnosis and treatment of SBI improves outcomes and serves as the cornerstone of sepsis therapy. The 'golden hour' of sepsis therapy is frequently mentioned in clinical guidelines. According to research showing that each hour of delayed treatment increases mortality, it is advised that antibiotics be started as soon as severe sepsis is identified.[8] Antibiotics are typically administered more than two hours after a child with probable sepsis arrives in the emergency department. Prehospital antibiotics decrease the likelihood of death in the case of MCD, whereas delays in antibiotic delivery are related with greater mortality.[9] Early on in the course of the disease, MCD symptoms and indicators are non-specific and quickly advance. A little over half of kids with MCD are notidentified at first contact with medical services.[10] The present study was conducted to evaluateserious bacterial infections (SBI) in children. We found that out of 74 children, males were 44 and females were 30. Children with hyperpyrexia are at risk for serious bacterial infections, and it has been determined by Trautner et al[11] whether clinical signs can identify those patients. All children under the age of 18 who visited a

pediatric emergency room during a two-year period with rectal temperatures below 106°F had their data collected prospectively. On all of the patients, a medical history, physical examination, complete blood cell counts, blood cultures, and nasopharyngeal virus cultures were performed. Out of 130, 103 children experienced hyperpyrexia. Twenty of the 103 participants had significant bacterial infections, and 22 of them had viral illnesses that had been established in lab settings (one of whom had a bacterial/viral coinfection). We observed that common diagnosis was enteric fever in 12, bacterial meningitis in 3, bronchiolitis in 12, dysentery in 8, upper respiratory tract infection in 7 patients, bronchopneumonia in 6, urinary tract infection in 4 and severe acute malnutrition in 22 cases.When children with fever were admitted, Pathak et al[12] assessed the epidemiological, clinical, haematological, and biochemical risks for SBI. In all, 302 children were enrolled in the trial, and 47% of those kids had SBI. A partially immunized child, a history of the common cold, a history of moderate-grade fever, a toxic appearance, significant lymphadenopathy, the absence of a BCG scar, delayed development, irritability, breathlessness, respiratory distress, poor feeding, significant weight loss, suspected urinary tract infection, and hyponatremia were the factors linked to confirmed SBI in bivariate analysis. Breathing difficulties (RR 1.80), weight loss (RR 2.28), probable urinary tract infection, and insufficiently immunized infant were all identified in the final generalized logistic regression model. Kuppermen et al[13] in their study found that serious bacterial infections were present in 170 of 1821 infants (9.3%), including 26 (1.4%) with bacteremia, 151 (8.3%) with urinary tract infections, and 10 (0.5%) with bacterial meningitis; 16 (0.9%) had concurrent SBIs. The prediction rule identified infants at low risk of SBI using a negative urinalysis result, an ANC of 4090/μL or less and serum procalcitonin of 1.71 ng/mL or less. In the validation cohort, the rule sensitivity was 97.7%, specificity was 60.0%, negative predictive value was 99.6% and negative likelihood ratio was 0.04. One infant with bacteremia and 2 infants with urinary tract infections were misclassified. No patients with bacterial meningitis were missed by the rule. The rule performance was nearly identical when the outcome was restricted to bacteremia and/or bacterial meningitis, missing the same infant with bacteremia.

Conclusion

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

References

1. Alpert G, Hibbert E, Fleisher GR. Case-control study of hyperpyrexia in children. Pediatr Infect Dis J 1990;9:161–163.
2. Stanley R, Pagon Z, Bachur R. Hyperpyrexia among infants younger than 3 months. Pediatr Emerg Care 2005;21:291–294.
3. Adams WG, Deaver KA, Cochi SL, et al. Decline of childhood Haemophilus influenzae type b (Hib) disease in the Hib vaccine era. JAMA 1993;269:221–226.
4. Elzouki AY, Mir NA, Jeswal OP. Symptomatic urinary tract infection in pediatric patients: a developmental aspect. Int J Pediatr Nephrol 1985;6:267–270.
5. Smitherman HF, Caviness AC, Macias CG. Retrospective review of serious bacterial infections in infants who are 0 to 36 months of age and have influenza A infection. Pediatrics2005;115:710–718.
6. Mellor, MFA. Heat-induced illness. In: Barkin, R.; Caputo, G., editors. Pediatric Emergency Medicine: Concepts and Clinical Practice. St Louis, MO: Mosby; 1997. p. 496-499.
7. Supure JS. Hyperpyrexia in children: clinical implications. Pediatr Emerg Care 1987;3:10–12.
8. Press S, Fawcett NP. Association of temperature greater than 41.1C (106F) with serious illness. Clin Pediatr (Phila) 1985;24:21–25.
9. Olson KR, Benowitz NL. Environmental and drug-induced hyperthermia. Emerg Med Clin North Am 1984;2:459–474.
10. McCarthy PL, Donlan TF. Hyperpyrexia in children: eight-year emergency room experience. Am J Dis Child 1976;130:849–851.
11. Trautner BW, Caviness AC, Gerlacher GR, Demmler G, Macias CG. Prospective evaluation of the risk of serious bacterial infection in children who present to the emergency department with hyperpyrexia (temperature of 106 F or higher). Pediatrics. 2006 Jul 1;118(1):34-40.
12. Pathak A, Upadhayay R, Mathur A, Rathi S, Lundborg CS. Incidence, clinical profile, and risk factors for serious bacterial infections in children hospitalized with fever in Ujjain, India. BMC infectious diseases. 2020 Dec;20(1):1-1.
13. Kuppermann N, Dayan PS, Levine DA, et al. A clinical prediction rule to identify febrile infants 60 days and younger at low risk for serious bacterial infections .JAMA Pediatr. 2019;173:342-51.