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A Clinico-Epidemiological Profile of Leptospirosis among Children in Kolar, Southern India

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ABSTRACT

Introduction: *Even though leptospirosis is commonly being reported in India there are very few reports on its presentation and outcome in children.*

Objectives: *This study was conducted to determine the clinical profile, the epidemiological factors and outcome of leptospirosis confirmed by serology in the children who were admitted and managed in the referral hospital attached to Sri Devaraj Urs Medical College at Kolar, Karnataka.*

Methods: *Hence a retrospective data analysis of records of 50 children diagnosed with leptospirosis over a period of four years (2007 to 2011) was undertaken.*

Results: *Fever with head ache (92%) and myalgia (96%) were the commonest presentations. Neurological and respiratory manifestations were observed in 20% and hepatosplenomegaly was found in 84% of them. Icteric leptospirosis contributed to 16% of the cases. Seventy eight percent of the cases were admitted in the monsoon. History of contact with animals was present in 68% of the children.*

Conclusion: *Leptospirosis can be easily overlooked among children in our clinical settings because of manifestations which are similar to malaria, dengue and typhoid fevers. Leptospirosis should be considered in fever cases in the monsoon and among those who had contact with animals.*

Key words: *Leptospirosis, children, zoonoses, clinico-epidemiological, Kolar.*

INTRODUCTION

Leptospirosis is a zoonoses and occurs in endemic and epidemic forms in many parts of India.[1] A potentially serious but treatable disease, symptoms of leptospirosis may mimic those of a number of unrelated infections such as influenza, meningitis, hepatitis, dengue or viral haemorrhagic fevers.[2] Because of the protean manifestations of leptospirosis it is often misdiagnosed and under-reported.[3]

Leptospirosis is now emerging in India as an important public health problem.[2,4] There is no information about the existing status of the disease and its burden in the country. Leptospirosis is being increasingly diagnosed at the tertiary care medical college hospital in

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Kolar since the year 2005. Hence it is being considered as one of the causes of fever in children referred to this hospital. This study reports the cases of leptospirosis diagnosed clinically and confirmed serologically in children admitted for treatment in the medical college hospital in Kolar. The frequencies of the manifestations of the disease and its outcome to management are reported.

MATERIALS AND METHODS

Patient population: This study was performed in the teaching hospital of Sri Devaraj Urs Medical College at Kolar in Karnataka. This 1,050 bed hospital in the predominantly agricultural district is the only fully equipped emergency facility for a population of about 16 lakhs. The case records from the period January 2007 to February 2011 of children admitted to the paediatric unit of the hospital and who were IgM positive for leptospirosis were retrospectively analysed. The study was approved by the institute ethical committee.

The clinical criteria for suspicion of leptospirosis was fever associated with at least one of the following sets of signs and symptoms as laid down by Indian Leptospirosis society namely, jaundice, oliguria, cough, haemoptysis and breathlessness, neck stiffness and altered sensorium, haemorrhagic tendencies including conjunctival suffusion and others.[5] Tests for malaria, dengue fever, hepatitis, typhoid, tuberculosis and pneumonia were also undertaken on these children depending on the clinical symptoms and signs. CSF analysis was done where meningitis was suspected. Complete blood count was done for all the fever cases. Myocarditis was identified with evidence of tachycardia, ECG changes and clinical and radiological evidence of heart failure.[6] Acute respiratory distress was identified by evidence of rapidly progressive dyspnoea, tachypnoea, hypoxaemia and bilateral pulmonary infiltrates in chest radiograph.[7]

In every case, the diagnosis of leptospirosis was made by qualitative detection of leptospira IgM based on indirect ELISA (LEPTO IgM MICROLISA, J.Mitra & Co Pvt. Ltd). Where the diagnosis of leptospirosis had been confirmed, the patient's records were reviewed. The demographic profile (age and gender) and epidemiological data (exposure to rodents and animals, month of admission and time between the onset of clinical signs and hospitalization) were collected.

Clinical definitions: The clinical data collected included the presence of fever, headache, myalgia, jaundice, oliguria, conjunctival suffusion and dyspnoea. The neurological, gastrointestinal and bleeding manifestations were also recorded.

Laboratory tests: Complete blood count, serum bilirubin, AST, ALT and serum creatinine were determined in all the cases.

Outcome: The patients were observed until they completely recovered and were discharged from the hospital. The cause of death was recorded. Post-mortem examination was not performed.

Statistical analysis: Data was entered and analysed in Microsoft Excel programme. The frequencies of the clinical symptoms and the positive clinical signs, the laboratory parameter results and the outcome of the disease to treatment were found. The results are presented as proportions, mean, range and standard deviation (SD).

RESULTS

Fifty cases of leptospirosis were identified by IgM ELISA test during the study period in the paediatric units of the hospital. The mean age of the children was 8.7 years (SD ± 4.3 yrs, range 2 -17 years), male to female sex ratio was 1.15:1 (27 boys and 23 girls) and the mean duration of the symptoms was 9.2 days (range 5 - 30 days). Sixty eight percent of the children were from rural areas. Also, 68% of the children had a history of exposure to dogs, rodents and live stock. Majority of the cases (78%) were admitted during the monsoon from June to September.

Headache in 92% and myalgia in 96% were the commonest symptoms in children with leptospirosis (Table 1). The other frequent symptoms noted were vomiting, seizures and cough. Hepatomegaly was found in 84% and splenomegaly in 34% of the children. Hepatomegaly was found in all the 14 children with splenomegaly.

Leucocytosis was found in 64% of the cases. Thrombocytopenia and elevated hepatic enzymes were the common abnormalities in the laboratory parameters in these children (Table 2). The mean (SD) values of AST and ALT were 92.3±77.2 and 71.1±69.2 IU/L respectively. None of the patients had co-existing illness like malaria, typhoid, tuberculosis and pneumonia.

Crystalline Penicillin, 50,000 I.U per kg per dose every sixth hourly, was administered to 48 children. Two children received oral Doxycycline at a dose of 2.5 mg/kg twice daily. The mean duration of antibiotic administration was 7 days (range 5 - 10 days). The mean duration of hospital stay was 9 ± 5 days. One patient died of acute respiratory distress syndrome (ARDS) at 6 hours of admission. The rest of the patients recovered completely.

DISCUSSION

Leptospirosis should be suspected in children with fever and protean manifestations of myalgia, headache, vomiting, jaundice, respiratory symptoms and meningeal signs. Among children in the present study fever with headache, myalgia and vomiting was common. Skin rashes, seizures, conjunctival suffusion, jaundice and cough was less common. Meningeal signs, neurological deficits, haematuria, haematemisis, malena, myocarditis and respiratory distress was observed in less than 12% of the cases.

There are a few reports on leptospirosis in children.[8,9] It is generally presumed that leptospirosis in children and young infants are rare, possibly because of minimal exposure[10] among them. Our study contradicts this assumption. One possible reason could be that agricultural based activity is the main occupation of rural population in Kolar region. Contact with livestock is inevitable in such a situation. Poor sanitation in the rural communities and urban slums contribute to contamination of rain water with urine of the livestock and rodents. A significant percent of the children in our study were from rural area. Around 68% of the children in the study had come in contact with live stock and dogs.

Table 1: Clinical features in children with leptospirosis in Kolar

Clinical features	Subcategory	No (%)
Fever (≥38°C)	All form	50 (100)
	With chills	36 (72)
Headache		46 (92)
Myalgia with muscle tenderness		48 (96)
Conjunctival suffusion		8 (16)
Skin rash	Maculo-papular	13 (26)
Gastrointestinal manifestations	Vomiting	21 (42)
	Abdominal pain	4 (8)
	Jaundice	8 (16)
	Hepatomegaly	42 (84)
	Splenomegaly	17 (34)
Renal manifestations	Oliguria	2 (4)
Respiratory manifestations	Cough	10 (20)
	Rhonchi and crepitations	8 (16)
	ARDS	1 (2)
Neurological manifestations	Seizures	10 (20)
	Altered sensorium	10 (20)
	Meningeal signs	6 (12)
	Neurological deficits	3 (6)
Bleeding manifestations	Haematemisis	2 (4)
	Malena	1 (2)
	Haematuria	5 (10)
	Haemoptysis	1 (2)
Myocarditis		4 (8)

Table 2: Laboratory parameters of children with leptospirosis in Kolar

Laboratory parameter	No (%)
Leucocytosis (>10000/mm^3)	32 (64)
Anaemia – microcytic and hypochromic	14 (28)
Thrombocytopenia (<1 lakh/dl)	12 (24)
Hyperbilirubinemia (>2 mg/dl)	11 (22)
AST >40 IU/L	39 (78)
ALT >40 IU/L	34 (68)
Serum creatinine (>1.2 mg/dl)	8 (16)

AST-aspartate amono transaminase, ALT-alanine amino transaminase

Obtaining such a history in children with fever is essential to suspect leptospirosis. The infection is probably transmitted to human when wading through stagnant rainwater contaminated by infected urine of animals.[3,11] There was no difference in the exposure to dogs and live stock in the children from rural and non-rural background in this case series analysis. All the children from the non-rural background were from poor socioeconomic families. The environmental sanitation in the towns of Kolar district is generally poor.

It is important to consider many diseases in a child presenting with fever during the monsoon. Dengue, malaria, typhoid, hepatitis and leptospirosis all increase in the monsoon. Also, children frequently present with fever, vomiting and hypotension, which makes it difficult to identify the aetiology. A case series analysis was undertaken in a major referral hospital for children in Mumbai on 32 patients with fever, vomiting, diarrhoea, bleeding manifestations, hypotension, hepatomegaly, splenomegaly, jaundice and/or oliguria in the monsoon of 2005. Dengue, leptospirosis and malaria were identified in 34.4%, 28.1% and 21.9% of them respectively. Also, in this study, patients with leptospirosis presented with fever and non-oliguric renal failure and near normal platelet count.[11]

There are variations in the incidence of icteric leptospirosis and severe disease with renal failure reported in the various case series studies in India.[13-15] Only 16% and 4% of the cases had jaundice and oliguria respectively in our series. Similar such observations with respect to jaundice and oliguria are made in several hospital based studies in south India.[13] In a study on the outbreak of leptospirosis in Chittoor district of Andhra Pradesh, none of the 49 cases of leptospirosis had jaundice. Myalgia (42.9%) and headache (32.6%) were the common symptoms observed in this study in Chittoor.[12] Jaundice was observed in 73.3% and oliguria in 29.9% of the patients in a case series study on 86 patients with leptospirosis in north India. It is argued by the authors that the pattern of severe manifestations of leptospirosis may vary from region to region.[15]

Leptospirosis is increasingly being reported from various states in India especially in the monsoon.[14,16] It is also suggested that several of these reports is not based on authentic diagnostic techniques.[3] Many animal hosts excrete the leptospires in urine for long periods without producing disease and wild animals are important reservoirs which continuously reinfect population of domestic animals. These epidemiologic features of leptospirosis make effective control of the disease extremely difficult.[17]

Leptospirosis is an emerging disease in Kolar of Karnataka state. Kolar being a predominantly agricultural region, leptospirosis must be suspected in fever cases with myalgia and headache. The suspicion should be strong among those with febrile illness, especially in the monsoon and among those in contact with livestock. As leptospirosis is endemic in Kolar, a detailed study of all the serovars is required to identify the common local strains.

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