Original Article

Clinico-laboratory profile of leptospirosis in children

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Abstract

Leptospirosis is an infectious disease of humans and animals. It is caused by pathogenic spirochetes of the genus Leptospira. Identification of infection is based on certain specific laboratory tests. microscopic agglutination test (MAT) is considered to be the gold standard for diagnosis, but enzyme-linked immunosorbent assays (ELISA) are commonly done. The study was undertaken to describe the demographic factors having an impact on leptospirosis along with the clinical features and laboratory profile in children. 62 patients in the age group of 1 month to 15 years, satisfying the WHO clinical description of leptospirosis were included in the study. Male to female ratio in the study was 1.5:1. Fever was the most common symptom. Only 61% of patients had a history of animal contact. The icteric type of Leptospirosis was present only in 8% of children. 80.65% had a modified Faine's score of more than 25and fulfilled for the diagnosis of leptospirosis.

Keywords: leptospirosis.

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INTRODUCTION

Leptospirosis is an infectious disease of humans and animals. It is caused by pathogenic spirochetes of the genus Leptospira. Common in tropical and subtropical regions like India[1]. The burden of leptospirosis is hard to quantify in these countries. This is due to lack of efficient confirmatory clinic-laboratory profile of leptospirosis pertaining to these regions[2]. The prognosis of leptospirosis is potentially fatal if not diagnosed and treated early. Potentially leading to complications such as kidney damage, meningitis, cardiac arrhythmias, severe pulmonary hemorrhage[3]. World Health Organization estimates that more than 500,000 life threatening cases leptospirosis occur worldwide. Leptospires are thin, coiled, gram-negative, aerobic organisms 6-20 µm in length. The genus includes 20 named species, 14 of them are pathogenic. New species and serovars continue to be discovered. They are unique among the spirochetes in that they can be isolated on artificial media. Most leptospiral serovars have a primary reservoir in wild mammals. The organism affects at least 160 mammalian species[4]. The most important reservoirs are rodents and rats are the most common source worldwide. Urinary shedding of organisms from infected animals is the most important source of these bacterial pathogens. Contaminated media includes water, soil, mud, and aborted tissue. Identification of infection is based on certain specific laboratory tests. Isolation of organism by culture, specific antigen detection by polymerase chain reaction (PCR), or antibody detection by microscopic agglutination test (MAT) or ELISA IgM[5]. Leptospires are difficult to isolate in pure culture from clinical specimens. Cultures are tedious procedures and need examinations at weekly intervals by dark-field microscopy for up to 3 months[6]. Therefore culture is not useful in clinical practice. MAT has a high degree of specificity but is expensive, time consuming, and labour intensive. India, leptospirosis was first reported in Andaman Islands in 1930s. Subsequently, it has been reported from Orissa, Maharashtra and Gujarat. Since the 1980s Leptospirosis appears to be on the increase in Kerala, Tamil Nadu, and Andamans.

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Major contribution to the number of cases had been rendered by Chennai with 509 cases[7]. Studies have signified that it is an important public health problem not only in rural but also urban population. Age related presentation report suggest that the prevalence increases with the age being higher in adolescents than children. High prevalence of leptospirosis is in the monsoon season with few cases reported in summer. The objective of the present study was the need of the geographic region. The study was undertaken to describe the demographic factors, clinical features and laboratory profile of leptospirosis in children between the age group of 1 month to 15 years in a tertiary care hospital in the endemic region.

MATERIALS AND METHODS

Study Area

Department of Pediatrics at BRS Hospital Pvt Ltd, a tertiary care multispeciality hospital in Nungambakkam, Chennai. The study hospital is located in the centre of the endemic region with patient flow from all strata of the society. The hospital receives patients from the urban areas of the region as well as the neighbouring rural agricultural regions. Study population The study population consisted of children in the age group of 1 month to 15 years with fever of more than 7 days and fulfilling the WHO case definition of leptospirosis, during the period from November 2011 to April 2013 (18 months). Total 62 children were included in the study.

Data collection technique and tools

The study was conducted after approval from the institutional ethical committee and informed consent from the parents. Children were enrolled after fulfilling the characteristics of the inclusion criteria. Those included in the study satisfied the WHO clinical description of leptospirosis[8]. Detailed proforma was filled bedside for these children. Details regarding the modified Faine's criteria were filled up by the same observer to minimise the intra-observer variations. Blood was drawn in a sterile syringe using aseptic precautions and testing for MAT[9] and Leptospira IgM ELISA[10] was done. The blood samples were subjected to routine investigations. Subsequently children were scored as per the modified Faine's criteria[11] based on clinical, epidemiological and serological parameters. ELISA IgM was carried out using the Panbio IgM ELISA kit. A result of >11 panbio units was taken as positive. MAT was performed with nine live culture antigens using standard microtitre methodology and a titre of >1:80 was taken significant. Being a multi-system disorder, other basic investigations were done to find out other system involvement. The data collected was analyzed statistically, using software SPSS version 13.

RESULTS

37(59.68%) of the patients were boys and 25(40.32%) were girls. 4 out of 62(6.45%) children were infants, 17(27.42%) were in 1-5 years age group and 5(8.07%) were above 10 years of age. Children between 5-10 years constituted 58.06% of the study population. Out of the 62, 38 children (61.29%) had a history of animal contact, 20 (32.26%) were barefooted, 10 (16.13%) had been in water logged areas. 33 (53.22%) had wet, dirty surroundings with open drainage, 32 children (51.61%) stayed in houses infested with rats, 13 (20.97%) had been recently to a village or a field trip. 41 out of 62 children (66.13%) were affected during the monsoon season, while 21 (33.87%) children had the disease in summer.

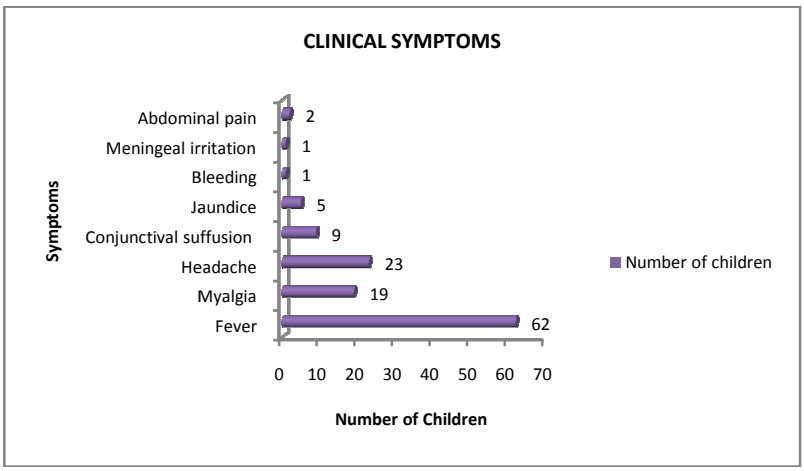

Table 1: Distribution of clinical symptoms in leptospirosis

35 out of 62 children (56.45%) were admitted in the hospital for an average of 5-10 days, 22 (35.48%) children stayed for less than 5 days and 5 (8.07%) had stay for 11-15 days. MAT was positive in 23 out of 62

children (37.10%), and was negative in 39 children (62.90%). All patients had 1:80 titres. ELISA test for leptospiral IgM antibodies was positive in 87.10% of cases and negative in 12.90% of cases. 50 (80.65%) children were positive for leptospirosis based on modified Faine's criteria. 27 children (43.55%) had scores between 25-30, 22 children (35.48%) had score between 31-35, while 1 child (1.61%) had score >35.

DISCUSSION

Leptospirosis is characterised by a broad spectrum of clinical manifestations varying from inapparent infection to fulminant fatal disease. A low index of suspicion of this disorder coupled with the diversity of its presentation accounts for significant number of cases that go unrecognized and are underdiagnosed[12]. In the present study maximum number of children diagnosed with leptospirosis were in the age group of 5–10 years (58.06%). Similar findings were reported by Rajajee S *et al* in Chennai[13], Suarez Hernandez in Cuba and Marotto PC in Brazil[14]. The male to female ratio in our study was 1.5:1 which matched the ratio noticed in Karande S *et al* study (1.6:1). But many studies have reported male preponderance, some as many as 5 times[13,14]. Present study reported 38 (61.29%) cases with history of animal contact while exposure to contaminated environment (wet, dirty surroundings) was seen in 33 (53.22%) cases. Shivakumar S reported, animal contact and contaminated environment in 94% and 95% cases respectively[15]. This difference may have been because urban population in our study. The icteric type of Leptospirosis was present only in 5 (8.06%) of our children. This is different from earlier reports from Brazil where 70% of patients presented with jaundice. Less number of children with jaundice were also seen in other previous reports from Mumbai showing 36% of children and from Chennai showing 18% of children presenting with jaundice as the predominant symptom. Meningitis was seen in only 1 case (1.61%) in our study as against 23% reported in Brazil study, and 7% reported in study done by Rajajee S *et al*[13]. The differences is due to early diagnosis and institution of effective antibiotic therapy. Fever was the most common symptom seen in 62 (100%) in present study. MAT was positive in 23 out of 62 children (37.10%). IgM ELISA was positive in 54 children (87.10%). ELISA test becomes positive slightly earlier than MAT. This could account for the higher positivity of ELISA as compared to MAT. Most samples (64.52%) in present study were studied within one-two weeks of the onset of illness. 50 children (80.65%) had a modified Faine's score of more than 25and fulfilled for the diagnosis of leptospirosis. Similar findings were also seen in a study by Sethi S *et al* where 88.13% of cases were diagnosed by modified Faine's criteria[16].

CONCLUSION AND RECOMMENDATIONS

Slight male preponderance was seen. Fever was the most common presentation. Older children in the age group of 5-10 years were most susceptible. Modified Faine's criteria could diagnose leptospirosis in 50 (80.65%) of cases. We recommend that all children admitted for fever of more than 5 days and having symptoms suggestive of leptospirosis, should be screened for leptospirosis utilizing Genus specific tests like ELISA IgM. If positive, diagnosis of current leptospirosis can be made utilizing modified Faine's criteria.

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