ORIGINAL RESEARCH PAPER

Tropical Medicine

A STUDY OF CLINICAL PROFILE OF LEPTOSPIROSIS IN A TERTIARY CARE HOSPITAL

KEY WORDS: MODS, SIADH, Myocarditis

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ABSTRACT

Introduction: Leptospirosis is a zoonotic infection that can be lethal and is common in many tropical areas. It often spreads through huge epidemics following periods of high precipitation and floods. Exposure to infected reservoir host animals either directly or indirectly transmits infection. **Aim:** To study the clinical profile of leptospirosis patients admitted in a tertiary care hospital. **Methods** The present electronic record based retrospective study was conducted among eighty patients admitted with a diagnosis of leptospirosis at the Saveetha Medical College Hospital for the period of one year between January 2022 and December 2022. **Results** A total of 80 patients were included in the study . Among the study population 53.75% of the patients were males. The median age of the patients was 41.5 years. Most of the cases presented in the rainy season. In our study. most common symptom was fever (90%). Other symptoms were myalgia (87.5%), headache (41%), Abdominal pain (35%), Vomiting (25%), Loose stools (20%) and Dyspnea (10). Comorbidities in our study population include diabetes mellitus(n=8), systemic hypertension (n=6), coronary artery disease (n=1), hypothyroidism (n=2) and asthma (n=3). Complete hemogram revealed leucocytosis in 60% (n= 48) of the patients ,leucopenia in 2.5% (n=2), thrombocytopenia in 60% (n= 48) of the patients. Electrolyte abnormalities include hypokalemia (60%) , hyponatremia (40%) and hyperkalemia (n=2). Liver function tests (LFT) was deranged in 47.5% of the patients. Acute kidney injury was found in 27.5% patients (n=22) among which dialysis was needed for six patients. Liver was the most common organ affected followed by kidney. Bleeding manifestations occurred in 20% of the patients. Other complications include septic shock (18.75%) , acute respiratory distress syndrome (15%), encephalopathy (6.25%) and myocarditis (5%). Death occurred in 6.25% (n= 5) of the patients. **Conclusion:** Eventhough case fatality rate in leptospirosis is low, incidence of complications are higher. severe thrombocytopenia is associated with worse outcomes. Hypokalemia and hyponatremia are the most common electrolyte abnormalities. Liver and kidney are the most common organs affected. Incidence of cardiac and pulmonary manifestations leads to fatal outcomes.

INTRODUCTION:

Leptospirosis is a zoonotic infection that can be lethal and is common in many tropical areas. It often spreads through huge epidemics following periods of high precipitation and floods. Exposure to infected reservoir host animals either directly or indirectly transmits infection.

The host animals shed harmful germs in their urine and carry the pathogen in their renal tubules.

Although many domestic and wild animals can serve as reservoir hosts, the brown rat (Rattus norvegicus) is the most significant and frequent source of infections in humans.

Rat exposure and leptospirosis are serious health risks for those who live in urban slum areas with insufficient housing and sanitation[1]. According to global data gathered through surveys by the International Leptospirosis Society, there are 350,000–500,000 cases of severe leptospirosis per year[2]. Innate immune systems eventually set off tissue-based and systemic responses to infection that result in serious consequences like a sepsis-like syndrome or organ failure when high levels of leptospiremia are present during infection. Leptospirosis is known to generate cytokine storm and individuals with severe cases had greater levels of IL-6, TNF-alpha, and several other cytokines than those with moderate cases[3]. The liver is one of leptospirosis' primary target organs. Leptospirosis fatalities have been linked to sinusoidal congestion and distention of the space of Disse between the sinusoids and hepatocytes, according to pathology studies from autopsy specimens[4]. The availability of straightforward diagnostic tests should aid in the identification of less severe types of leptospirosis. The Modified Faine's Criteria is a good clinical tool for identifying leptospirosis[5].. There is lacunae of information on the prevalence and several clinical presentations of leptospirosis in India, where there is high prevalence of tropical climate which favours the spread of leptospirae. The goal of the current study was to evaluate the clinical features, laboratory features, complications and prognosis of leptospirosis patients admitted in saveetha medical college hospital for a period of 1 year.

AIM

To study the clinical profile of leptospirosis patients admitted in saveetha medical college hospital over a period of 1 year.

MATERIALS AND METHODS:

The present electronic record based retrospective study was conducted among all patients admitted with a diagnosis of leptospirosis at the Saveetha Medical College Hospital. It acts as a referral center for Northern districts of Tamilnadu and Southern parts of Andhra pradesh. The information on the demographic and clinical profile of leptospirosis patients seeking medical attention (only serologically confirmed cases through Lepto IgM ELISA) was recorded in the data capture sheet after a review of the leptospirosis patient registries for the period of one year between January 2022 and December 2022. All the data were analysed anonymously

RESULTS:

A total of 80 patients were included in the study . Among the study population 53.75% of the patients were males. The median age of the patients was 41.5 years. Table 1 shows seasonal distribution of patients presenting to the hospital with predominance of cases in the rainy season. In our study 80% of the patients were from rural areas. Figure 2 shows the symptom distribution of patients in our study. Most common symptom was fever (90%). Other symptoms were myalgia (87.5%), headache (41%), Abdominal pain (35%), Vomiting (25%), Loose stools (20%) and Dyspnea (10%).Table 2 shows the distribution of comorbidities in our study population which include diabetes mellitus(n=8), systemic hypertension (n=6), coronary artery disease (n=1), hypothyroidism (n=2) and asthma (n=3). Complete hemogram revealed leucocytosis in 60% (n= 48) of the patients ,leucopenia in 2.5% (n=2), thrombocytopenia in 60% (n= 48) of the patients. Electrolyte abnormalities include hypokalemia (60%) , hyponatremia (40%) and hyperkalemia (n=2). Liver function tests (LFT) was deranged in 47.5% of the patients in the form of hyperbilirubenemia (47.5%) , transaminitis with AST > ALT (25%) and elevated alkaline phosphatase (10%). Acute kidney injury was found in 27.5% patients (n=22) among which dialysis was needed for six patients. Figure 2 shows various complications noted in these 80 patients. Liver was the most common organ affected followed by kidney. Bleeding manifestations occurred in 20% of the patients among which bleeding gums was the most common . Malena occurred in 2 patients , pulmonary hemorrhage was found in 2 patients and subdural hemorrhage in 1 patient. Other complications include septic shock (18.75%) , acute respiratory distress syndrome (15%), encephalopathy (6.25%) and myocarditis (5%).Table 3 shows the number of patients with multiorgan dysfunction syndrome (MODS) and the number of survivors among those patients. Death occurred in 6.25% (n= 5) of the patients.

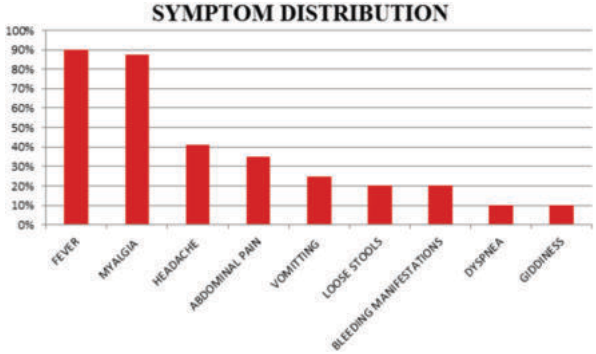

Figure 1 shows symptom distribution of the patients in the study (N=80)

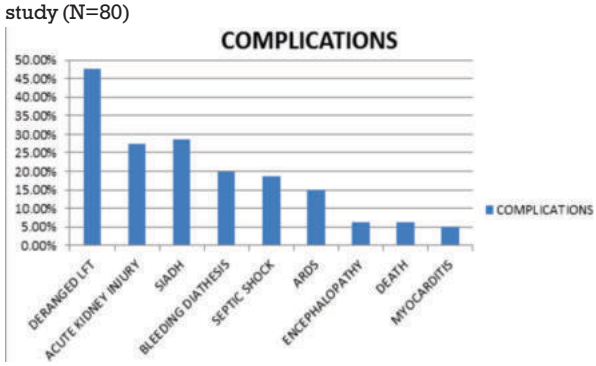

Figure 2 shows distribution of complications in the study population (N=80)

Table1. Seasonal distribution (N=80)

Season	No of patients	Percentage%
Rainy	40	50
Winter	25	31.25
Summer	15	18.75

Table 2. Comorbidities observed in patients (N=80)

Comorbidities	Frequency
Diabetes Mellitus	8
Systemic Hypertension	6
Coronary Artery Disease	1
Hypothyroidism	2
Asthma	3

Table 3.Multi organ dysfunction syndrome (MODS)

MODS	Number of patients (20)
Survivors	15
Nonsurvivors	5

DISCUSSION:

Leptospirosis is an infectious illness brought on by the spirochete Leptospira interrogans, which can range in severity from a asymptomatic to serious and sometimes deadly systemic infection. Leptospirosis often occurs during the wet season. According to Patil V. et al, his study showed that the months of July and August had the highest occurrence. Patients made up of 21.73% workers and 78.26% farmers[6]. In our study, the rainy season was when 50 % of patients presented. Our patients came from rural areas in 80% of cases. Leptospirosis symptoms first appear suddenly as a rash, conjunctival congestion, headache, fever, malaise, and myalgia.

In our study, we found that 90% of patients had fever, 88% had body aches, 25 % had vomiting, and 10% had dyspnea as their primary presenting symptom. An important laboratory parameter of leptospirosis is thrombocytopenia, and it occurs in 40-86,6% of infections[7]. The processes include immune-mediated platelet destruction, peripheral platelet consumption, and bone marrow-inhibited platelet creation. In our study thrombocytopenia was found in 60% of the patients. The study done by Sharma et al and Pappachan et al showed thrombocytopenia in 86.6% and 65.8 % respectively[8,9].In our study, all patients with myocarditis (n=4), 66% of patients with septic shock (n=10/15) , 85% of patients with ARDS (n=10/12) had platelet count less than one lakh cells/cu.mm. Jaundice, acute kidney injury (AKI), and bleeding known as Weil's disease are all symptoms of the severe type of leptospirosis, which is brought on by the serovars Icterohaemorrhagiae, Copenhageni, and Lai. In leptospirosis, thrombocytopenia is commonly accompanied with AKI and liver impairment. Weil's syndrome was found in 33.75% (n=27) of patients in our analysis, nearing the incidence of 30.43% seen in Vikas Ratnaparkhe et al's study[10]. 49 leptospirosis patients' platelet levels were examined retrospectively by Turgut M et al. 43 individuals (87.8%) had thrombocytopenia. In 11 cases, hemorrhagic events were seen. Acute renal failure affected 36 patients (73.5%), whose mean platelet count was 0.46 lakhs/cu.mm. Renal failure and/or thrombocytopenia are frequently linked to multiple organ involvement and fulminant illness in leptospirosis[11]. In our study , renal parameters were deranged in 27.5% of the patients and the mean platelet count among these patients was 0.81 lakhs/cu.mm. Recent research has demonstrated the value of early dialysis for leptospirosis patients, with a decrease in mortality. A significant drop in mortality was shown in the group getting early (on admission) and daily dialysis as compared to the group receiving late-onset dialysis every other day (16.7% vs. 66.7%) in a research conducted in So Paulo with 33 patients with leptospirosis admitted to an ICU[12]. In a study by Praveen V et al, 68.46% of patients had elevated total bilirubin, 67.69% had elevated direct bilirubin, 93% had elevated SGOT and 93% had elevated SGPT, and 36.92% had elevated ALP[13]. In our study, hyperbilirubinemia (47.5%) was the most common LFT derangement observed in which direct bilurubin was elevated predominantly ; transaminitis was found in 25% of the patients in which Aspartate transaminase was found to be higher than Alanine transaminase in all these patients . Alkaline phosphatase was elevated in 10% of the patients. Hypokalemia was the most common electrolyte

abnormality and was observed in 60% of the patients; among which renal potassium wasting was seen in 62.5% of patients with hypokalemia (n=30). The mechanism of potassium loss can be due to gastrointestinal losses and inhibition of the Na-K-ATPase pump by the outer membrane proteins of leptospira, which results in an increase in internal sodium and a reduction in sodium transport at the luminal edge of the tubules. Therefore by increasing sodium delivery distally, Na-K exchange produces kaliuresis[14]. In a retrospective study by Gdayllon Cavalcante Meneses et al , hyponatremia was found in 51% of patients and was associated with higher incidence of complications[15].In our study hyponatremia was found in 40% of the patients (n=32) in which SIADH was found in 25% of the eighty leptospira infected patients. Renal and hepatic involvement are the hallmarks of leptospirosis; significant cardiac and pulmonary illness is less frequently described[16,17]. Although the liver and kidney were the most often affected organs in our study, patients with myocarditis (n= 4) and pulmonary haemorrhage (n=2) had 100% death rate. All patients who died (n=5) had acute respiratory distress syndrome (n= 12). If the lungs are involved, leptospirosis mortality is two times greater as quoted in a retrospective case study done by J P Courtin et al[18]. According to Dupont et al., alveolar infiltration and dyspnea are separate variables with poor prognoses that are linked to increased mortality[19]. Even before the development of renal or hepatic dysfunction, alveolar haemorrhage has been seen[20]. The pathophysiology of cardiac involvement in leptospirosis is poorly understood. Cardiac involvement, demonstrated electrocardiographically or clinically, tends to predict poor outcome[21]. In our study acute myocarditis was found in 5% of the patients (n=4) and death occurred in all these patients.

CONCLUSION:

Higher incidence of cases indicate endemicity of the disease. Faine's diagnostic criteria can be used for identification of leptospirosis patients. Leptospirosis more often occurs during rainy season. Eventhough case fatality rate in leptospirosis is low, incidence of complications are higher leading to significant morbidity. Thrombocytopenia in leptospirosis is common and severe thrombocytopenia is associated with worse outcomes. Hypokalemia and hyponatremia are the most common electrolyte abnormalities. Most of the patients with hyponatremia have SIADH. Liver and kidney are the most common organs affected. Although liver and kidney are the most common organs involved, incidence of cardiac and pulmonary manifestations leads to fatal outcomes.

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