



Study of the clinical profile of sporadic cases of Leptospirosis

KEYWORDS

Leptospirosis , zoonotic , ELISA

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ABSTRACT *Background - Human Leptospirosis is a zoonotic disease. Infection is acquired either directly through contact with an infected animal or indirectly by water or soil contaminated with the urine of an infected animal. We carried out a hospital based retrospective study of 15 sporadic cases of leptospirosis admitted in a tertiary care hospital in Western Maharashtra. Methods-This study was done over a period of one year (February 2013 – January 2014) and included 15 confirmed cases of leptospirosis. Institutional ethical committee permission was taken prior to the study and a detailed hospital indoor records including history, clinical findings, laboratory findings, complications, outcome after treatment were sought to understand the clinical spectrum of the disease. All included cases were positive for Leptospira IgM ELISA test (Enzyme Linked Immunosorbent Assay) with significant titre of ≥ 80 . Conclusion- Leptospirosis is not uncommon in Western Maharashtra and patients presenting with acute febrile illness with thrombocytopenia and rapid deterioration with multi organ involvement should raise the suspicion of leptospirosis. Though seen in monsoon season, sporadic cases can be encountered throughout the year as shown in this study. Early diagnosis and treatment will reduce significant mortality and morbidity.*

Introduction –

Leptospirosis is zoonotic disease, which is caused by spirochaete *Leptospira interrogans*. It has been recognized as an important emerging global public health problem because of its epidemic proportions and increasing incidence in both developing and developed countries (Meites et al 2004). It is tropical infection which leads to great degree of morbidity to mortality among the productive population of the country.

It is little more than 100 years since Weil, Professor of Medicine in 1886, whose name has been given to this disease. Leptospirosis is caused by different serovars of spirochete *Leptospira* namely; *Leptospira interrogans*, *icterohemorrhagica*, *grippotyphosa*, *biflexa*, *Pomona*, *ballum*, *canicola*, *copenhageni* etc. These different serovars are found in different animals who act as reservoirs for them.

Humans are accidental hosts and usually become infected through, walking bare foot with lacerated wound or abrasion over feet or anywhere over the body through contact with water in lake or ponds or soil contaminated by the urine of infected animals such as rats , dogs, cattle pigs usually in urban & rural area. Leptospirosis cases are mostly seen in rainy season while walking bare foot or injuries over the body which comes in contact with flood water which is contaminated.

Sporadic cases of leptospirosis is seen throughout years. The spectrum of disease ranges from subclinical infection to a severe syndrome of multiorgan dysfunction characterized by headache, fever, myalgia, jaundice, hepatomegaly and convulsions¹. Clinical manifestations of unicteric leptospirosis are fever , myalgia, rash over body, meningitis, severe pulmonary hemorrhage syndrome. Ictero-hemorrhagic leptospirosis is the infection which cause the person to turn yellow, have kidney failure & bleeding which is known

as Weil's disease. It is biphasic infection with initial acute phase of bacteremia which lasts for week followed by immune phase characterized by antibody production and excretion of leptospire in the urine. This occurs in the second week of the infection.

In mild infection (subclinical) it manifests as acute febrile illness and do not seek any care and recover on its own. The fever may be associated with chills, severe myalgias, headache, conjunctival suffusion.

Complications in leptospirosis usually affects multi organs. It can lead to liver dysfunction, thrombocytopenia, and acute renal failure. It may present as ARDS, neurological manifestations or cardiac involvement in the form of myocarditis with arrhythmias. A mortality rate of 54% was reported in severe cases of leptospirosis^{2, 3, 4}. Ocular late complications in the form of uveitis, iritis, scleritis, vitreous opacities, vasculitis, and anterior chamber cells also occur. Other complications in the form of thrombotic thrombocytopenic purpura, Acalculus cholecystitis, rhabdomyolysis, etc. have also been reported.

Treatment is determined by clinical status of the patient. Mild febrile illness can be managed on OPD basis with oral antibiotics, nutrition, hydration and rest. While patient with jaundice and other complications like thrombocytopenia, hepatic encephalopathy, hypotension, ARDS, renal failure may require intensive care management. Oral Doxycycline in the dose of 100mg BD for 10 days has been recommended.

Epidemiology

Leptospirosis is currently identified as a worldwide public health problem. Increase in the incidence of the disease has been recorded in countries where leptospirosis surveillance exists (WHO 2003). The annual incidence of lepto-

spiro-sis has increased from 0.3/100,000 persons (between 1982 and 1995) to 3.3/100,000 persons (between 1997 and 1998) in Thailand (Faine 1994). During the past several years, large outbreaks of leptospirosis have occurred in many countries, particularly in Southeast Asian countries, Central and South America. Leptospirosis is the cause of a significant proportion of cases of non-hepatitis A and E jaundice, non-malarial febrile illnesses and non-dengue hemorrhagic fever in South East Asia (Laras et al 2002).

Indian Scenario

Leptospirosis was first reported from the Andaman Islands in 1929, and has since then affected all parts of India⁵. Although national incidence data are not available, leptospirosis has been recognized as a major health problem. Human leptospirosis is prevalent in many states of India, sporadically or as outbreaks, especially during rainy seasons. It is known that leptospirosis is wide spread in farms and domestic animals in many parts of Andhra Pradesh, Maharashtra, Karnataka, Kerala, Tamil Nadu, North-East, West Bengal, Bihar, Madhya Pradesh, Punjab and Haryana⁶. Natural disasters and poor sanitary conditions have contributed to the multiple epidemics reported⁶, and several outbreaks of the disease have been reported in recent years^{7,8}. Multi-centric investigations in India indicate that leptospirosis account for about 12.7% of cases of acute febrile illness reporting to the hospitals (Sehgal et al 2003). Following the super-cyclone that hit the coastal villages in Orissa, nearly 14% of the studied subjects had febrile illness and serological evidence of leptospiral infection (Faine 1994).

The state of Maharashtra has reported total 170 cases and 7 deaths due to leptospirosis in the year 2014. The highest four deaths have occurred in Mumbai. The disease has been detected in Thane, Navi Mumbai & coastal regions of Maharashtra (Times of India 14 December, 2014). But limited data is available regarding occurrence of this disease in the Western part of the state. The Union Government of India has implemented a National Programme for the prevention and control of leptospirosis, which is being implemented in endemic parts of country including Maharashtra. The program aims to reduce the morbidity and mortality rate due to leptospirosis.

Materials and Method

The study was conducted at Bharati Vidyapeeth Deemed University Medical College and Hospital, Sangli, Maharashtra, a tertiary health care centre. A total number of 1286 patients (age > 16 years) were admitted with acute febrile illness due to various causes out of which 15 were confirmed cases of leptospirosis (all other common causes of fever like malaria, enteric fever, brucellosis, scrub typhus, Dengue fever, UTI, LRTI, septicemia and PUO were excluded) in our hospital from 1st February 2013 to 31st Jan 2014. The confirmed cases were tested for IgM Elisa test with significant titre ≥ 80 from Thyrocare laboratory. However, culture and PCR tests were unavailable in our setting which was the limitation of our study. Epidemiological variables including gender, age, occupation and residential address were studied. Institutional ethical committee approval was taken to conduct this retrospective study.

Clinical manifestations were fever, rash, cough, anorexia, vomiting, jaundice, pain in abdomen, headache, weakness, drowsiness. Laboratory data included all routine investigations, WIDAL, Dengue, Rapid malarial test, ECG, CXR, CSF studies wherever necessary.

All confirmed cases of Leptospirosis were treated with recommended dosage of parenteral Crystalline Penicillin 20 lakh U.I.V. 6 hourly in critically ill patients and those with milder forms were given Cap. Doxycycline 100mg 1 BD for 10 days. All patients responded well to treatment without any mortality.

Results

Table 1. Baseline characteristics of the patients

	Data	No. of cases	Percentage
1.	<u>Gender -</u>		
	Male	9	60
	Female	6	40
2.	<u>Age (in years)-</u>		
	18-40	9	60
	41-60	5	33
	>61	1	7
3.	<u>Occupation-</u>		
	Farmers	8	53
	Housewife	4	26
	Businessmen	3	21
4.	<u>Residence-</u>		
	Rural	12	80
	Urban	3	20

Table No. 2 Symptoms and signs

	Symptoms/Signs	No. of cases	Percentage
1.	<u>Fever duration-</u>		
	1-3days	4	26
	4-7days	6	40
	>7days	5	34
2.	Cough	2	13
3.	Breathlessness	5	34
4.	Headache	7	47
5.	Vomiting	6	40
6.	Pain in abdomen	5	34
7.	Loose motions	4	26
8.	Generalised weakness	2	13
9.	Loss of appetite	5	34
10.	Joint pain	3	20
11.	Altered mentation	2	13
12.	Maculopapular rash	3	20
13.	Jaundice	9	60
14.	Tachycardia	6	40
15.	Lymphadenopathy	0	-
16.	Hepato-splenomegaly	4	26
17.	Lung crepitations	5	34

Table No. 3 Laboratory Findings

	Laboratory Data	No. of Cases	Percentage
1.	Anemia	8	53
2.	Leucopenia	2	13
3.	Leukocytosis	8	53
4.	Platelets	12	80
	<1.5 lakh/mm ³		
5.	AST(SGOT) elevation	13	87

6.	ALT(SGPT) elevation	13	87
7.	ALP	11	73
8.	Sr. Creatinine	10	67
9.	CSF study	4 (Normal study)	-
10.	USG(Abdomen & pelvis)		
	Ascites with pleural effusion	2	13
	Bilateral pleural effusion	3	20
	Hepatosplenomegaly	6	40
	Hydrocele	1	7
11.	Chest X-Ray (Pneumonitis)	4	27
12.	ECG (Tachycardia)	6	40

Table No. 4 Organ involvement -

	Organ Involved	No. of cases	Percentage
1.	Respiratory-		
	Pneumonitis	4	27
	Pleural effusion	3	20
2.	CNS		
	Meningitis	2	13
3.	CVS		
	Tachycardia	6	40
4.	Renal Failure	10	67
5.	Hepatic dysfunction	13	87
6.	Hepato-splenomegaly	6	40
7.	Thrombocytopenia	12	80

A total of 15 patients were diagnosed with Leptospirosis from 2013 – 2014. All cases were positive for IgM ELISA test with significant titre >80. The demographic results are seen in Table 1. Both males (n=09) and females (n=06) were among identified cases.

Adults in the age group 18-40 constituted 60%, age 41-60 constituted 33% and age group above 60 constituted 07%. Almost 80% cases were encountered in the rural population. This study done over a one year period showed equal distribution of cases in different seasons. It showed disease to be common in farmers with 53% occurrence but was also seen in housewives (26%) and non-farming population (21%). This suggests that leptospirosis is not just seen in farmers or those coming in contact with the domesticated animals but other people are also at risk of contacting this disease.

The clinical symptoms are shown in Table No. 2. All patients presented with fever, ranging from 1 to 14 days prior to hospital admission. Other symptoms included the presence of cough(n=02), breathlessness(n=05), loss of appetite(n=05), headache(n=07), rash(n=03), vomiting(n=06), pain in abdomen(n=05), weakness (n=02), drowsiness(n=02), etc. Other signs included Jaundice (n=09), tachycardia(n=06), Hepatosplenomegaly (n=04) and lung crepitations (n=05).

Several laboratory values were consistently elevated among most cases, especially SGPT/SGOT (87%) , Alkaline phosphatase(73%) and Serum Creatinine(67%) , etc. Other abnormalities like thrombocytopenia (<1.5lakh/mm³) , anemia and leucocytosis were noted in a few cases. 6 cases (40%) had shown hepatosplenomegaly on USG and 3 cases (20%) showed pleural effusion with ascites. 4 pa-

tients(27%) showed pneumonitis on chest Xray. Lumbar puncture was done in just two cases who had shown altered mentation, but reports were within normal limit. No any mortality occurred in any of the subjects.

Discussion

The occurrence of leptospirosis in patients with an acute febrile illness has been studied less often in Western Maharashtra as compared with other parts of the country. The highest positivity rate of 25.6% has been reported from South India. The reported positivity rates are 8.3%, 3.5%, 3.1% and 3.3% in northern, western, eastern and central India, respectively⁹. Although traditionally considered to be a disease of sewage workers, miners and farmers, leptospirosis is now recognized as one of the common causes of acute febrile illness in the general population. We found that 15 of 1286 patients had serological evidence of leptospirosis. A seroprevalence of 8.8% and 21.7% has been reported from Chandigarh and Varanasi, respectively, by Sethi et al¹⁰. Leptospirosis has a peak during the monsoon and post-monsoon months but our study showed occurrence of sporadic cases throughout the year. Studies done previously showed the disease occurring more commonly in people living in urban slums with poor sanitation and low hygienic conditions. However, in the past decade, it has been reported from all parts of urban and rural India which is consistent with our study¹¹. We found the prevalence among housewives (26%) followed by businessmen (21%). This also suggests that Leptospirosis can be seen amongst all the population groups irrespective of occupation and place of residence. This should avail the physicians to suspect this disease presenting with acute febrile illness with Hepato-renal involvement.

Fever was the commonest clinical presentation in the present case series (100% cases). Other symptoms with decreasing order of frequency were, headache (47%) , Vomiting (40%) , Pain in abdomen (34%) and loss of appetite (34%). Leptospirosis has two distinct clinical syndromes—a mild anicteric febrile illness seen in 90% of patients, and a severe variety (10%) with jaundice and other manifestations (Weil disease)¹². The laboratory investigations in our study were consistent with both mild and severe forms of leptospirosis. Though the incidence of icteric and severe disease with renal failure has decreased in certain centers of south India¹³, the present study found several cases manifesting with severe icteric disease and renal failure. In our study, 60% patients had jaundice, 87% patients had elevated liver enzymes and 67% had deranged renal function tests. Prabhakar MR et al. point out that epidemiological and clinical pattern of infectious disease change in course of time and leptospirosis is no exception to this rule¹³. We further argue that the pattern may vary from region to region. Knowledge of such changing epidemiological and clinical profile of leptospirosis is essential for successful prevention, early diagnosis and treatment¹³.

We encountered 2 patients with central nervous system manifestations and 4 patients with respiratory complications. In the present study, 80% cases had thrombocytopenia which was also the commonest hematological complication seen in studies done in the past.

All confirmed cases of Leptospirosis were treated with recommended dosage of parenteral Crystalline Penicillin 20lakh U I.V. 6 hourly in critically ill patients and those with milder forms were given Cap. Doxycycline 100mg 1 BD for 10 days. All the patients responded well to the treatment without any mortality.

Conclusion

There is a significant rise in the incidence of leptospirosis in Western Maharashtra. It can be encountered in all the seasons irrespective of the occupation and place of residence. Clinical manifestations and laboratory abnormalities were protean; severe complicated disease with renal, hepatic or respiratory failure, thrombocytopenia and neuroleptospirosis was also observed. The increased awareness among physicians of protean clinical manifestations of leptospirosis and early laboratory diagnosis will help reduce morbidity and mortality associated with disease.

Serodiagnosis by a microagglutination test (MAT) is the gold standard but is not universally available. Leptospirosis can be easily diagnosed using a latex agglutination test and IgM ELISA. We recommend all the physicians to consider the differential diagnosis of leptospirosis in cases of fever with multiorgan involvement particularly affecting respiratory system and liver dysfunction.

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