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A Clinical Study of Leptospirosis and Its Complications

Dr.Sayali Damle[1], Dr.Shwet Sabnis[1], Dr.T.K.Biswas[2]
[1]Resident (Geriatrics), [2]Professor and HOD (Geriatrics)
Mahatma Gandhi Mission Institute of Health Sciences, Navi Mumbai
Corresponding Author: Dr.Sayali Damle

ABSTRACT
OBJETIVES: *to review clinical features and related complications of leptospirosis in view of upsurge of leptospirosis in urban population.*
DESIGN:retrospective observational study
SETTING: *Mahatma Gandhi Mission Institute of Health Sciences, Navi Mumbai.*
PARTICIPANTS: Patients aged 60 years and above attending both in-patient and out-patient department with positive Leptospirosis IgM.
METHODOLOGY: *We conducted a systematic review of 35 patients attending both inpatient and outpatient department with positive Leptospirosis IgM. Detailed history of each patient was taken including laboratory investigations and physical examination. Patients in acute phase presented with symptoms like fever with chills, headache, vomiting, myalgia, breathlessness, icterus, cough and decreased urine output. Clinical and epidemiologic data was collected for each patient. Laboratory tests included complete blood count, liver function test, renal function test, urine routine and microscopy and leptospiraIgG, IgM.*
RESULTS: *The 32 cases presented with following gender distribution: male (n=21) and female (n=11). Maximum cases were seen in Monsoon season. The main presenting complaints were fever and chills with occurred in 100% patients followed by headache and myalgia (93%), vomiting (87.5%) and oliguria (68.75%). Mortality increased with increase in number of complications. The most common complication was hepatic failure followed by renal failure.*
CONCLUSION: *Leptospirosis remains one of the common febrile illness with myalgia and associated hepatorenal involvement needing prompt and early treatment for satisfactory outcome. Due to wide spectrum of clinical signs and symptoms, a high degree of clinical suspicion is necessary for timely diagnosis. People in endemic areas should be educated about the disease specially the signs and symptoms and advise to come to the hospital as early as possible for treatment which will prevent multi-organ failure and subsequent mortality.*

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I. Introduction

Weil, in 1886, first reported a case of severe icteric illness that he found to be different clinical entity. During a yellow fever epidemic in 1907, the causative organism was successfully seen in dissected kidney tissue. In 1915, spirochete was successfully cultured and was linked to Weil's disease.Leptospirosis is an acute anthropo-zoonotic infection caused by a spirochete Leptospira which has twenty three serogroups and approximately more than 200 serovars[(1)]. The disease incidence was negligible earlier but now the incidences are increasing and leptospirosis has become an important public health issue. It is spreading in urban areas recently due to poor hygiene conditions and population surge [(2, 3)].

Leptospira is one of the commonest zoonoses in the world [(4)]. Leptospirosis is mainly the disease of animals and almost all animals can transmit it to humans. During 1930-1960, there were few reports scattered through different parts of the country [(5, 6)]. Several outbreaks occurred in various parts of the country mainly including Tamilnadu, Karnataka and Nagpur. In 1988, it was reported in the Andaman Island and was called as Andaman hemorrhagic fever [(7)]. Following heavy rains and floods in Mumbai and Thane area, outbreaks were reported. Epidemics have also been reported in Kerala. All these point that Leptospirosis has emerged as a major public health problem in India.

II. Materials And Method

This was a retrospective observational study conducted in Mahatma Gandhi Mission Institute of Health Sciences, Navi Mumbai. Patients aged more than 60 years presenting with acute febrile illness and proven positive IgM for leptospirosis were included in this study. Patients with negative IgM for leptospirosis were excluded from the study, even though they were having symptoms and clinical features suggestive of leptospirosis.

Thorough history of presenting complaints, age, sex, address, duration of fever, temperature pattern, headache, nausea, vomiting, myalgia, decreased urine output, conjunctival hemorrhages, jaundice, occupation, and titre of IgM positivity was recorded. Clinical examination and laboratory reports were recorded and statistically analyzed. All patients received intravenous crystalline penicillin and oral doxycycline, supportive care which included intravenous fluids, dialysis, ventilatory support and other medications based upon symptoms. Close monitoring was done every 4-6 hourly. Urine routine and microscopy, liver function tests, renal function tests, complete blood count, chest radiograph and ultrasonography of abdomen and pelvis were the additional tests performed. During the course of hospitalization, additional tests were performed as and when needed.

Statistical analysis was done by using Microsoft excel sheet and numerical parameters in the form of mean, percentage standard deviation and correlation were calculated.

Acute kidney injury defined by serum creatinine level >1.5mg/dL, oliguria defined by 24 hour urine output less than 400mL, Acute respiratory distress syndrome, significant jaundice defined by serum total bilirubin >1.2mg/dL, hypotension suggested by mean arterial blood pressure of <70mm Hgand necessitating administration of vasopressors to maintain blood pressure and pulmonary hemorrhage were the markers of multiorgan dysfunction [(8)].

III. Results

Demographic and epidemiologic features

A total of 32 patients were diagnosed positive for leptospirosis from June to December 2017. Out of total 32 patients, 21 (66%) were male and 11 (34%) were female. Age was from 60 to 82 years with mean age being 67years. Total 30 (94%) cases were from May to October (monsoon season) and 2 (6%) were from November to April. Total 20 (62.5%) patients were farmers, 4 (12.5%) were housewives, 6 (19%) were manual labourers and remaining 2 (6.25%) were not working at all.

	NUMBER OF PATIENTS	PERCENTAGE
FARMERS	20	62.5%
MANUAL LABOURERS	6	19%
HOUSEWIVES	4	12.5%
OTHERS	2	6.25%

Clinical profile

Fever and chills were universally present in all 32 patients. In 22 (68.75%) patients fever lasted for 5-9days, in 7 (21.88%) patients fever lasted for 0-4 days and in 3 (9.38%) patients fever lasted more than 10days. Total 2 (28.5%) patients with fever of duration 0-4 days, 13 (60%) patients with fever duration of 5 to 9 days and 3 (100%) patients with fever duration more than 10 days died during the course of illness. 30 (93%) suffered from headache and myalgia. Jaundice was present in 27 (84%) cases. 28 (87.5%) patients complained of vomiting. Oliguria was observed in 22 (68.75%) patients. Breathlessness was seen in total 20 (62.5%) and cough in 12 (37.5%) cases. Total 6 (18%) patients had mental confusion.

SYMPTOMS	**NO. OF PATIENTS**	**PERCENTAGE**	**P VALUE**
FEVER	32	100%	0.4
CHILLS	32	100%	0.4
HEADACHE	30	93%	0.5
VOMITING	28	87.5%	0.65
MYALGIA	30	93%	0.81
MENTAL CONFUSION	6	18%	0.65
COUGH	12	37.5%	0.2
OLIGURIA	22	68.75%	0.00
HIGH COLOURED URINE	26	81%	0.37
BREATHLESSNESS	20	62.5%	0.00

Laboratory profile

All cases were positive for leptospira IgM, done by enzyme immunoassay method. Platelet count was more than 90,000 in 9 (28.13%), out of which only 1 (11%) patient died. Platelet count was 50,000 to 90,000 in 11 (34.38%) and mortality was 6 (54%). Platelet count was less than 50,000 in 12 (37.5%) cases out of which 11 (91%) patient died. Serum creatinine was normal in 1 (3.12%), less than 2.4mg/dL in 7 (21.87%), 2.5-7.4mg/dL in 21 (65.62%), 7.5-12.4mg/dL in 2 (6.25%) and more than 12.5mg/dL in 1 (3.12%) patients. Mortality was 100% in patient with creatinine more than 12.5mg/dL. Serum total bilirubin was less than 2.4mg/dL in 6 (18.75%), between 2.5-7.4mg/dL in 17 (53.12%), between 7.5-12.4mg/dL in 6 (18.75%) and more than 12.5mg/dL in (39.37%) cases. SGOT was normal in 4 (12.5%) patients, 41-80 in 15 (46.85%), 81-120 in 5 (15.62%) and more than 120 in 8 (25%) cases.

Clinical presentation and complications

26 (81%) patients developed hepatic failure. Renal failure was seen in 23 (72%) patients. Total 19 (60%) patients went into acute respiratory distress syndrome. Both hepatic and renal failure was seen in 19 (60%) patients. Hepatic plus renal failure and ARDS was the feature seen in 15 (47%) cases. Only 6 (18%) patients suffered from meningitis and myocarditis was seen in only 1 (3%) patient. Total 16 (50%) patients required ventilator support and hemodialysis was needed in 7 (21.87%) patients. 21 (65.62%) patients developed bleeding manifestations. Subconjunctival hemorrhage was commonest bleeding diathesis observed in 21 (65%) cases, followed by hematuria seen in 16 (50%), purpura seen in 14 (43.75%), hemoptysis in 8 (25%), hematemesis in 7 (21.87%), epistaxis and gum bleeding in 4(12.5%) cases each. All the patients received crystalline penicillin and doxycycline out of which 18 (56.25%) died. 21(65.62%) patients received intravenous methyl prednisolone of which 18 cases died (85.71%). Total 18 (56.25%) died during the course of illness and 14 (43.75) patients survived.

COMPLICATIONS	NO. OF PATIENTS	PERCENTAGE
HEPATIC FAILURE	26	81%
RENAL FAILURE	23	72%
ARDS	19	60%
RENAL+HEPATIC FAILURE	19	60%
RENAL+HEPATIC FAILURE + ARDS	15	47%
MENINGITIS	6	18%
MYOCARDITIS	1	3%

IV. Discussion

A vast variety of clinical manifestations is seen in leptospirosis. Age of the patients who took part in study ranged from 60-82 years with mean age 67 years. Most of the patients were between age group 60-70 years (75%). Occupation of patients in our study revealed occurrence of the disease to be more common in people engaged in outdoor activities like farming (62.5%) and manual labourers (19%). This is comparable to study by Muthusethupathi et al where 49% were out door workers, 8.8% non-outdoor workers [(9)]. According to Alan R Katz et al 28% were farmers, 16% were manual labourers and 31% had no formal employment [(10)].

Fever with chills was the commonest presenting symptom, seen in all (100%) patients. This was followed by headache (93%), myalgia (93%), vomiting (88%), high colour urine (81%), oliguria (69%), altered sensorium (18%) and breathlessness (63%). In this study bleeding manifestations were seen in 22 (68%) patients in the form of subconjunctival hemorrhage (65%), hematuria (50%) and purpuric rashes (44%). Epistaxis, gum bleeding and hemoptysis was seen in few patients. These findings are consistent with the study by Gopalkrishnan et al [(11)] where they found clinical features of fever (98%), myalgia (72%), jaundice (40%) and bleeding (25%).

Liver was the most common organ involved (84%) and clinically jaundice was seen in 84% patients and hepatomegaly in 53% patients. 16 (61%) out of 26 patients of hepatic failure died. Hyperbilirubinemia was seen in 81% patients, mainly conjugated type. Hepatic encephalopathy was seen in 9% patients from our study. Muthusethupathi et al has shown liver involvement in 84% of patients with predominant conjugated hyperbilirubinemia [(9)]. Kidney was the second most common organ involved (71%) and was found as a part of multi-organ failure. Muthusethupathi et al also found kidney involvement in 71.92% patients and oliguria was present as consequence ARF in renal involvement [(9)].

Thrombocytopenia was important hematological abnormality and was present in 68% of patients. Other hematological abnormalities included anemia (87%) and leukocytosis (50%). However thrombocytopenia was most important as it was present in all patients who died. According to Muthusethupathi et al, thrombocytopenia was reported in 22% patients [(9)].

Multi-organ failure was seen in 60% of our patients and was significantly related to mortality. All patients who had multi-organ failure, died. Singh et al have found multi-organ failure in 45.6% patients [(12)].

V. Conclusion

Leptospirosis remains one of the most common febrile illnesses with myalgia and associated hepato-renal involvement needing prompt and early treatment. The wide range of its clinical symptoms and signs necessitates a high degree of clinical suspicion for timely diagnosis. Males engaged in outdoor activities were more prone to the disease. Clinical features which prompt the investigation for leptospirosis include fever, myalgia, jaundice hypotension and high coloured urine. Liver and kidney were the commonest organs involved. Multi-organ failure and thrombocytopenia was significantly associated with mortality.

People living in endemic areas should be educated about the disease, its signs and symptoms and should be advised to seek medical intervention as early as possible to avoid development of complications like multi-organ failure and subsequent mortality. Hospitals in nearby vicinity should have adequate stock of

diagnostic tools, drugs like penicillin and doxycycline, blood components and life supporting equipment in monsoon season.

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