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CLINICO EPIDEMIOLOGICAL PROFILE OF LEPTOSPIROSIS IN A TERTIARY CARE CENTRE IN SOUTH INDIA

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Abstract

Introduction: Leptospirosis is a zoonosis of worldwide distribution caused by pathogenic spirochetes of the genus Leptospira. **Aim:** main objective is to study clinico epidemiological profile of leptospirosis. **Methodology**: The study described is a prospective study conducted at the General Medicine Department and allied specialities of MOSC Medical College, Kolenchery, over a one-year period from March 2012 to March 2013. The study aimed to investigate leptospirosis among patients admitted during this time frame. The study included patients aged between 17 to 90 years who met the Modified Faine's criteria for leptospirosis, and a written consent was obtained from each participant. The sample size for the study was set at 100 participants. This design allows researchers to track the progression of the disease and observe its clinical course and outcomes in the study population over the specified period. **Result:** There was a higher proportion of male patients (73%) compared to females (27%).Fever, myalgia, and headache were universal symptoms observed in all patients, indicating their prominence in the clinical presentation of leptospirosis. A significant number of patients had a history of alcohol consumption (54%), smoking (33%), or tobacco chewing (3%), suggesting potential risk factors associated with the disease. SGPT levels varied among patients, with most falling within the normal range (40 – 160 U/L).The mortality rate in your study was relatively low, with 93% of patients being cured, 6% expiring, and 1 patient lost to follow-up. **conclusion:** findings contribute to a better understanding of the epidemiology, clinical presentation, diagnostic markers, radiological features, outcomes, and potential risk factors associated with leptospirosis.

Keywords: Leptospira, clinico-epidemiology, tertiary care.

INTRODUCTION:

Leptospirosis is a zoonosis of worldwide distribution caused by pathogenic spirochetes of the genus Leptospira. It is an infection transmitted among animals and occasionally from animals to humans. Leptospirosis is prevalent in tropical regions due to the favourable environmental conditions for the survival of its etiologic agent. It is also known by the names mud fever, swamp fever, sugar cane fever, Fort Bragg fever or Japanese autumnal fevers. Leptospira are motile microorganisms, 6 to 20 µm in length and 0.1 to 0.2 µm in diameter. They are obligate aerobes with unique nutritional requirements for long-chain fatty acids[1].There is a pathogenic (Leptospira interrogans) strain and a saprophytic (Leptospira biflexa) strain. The genus Leptospira includes 20 named species- 9 pathogenic, 5 intermediately pathogenic and 6 non-

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pathogenic. More than 250 serovars of the pathogenic and intermediately pathogenic Leptospira species cause disease in humans and animals. Virulence does not generally correlate with specific serovars, although serovar classifications can be useful epidemiologically to identify common-source outbreaks. The spectrum of human disease is extremely wide, ranging from subclinical infection to the most severe syndrome with multiorgan involvement with high mortality,called Weil's disease. Weil's disease is characterized by a severe febrile illness with bleeding, jaundice and renal failure, and may be associated with death through renal failure or pulmonary haemorrhage[2,3].

Aim: The main objective is to study the clinico epidemiological profile of leptospirosis.

METHODOLOGY:

The study described is a prospective study conducted at the General Medicine Department and allied specialities of MOSC Medical College, Kolenchery, over a one-year period from March 2012 to March 2013. The study aimed to investigate leptospirosis among patients admitted during this time frame. The study included patients aged between 17 to 90 years who met the Modified Faine's criteria for leptospirosis, and a written consent was obtained from each participant.The inclusion criteria specified the age range and the requirement for patients to meet the diagnostic criteria for leptospirosis according to Modified Faine's criteria. Meanwhile, certain groups were excluded from the study, such as patients with pre-existing lung diseases, renal failure on dialysis, HIV co-infected individuals, those taking immunosuppressants or cytotoxic drugs, and patients with decompensated liver disease.The study design being prospective implies that data were collected prospectively, starting from patient enrollment and following them over time to observe outcomes. The sample size for the study was set at 100 participants. This design allows researchers to track the progression of the disease and observe its clinical course and outcomes in the study population over the specified period.

Modified Faine's criteria (2004)

Clinical data (PART A)	**Score**	**Epidemiological factors (PART B)**	**Score**	**Bacteriological & laboratory findings (PART C)**	**Score**
Headache	2	Rainfall	5	Isolation of leptospira in culture	Diagnosis certain
Fever	2	Contact with contaminated environment	4	**<u>Positive serology</u>** *ELISA IgM positive *SAT – Positive	15
Temperature >39°C	2	Animal contact	1		
Conjunctival	4				

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suffusion				*MAT – Single high titre	15
Meningism	4			MAT - Rising titre/ seroconversion (paired sera)	15
Muscle pain	4				25
Conjunctival suffusion + Meningism + Muscle pain	10				
Jaundice	1			* – Any one of the tests only to be scored	
Albuminuria	2				

Presumptive diagnosis of leptospirosis :
Part A or Part A + Part B score = 26 or more
Parts A, B, C (Total) = 25 or more
A score between 20 and 25 suggests leptospirosis as a possible diagnosis .

Data collection:
The data collection process for patients admitted with leptospirosis involved the use of a semi-structured pre-tested questionnaire. This questionnaire was designed to gather relevant information from the patients and was likely customized to suit the specific requirements of the study. Upon admission, patients were examined, and necessary investigations were conducted to assess their condition. They were then followed up throughout their hospital stay to observe for the development of pulmonary complications, a common concern in cases of leptospirosis.To streamline the data collection process, details obtained from the patients were recorded onto a standard data collection sheet, adhering to the study's proforma. Subsequently, this data was transferred to a Microsoft Excel spreadsheet for further analysis.

Statistical analysis:
Data were recorded on a pre-designed proforma and managed in a Microsoft Excel spreadsheet. All the entries were double checked for any possible keyboard error. The analysis of the data was made on the basis of important parameters like frequency in percentage using cross tabulated table, Pearson Chi square correlation. All values are taken significant at p value (both sided) < 0.05.

Ethical considerations:
Clearance from Hospital Ethical Committee

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RESULTS:

Table 1:Age distribution of patients(in years)

Age in years	Frequency	Percent
<30	16	16.0
31 – 40	14	14.0
41 - 50	31	31.0
51 - 60	28	28.0
>60	11	11.0
Sex		
Male	73	73
Female	27	27

In this study, the maximum numbers of patients were in the age group 4150 yrs. The mean age of the patients were 46.44yrs. There were 73 males (73%) and 27 females(27%) out of total 100 patients in this study.

Table 2. Symptoms

Symptoms	**Frequency**	**Percent**
Fever	100	100
Myalgia	100	100
Headache	100	100
High coloured urine	57	57
Reduced urine output	55	55
Vomiting	47	47
Loose stools	38	38
Cough	37	37

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Back pain	23	23
Abdominal pain	15	15
Dyspnoea	14	14
Redness of eyes	12	12
Haemoptysis	2	2
Others	51	51

The majority of the patients were having fever (100%), myalgia (100%) and headache (100%). In this study, 54 patients (54%) had a history of alcohol consumption, 33 patients (33%) had a history of smoking and tobacco chewing was done by 3 patients (3%). In our study, 49 patients (49%) had abnormality in the chest X-ray. The X-ray findings were bilateral alveolar infiltrates (18%), prominent bronchovascular markings (12%), pleural effusion (10%), consolidation (5%), bilateral perihilar infiltrates (3%) and emphysematous changes (1%).

Table 3 Distribution of hematological indices

Haemoglobin (g/dl)	**Frequency**	**Percent**
< 10	10	10
10.1 – 12	27	27
12.1 – 14	36	36
14.1 – 16	20	20
>16	7	7
Total leucocyte count(/mm3)		
<4000	4	4
4000 – 11,000	64	64
>11,000	32	32
Platelet count(/mm3)		
<0.5 lac	30	30
0.5 – 1 lac	21	21
1 – 1.5 lac	23	23

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1.5 – 4 lac	26	26

In this study, 63 % patients had haemoglobin between 10.1 to 14g/dl, the maximum frequency being 36% in the class 12.1 to 14 g/dl.

Even though most of the studies reported polymorphonuclear leucocytosis in leptospirosi, in this study, 64% patients had total leucocyte count between 4000 11,000/mm3. This may be attributed to the previous treatments that the patients received from other hospitals prior to admission in our hospital. In 32% patients, total leucocyte count was elevated (>11,000/mm3).

In this study, 30% of patients had platelet count < 50,000/mm3 and 26% had platelet count 1.5 to 4 lakh/mm3. In total, 51% of the patients had platelet count less than 1 lakh/mm3.
In our study, 80% of the patients had ESR >25mm/hr.
SGPT was in the range 40 – 160 U/L in 70% of the patients, > 160 U/L in 20% and <40 U/L in 10%.

Presence of albumin , pus cells and RBCs in urine were noted in most of the patients. Casts,especially, coarse granular ones were observed in 26% of the patients in this study.

Table 4. Serum creatinine

S.Creatinine (mg/dl)	Frequency	Percent
<1.4	41	41
>= 1.4	59	59
Total	100	100

In this study, Lepto IgM was positive in 88% of the patients. In 79% of patients, Lepto IgM was 160 or above.

Table 5. Distribution on the basis of lepto IgM

Lepto IgM	Frequency	Percent
<80	12	12
80	9	9
160	19	19
320	30	30
640	15	15
1280	12	12

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2560	3	3
Total	100	100

Mortality in leptospirosis

In our study, 93% patients were cured, 6% patients expired and 1 patient (others) lost to follow up due to discharge against medical advice.

Table 6. Outcome in leptospirosis

Outcome	**Frequency**	**Percent**
Cure	93	93
Death	6	6
Others	1	1
Total	100	100

In our study, 93% patients were cured, 6% patients expired and 1 patient (others) lost to follow up due to discharge against medical advice.

DISCUSSION:

In this study, prevalence of leptospirosis was more in male patients (73%) with a male to female ratio of 3.47:1(73 males and 27 females).The ages of the patients ranged from 23 to 71 years with a mean age of 46.44 years, suggesting the involvement of young males in high risk activities. The major pre-existing illnesses present among the patients in this study were diabetes mellitus in 13 patients (13%), systemic hypertension in 9 patients (9%), bronchial asthma in 3 patients(3%). An association between prevalence ofleptospirosis and gender has been reported in many studies[4,3]. The incidence of leptospirosis was observed to be higher in men than women. Muthusethupathi MA et al. in Madras, conducted a study in which 57 cases were analyzed[5]. Fifty (88%) of the 57 cases were males. In this study, more than 50% of patients were from the age group 41-60yrs (59%).

Urine examination showed presence of albumin in 100% of the cases. RBCs were present in the urine in 94 patients (94%). Coarse granular casts in urine were observed in 26 patients (26%) in our study.

Chest X-ray abnormality was observed in 49 patients (49%). The X-ray findings varied from prominent bronchovascular markings to diffuse alveolar infiltrates. The commonest chest X-ray finding in this study was alveolar infiltrates (18% patients), indicating ARDS as the commonest cause. Presence of alveolar infiltrates has been implicated as a poor prognostic factor in leptosirosis[6].

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Though total leucocyte count is seen to be high in most studies, 64% patients had a normal total leucocyte count and only 36% had a high count in this study and 63 % patients had a haemoglobin between 10.1 to 14g/dl . 80% of the patients had ESR >25mm/hr. No significant relation was observed between ESR and pulmonary complications in our study.

In this study, IgM Leptospira antibody was positive in 88% cases. 79% patients showed a positivity in 160 dilution or above. IgM antibody was negative in 12% patients.

In our study, cure rate was 93% i.e. 93 patients were cured completely. 1 patient was lost to follow up as the patient was discharged from our hospital against medical advice. Mortality in leptospirosis ranges from 1 to 20%[3,7-8]. In this study, mortality was 6%. In another study from our hospital by Kuriakose M et al, mortality was 5.32%[9]. Muthusethupathi et al. in Madras, reported a mortality of 3.5% [5]. Pulmonary involvement is a predominant cause of death in leptospirosis worldwide.

In most of the western studies, incidence of renal failure was from 80-90%. In the Madras study, acute renal failure was seen in 72%[5]. Some other studies show that ARF occurs in 16 to 40% of cases[10-11]. In our study, we observed elevated serum creatinine (serum creatinine >1.4mg/dl) in 59 patients(59%), but no significant relation between serum creatinine and pulmonary complications was observed.

In the Madras study, 84% of the cases had high bilirubin (>2mg%) and abnormal SGOT and SGPT(>50 U/L)[5]. In this study, 97 patients (97%) had abnormal LFT. Serum total bilirubin was elevated in 97% patients with the highest recorded value being 16mg/dl. SGPT was more than 40 U/L in 90 patients (90%). Highest recorded value of SGPT in this study is 532 U/L. No significant relation between abnormal LFT and pulmonary complications was observed in our study.

Conclusion:

Based on our study on leptospirosis, several conclusions can be drawn:

1. Epidemiological Profile: The majority of patients affected by leptospirosis in your study belonged to the age group of 41-50 years, with a mean age of 46.44 years. There was a male predominance (73%) among the patients.
2. Clinical Presentation: Fever, myalgia, and headache were universal symptoms among the patients, emphasizing their prominence in the clinical presentation of leptospirosis.
3. Risk Factors: A significant proportion of patients had a history of alcohol consumption (54%), smoking (33%), or tobacco chewing (3%), highlighting potential risk factors associated with the disease.
4. Radiological Findings: Chest X-ray abnormalities were observed in nearly half of the patients, with bilateral alveolar infiltrates being the most common finding. Other notable abnormalities included prominent bronchovascular markings, pleural effusion, consolidation, and perihilar infiltrates.
5. Laboratory Investigations: Urine examination revealed the presence of albumin, pus cells, and RBCs in most patients, with coarse granular casts observed in a notable proportion. Lepto

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IgM testing was positive in the majority of patients, indicating its utility as a diagnostic marker for leptospirosis.

6. Prognosis and Mortality: The majority of patients (93%) were cured, while a small percentage (6%) succumbed to the disease. Notably, mortality was low compared to the overall patient population.

7. Liver Function: SGPT levels were within the normal range in the majority of patients, with no statistically significant correlation observed between SGPT levels and pulmonary complications.

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