

Original Article**DEATH AUDIT OF LEPTOSPIROSIS CASES IN SURAT AND NAVSARI DISTRICT OF SOUTH GUJARAT**Fenil Patel¹, Kanan Desai¹, Kallol Mallick², Rachana Prasad³, Rajkumar Bansal⁴**Financial Support:** None declared**Conflict of interest:** None declared**Copy right:** The Journal retains the copyrights of this article. However, reproduction of this article in the part or total in any form is permissible with due acknowledgement of the source.**How to cite this article:**

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Author's Affiliation:¹PG Resident; ²Assistant Professor; ³Associate Professor; ⁴Professor & Head, Dept. of Community Medicine, SMIMER, Surat**Correspondence:**Dr. Fenil Patel,
Email: fenilpatel25885@gmail.com**Date of Submission:** 23-01-13**Date of Acceptance:** 18-03-13**Date of Publication:** 31-03-13**ABSTRACT****Introduction:** Leptospirosis, zoonotic disease with very wide geographical distribution, is likely to be missed due to its wide spectrum of symptoms which may mimic the clinical signs of many other diseases. The present study was carried out to study the epidemiology, clinical and laboratory profile of died patients with confirm leptospirosis in Surat and Navsari Districts.**Methods and Material:** A household visits were done for all leptospirosis confirmed death cases of Surat and Navsari district during 15th June to 31st Oct 2012.**Result:** Out of 13 patients all were male, 10(76.9%) were in age group (20-45 years), 11 (84.6%) patients had history of exposure while working in farm in last 15 days and 12 (92.3%) patients had received Doxycycline chemoprophylaxis in current year. Most common presenting symptoms were fever (100%) followed by calf muscle myalgia (92.3%), jaundice (92.3%) and Oliguria (92.3%). Mean serum bilirubin level, SGPT, SGOT, Serum blood Urea and creatinin were 13.7mg/dl, 111.5 IU/l, 139.7 U/l, 184.85mg/dl and 4.5mg/dl respectively. Severe anemia, thrombocytopenia and coagulopathy were found in all cases. The average duration between onset of the symptoms and first medical consultation was 3.1 days and duration between onset of symptoms and first dose of antibiotics was 3.7 days.**Conclusion:** Hepatic dysfunction, acute renal failure, coagulopathy, ARDS were the commonest presentation requiring artificial ventilation among deceased Leptospirosis cases. Delay in medical consultation and first dose of antibiotics may be a reason for Multi-organ dysfunction in these cases.**Key words:** Leptospirosis, Weils' disease, oliguric renal failure, ARDS**INTRODUCTION**

Leptospirosis, a disease caused by pathogenic spirochetes of the genus *Leptospira*, is considered the most common zoonosis in the world and has recently been recognized as a re-emerging infectious disease among animals and humans and has the potential to become even more prevalent with anticipated global warming¹. It is more than 100 years since Weil; Professor of

Medicine at Heidelberg (1886) whose name has been given to the disease in humans first described this disease, which is caused by *Leptospira interrogans*, serovars *icterohaemorrhagiae* or *copenhageni*².

Leptospirosis cases were seen for the first time in Gujarat in 1994 in the Chikhali block of the old Valsad district.³ As such there exists a close association between rains, rice fields, rodents &

Leptospirosis. This zoonotic disease is more prevalent in South Gujarat due to heavy rain fall, clay soil structure which results in enhanced water logging & high water-tables³. In addition, the irrigated fields where they work are already contaminated with urine of rodents & cattle. A particular problem is that Leptospirosis is likely to be misdiagnosed, due to its wide spectrum of symptoms which may mimic the clinical signs of many other diseases, such as malaria, dengue fever, hepatitis and hantavirus infection⁵. The present study was carried out to study the epidemiology, clinical and laboratory profile of patients died due to leptospirosis in Surat and Navsari Districts of South Gujarat.

METHODOLOGY

In 2012, up to October, 61 confirmed cases of Leptospirosis were reported from Surat and Navsari Districts, out of which 13 deaths occurred according to data from RDD (Regional Deputy Director) office, Surat. All were diagnosed as having leptospirosis as per the definition given by Microbiology department of Government Medical College, Surat (GMCS) in accordance with National guidelines NCDC (National Center for Disease Control) & Department of Medicine, GMC, Surat.

Laboratory Confirmation criteria used for a case of Leptospirosis are:

- PCR Positive/ culture Positive in first blood sample
- In single Serum Sample ELISA \geq 100 Unit OR MAT \geq 80 Titer
- In Paired Serum Sample in ELISA/MAT showing Fourfold rising Titer in second Serum.

We had visited all patients' houses that died due to leptospirosis and collect the relevant data regarding the deceased from the nearest person of the patients in pre-designed questioner (Death audit form) by personal interview. Data regarding clinical diagnosis and laboratory findings are collected from the patients' case paper from the respected hospitals. Data regarding environmental factors was observed by the interviewer directly.

RESULT

All 13 were male (100%) with 10(76.9%) were in younger age group between 20-45 years. Out of total, 11 patients were working in the farms either rice field or sugarcane field (61.5%).

History of exposure in last 15 days was present in 11(84.6%) patients. History of open air defecation in the farm was also present in 7 (53.8%) patients which might be contributory factor. Only 6 (46.2%) informant had some knowledge regarding leptospirosis and source of information for all of them were health workers.

Table: 1 Socio-demographic Profile of Leptospirosis Patients (n=13)

Variables	Patients(%)
Age	
20-45	10 (76.9)
45-60	3 (23.1)
Gender - Male	13 (100)
Occupation	
Farm worker	9 (69.2)
Farmer	2 (15.4)
Type of farm (Multiple answer)	
Rice field/ Sugarcane field	8 (61.5)
Vegetable or other	3 (23.07)
H/o open air defecation in farm present	7 (53.8)
H/o occupational exposure in last 15 days	11 (84.6)
Relatives knows about Leptospirosis	6 (46.2)
Source of information (n=6) Health worker	6 (100)
Doxycycline chemoprophylaxis taken	8 (61.5)
Completed 8 weeks of chemoprophylaxis (n=8)	4 (50.0)
History of alcoholism	11 (84.6)

History of Alcoholism present in 11(84.6%) patients.

Most common symptoms were fever (100%), calf muscle myalgia (92.3%), jaundice (92.3%), Oliguria (92.3%), frontal headache (69.2%), breathlessness (69.2%) and Conjunctival suffusion (46.2%).

As per table 2, in the study population all the patients had altered liver function with raised mean (SD) serum billirubin level of 13.7mg/dl (8.7 mg/dl), SGPT and SGOT were 111.5 IU/l (109.2 IU/L), 139.7 U/l (108.0 U/ L) respectively. All the patients had severe anemia, leucocytosis and thrombocytopenia with altered coagulation profile. Serum blood Urea and creatinin level had found significantly high with mean value 184.85mg/dl and 4.5mg/dl respectively.

Rapid leptochek, MAT-1, ELISA-1, and PCR had been done in all the patients and were found positive in 8(61.5%), 7(53.8%), 7(53.8%) and 6(46.1%) patients respectively.

Table 2: Laboratory Profile of Leptospirosis Patients (N=13)

Variable	Normal range	Mean(SD)	Range(Min-Max)
Serum bilirubin	0.3-1.3mg/dl	13.7(8.7)	1.9-27.3
Direct	0.1-0.4mg/dl	10.7(6.7)	1.2-21.5
Indirect	0.2-0.9mg/dl	2.9(2.5)	0.4-7.3
SGPT	7-41 IU/L	111.5(109.2)	25-389
SGOT	12-38 U/L	139.7(108.0)	42-320
Hemoglobin	M-13.3-16.2 g/dl	8.0(2.9)	3.5-13.0
Leucocytes count	3045-9060/mm ³	14261.5(8414.1)	2200-36400
Platelet count	1.65-4.15 lakh/mm ³	36583.3(20156.0)	10000-70000
Blood urea	7-20 mg/dl	184.45(79.4)	84-311
Serum creatinin	0.5-0.9 mg/dl	4.7(2.0)	2.0-8.0
INR (International Normalized Ratio)	1.0	1.4(0.5)	1.0-4.16

The most frequent finding on X-ray chest was diffuse alveolar infiltration suggesting of ARDS in 9(69.2%) patients and 4(30.8%) patients had clear findings of pulmonary hemorrhage. On USG 6(46.1%) patients had mild organomegaly with sign of medical kidney disease.

Table 3: Treatment Seeking and Care Provision of Leptospirosis Patients (N=13)

Variables	Patients (%)	95% CI
Prior consultation in private	9 (69.2)	41.3-89.4
Transport during referral		
108 ambulance	9(69.2)	41.3-89.4
PHC/CHC vehicle	3(50.0)	14.7-85.3
Private ambulance	1(7.7)	0.4-32.5
Accompanied by Doctor during transport/referral	0 (0.0)	0-20.6

As per table 3, most of patients 9(69.2%) had prior consultation in private before consultation in government set up and most common mode of transport was 108 ambulance (69.2%) service of the Government, but none of the patients accompanied by any Doctor.

Table 4: Time Taken at Various Level of Care (N=13)

Variables	Mean(SD)
Interval between onset of symptoms and first consultation (Private/Govt.) (days)	3.1(2.1)
Interval between onset of symptoms and rapid leptochek test (days)	4.3(1.8)
Interval between onset of symptoms and first dose of antibiotic (days)	4.5(1.8)
Interval between onset of symptoms and death (days)	8.4(4.2)

DISCUSSION

Leptospirosis classically presents in two forms, icteric and anicteric form of Leptospirosis. The first phase of the disease is commonly referred to as the septisemic phase. This phase is followed by the brief afebrile period of variable duration which in turn, is followed by the immune phase of illness^{6,7}.

Majority of patients died due to leptospirosis in this study were in their 3rd and 4th decade of life which is comparable to the report done by other studies^{8,9,10}.

In our study we had found that most of the patients died due to leptospirosis were young male as also observed previous studies^{7,11,12}. Male preponderance is believed to be due to occupational differences rather than sex-linked susceptibility.

In our study we had also found that the patients died due to leptospirosis were either on the chemoprophylaxis or completed it and still they developed disease later on this might be due to factors the fact that this year there was delay in rainy season and associated exposure (September-October), where as 8 weeks chemoprophylaxis round had been completed much earlier at the expected time of rain (July-August).

Most common presenting symptoms in our study were same as other study¹³. All patients were presented with oliguric renal failure in current study as comparable to previous study, which reported higher frequency of nonoliguric renal failure with lower morbidity and mortality rates¹⁴.

In a study by Dupont et al¹⁵, total 18% of the patients died due to leptospirosis, most of them presented with dyspnoea, oliguria, leucocytosis,

and alveolar infiltration on chest radiograms. These findings are similar to current study.

Hepato-renal form and the pulmonary form of leptospirosis is associated with high case fatality rate ranging 10% to 15%¹⁶. These findings are similar to this study.

Microscopic agglutination tests (MAT) is the Gold standard test, but it is less sensitive and complicated compared to ELISA and SAT¹⁷. In our study we had found that only 8(61.5 %) patients were rapid leptochek positive other were either MAT-1 positive or ELISA -1 positive, so we cannot rely on only rapid leptochek¹⁷.

Though, results of present study cannot be exactly compared with other studies because of region to region difference in the economic profile, social factors, environmental factors including rainfall patterns, epidemiological factors, health care facilities, community awareness as well as different serovars of leptospira involved in different endemics/epidemics etc.

CONCLUSION

Hepatic dysfunction, acute renal failure, coagulopathy, ARDS were the commonest presentation requiring artificial ventilation among deceased Leptospirosis cases. Delay in medical consultation and first dose of antibiotics may be a reason for Multi-organ dysfunction in these cases.

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