

Prevalence of leptospirosis in Thoothukudi - Southern coastal city, Tamil Nadu

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Abstract

Introduction: Leptospirosis, a Zoonosis with multi-systemic involvement, is caused by the pathogenic strains of *Leptospira*. Leptospirosis has a very wide range of natural rodent and non-rodent reservoir hosts. Rural farm workers, sewer workers and fishermen are at high risk for Leptospirosis, and it can be a significant public health problem when water and food safety are not ensured. Few reports are available about circulating Leptospiral species and serogroups in Southern Tamilnadu. Our study wants to highlight the threat of Leptospirosis in coastal areas of southern India so that preventive measures should be initiated.

Aim: To determine the prevalence of Leptospirosis in PUO (Pyrexia of unknown origin) cases in Tuticorin - coastal district of Tamil Nadu by serological test IgM ELISA and to analyse the predisposing factors for Leptospirosis.

Materials: A Cross-sectional comparative study stretched over a period of 2 months involving 50 cases with clinical suspicion of Leptospirosis, the other causes of fever being excluded. Detailed history taken with complete clinical examination. The diagnostic modality used in this study is IgM Elisa.

Results: Out of the 50 cases investigated for leptospirosis, 5 (10%) came out to be positive. Amongst the positive cases, 4 out of 5 had direct animal contact, 4 out of 5 belonged to the rural area and 2 out of 5 had access to common water bodies.

Conclusion: Leptospirosis showed higher prevalence among rural people with animal contact and access to water bodies.

Keyword: Leptospirosis, Prevalence, Disease Burden.

Introduction

Leptospirosis, a Zoonosis with multisystemic involvement, is caused by the pathogenic strains of *Leptospira*. It is a gram-negative spirochete. Leptospirosis has an extensive range of natural rodent and non-rodent reservoir hosts. *Leptospira* are excreted in large numbers in the urine of rodents and cattle contaminating soil as well as water bodies. Farm laborers, sewer workers, and fishermen are at high risk of contracting Leptospirosis, and it can be a significant public health problem when water and food safety are not secured. The outbreaks of Leptospirosis have been reported from coastal districts of Gujarat, Maharashtra, Kerala, Tamil Nadu, Andhra Pradesh, Karnataka and Andaman's from time to time.^(1,2) The *Leptospira* Serovars predominantly present in India are *L. andamana*, *L. pomana*, *L. grippityphosa*, *L. hebdomadis*, *L. semoranga*, *L. javanica*, *L. autumnalis* and *L. canicola*. Almost 90% of patients present as Anicteric leptospirosis with only 5-10% cases being icteric. If left untreated disease progresses rapidly, mortality rates being high in severe cases. Few reports are available about circulating Leptospiral species and serogroups in Southern Tamilnadu.⁽³⁻⁵⁾ Case definition criteria are used for detection of cases. According to these criteria, leptospirosis should be suspected in a person presenting with a history of abrupt onset of high fever and myalgia, with any one or more of the following features: jaundice, oliguria, cough and breathlessness, hemorrhagic tendency, and signs of meningeal irritation or altered sensorium or convulsions.⁽⁶⁾ In addition to clinical evaluation,

Leptospirosis is diagnosed by the serological detection of *Leptospira* by enzyme-linked immunosorbent assay (ELISA) for *Leptospira* immunoglobulin (IgM) antibody, Macroscopic slide agglutination test (MSAT) and Microscopic agglutination test (MAT).^(7,8) Our study wants to highlight the threat of Leptospirosis in coastal areas of southern India so that preventive measures should be initiated. We studied the prevalence of Leptospirosis in PUO (Pyrexia of unknown origin) cases in Tuticorin-coastal district of Tamil Nadu by serological test IgM ELISA and to analyse the predisposing factors for Leptospirosis.

Materials & Methods

This is a Cross-sectional study performed in a tertiary care hospital, Thoothukudi Government Medical College Hospital, Thoothukudi. A total of 50 clinically suspected febrile cases of leptospirosis, both outpatients and inpatients attending Government medical college hospital, Thoothukudi were included in the study. Patients with fever, headache and myalgia jaundice, oliguria, respiratory symptoms, hemorrhagic manifestations and convulsions were included. Patients with fever due to other causes like malignancy and autoimmune diseases were excluded from this study. Detailed history is obtained from all the patients and complete clinical examination is done. Patient's data like age, sex, symptoms-fever, body ache, headache, vomiting, joint pain & duration of hospital stay collected and documented as per proforma. Clinical assessment for signs of infection like purpuric rashes, reduction in platelet count is made. All cases are

monitored until discharge from the hospital. Informed consent is obtained from all the patients.

Results:

A total of 50 clinically suspected febrile cases of leptospirosis, both outpatients and inpatients attending Government medical college hospital, Thoothukudi were included in the study. Patients in 0 to 70 years age group with associated symptoms like headache, jaundice, oliguria, respiratory distress, hemorrhagic manifestations included in the study. During the study period, the total number of samples screened was 50, 5(10%) were positive for Leptospirosis and 45 (90 %) were negative. (Fig. 1)

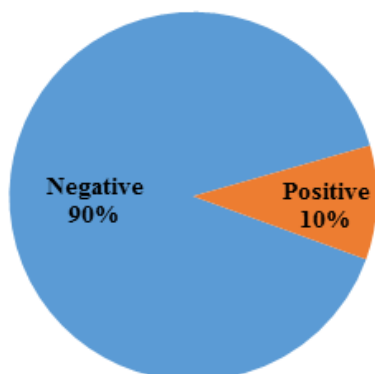


Fig.1: Prevalence of Leptospirosis

Of the 50 cases screened 28(56%) were males, 22 (44%) were females showing mild difference in the sex distribution. Out of the leptospirosis positive cases 3 (60%) were males and 2 (40%) of the positive were females. Among the age groups, there was no preference for a single age group. Positivity was evenly distributed among all age groups. (Table 1)

Table 1: Age and sex distribution of Leptospirosis IgM positive cases

Age group	Male	Female	Total
0-10	1	-	1
11-20	1	-	1
21-30	-	1	1
31-40	-	-	-
41-50	1	-	1
Above 50	-	1	1

So we can conclude that the positive cases were more or less evenly distributed throughout all age and sex groups. Among the cases tested, 10 out of the 50 cases had some form of direct contact to animals like dogs, pigs, cattle, goat, sheep. Among the positive cases, 4 out of 5 about 80% had direct animal contact in one form or the other. (Fig. 2)

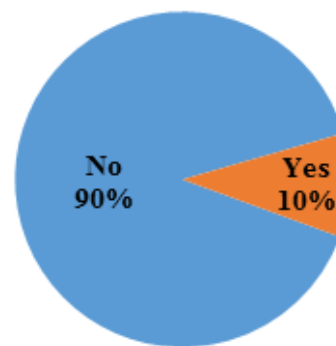


Fig.2: Direct Animal Contact

Among the cases tested 22 out of 30 cases had access to common water bodies. Among the positive cases 2 out of 5 (40%) had access to common water bodies. Among the total cases tested, 18 people were from urban area while 32 people were from rural area. Among the positive cases, 1 was from urban area while 4 were from rural area. Only 2 cases out of 5 positive cases had jaundice (Icteric Leptospirosis).

Discussion

Of the 50 cases screened, 28 (56%) were males, 22 (44%) were females showing the mild difference in the sex distribution. Out of the Leptospirosis positive cases, 3 (60%) were males, and 2 (40%) of the positive were females. The positive Leptospirosis cases in this study had shown slightly higher male preponderance.^(2,9) According to MA Muthusethupathi et al.,⁽¹⁾ 50 (88%) of the 57 cases were males. This has been attributed to the fact that males do more outside work compared to females which resulted in an increased prevalence of Leptospirosis. The following factors have to be introduced in Part B of Faine's⁽¹⁰⁾ criteria (which is more relevant to India).

Among the age groups, there was no preference for a single age group. Positivity was evenly distributed among all ages. According to MA Muthudethupathi et al.,⁽¹⁾ Leptospirosis also showed no age preference and the median age was found to be 39.2 years. During the study period, the total number of samples screened was 50, 5 (10%) were positive for Leptospirosis, and 45 (90%) were negative. Leptospirosis has long been conceded a rare zoonotic disease in India, with only sporadic cases being recorded. So a lower prevalence is to be expected. Also, the study was not carried during an outbreak, so a low incidence is seen. According to Armugam G et al., 2011.⁽¹¹⁾ Out of a total of 3830 blood samples were received from various hospitals and laboratories in and around Chennai, a total of 748 (19.5%) Leptospira positive cases were identified. The prevalence was higher in the study as mentioned above because Chennai was considered to be a highly endemic area for Leptospirosis. According to Sharma. S et al.,⁽⁹⁾ a study conducted in the Andamans Leptospirosis is

considered as an Occupational disease of persons engaged in agriculture, sewage works, forestry, and animal slaughtering. A study was performed with an objective of assessing the seroprevalence of Leptospirosis among the high-risk groups of Andaman Islands. A total of 611 sera samples from different high-risk populations were collected and tested. Antibodies to *Leptospiras* were detected in 322 samples giving an overall seroprevalence of 52.7%. Seroprevalence among control population was 14.7%, which was comparatively less than that of the high-risk population groups. This is comparable with our study which has a seroprevalence of 10% as our population were also not specifically selected from the high-risk groups. Among the cases tested, 10 out of the 50 cases had some form of direct contact with animals like dogs, pigs, cattle, goats, sheep. Among the positive cases, 4 out of 5 about 80% had the direct animal contact in one form or the other. This was due to the fact that Leptospirosis, originally named as rat fever because it was transmitted through the urine of rats, is also transmitted through the urine of other animals like our usual domestic animals like dogs, pigs, cattle, goats, sheep, etc., This means that the high-risk groups for Leptospirosis included animals husbandry staff, veterinarians, cattle herders, poultry farmers, people with pets, etc., Among the cases tested 22 out of 30 cases had access to common water bodies. Among the positive cases, 2 out of 5 (40%) had access to common water bodies. This was expected as animal urine could contaminate common water bodies. In rural areas, high-risk groups are workers in rice fields, cane fields, etc., According to Sharma. S et al,⁽⁹⁾ Leptospirosis is considered an occupational disease of persons engaged in agriculture, sewage works, forestry, and animal slaughtering. A higher overall seroprevalence of 52.7% was seen in this high-risk population. Among the total cases tested, 18 people were from the urban area while 32 people were from rural area. Among the positive cases, 1 was from the urban area while 4 were from rural area.⁽¹⁾

In 2005, 58 leptospirosis cases were reported with exposure to agriculture being 69%, history of contact with animals being 72.4%, and case fatality rate was 24.1%. Mortality was due to pulmonary hemorrhage and occurred within 48 hours.⁽¹²⁾

According to S.Shiva Kumar,⁽¹³⁾ though severe Leptospirosis has declined, mild Leptospirosis has increased. Fever, headache, and Myalgia were the common presentations. The reasons for the decline of severe Leptospirosis suggested were greater awareness of the disease, availability of better diagnostic facilities and widespread use of antibiotics. Also, serogroup Autumnalis, a virulent serogroup causing severe Leptospirosis has also declined since 1995. Micro agglutination test (MAT) considered to be the gold standard test in serodiagnosis of Leptospirosis is a complicated test conducted in specialised set up. Therefore, ELISA IgM and Slide Agglutination Test

(SAT) are considered to be more sensitive, simpler and adequate for diagnosis of current leptospiral infection.⁽¹⁴⁾ In fact, they can replace MAT for diagnosis of current infection. The IgM ELISA test is a very sensitive test for the diagnosis of current infection. But as a point of further research, MAT can be used to find the different serovar. According to MA Muthusethupathi et al.⁽¹⁾ autumnalis was the serogroup most commonly recorded serologically, and *Leptospira interrogans* serovar autumnalis was isolated from one patient. According to Chinnari pradeep KS et al,⁽⁸⁾ MAT revealed the predominant serovars to be autumnalis (48.3%) and icterohaemorrhagiae (31.1%) during 1995 and *Leptospira* 1996.

Conclusion

A significant rise in the incidence of leptospirosis in south costal district of India was documented. Leptospirosis shows no preference for any age group. Coinfection with malaria, dengue and other viruses may present diagnostic dilemmas to the treating physician. The increased awareness among physicians of clinical manifestations of leptospirosis and early laboratory diagnosis will help reduce morbidity and mortality associated with disease.

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