

INCIDENCE OF LEPTOSPIROSIS IN INDIA: A CROSS SECTIONAL STUDY**¹Dr. Rajdeep Saha, ²Dr. Soma Sil (Mullick) and ³Dr. Rajyasri Guha Thakurta**¹Assistant Professor, Department of Microbiology, Calcutta National Medical College.²Post Graduate Trainee, Department of Microbiology, Calcutta National Medical College.³Professor, Department of Microbiology, Calcutta National Medical College.***Corresponding Author: Dr. Rajdeep Saha**

Assistant Professor, Department of Microbiology, Calcutta National Medical College.

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ABSTRACT

Leptospirosis is a serious zoonotic re-emerging infectious disease prevalent in India. Leptospirosis occurs worldwide, in both rural and urban areas and in temperate and tropical climates. It is an occupational hazard for people who work outdoors or with animals, such as rice and sugar-cane field workers, farmers, sewer workers, veterinarians, dairy workers and military personnel. This study was performed to detect incidence and current scenario of leptospirosis in our hospital. Out of 1527 patients, 562 (36.8%) patients were diagnosed as a case of leptospirosis. The disease is often difficult to diagnose clinically; laboratory support is indispensable. Treatment with appropriate antibiotics and prevention by rodent control and animal vaccination is required. Untreated cases can progress to a more severe and potentially fatal stage.

KEYWORDS: Leptospirosis, Immunochromatography, Rodents.**INTRODUCTION**

Leptospirosis is an apparent or unapparent disease of animals and man.^[1] Leptospirosis is the world's most widespread zoonotic infection of global importance. It occurs in both developed and developing countries and large outbreaks have been reported from all over the world. Leptospirosis is now being recognized as a re-emerging infectious disease.^[2] The disease has a broad geographical distribution due to the large spectrum of mammalian hosts that harbour and excrete the spirochete agent from their renal tubules.^[3, 4, 5] Many animal species, including rodents, are considered natural hosts of the microorganism.^[6, 7, 8, 9]

Natural hosts are disseminating the agent in nature through their urine.^[10]

It is caused by one member of spirocheates of complex *Leptospira interrogans*.^[11] The illness progresses through an acute (septicaemic) phase, which is followed by an immune phase. The clinical manifestations are in broad spectrum including fever, myalgia, headache, acute renal failure, jaundice, cardiovascular and pulmonary disorders. This study was carried out to detect incidence of leptospirosis in our tertiary care hospital.

MATERIALS AND METHODS

This cross-sectional study involving 562 sera of patients during thirty-six months period (from February 2013 to January 2016) with clinical and biochemical evidence of leptospirosis were included. The samples from the

hospitalized patients having signs and symptoms of leptospirosis specially those who are Farmers, Mine workers, Sewer workers, Slaughterhouse workers, Veterinarians and animal caretakers, Fish workers and Dairy farmers, were taken. Renal function tests (blood urea nitrogen and creatinine) as well as liver function tests and routine haematological tests were performed. Diagnosis is confirmed by detection of IgM antibody by immunochromatography and enzyme-linked immunosorbent assay (ELISA).

RESULT

The Study was conducted for three years extending from June 2013-May 2016. Out of total 1527 patients 562 (36.8%) clinically relevant patients were diagnosed thoroughly for leptospirosis.

Clinical analysis revealed acute onset with fever (100%), hepatosplenomegaly (100%), nausea and vomiting (82%), oliguria or anuria (75%), jaundice (80%). Haemorrhagic syndrome has been observed in 33% of cases. Its presence is a criterion for severe course of the illness. Haemorrhagic skin lesions were observed in 33%; visceral bleeding in 19%, including haematuria (20%), melaena (14.2%), haematemesis (10,71%). Fatal cases were in 20%; in 75% of them haemorrhagic symptoms present. (Fig .1).

Routine laboratory investigations demonstrate leucocytosis in 74% anaemia in 82%, thrombocytopenia in 40% Blood urea nitrogen levels above 8,3 mmol/L

were found in 84%, Severity of infections were detected by measurement of serum creatinine level. Mild increase in serum creatinine level was found in 58%, moderate (serum creatinine level from 200 to 600 $\mu\text{m/L}$) was found in 21% and severe increase (serum creatinine level above 600 $\mu\text{m/L}$) was found in 21%. Serum bilirubin level was elevated in 71% specially conjugated fraction. Alanine aminotransferase was elevated in 67% Alkaline phosphatase was elevated in 54%. (Table.1).

Out of 562 samples, male patient was 410 (72.9%) and female was 152 (27.1%). (Fig.2).

562 samples were reactive in immunochromatography card tests. ELISA test gave similar results except in seven cases in which test showed equivocal reports. To combat this problem we repeated these cases after one week and finally all tests were positive.

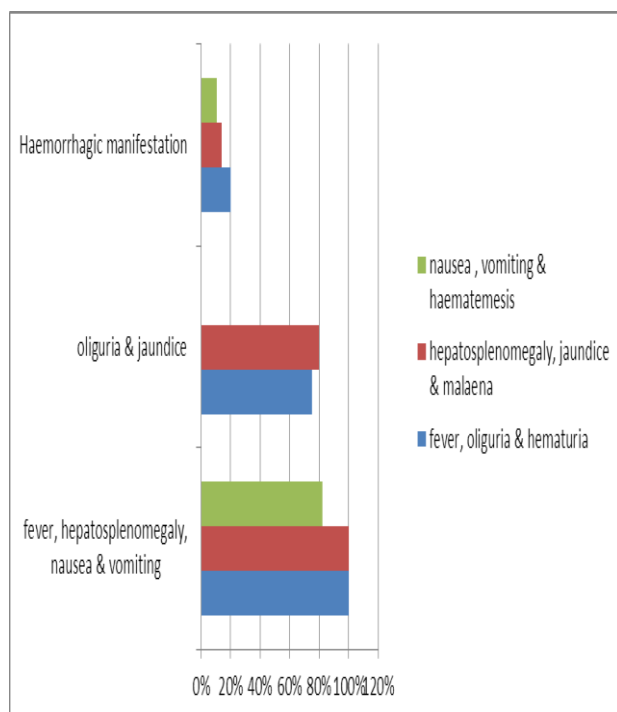


Fig. 1 – Percentage of clinical manifestations in leptospirosis patients

Table. 1- Percentage of abnormal blood reports in leptospirosis patients

Leucocytosis	74%
Anaemia	82%
Thrombocytopenia	40%
Increased urea	84%
Mild increased creatinine	58%
Moderate increased creatinine	21%
Severe increased creatinine	21%
Bilirubin	71%
ALT	67%
Alk.phos	54%

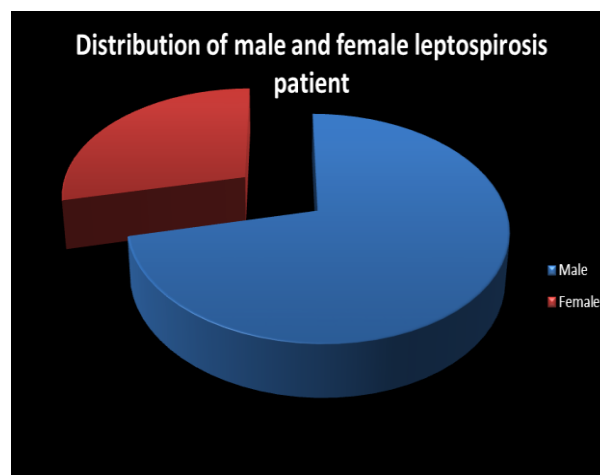


Fig .2 Distribution of leptospirosis patient according to sex

DISCUSSION

Leptospirosis is one of the most recognized zoonotic diseases around the world that has been reported from every continent inhabited by man. Leptospirosis is known to be endemic in India since the early 20th century with most outbreaks reported from the coastal regions of the Indian peninsula and the Andaman Islands. Outside India there were several water-sports related outbreaks of leptospirosis have been documented in various countries.

Outbreak among school children who bathed in Cimarron Channel, Moron, Cuba in 1986, outbreak among military personnel who went for fresh-water swimming in Oahu Island in Hawaii in 1992, outbreak among white-water rafters in flooded rivers of Costa Rica in 1996 and the outbreak among the participants of a multi-sport racing expedition in Malaysia in 2000 are examples of recreation-associated leptospirosis.

Outbreaks have been reported from Nicaragua in 1995 following floods, from Orissa in 1999 following the Super-Cyclone and floods, from Mumbai in 2000 and 2005 following heavy rainfall and flooding and on several occasions in countries like Philippines and Thailand.

A recent population-based study reported an annual morbidity for leptospirosis of 75–102 cases per 100,000 populations in northern Tanzania.^[12]

The annual morbidity of leptospirosis was estimated to be high in countries of South and Southeast Asia with large populations, such as India (19.7 cases [95% CI 6.8–36.8] per 100,000 populations).

An association between prevalence of leptospirosis and gender has been reported in many studies. Particularly, men tend to present much higher incidence or prevalence of the disease than women and this fact was not attributed to more frequent exposure of men.^[13, 14]

However, this association has not been confirmed in other studies.^[15]

CONCLUSION

Leptospirosis is a major endemic disease of zoonotic importance in India. Socioeconomic conditions, population density of animals, climatic conditions, environmental hygiene and occupational habits of humans are determinants of the incidence and prevalence of the disease in our country. Several control measures, environmental control programs and animal vaccination, along with a strong surveillance system may significantly reduce the outbreak of disease. Since, the global burden for leptospirosis is extremely hard to quantify because of difficulties in diagnosis and lack of laboratory testings, a continuous vigil is necessary. Presently, in the flood situation and severe water logging in our state an extra vigil is necessary too.

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REFERENCE

- Adler B, Moctezuma PA. *Leptospira* and Leptospirosis. *Veterinary Microbiology.*, 2010; 140: 287-296.
- Levett PN. Leptospirosis: A forgotten zoonosis? *Clinical Applied Immunology Reviews.*, 2004; 4: 435-448.
- Ko AI, Goarant C, Picardeau M. *Leptospira*: the dawn of the molecular genetics era for an emerging zoonotic pathogen. *Nature reviews Microbiology.*, 2009; 7: 736-747.
- Levett PN. Leptospirosis. *Clinical microbiology reviews.*, 2001; 14: 296-326.
- Pappas G, Papadimitriou P, Siozopoulou V, Christou L, Akritidis N. The globalization of leptospirosis: worldwide incidence trends. *Int J Infect Dis.*, 2008; 12: 351-357.
- Bunnell JE, Hice CL, Watts DM, Montrueil V, Tesh RB, Vinetz JM. Detection of pathogenic *Leptospira* spp. Infections among mammals captured in the Peruvian Amazon basin region. *The American Journal of Tropical Medicine and Hygiene.*, 2000; 63: 255-258.
- Michel V, Branger C, Andre-Fontaine G. Epidemiology of leptospirosis. *Revista Cubana de Medicina Tropical.*, 2002; 54: 7-10.
- Turk N, Milas Z, Margaletic J, Staresina V, Slavica A, Riquelme-Sertour N, Bellenger E, Baranton G, Postic D. Molecular characterization of *Leptospira* spp strains isolated from small rodents in Croatia. *Epidemiology and Infection.*, 2003; 130: 159-166.
- Cox TE, Smythe LD and Leung LKP. Flying foxes as carriers of pathogenic *Leptospira* spp. *Journal of Wildlife Diseases.*, 2005; 41: 753-757.
- Monahan AM, Callanan JJ and Nally JE. Review paper: Host – pathogen interactions in the kidney during chronic leptospirosis. *Veterinary Pathology.*, 2009; 46: 792-799.
- Ricaldi NJ, Vinetz MJ. Leptospirosis in the tropics and in travelers. *Current Infectious Disease Reports.*, 2006; 8: 51-58.
- Biggs HM, Hertz JT, Munishi OM, Galloway RL, Marks F, et al. Estimating leptospirosis incidence using hospital-based surveillance and a population-based health care utilization survey in Tanzania. *PLoS Neglected Tropical Diseases.*, 2013; 7.
- Lecour H, Miranda M, Margo C, Rocha A, Goncalves V. Human leptospirosis- a review of 50 cases. *Infection*, 1989; 17: 8-12.
- Sasaki DM, Pang L, Minette HP, Wakida CK, Fujimoto WJ, Manea SJ, et al. Active surveillance and risk factors for leptospirosis in Hawaii. *American Journal of Tropical Medicine & Hygiene*, 1993; 48: 35-43.
- Bertherat E, Renaud A, Nabias R, Dubreuil G, Georges-Courbot MC. Leptospirosis and Ebola virus infection in five gold-panning villages in northeastern Gabon. *American Journal of Tropical Medicine and Hygiene*, 1999; 60: 610-615.