Preliminary Survey of Leptospirosis Amongst Febrile Patients from Urban Slums of East Delhi

IR Kaur*, R Sachdeva**, V Arora**, V Talwar***

Abstract

Aim: To determine the possibility of leptospirosis among patients from urban slums presenting with febrile illness during monsoon and post-monsoon season.

Methods: Evidence of leptospirosis in 180 patients with febrile illness was determined by looking for presence of immunoglobulin M (IgM) antibodies by leptospiral IgM enzyme linked immunosorbent assay (ELISA). The test was carried out on 160 Widal test negative and 20 Widal test positive sera received from febrile patients during June to September 2001.

Results: Twenty-seven out of 180 (15%) sera were positive for leptospiral IgM antibodies.

Conclusions: This preliminary survey indicates that leptospirosis could be an important cause of febrile illness in patients from urban slums during monsoon and post-monsoon season.

INTRODUCTION

Leptospirosis is a zoonotic disease known to be capable of causing human infection for almost a century. The disease has a large number of animal carriers and the environment in which we live are ideal factors for the transmission of infection to man. The disease is more common during post-monsoon period and may assume epidemic potential. First reported from Andamans in 1920s, reports have become more frequent since 1980s especially from the states of Tamil Nadu, Kerala, Karnataka and Maharashtra.1,2

Despite this knowledge, the information about the existing status of the disease in the country is lacking and we do not have an accurate estimate of disease burden in the country. Probably the disease is underreported in humans. All available evidence suggests that the disease is now emerging in India as an important public health problem. Since isolation rate of the causative organism from clinical specimens is low due to prior indiscriminate use of antibiotics and also difficult and expensive isolation techniques, serological techniques remain the cornerstone of diagnostics. A commercial screening test-leptospira IgM enzyme linked immunosorbent test (PanBio, Queensland, Australia) has been evaluated earlier by other workers and PHLS Leptospira Reference Unit found suitable in the United Kingdom (UK).3,4 This test was used as serological evidence to determine the presence of leptospirosis in febrile patients attending clinics and wards of University College of Medical Sciences and Guru Tegh Bahadur Hospital (UCMS and GTB), Delhi during monsoon and post-monsoon season.

MATERIAL AND METHODS

Sera

One hundred eighty sera from patients with febrile illness were included in the study. These patients had presented to clinics and wards of UCMS and GTB Hospital, Delhi during the months of June to September 2001. This tertiary care hospital has a catchment area of urban slums with poor sanitation, open drainage and low socioeconomic strata predominantly. The duration of fever in these patients varied between three and fifteen days. The specimens included in the study were those received for Widal test done routinely for laboratory work up of febrile patients. These included 160 Widal test negative and 20 Widal test positive sera.

Leptospiral IgM ELISA (Pan Bio, Queensland, Australia)

The test was carried out as per manufacturer’s instructions. Positive and negative controls as well as cut off calibrators in triplicate along with the test sera were diluted 1/100 in serum diluent, and 100 µl of each was added to antigen coated micro ELISA wells. Plates were covered and incubated at 37°C for 20 minutes. After aspiration and washing with wash buffer, 100 µl volumes of horse radish peroxidase (HRP) conjugated antihuman IgM were added to all wells. Plates were again sealed and incubated at 37°C for 20 minutes. After aspiration and washing, 100 µl TMB substrate (3, 3', 5, 5'-

*Reader; **Senior Resident; ***Professor and Head, Department of Microbiology, University College of Medical Sciences and Guru Tegh Bahadur Hospital, Delhi.

Received : 8.2.2002; Accepted : 2.8.2002
tetramethylbenzidine and hydrogen peroxide in an organic base) was added to all wells. Plates were incubated for 10 minutes at room temperature and then 100 µl of ‘stop solution’ (1M phosphoric acid) was added to all wells. The OD of each well was read at 450 nm. PanBio units were calculated and interpreted as instructed: < 9 PanBio units, negative; 9-11 PanBio units, equivocal; > 11 PanBio units, positive.

**Results**

Twenty seven out of 180 (15%) sera tested were positive for leptospiral IgM. Three sera gave equivocal results. Except for one specimen out of 27 leptospiral IgM positive sera, remaining 26 were negative for Widal test. No other Widal test positive sera included in the study gave leptospiral IgM. Three sera gave equivocal results. Except for leptospiral IgM. Three sera gave equivocal results. Except for leptospiral IgM amongst patients with febrile illness during monsoon. In another study, positivity rate of 15% in our study cannot be compared to previous studies because of inclusion of sera of all febrile patients sent for Widal test and not specifically with suspicion of leptospirosis. Other presentations of leptospirosis like hepatitis and haemorrhagic manifestations were not encountered during the study period. Moreover, low undetectable IgM levels in patients with fever of short duration of 3-5 days could have resulted in negative result in such cases. Repeat testing on specimens taken later in illness from same patients could have resulted in the detection of higher number of positive cases. Although the test performed is a genus specific test and it has been demonstrated to detect infections caused by *L. interrogans* serovars including: hardjo, pomona, copenhageni, australis, madanesis, kremastos, nokolaevo, celledoni, canicola, grippotyphosa, szwajizak, djasiman and tarassovi, it is likely that some locally prevalent serovars were not detected by it.

Three sera that gave equivocal results were not included for calculating the positivity rate as we could not get them confirmed by MAT, which is available at very few places like reference centers only. Details of the only patient with both widal and leptospiral IgM positive were traced. It was found that this person was a farmer by profession and hailed from rural background from a nearby state. There is a possibility that this patient had both enteric fever and leptospirosis concomitantly or had suffered from enteric fever in the recent past.

This study is a preliminary survey to find out the possibility of leptospirosis as a cause of febrile illness in urban slums around our hospital. Positive rate of 15% in the present study stresses the need to have elaborate studies and continuous surveillance programme for leptospirosis. Moreover, increased awareness amongst medical professionals regarding higher clinical suspicion and development of simple and indigenous laboratory diagnosis methods is essential to have an accurate data on disease burden of leptospirosis.

**Discussion**

Leptospirosis is a zoonosis caused by pathogenic spirochaetes belonging to the genus *Leptospira*. Although traditionally considered an occupational disease among persons exposed to contaminated water or infected animal urine e.g. sewer workers, miners and farmers, leptospirosis is becoming recognized as a common cause of febrile illness in tropical environments worldwide. The concept that leptospirosis always presents in the form of typical Weil’s disease has crept into the minds of the medical professionals due to very low priority given to the disease in medical education. The extremely variable clinical presentation is common not only in India but in other countries also. The possibility that leptospirosis can present in varied forms is often forgotten while making a clinical diagnosis.

The likelihood of leptospirosis is highest during post-monsoon season especially among people living in places with poor sanitation and low hygiene like urban slums according to the current knowledge of the epidemiology of the disease. Keeping this fact in mind, sera from patients presenting to UCMS and GTB Hospital during the months of June to September, 2001 were included in the present study. As enteric fever is endemic in this region, Widal test is requested as a part of routine workup of febrile patients. The present study aimed at finding the levels of leptospiral IgM as evidence of possible leptospirosis in these febrile patients.

PHLS Leptospira Reference Unit, United Kingdom (UK), has previously evaluated the serological test used in the present study by comparison with microscopic agglutination test (MAT) and other commercial screening tests. Compared with MAT, sensitivity and specificity of this test was found to be 90% and 94% respectively. It appeared to be the most suitable as a screening test for leptospiral IgM in the UK although confirmation needs to be achieved by MAT especially in case of sera giving equivocal results.

The present study showed 15% (27 out of 180) positivity for leptospiral IgM amongst patients with febrile illness during monsoon and post-monsoon months. In another study, leptospirosis was found to be the cause of 38% of cases of PUO in Tamil Nadu during monsoon. In Surat, 40% of the suspected cases showed IgM antibodies during 1997 outbreak. While in other states of India, no reliable figures on disease burden are available, in Andamans some crude estimate of disease burden is possible because of the huge attention attracted by the recurrent outbreaks of Andaman hemorrhagic fever. Seroprevalence rates in the range of 50-60% have been observed amongst apparently healthy population in the Andamans.

Positivity rate of 15% in our study cannot be compared to previous studies because of inclusion of sera of all febrile patients sent for Widal test and not specifically with suspicion of leptospirosis. Other presentations of leptospirosis like hepatitis and haemorrhagic manifestations were not encountered during the study period. Moreover, low undetectable IgM levels in patients with fever of short duration of 3-5 days could have resulted in negative result in such cases. Repeat testing on specimens taken later in illness from same patients could have resulted in the detection of higher number of positive cases. Although the test performed is a genus specific test and it has been demonstrated to detect infections caused by *L. interrogans* serovars including: hardjo, pomona, copenhageni, australis, madanesis, kremastos, nokolaevo, celledoni, canicola, grippotyphosa, szwajizak, djasiman and tarassovi, it is possible that some locally prevalent serovars were not detected by it.

Three sera that gave equivocal results were not included for calculating the positivity rate as we could not get them confirmed by MAT, which is available at very few places like reference centers only. Details of the only patient with both widal and leptospiral IgM positive were traced. It was found that this person was a farmer by profession and hailed from rural background from a nearby state. There is a possibility that this patient had both enteric fever and leptospirosis concomitantly or had suffered from enteric fever in the recent past.

This study is a preliminary survey to find out the possibility of leptospirosis as a cause of febrile illness in urban slums around our hospital. Positive rate of 15% in the present study stresses the need to have elaborate studies and continuous surveillance programme for leptospirosis. Moreover, increased awareness amongst medical professionals regarding higher clinical suspicion and development of simple and indigenous laboratory diagnosis methods is essential to have an accurate data on disease burden of leptospirosis.

**References**

4. Zochowski WJ, Palmer MF, Coleman TJ. An evaluation of...
three commercial kits for use as screening methods for the
detection of leptospiral antibodies in the UK. J Clin Pathol

5. Sehgal SC, Murhekar MV, Sugunan AP. Outbreak of
leptospirosis with pulmonary involvement in North Andaman.

infections of humans, epidemiology and control. 2nd edition.

7. Ratnam S, Sunderaraj T, Thyagarajan SP, Rao RS,
Madanagopalan N, Subramanian S. Serological evidence of
leptospirosis in jaundice and pyrexia of unknown origin. Indian

8. Sehgal SC, Murhekar MV, Sugunan AP. A serosurvey for
leptospirosis in North Andamans. Indian J Med Microbiol

**DOCTOR 2002 - General Medicine**

*Highly Advanced and Newer Medical Software for Clinical Management*

Easy to use, comprehensive, economical, revised medical software package made just for you. Widely used, Reliable and Secure:

- Case sheets and specialty sheets
- Appointment scheduler, statistics, inventory
- Finance management, billing (lab, drugs etc)
- Print outs of prescription, auto case summary, medical certificate, bills, letters
- Details lab and lab summaries
- Disease guidelines, PDR and journal reference
- Diet adviser, med. photographs and graphs.
- Patient education videos and printouts
- Prescription : Autodose, Autoallergy, autodisease (or condition) contraindication alert, auto drug interaction, alert, fonts option Hindi, Punjabi, Marathi, Tamil etc.
- Allows auto filling - very little typing needed
- Save money, time, life, network ready
- No learning required. For consultants, clinics, and small to medium hospital and excl. medicine, surgery, OBG, ped. clinic packs

MEDISOFT, Warrier lane, MG Rd, Cochin - 682035.
E_mail : medisoft@doctor.com Ph : 09847294414
Visit http://www.medisoftindia.com