Frequency of Leptospirosis in Patients of Acute Febrile Illness in Uttar Pradesh

H Manocha*, Ujjala Ghoshal*, SK Singh**, J Kishore***, Archana Ayyagari+

Abstract

Objective: This study was performed to assess the disease burden of leptospirosis in and around Lucknow among patients presenting with acute febrile illness and conforming to the case definition of leptospirosis.

Methods: A total of 346 serum samples (mostly paired) and an equal number of urine samples were collected from patients presenting with acute febrile illness and fulfilling the criteria of clinical diagnosis of leptospirosis from January 2001 to December 2001. Patients attending a tertiary care hospital as well as from various communities in and around Lucknow were included in this study. All sera and urine samples were tested for the presence of IgM antibody by Leptodipstick test and by dark-field microscopy (DFM) respectively. All positive and 10% negative sera were tested at national leptospirosis reference centre at Andaman and Nicobar Islands for microagglutination test (MAT).

Results: IgM antibody was detected in 25/346 (7%) patients ranging in age from 9-65 years. DFM was positive in only in one case. MAT was positive in 4/17 cases tested and the prevalent serogroups were L. grippotyphosa and L. pomona in two each. Common presenting features in these patients were fever (25/25) and jaundice (17/25). History of contact with animal or water contaminated with animal urine was present in 96% cases.

Conclusion: leptospirosis is not uncommon in Uttar Pradesh. However larger epidemiological studies are required to know the actual disease burden. Dark-field microscopy is an insensitive method for the diagnosis of leptospirosis and is not suitable for surveillance.

INTRODUCTION

Leptospirosis is an important zoonotic disease and has been reported from various countries. Since its first report from Andaman Island in 1929 it has been reported from other parts of India and it has hit virtually all parts of urban, semi-urban, semi rural and rural India in last decade. Despite presence of environmental condition favoring growth of leptospira in Uttar Pradesh (UP) like more than 85% rural population, presence of pets in houses, water logging during rainy season, abundance of rodents and reports of leptospirosis in animals, there is no report of it in human in UP. The present study was done with an objective to assess the proportion of cases due to leptospirosis in and around Lucknow among patients presenting with acute febrile illness, conforming to the case definition.

MATERIAL AND METHODS

The present study was conducted at Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow. Patients attending the out patient departments or admitted to the various wards and from rural communities in and around Lucknow fulfilling the criteria of clinical suspicion of leptospirosis were included.

Criteria for clinical diagnosis

Fever of acute onset with one or more of the following sign/symptoms were taken as the criteria for clinical diagnosis. Cough with haemoptysis, unexplained breathlessness, bleeding tendency including subconjunctival hemorrhage, jaundice or laboratory evidence of liver dysfunction and signs of meningeal irritation. Since clinical suspicion is often difficult evaluation of clinical criteria is recently been reported.

Patients

One hundred thirty three patients from the hospital and 213 patients from the community were included. (Total 346). Camps were organised in five rural areas in and around Lucknow, these are Sarojini Nagar, Mohanlalgang,
Billochpura, Bijnour and Panki. Sera samples from the patients of acute febrile illness with any sign/symptom suggestive of leptospirosis mentioned above were taken. Second serum sample was collected one week later from all patients except two. Urine samples were also collected from all the patients for dark-field microscopy (DFM).

**Sampling and test procedure**

Leptodipstick test (Organon Tennik) was performed on paired sera for detection of specific IgM antibody against leptospira, according to the manufacturer’s instruction. MAT (Micro agglutination test) was done in all positive and 10% of seronegative samples at National Leptospirosis Reference Centre at Port Blair, Andaman Nicobar Island. Urine samples were prepared for DFM by centrifuging 10 ml of urine at 2000 rpm for 10 minutes. Deposits of the centrifuged urine were examined in a wet mount under 20X objective with dark-field condenser.

**Leptodipstick**

The dipstick contains two horizontal bands, lower containing broadly reactive Leptospira antigen and upper an internal control. The assay is based on binding of leptospira specific antibody to its antigen. Antibodies are detected with an antihuman IgM conjugate. The assay was performed in serum at 1:50 dilution in detection reagent and incubating a wetted dipstick in this solution. Staining of the antigen band revealed presence of leptospira specific IgM antibody. Interpretation of the test result depends on the intensity of the staining of the antigen band, which can be simply determined by comparison with the coloured reference strip. The internal control band provides a check on the integrity of the detection reagent and serum. It has previously been shown that results of leptodipstick are comparable to ELISA.

History of contact with the animals was defined as the presence of animals in the same house where patients were living.

**RESULTS**

Leptospira-specific IgM antibody was detected in 25 patients, 18 and seven from hospital and community respectively. Five of seven patients from community were male and 15/18 hospitalized patients were male. Symptoms included jaundice 17/25, pain in abdomen 10/25, vomiting 10/25, headache, chills, rigor and oliguria 6/25 each (Table 1). Of 25 seropositive cases 24 were either related to an occupation involving animal handling (farmer, butcher etc.) as compared to 136/321 seronegative patients and this was statistically significant. Dark-field microscopy for urine was positive only in one patient. Four of seventeen cases were positive for MAT and the prevalent serovars were L. grippotyphosa in two and L. pomona in two. All but two patients responded to the treatment.

**DISCUSSION**

In the present study, leptospecific IgM antibody could be detected in 25 patients, proving that leptospirosis is not an infrequent cause of acute febrile illness in and around Lucknow.

To the best of knowledge it is perhaps the first large hospital and community based study on human leptospirosis from UP. The frequency (7%) of leptospirosis as a cause of acute febrile illness in the present study is not unexpected considering the sociodemographic and ecological factors prevailing in UP.

A similar frequency of leptospirosis in acute febrile illness has been reported earlier from India and abroad. Diagnosis of leptospirosis in our study was based on the presence of leptospecific IgM antibodies in presence of appropriate clinical settings. Leptodipstick is highly sensitive and specific for the diagnosis of leptospirosis.

In the present study we found frequency of positivity of DFM and MAT to be less as compared to leptodipstick test. Leptodipstick detects the antibody against leptospira where as DFM detects live organism. Since most of our patients (199/346) had received antibiotics before inclusion in the study, lower positivity of DFM is not entirely unexpected. DFM is both insensitive and lacks specificity. MAT does not have any diagnostic significance in 1st week and peak about 3rd week. Moreover it is a very highly complex test to perform, and interpret and therefore can be done only in reference laboratory. Earlier studies showed IgM to persist for 3rd week after acute infection with leptospirosis.

In conclusion, we found that leptospirosis does occur in UP and DFM is insensitive methods for its diagnosis, MAT is very complex and can be performed only in reference laboratories. Therefore high degree of clinical suspicion and appropriate investigations are required for early diagnosis of this potentially treatable infective illness. Our data may also suggest that leptodipstick should be preferred over DFM and MAT for its diagnosis.

**Table 1: Relative frequency of presenting symptoms in patients seropositive for IgM antibodies for leptospirosis**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Frequency among seropositive patients</th>
</tr>
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<tbody>
<tr>
<td>Fever</td>
<td>25 (100)</td>
</tr>
<tr>
<td>Jaundice</td>
<td>17 (44)</td>
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<tr>
<td>Pain in abdomen</td>
<td>10 (40)</td>
</tr>
<tr>
<td>Vomiting</td>
<td>10 (40)</td>
</tr>
<tr>
<td>Headache</td>
<td>6 (24)</td>
</tr>
<tr>
<td>Chills</td>
<td>6 (24)</td>
</tr>
<tr>
<td>Rigor</td>
<td>6 (24)</td>
</tr>
<tr>
<td>Oliguria</td>
<td>6 (24)</td>
</tr>
<tr>
<td>Muscle pain (calf)</td>
<td>4 (16)</td>
</tr>
<tr>
<td>Cough</td>
<td>4 (16)</td>
</tr>
<tr>
<td>Breathlessness</td>
<td>3 (12)</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>2 (8)</td>
</tr>
<tr>
<td>Haematuria</td>
<td>1 (4)</td>
</tr>
<tr>
<td>Haematemesis</td>
<td>1 (4)</td>
</tr>
<tr>
<td>Meningism</td>
<td>1 (4)</td>
</tr>
<tr>
<td>Conjunctival suffusion</td>
<td>0 (0)</td>
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</table>
Acknowledgement

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REFERENCES


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