Case Capsules of Leptospirosis Prevalence Among Children, Coimbatore, India

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Abstract
The study describes the first attempt to record leptospirosis in Coimbatore regarding paediatric leptospirosis by isolation, serology (microscopic agglutination test) and complete haematogram. Ten clinically suspected cases showing fever, headache, body ache associated with jaundice, decreased urine output and arthralgia were included. This infection has a broad spectrum of clinical manifestations varying from inapparent influenza like illness to fulminant fatal disease with hepato-renal dysfunction and haemorrhagic phenomena. Leptospirosis was suspected in view of epidemic situation prevailing in the city. As per the report, we report five positive cases among ten clinically suspected cases, where four survived and one died.

Introduction
Leptospirosis is a ubiquitous, zoonotic disease of worldwide in distribution which affects internal organs producing multiple organ dysfunctions (MOD) to multiple organ failure (MOF), basically an occupational disease. It is grossly under diagnosed disease in our country due to lack of awareness, protean manifestations and inadequate diagnostic facilities for many years. Sporadic cases of leptospirosis may occur in countries with moderate climates, can be endemic in countries with wet and warm climates, people living under poor socioeconomic and hygienic conditions are at particular risk of getting the disease. The true incidence of human leptospirosis in India is not known either because of lack of awareness on the part of the treating physicians or the lack of diagnostic techniques.

Epidemiological investigation of leptospirosis is often hampered by the difficulty of making a definitive microbiologic diagnosis. Isolation of leptospira from clinical samples provides a definitive diagnosis; however, the value of culture is limited because samples have to be collected before the administration of antibiotics and culturing requires prolonged incubation. Demonstration of typical motility of leptospira under dark ground illumination in clinical samples, though helpful in early diagnosis, has low sensitivity and depends on the technician's opinion. Measurement of antibodies has emerged as reliable diagnostic test with good specificity and sensitivity; achieving a positive serologic test increases with the duration of disease and a good correlation between results of MAT and ELISA.

Case Capsules
Case 1
A six year old boy was admitted in Kovai Medical
Centre and Hospital, Coimbatore with history of fever with chills and myalgia since seven days, a moderate puffiness of face and arthralgia since two days. A presumptive diagnosis of urinary tract infection was made. After one day, he developed sudden breathlessness, haemoptysis and haematemesis of 250-300 ml, and also experience with subconjunctival suffusion. Then blood was collected for leptospirosis detection by dark ground microscopy in EMJH semisolid media and serum was subjected to microscopic agglutination test (MAT) and doxycycline was administered. Complete Haematogram (CHG) showed Total white cell count of 5750/ cu.mm; neutrophils-70%, lymphocytes-30%, platelets were adequate and Hb-8.9 g/dL. Urine examination revealed 10-15 pus cells/hpf, few casts and bacteria. Dark ground observation of blood showed the presence of leptospires. The results of the blood sample supported culture positive to L. grippotyphosa and MAT showed positive to L. grippotyphosa (1:5120), L. australis (1:320) and L. canicola (1:640). The boy expired after two days of hospitalization.

**Case 2**

Nine year old baby was admitted with fever, headache, arthralgia since twelve days and approximately 50 ml haematemesis for three days. He was primarily observed by village based traditional medical practitioner but no improvement observed. Later he was admitted in hospital with cold, feeble pulses, tachycardia and cardiac arrhythmia. Complete haematogram (CHG) showed total leucocyte count of 5260/ cu.mm; platelets are moderate and HB-7.3 g/dL. Urine test provided 6-10 pus cells/hpf, few casts and bacteria. Dark field microscopy of blood and urine highlighted the presence of leptospires. The results of blood showed negative to culturing; and urine sample supported to culture positive to L. grippotyphosa and MAT showed positive to L. grippotyphosa (1:640) and L. australis (1:320). Patient received doxycycline in intravenous fluids and blood transfusion. Patient was slowly recovered from third day of hospitalization and enabled to dehospitalize on 9th day.

**Case 3**

An eleven month old male child was being treated for dehydration due to gastroenteritis. Ascites and vomiting was found after four days. The patient was hospitalized and antibiotic amikacin was started. On observation, the baby’s eyes were examined as severe subconjunctival suffusion and leptospirosis was suspected and blood sample was sent to lab for dark ground illumination including MAT, which provide positive. Doxycycline was administered along with intravenous fluid. The biochemical parameters (complete haematogram) revealed Hb of 11 g/dL, total white cell count of 22,500/cu.mm. The urine had 2-4 pus cells/hpf, serum creatinine was 0.6 mg/dL, serum urea was 18 mg/dL and blood sugar 60 mg/dL. After cultural examination, the patient showed positive to L. autumnalis where MAT revealed the serovars L. grippotyphosa (1:5120) and L. autumnalis (1:640). Due to continuous administration of doxycycline with plenty of fluids, patient slowly recovered and dehospitalized on 7th day.

**Case 4**

A three year old boy was observed with fever, nausea, redness of eyes in the OP ward. He was suspected with malaria and leptospirosis. On observation, he was pale and febrile. On studying the history, five days before the boy was bite by a rat and immediately faint down. Investigations revealed with the serum analysis, liver function tests, complete haematogram, culturing and serology. As a result, serum analysis showed positive to MAT of L. grippotyphosa (1:1280) and L. australis (1:320). Liver function test and urine examination were normal. DGI was positive and CHG revealed Hb-11.6 g/dL, Total white cell count – 5690/ cu.mm. Penicillin and doxycycline were administered in view of the positive reports of leptospirosis. The patient was improved and dehospitalized.

**Case 5**

A five year old girl was investigated with fever, nausea, vomiting and diarrhoea. On examination, stool sample, it gave positive to amoebic colitis by microscopy (presence of few pus cells, clumped RBCs, few macrophages, eosinophils, charcot-leyden crystals and haematophagous trophozoites), culturing and negative to bacillary dysentery. Blood stain was observed in stool sample and 100 – 120 mL haematemesis was recorded. On examination, he was febrile, pale, dehydrated and has suspected to hepatosplenomegaly. Due to the observation of fever, the patient was also suspected to leptospirosis where CHG revealed Hb of 11.3 g/dL, total WBC of 1030 cu.mm. Smear of the blood showed negative to malaria. The culturing on EMJH showed positive to L. icterohaemorrhagiae and MAT supported to L. grippotyphosa (1:1280), L. icterohaemorrhagiae (1:2560), L. australis (1:320) and L. canicola (1:320).
Biochemistry supported leptospirosis by serum creatinine of 1 mg/dL; LFT and urine examination not showed any variation and be normal. *Leptospira* by DGI of blood and blood culture was positive. It showed the patient had liver abscess due to *Entamoeba histolytica*. The patient was ideally treated with iodoquinol and doxycycline along with intravenous fluid. After seven days, the patient improved and dehospitalized.

**Discussion**

Leptospirosis is an anthropozoonotic disease caused by the pathogenic spirochaete *Leptospira interrogans*.\(^8,9\) This study shows that leptospirosis occurs frequently in Coimbatore and surrounding places during the north east monsoon. Considering the environmental conditions among the children, may the main reason for acquiring the infection.\(^4,10\) By this case capsules, it is clearly understood that the clinicians must alert to the possible presence of leptospirosis while diagnosing cases of febrile illness. The clinical criteria used for screening patients had a strong predictive value. This can only be tested by screening samples of all fever cases for leptospirosis and following them up for the development of symptoms/signs suggestive of leptospirosis.\(^10,11\) As it is known that in most cases of leptospirosis presents as a mild flu like illness, the actual number of leptospirosis cases could be several fold the number estimated by screening to suspected cases clinically diagnosed as having leptospirosis.

The first case of leptospirosis from India was reported in 1929 by Taylor and Goyal from Andaman and Nicobar islands. It is known to occur in sporadic as well as epidemic form in mainland India. There has been a significant increase in the reported cases of leptospirosis from India since 1980s. Epidemic has been increasingly reported form Orissa, Maharashtra, Karnataka, Tamilnadu and Kerala. The presence of lesion caused by leptospires is damage to the endothelial lining of small blood vessels with resultant ischaemic damage to liver, kidneys, meninges and muscles. A low index of suspicion of this disease coupled with the diversity and non specificity of the presentation accounts for the significant number of cases that go unrecognized. Identification of serovars is necessary for epidemiological surveillance since some serovars are known to have animal reservoirs or are associated with certain clinical forms.\(^12\)

This zoonotic infection should be considered in the differential diagnosis of any acute febrile illness. As there is an overlap of the clinical features of leptospirosis with other infections like influenza, dengue haemorrhagic fever, enteric fever and viral hepatitis A, a high index of suspicion is required to diagnose leptospirosis in a child, especially in endemic areas.

An urgent need in leptospirosis diagnosis is a rapid, sensitive, reliable method for detecting leptospires and simultaneously identifying serovars involved in outbreaks of infection.\(^13\) Microbiologically diagnosis of leptospirosis aims at demonstrating the leptospires, by culturing them or by demonstrating an appreciable antibody response to them.\(^14\) Early diagnosis, however, is mainly clinical (based on the characteristic signs and symptoms) and epidemiological (based on history of wading and contact with animals) since laboratory diagnosis (serology or culture) can only be obtained on the latter course of the disease. Laboratory testing to confirm the clinical diagnosis is essential for appropriate treatment and patient management by which laboratory diagnosis of leptospirosis mainly depends on serology.\(^15\)

Due to lack of simple diagnostic tools, the diagnosis of leptospirosis cannot be easily made in many laboratories. Hence, leptospirosis often is not recognized or is
erroneously mistaken for other diseases with similar symptoms. As a consequence, this often serious disease may be either left untreated or treated improperly; besides, information on the prevalence and incidence of leptospirosis may be unreliable.\textsuperscript{16} The precise identification and classification of leptospires is important for epidemiological and public health surveillance, as different serovars can exhibit different host specificities and may not be associated with a particular clinical form of infection. Detection of antibodies to individual serogroups requires the use of the microscopic agglutination test, the interpretation of which is complex.\textsuperscript{15-17}

While this infection affects multiple organs with varying presentation, in our case capsule analysis, prolonged fever, chills, myalgia, haematemeses, gastroenteritis, renal symptoms and signs were conspicuous. The patients of leptospirosis come from various localities. The first patient (case 1) who expired due to severe haemorrhagic diseases with acute respiratory distress syndrome. This expired case alerted us to keep leptospirosis in mind and suspect it all cases with febrile illnesses. In the last case (fifth), there was co infection of leptospirosis with amoebic colitis and amoebic liver abscess due to \textit{Entamoeba histolytica}. Some studies also showed the coinfection with malaria and leptospirosis.\textsuperscript{18}

It is not advisable to attach absolute values to the results obtained. They should be carefully considered case by case and evaluated in relation to all the other data including history and patients symptoms. A wide variety of tests are available for laboratory diagnosis of leptospirosis but usage of diagnostic kits is poised to play an important role in the early diagnosis.\textsuperscript{19-21} There is an urgent need for indigenous development of simple and economical tests of quality for use in Indian conditions. These case reports emphasize the need for essential diagnostic programme with a priority of setting in diagnostic tests, to institute prompt treatment and reduce fatal outcome.

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\textbf{References}


Can Antiretroviral Therapy Eliminate HIV Transmission?

ART may be used to prevent acquisition of HIV infection when delivered as prophylaxis before or after HIV exposure, or to prevent transmission from HIV-infected persons when provided as treatment that renders them less infectious. Prophylactic approaches are challenged by the large numbers having to be treated to prevent a single infection, and ART for preventing transmission from infected persons will have the greatest impact.

Proof of concept is offered by the virtual elimination of paediatric HIV disease in high-income countries by universal voluntary HIV testing of pregnant women and appropriate provision of ART. Because of newly recognised, non-AIDS-defining complications of uncontrolled HIV replication, as well as better treatment options, the pendulum around when to start therapy is again swinging towards earlier starting.