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Review

Retrospective analysis of leptospirosis among children – clinico- microbiological and therapeutic aspects for the cases

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These case capsules provide a nice record of the identification of leptospirosis in Coimbatore among children in isolation, sensitive serological analysis and complete haematogram. Eight cases that were clinically suspected showing general body signs (jaundice, decreased urine output and arthralgia) were well studied in this investigation. As per this study, the cases had fever, puffiness, respiratory anguish and hemorrhagic diathesis as leading manifestations. Leptospirosis was suspected in view of the epidemic situation prevailing in the city by conducting a hospital based study on the presence of leptospiral infection among patients with signs/symptoms suggestive of leptospirosis during June 2007 to July 2008. As per this survey, we reported six positive cases among eight clinically suspected cases, of which five survived and one died. It is important to anticipate and recognize the suspected cases early in the course of leptospirosis so that the appropriate steps can be taken to prevent it and to treat it with appropriate antibiotics when it develops.

Key words: Leptospirosis, children, microscopic agglutination test.

INTRODUCTION

Leptospirosis is an anthropozoonose, a disease common among most animals including humans and has world-wide distribution, and it has been reported from countries all over the world (Prabhu et al., 2008a). Sporadic cases of leptospirosis may occur in countries with moderate climates; the disease however, can be endemic in countries with wet and warm climates. People living under poor socio-economic and hygienic conditions are at particular risk of getting the disease (Prabhu et al., 2008a; Andre et al., 2000; Prabhu et al., 2008b). Most people at risk cannot depend on health care facilities supported by laboratories capable of performing the more complicated standard laboratory assays (Prabhu et al., 2008b; Easton, 1999; Jayaraman, 1998). The epidemics of this disease in tropical countries are often related to heavy rainfall and flooding; the south Indian states has witnessed post monsoon epidemics of this disease in recent years (Pappachan et al., 2004). Early diagnosis and appropriate treatment can prevent fatal outcome. In this investigation, we reported six positive cases among eight clinically suspected cases, of which five survived and one died.

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CASE REPORT 1

A healthy 18 month old male child presented with a 8 day history of fever, repeated nausea and rarely vomiting,

irritability and abdominal pain. In the preceding 24h, he had become drowsy and oliguria. Physical examination revealed the temperature of 38.9℃, heart rate of 130 beats min^{-1}, a respiratory rate of 36 breaths per minute and body weight of 9.0 kg. The white blood count was 1.1 × $10^{10}L^{-1}$, haemoglobin level was 6.44 $mmolL^{-1}$ and the platelet count was 1.73 × $10^{11}L^{-1}$. Urine examination revealed 12 - 18 pus cells/hpf, more casts and spiral bacteria. Dark ground observation of the blood showed the presence of leptospires and the culture showed positive to *Leptospira australis* and MAT also supported to *Leptospira australis* (1:1280)*, L. grippotyphosa* (1:640) and *Leptospira canicola* (1:320).

CASE REPORT 2

A case of leptospiral jaundice and AFI was observed in this case presenting with signs and symptoms. A six year old boy was admitted in Kovai Medical Center 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 a day, he developed sudden breathlessness, hemoptysis and hematemesis of 250 – 300 ml, and also experience with subconjunctival suffusion. Blood was then collected for leptospirosis detection by dark ground microscopy, culturing in EMJH semisolid media and serum was subjected to microscopic agglutination test (MAT) and doxycycline was administered. Complete Haematogram (CMG) 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 REPORT 3

Nine year old baby was admitted with fever, head-ache, arthralgia since twelve days and approximately 50 ml hematemesis 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 leukocyte count of 5260/cu mm; platelets are moderate and HB-7.3 g/dl. Urine test provided 6 - 10 pus cells/hpf, no casts and leptospires observed. 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. australis* (1:640) and *L. grippotyphosa* (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 REPORT 4

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 laboratory for dark ground illumination including MAT, which tested 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 tested positive to *L. autumnalis* where MAT revealed with the serovars *L. grippotyphosa* (1:5120) and *L. autumnalis* (1:640). Due to continuous administration of doxycycline with plenty of fluids, patient was slowly recovered and dehospitalized on 7th day.

CASE REPORT 5

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, 5 days before the boy was bit by a rat and immediately he fainted. Investigations revealed with the serum analysis, liver function tests, complete haematogram, culturing and serology. As a result, serum analysis tested 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 recovered and dehospitalized.

CASE REPORT 6

A five year old girl was investigated with fever, nausea, vomiting and diarrhea. On examination, of stool sample, it gave positive to amoebic colitis by microscopy (presence

of few pus cells, clumped RBCs, few macrophages, eosinophils, charcot-leyden crystals and haematophagus trophozoites), culturing and negative to bacillary dysentery. Blood stain was observed in stool sample and 100 – 120 ml haematemesis was recorded.

On examination, she was febrile, pale, dehydrated and suspected have hepatospleenomegaly. 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 tested 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 did not show any variation and was 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's health improved and was dehospitalized.

DISCUSSION

Leptospirosis is a zoonotic disease found worldwide which is caused by genus Leptospira and presents a wide spectrum of clinical manifestations which starts with multiple organ dysfunction and multiple organ failure (Prabhu et al., 2008b; Alexandre et al., 2006; Marotto et al., 1999). This study showed that leptospirosis occurs frequently in Coimbatore and surrounding places during the north east monsoon. The main reason for acquiring the infection among the children was considered as environmental conditions (Andre et al., 2000; Pappachan et al., 2004; Marotto et al., 1999; Natarajaseenivasan et al., 2004). As a result of this case report, it is undoubtedly tacit that the clinicians must be attentive to the doable incidence of leptospirosis while diagnosing cases of febrile infection. 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.

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 (Natarajaseenivasan et al., 2004). An urgent need in leptospirosis diagnosis is a rapid, sensitive, reliable method for detecting leptospires and simultaneously identifying serovars involved in outbreaks of infection (Ramadass et al., 1997).

Microbiological diagnosis of leptospirosis aims at investigating leptospires, by culturing them or by investigating an antibody that respond to them (Ko et al., 1999; Velineni et al., 2007). 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 (Prabhu et al., 2008b; Natarajaseenivasan et al., 2004; Ramadass et al., 1997; Ko et al., 1999; Smits et al., 2001).

Due to the 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 is either left untreated or treated improperly; besides, information on the prevalence and incidence of leptospirosis may be unreliable (Gussenhoven et al., 1997; Senthilkumar et al., 2008). 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 (Prabhu et al., 2008b; Natarajaseenivasan et al., 2004; Brown and Levett, 1997; Katz et al., 2001).

While this infection affects multiple organs with varying presentation, in our case capsule analysis, prolonged fever, chills, myalgia, hematemesis, gastroenteritis, renal symptoms and signs were conspicuous. The patients of leptospirosis come from various localities. The patient (case 2) who expired due to severe haemorrhagic diseases with acute respiratory distress syndrome alerts us to keep leptospirosis in mind and suspect all cases with febrile illnesses (Gulati et al., 2002). The serological follow up provide the observable reduction in the patients serum that indicated the importance of follow up of the patients (Lupido et al., 1991). In the last case (sixth), there was coinfection of leptospirosis with amoebic colitis and amoebic liver abscess due to *E. histolytica*.

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. 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.

Despite the common occurrence of leptospirosis in tropical areas of Tamilnadu, the diagnosis may be missed, as the classical clinical features may not always be present. The diagnosis should be suspected, however, in anyone with an appropriate history of exposure, especially occupational exposure. As this condition can progress very rapidly and result in death, such patients need intensive monitoring and treatment.

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REFERENCES

Alexandre LS, Jaques S, Silvia RM, Antonio CS (2006). Leptospirosis-induced meningitis and acute renal failure in a 19-month-old male child. J. Med. Microbiol., 55: 795-797.

Andre VL, Diamen D, Jaime RT (2000). Leptospirosis in Latin America. Infect. Dis. Clin. N. Am., 14: 23-29.

Brown PD, Levett PN (1997). Differentiation of *Leptospira* species and serovars by PCR restriction endonuclease analysis, arbitrarily primed PCR and low stringency PCR. J. Med. Microbiol., 46: 173-181.

Easton A (1999). Leptospirosis in Philippine floods. Brit. Med. J., 319: 212-213.

Gulati S, Menon S, Kabra M, Caudhry R, Kalra V (2002). Leptospirosis: A case report. Pediatr. Today, 7: 428-433.

Gussenhoven GC, Vander HMAWG, Goris MGA, Terpstra WJ, Hartskeerl RA, Mol BW, Van Ingen CW, Smitis HL (1997). LEPTO Dipstick, a Dipstick assay for detection of *Leptospira* specific immunoglobulin M antibodies in human sera. J. Clin. Microbiol., 35: 92-97.

Jayaraman KS (1998). India urged to act against leptospirosis. Nature. 392: 2-4.

Katz AR, Ansdell VE, Effler PV, Middleton CR, Sasaki DM (2001). Assessment of the clinical presentation and treatment of 353 cases of laboratory confirmed leptospirosis in Hawaii, 1974-1998. Clin. Infect. Dis., 33: 1834-1841.

Ko AI, Galvao RM, Ribeiro DCM, Johnson WD, Riley LW (1999). Urban epidemic of severe leptospirosis in Brazil, Salvador Leptospirosis study group. Lancet, 354: 820-825.

Lupido R, Cinco M, Balinzin E, Delprete E, Varaldo PE (1991). Serological follow up of patients in a localized outbreak of leptospirosis. J. Clin. Microbiol., 29: 107-109.

Marotto PCF, Mascimento CMR, Eluf NJ, Marotto MS, Andrade L, Sztajnbok J, Seguro AC (1999). Acute lung injury in leptospirosis clinical and laboratory features, outcome and factors associated with mortality. Clin. Infect. Dis., 29: 1561-1563.

Natarajaseenivasan K, Prabhu N, Selvanayaki K, Raja SSS and Ratnam S (2004). Human Leptospirosis in Erode, South India: Serology, Isolation and Characterization of the isolates by Rapidly Amplified polymorphic DNA (RAPD) fingerprinting. Jap. J. Infect. Dis., 57: 193-197.

Pappachan MJ, Shella M, Aravindhan KP (2004). Relation of rainfall pattern and epidemic leptospirosis in the Indian state of Kerala. Epidemiol. Commun. Hlth., 58: 1054-1058

Prabhu N, Joseph PID, Chinnaswamy P (2008a). In vitro antileptospiral activity of aqueous extract of *Eclipta alba* Linn. Antiseptics, 105: 300-302.

Prabhu N, Joseph PID, Chinnaswamy P (2008b). Leptospirosis in Coimbatore, Manchestor of South India: Assessment of Clinical presentation of 93 cases. Bom. Hosp. J., 50: 434-438.

Ramadass P, Meerarani S, Venkatesha MD, Senthilkumar A, Nachimuthu K (1997). Characterization of leptospiral serovars by Randomly Amplified polymorphic DNA fingerprinting. Int. J. Syst. Bacteriol., 47: 575-576.

Senthilkumar TMA, Subathra M, Ramadass P, Ramaswamy V (2008). Rapid Serodiagnosis of Leptospirosis by Latex agglutination test and flow through assay. Ind. J. Med. Microbiol., 26: 45-49.

Smits HL, Eapen CK, Sheela S, Mariamma K, Gasem MH, Yersin C, Sasaki D, Pujianto B, Vestering M, Abdoel H, Gussenhoven GC (2001). Lateral flow assay for rapid serodiagnosis of human leptospirosis. Clin. Diag. Lab. Immunol., 8: 166-169.

Velineni S, Asuthkar S, Umabala P, Lakshmi V, Sritharan M (2007). Serological evaluation of Leptospirosis in Hyderabad, Andhra Pradesh: A retrospective hospital-based study. Ind. J. Med. Microbiol., 25: 24-27.