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COINFECTIONS OF LEPTOSPIROSIS WITH DENGUE, MALARIA AND ENTERIC FEVER

Medical Microbiology

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ABSTRACT

Introduction: Leptospirosis is an important infectious disease presenting with fever.1 It is a zoonosis caused by pathogenic spirochetes of Genus Leptospira. **Aims and Objectives:** Was to determine the prevalence of leptospirosis in FUO cases, to detect presence of coinfections of leptospirosis with dengue, malaria and enteric fever and to compare the clinical features and laboratory parameters of leptospirosis and coinfections **Materials and Methods:** This cross sectional study included 466 patients with fever of 5 days and more duration and of the age group 12 years, From all the 466 patients serum was subjected to serological tests for leptospirosis-MSAT and MAT. From the positive patients 10ml of blood was collected and subjected Blood culture and widal test for enteric fever, peripheral blood smear for malaria, Dengue duo cassette rapid test and Dengue IgM and IgG Elisa tests. **Results and Discussion:** Clinically suspected cases of leptospirosis were first screened using the Macroscopic Slide Agglutination Test (MSAT). MAT was performed on the samples positive by MSAT.136 patients were positive. In this study the predominant serogroup was Icterohaemorrhagiae (41.8%) followed by Patoc 22% Australis 13.9% Autumnalis 7.4% Hebdomadis 6.6% Lousiana 5.9% Grippotyphosa 2.2% . Seven patients had coinfections with dengue (5.1%), five patients with malaria (3.7%) and nine patients with enteric fever (6.6%) . Thus it is important to look for coinfections in an appropriate setting particularly if the patient does not show clinical signs of improvement despite pathogen directed therapy for an established alternative infectious etiology.

KEYWORDS

INTRODUCTION

Febrile illness is one of the most common reasons for seeking medical attention. Fever is defined as an elevation of core temperature above 37.8°C due to resetting of the temperature centre in the medulla.

Human leptospirosis is prevalent in several states in India, sporadically or as outbreaks especially during rainy seasons.

There have been reports of coinfections of dengue, malaria and enteric fever with leptospirosis[2,3,4,5]. However once a patient is diagnosed with leptospirosis he is unlikely to undergo further evaluation for concurrent infections in a normal clinical setup. These patients usually receive treatment only for leptospirosis. Failure to identify coinfection may lead to treatment failure and even mortality if inappropriate antibiotics are used.

So, this study was conducted to detect the prevalence of coinfections of leptospirosis with dengue, malaria and enteric fever and also their clinical implications.

Aims and Objectives

Was to determine the prevalence of leptospirosis in FUO cases, to detect presence of coinfections of leptospirosis with dengue, malaria and enteric fever and to compare the clinical features and laboratory parameters of leptospirosis and coinfections.

MATERIALS AND METHODS

This cross sectional study included 466 patients who attended Government General Hospital, Chennai with fever of 5 days and more duration and of the age group 12 years and above in the period April 2006 to March 2007. Only patients with features suggestive of leptospirosis were included in this study. Patients with fever associated with malignancies, autoimmune diseases were excluded from this study.

Detailed history was obtained from all the patients and a complete clinical examination was done. The data collected from the patients was documented in a proforma

Laboratory values of Haemoglobin, Total count, Differential count, ESR, Platelet count were obtained from Clinical Pathology Department and Urine albumin, sugar, deposits, S.bilirubin, SGOT, SGPT, Alkaline phosphatase, Blood urea and S.creatinine levels obtained from Biochemistry Department , Govt.General Hospital..

From all the 466 patients 2 ml of blood was collected by venepuncture with aseptic precautions and the serum was subjected to serological tests for leptospirosis-Macroscopic Slide Agglutination Test and Miroscopic Agglutination Test. 136 of them was found to be positive. From these patients 10ml of blood was collected and subjected to the following investigations. Blood culture and widal test for enteric fever, peripheral blood smear for malaria, Dengue duo cassette rapid test and Dengue IgM and IgG Elisa tests (Panbio).

RESULTS AND DISCUSSION

Samples were collected from 466 patients with clinical features suggestive of leptospirosis. It included 263 males and 203 females.

Microscopic Agglutination Test (MAT), the gold standard reference method for diagnosis of leptospirosis was positive for 136 patients This accounts for 29.1% of the total cases screened (Table I).

Table I: Prevalence of Leptospirosis in FUO Cases (n=466)

Total no of FUO cases	Positive for Leptospirosis	Percentage
466	136	29.1

This is comparable to other studies of Muthusethupathy et al (1995)[5], Kalimuthusamy et al (2004)[6] and Rathnam et al (1994)[7]. In the study by David R Murdoch et al (2004)[8] on the etiology of febrile illness in Kathmandu, Nepal, the prevalence of leptospirosis was only 4.1%. During outbreaks the rates are higher.

Among the 136 positive cases males were the predominant group in the study 71(52.2%) as compared to females 65(47.9%).

Highest number of cases were in the 20 –30 age group followed by 30-40 age group.

Clinically suspected cases of leptospirosis were first screened using the Macroscopic Slide Agglutination Test (MSAT). Microscopic agglutination test (MAT) was performed on the samples positive by MSAT. MAT was positive in a titre of 1:80 in all the 136 cases. Out of the 136 patients paired sera was obtained from 11 of the patients in whom a 4 fold rise in titre was observed. In others it was difficult to obtain a second sample. MAT was performed with 7 live culture antigens. Icterohaemorrhagiae, Patoc, Australis, Autumnalis, Lousiana, Hebdomadis, Grippotyphosa.

Table II: Distribution of Serovars by Microscopic Agglutination Test Result (n=136)

Serogroup	No.of cases	Percentage
Icterohaemorrhagiae	57	41.9
Patoc	30	22
Australis	19	13.9
Autumnalis	10	7.4

Hebdomadis	9	6.6
Lousiana	8	5.9
Grippotyphosa	3	2.2

Icterohaemorrhagiae was the Predominant Serogroup

In this study the predominant serogroup was Icterohaemorrhagiae (41.8%) followed by Patoc 22% Australis 13.9% Autumnalis 7.4% Hebdomadis 6.6% Lousiana 5.9% Grippotyphosa 2.2% .

In a study in Erode, South India (Kalimuthusamy et al., 2004)[7]. Australis 39% followed by Hebdomadis 5% Grippotyphosa and Icterohaemorrhagiae 1.5% each were detected Grippotyphosa was implicated in Andamans (Sehgal Sc1995)[9] & Kerala (John TJ, 1996).[10]

In this study all leptospirosis confirmed patients presented clinically with fever (100%). It was associated with chills in a few cases. In duration it lasted from 5 days to more than a month. Most of the cases had fever lasting between 5-15 days. The other symptoms and signs in decreasing order were myalgia 83% headache 58%, conjunctival suffusion 41.1%, gastrointestinal symptoms 27.9%, jaundice 9.6%, respiratory symptoms 8.8%, urinary symptoms 16.1%, meningism 10.2% rashes 8%, splenomegaly 5.14%, hepatomegaly 3.6%, bleeding tendencies and arthralgia 3.6% each .

The differences in distribution of major clinical features in this study might be due to variable infective dose, infecting serovar and the host's immune response.

Leptospiral illness may be a significant component in cases of dual infections or in simultaneous infections with more than 2 pathogens. Occurence of leptospirosis with concurrent illnesses have been reported. [11,8,12,13]

Table III: Coinfections of Leptospirosis with Dengue, Malaria and Enteric Fever

Coinfections	No.of cases	Percentage
Leptospirosis with enteric fever	9	6.6
Leptospirosis with dengue	7	5.1
Leptospirosis with malaria	5	3.7
Total number of coinfections	21	15.4

In this study seven patients had coinfections with dengue (5.1%), five patients with malaria (3.7%) and nine patients with enteric fever (6.6%) .

Out of 136 cases of leptospirosis, seven were positive for dengue serology. An outbreak of dengue was taking place concurrently. The peak incidence of both leptospirosis and dengue occurred during the rainy season. This could cause diagnostic confusion between leptospirosis and dengue. Ko AI et al (1999)[14] reported that during an concurrent outbreak of dengue fever with leptospirosis in Brazil, 42% of leptospirosis cases were misdiagnosed as having dengue fever. Both are emerging infectious diseases with a similar geographic distribution. [14]

Five patients had malarial coinfection detected by peripheral blood smear. Four of them had P.vivax and one had P.falciparum infection . The first report of coinfection with malaria and leptospirosis was given by Chansuda et al(2003)[15]. Both infections are common in the tropics.

Nine patients had serologic evidence of enteric fever coinfection. They were positive by the rapid slide agglutination test for S.typhi. Rapid slide agglutination tests have a higher rate of false positivity.[16]

Yupin Suputtamongkol (2004)[17] et al in their study detected gram negative bacteremia due to S.typhi in a patient with leptospiremia.

Thus it is important to look for coinfections in an appropriate setting particularly if the patient does not show clinical signs of improvement despite pathogen directed therapy for an established alternative infectious etiology.

Leptospirosis is one of the important cause of febrile illness. In this study the prevalence of coinfections with leptospirosis was 15.4% implying that dual infections are common and under recognized. Clinical features and laboratory parameters are unreliable to separate single infections from dual infections. Dual infections may have a severe clinical presentation and their clinical course may be worsened by lack of appropriate therapy for both. Hence it is imperative to have a high index of suspicion for dual infections.

REFERENCES

1 Speelman Peter, Leptospirosis, In Braunwald, Favci, Kasper, Hauser, editors. Harrison's Principles of internal medicine, 15th edn. (McGraw-Hill, New York) 2001, Pg. 1055-57.
2 Chaudhry.R, Premlatha MM, Mohanty S, et al Emerging Leptospirosis,North India. Emerg Infect Dis .2002;18(12):02-52.
3 David, R. Mordoch, Christopher W, Woods, Mark Det al .Study on etiology of febrile illness in adults presenting to PATAN Hospital in Kathmandu. Am J Trop Med Hyg. 2004; 70(6): pp.670-675.
4 Levett PN, Branch SL, Edwards CN. Detection of Dengue infection in patients investigated for Leptospirosis in Barbados. Am J Trop Med Hyg. 2000; 62: 112-114.
5. Muthusethupathi MA, Shivakumar S, Suguna R, Sumathi G. Leptospirosis in Madras – a clinical and serological study. J. Assoc Physicians India. 1995; 43; 456-8.
6. Kalimuthusamy Natarajaseenivasan, Nagarajan Prabhu, Krishanaswamy Selvanayaki et al. Human Leptospirosis in Erode, South India. Jpn J Infec Dis. 2004; 57: 193-197.
7. Ratnam S. Leptospirosis. An Indian perspective. Indian J Med Microbiol. 1994; 12:228-39.
8. David, R. Mordoch, Christopher W, Woods, Mark Det al .Study on etiology of febrile illness in adults presenting to PATAN Hospital in Kathmandu. Am J Trop Med Hyg. 2004; 70(6): pp.670-675.
9. Sehgal SC, Murhekar MV, Sugunan AP. Outhreak of Leptospirosis with Pulmonary involvement in North Andaman. Indian J Med Res: 1995; 102: 9-12.
10. John TJ. Emerging and Reemerging bacterial pathogens in India. India J Med Research. 1996; 103: 4-18.
11. Chaudhry.R, Premlatha MM, Mohanty S, et al Emerging Leptospirosis,North India. Emerg Infect Dis .2002;18(12):02-52.
12. Kamath Shrishu R, Ranjit Suchitra. Clinical features, complications and atypical manifestations of children with severe forms of Dengue haemorrhagic fever in South India. Indian J of Paediatrics. 2006; 73(10): pg.889-895.
13. Sulzen A.J, Sulzer KR, Cantella RA, Latorreck. Study of Coinciding Foci of Malaria and Leptospirosis in the Perunian Amazon Area 1978. Trans R.Soc. Trop Med. Hyg: 72; 76-83.
14. Ko AI, Galvao Reis M, Ribeiro Dourado CM et al. Urban epidemic of severe Leptospirosis in Brazil Salvador, Leptospirosis study group. Lancet. 1999; 354; 820-5.
15. Wongsrichanalai Chansuda, Murray CK, Gray M, Miller KS, McDaniel P, Liao WJ, Pickard AL, Magill AJ. Coinfection with Malaria & Leptospirosis .Am J Trop Med Hyg.2003; 68:583-585.
16. Rodhain. F. Situation of dengue in the World. Bull Soc Pathol Exot. 1996; 89(2) 87-90.
17. Yupin Suputtamongkol, Kanigae Niwattayakul, Chvanpit Suttinort. An open randomized controlled trial of Penicillin, Doxycycline and Cefotaxime for patients with severe leptospirosis. CID. 2004: 39(15).