

## Recognition of concomitant urinary tract infection in leptospirosis cases

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### ABSTRACT

We retrospectively analyzed leptospirosis patients with UTI sign to scrutinize the progress of simultaneous co-infection because of lack of knowledge and earlier report. Among 27 acute and chronic cases of leptospirosis confirmed by microscopic agglutination test and titers for *Leptospira* serovars *autumnalis* and *icterohaemorrhagiae* ranging from 1:80 to 1:320. 14 serum samples of patients with UTI indicative symptoms were taken for further studies. Diagnosis of dual infections is determined by their clinical manifestation and laboratory investigation. 5 cases (5.4%) had concomitant UTI with *Pseudomonas aeruginosa*, *Enterococcus faecalis* and *Escherichia coli*. Our report serves as a reminder of potential co-infection and provides clues for its detection to prevent possible consequences of serious complications.

**KEY WORDS:** Leptospirosis, Urinary Tract Infection, Co-infection, Epidemiology.

### 1. INTRODUCTION

Leptospirosis is an infection of worldwide distribution caused by pathogenic spirochetes of the genus *Leptospira* that can lead to fatal complications with multiple organ involvement (Adler and de la pena, 2010). It has a wide geographical distribution and occurs in tropical and temperate climatic zones. Co-infection in leptospirosis cases is not reported much and goes undiagnosed (Karande, 2005). The metropolitan city of Chennai is surrounded by almost polluted Cooum River, rice fields, cattle and poultry farms and small rural communities (Ratnam, 1983). Public who are working in contaminated water logged areas as poultry, cattle shed are prone to infection of leptospirosis (Sambasiva, 2003; Bhatnagar, 1967) and urinary tract infection (UTI) (Latham, 1985). The event of multiple agent infections in more leptospirosis patients in Chennai are not revealed still now. The prevalence of co-infection in leptospirosis varies widely across different parts of India and other countries (Karande, 2005; Wongsrichanali, 2003; Wei, 2012). Therefore it is important to find out the regional prevalence of this co-infection. Moreover co-infection with leptospirosis has become a major health care disaster. Hence it's necessary to identify them early to reduce the morbidity and other complications. It is impossible to assess what the total collective loss is for an individual and family. In this article, we are re-potting our experience with the above situation.

### 2. MATERIALS AND METHODS

As a part of our doctoral research work, we included 27 patients who are serologically confirmed for leptospirosis with UTI symptoms that include a frequent urge to urinate, a painful and burning feeling in the urinary bladder and urethra during urination. This study was done with public who are living in and around Chennai among the period of July 2008 and September 2011. Leptospirosis was diagnosed in patients who had at least a fourfold increase in antibody titer against serotype of leptospirae in paired serum samples by a Microscopic Agglutination Test (MAT) with a series of ten live cultures of *pomona*, *icterohaemorrhagiae*, *australis*, *autumnalis*, *hebdomadis*, *canicola*, *louisiana*, *grippotyphosa*, *javanica* and *patoc* that were grown in EMJH medium (Faine, 1982; Adler and de la Pena, 2010). Agglutination tests include MSAT and MAT.

**2.1. MSAT:** The collected serum sample was placed on a slide to which heat killed patoc-1 antigen was added. The slide which shows visible agglutination results positive for leptospirosis.

**2.2. MAT:** MAT was performed by adding the samples to the test tube and carrying out fourfold serial dilution. Live strain is added to the test tubes and allowed for agglutination. Results were observed with help of microscope.

**2.3. Urine culture:** UTI was diagnosed by urine cultures with Nutrient agar, Blood agar plates and McConkey agar using a calibrated loop (0.01ml). A colony count > 10<sup>3</sup> CFU / ml, of urine were believe to be significant (Hellerstein, 1982). Then it was sub cultured in selective mediums-EMB agar and mannitol salt agar based on growth characteristics and morphology appearance in Gram's staining. After the growth achievement in selective medium, biochemical tests were carried out and results were recorded for further conformation organisms in species level.

### 3. RESULTS AND DISCUSSION

Out of twenty seven suspected cases on urine analysis, five patients had UTI co-infection. *Enterococcus faecalis*, *Pseudomonas aeruginosa*, and *Escherichia coli* are the causative agents of UTI infection. Among them *Pseudomonas aeruginosa* was found in two cases and *Enterococcus faecalis* caused infection in two patients. *Escherichia coli* were also found in one of the case. Table 1 reveals the cultural and biochemical results of the above identified organisms. *L.interogans* showed positive against serovar *autumnalis* and *icterohaemorrhagiae* ranging from 1:160 to 1:320 (Table 2). The percentage of UTI co-infection in leptospirosis cases was found to be 18.5% with predominant symptoms of fever, chill, headache, myalgia, pain in urinary bladder & urethra and urine itself found cloudy in appearance. Out of five cases, three were female and two were male, one of the male, had undergone minor

appendicitis operations recently with diabetic complications. All five co-infection cases were with a median age group of 33 years (range = 28–38). Overall, observations revealed a more severe clinical presentation associated with co-infection than with UTI and leptospirosis mono-infection.

The prevalence of co-infection in leptospirosis varies widely across the different area within India and overseas. Therefore it is important to find out the place or region that is more prone to co-infection. Moreover co-infection with leptospirosis has become a major health care devastation of an individual, family and society (Suzuki *et al.*, 2003). Hence the opportunity of co-infection with UTI should also be borne in mind, because of multiple organ involvement of leptospira infection. Between 27 leptospirosis patients, five were cause by urinary tract infection with *Pseudomonas aeruginosa*, *Enterococcus faecalis* and *Escherichia coli* at acute stage with different clinical presentations. By analyzing history of patients we came to know that all are residential of highly polluted slum, poor hygienic practice and with malnutrition. The above revealed condition is shocking to general practitioner because of several overlapping clinical features of leptospirosis and UTI. Event of simultaneous, multiple infections in human being is a well-known in today's world of the AIDS pandemic; nevertheless such a diagnosis is still uncommon in other endemic diseases as leptospirosis.

To date association of leptospirosis with other infectious diseases as Dengue (Levett, 2000), Malaria (Sulzer, 1978; Wongsrichanalai, 2003) Hepatitis E (Behera, 2009), Herpes simplex virus (Gupta, 2007) was already reported in different states of India and other countries. Now UTI also added in this list, therefore, diagnosis and management of these co-infections become crucial to control the mortality and morbidity. Current investigation and report prove that environmental factors as monsoon floods cause the rodent infested sewer systems to run over the streets that coexisted along with the breeding of mosquitoes are the reasons for the multiple infections in an individual report clearly (Ricardo izurieta, 2008). Previous reports and the present study show a noteworthy proportion of patients with probable co-infections and provide suspicion for meticulous search for such a co-infection.

**Table.1.Cultural and biochemical characteristics of UTI co-infecting organisms**

Test	<i>Pseudomonas aeruginosa</i>	<i>Enterococcus faecalis</i>	<i>Escherichia coli</i>
Nutrient Agar	+	+	+
MacConkey agar	Pink color	White	Pink color
Blood agar	Beta hemolytic	-	-
EMB agar	-	-	Metalic sheen
Manital salt agar.	-	Yellow	-
Gram's staining	Gram-negative rods	Gram-positive cocci	Gram-negative rods
IMViC	- + - +	-	+ + - -
Bile Esculin test	-	+	-
Catalase test	+	-	-
Coagulase Test	-	-	-
Urease test	-	-	-
TSI	Acid- slant/butt, No gas, No H <sub>2</sub> S	Acid-slant/butt, Gas, No H <sub>2</sub> S	Acid- slant/butt, Gas, No H <sub>2</sub> S

Note: **EMB**- Eosin-methylene blue agar, **IMViC**- Indole, Methyl red, Voges-Proskauer and Citrate test, **TSI**- Triple sugar iron agar.

**Table.2.Microscopic agglutination test titres of serovar and UTI co-infecting organisms**

Serovars	Titres					co-infecting organism identified	n- 27 (%)
	80	160	320	640	1280		
<i>Autumnalis</i>	-	1	2	-	-	<i>Pseudomonas aeruginosa</i> <i>Enterococcus faecalis</i>	3(11.11)
<i>Icterohaemorrhagiae</i>	-	1	1	-	-	<i>Escherichia coli</i> <i>Enterococcus faecalis</i>	2(7.40)

Note: **UTI**- Urinary tract infection

#### 4. CONCLUSION

In conclusion, this is the only study that has reported concurrent infection of leptospirosis and UTI. This underscores the need to evaluate all patients who present themselves with divergent clinical outcome and multi organ involved in leptospirosis especially in endemic areas. Analysis and examination of cases in this point of view is extensively important in endemic and epidemic conditions, so that a better description of the prevalence of patients with concurrent disease exposure can obtain. In addition, the collected data shall be used to assist physician and other medical profession to prevent and control strategies in Chennai.

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