Leptospirosis-A Cross Sectional Study

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Abstract: Leptospirosis is a zoonosis caused by spirochaete Leptospira. There are a lot of serotypes and among them autumnale and ictero-hemorrhagica serovars cause increased morbidity and mortality. This study is a cross sectional study of 100 patients infected with leptospirosis. These patients were diagnosed while investigating for fever for more than 1 week from 2011 January-2012 May. 350 fever patients were screened for leptospirosis by dark field microscopy and MAT. Among them 100 had leptospirosis. 43 had leptospira copenhageni, 27 had l.louisiana, 18 had l.valbuzzi, 9 had l.bratislava, 2 had l.icterohemorrhagica and 1 had l.bataviae. Only 2 patients with leptospira-icterohemorrhagica had complications and one patient died. There is a decline in death to 7.5% in 1995-2004 to 1% in our study. The incidence of leptospirosis in female was more than males in this study. Leptospirosis is a common zoonotic infection. The decline in severe leptospirosis suggests greater awareness of disease, better diagnostic facilities and widespread use of antibiotics. The increase in incidence of infection in women is probably because more women are going to work and travelling to workplace through bad roads, wading through contaminated water and drinking contaminated water.

Key words: Leptospirosis • MAT-Microscopic Slide Agglutination Test • DIC • Multiorgan Dysfunction

INTRODUCTION

Leptospirosis is caused by infection with bacteria of genus Leptospira and affects humans as well as other mammals, birds, amphibians and reptiles. The infection is commonly transmitted to humans by allowing water to be contaminated with animal urine which comes in contact with cuts in skin, eyes, mucous membranes.

Aim: This study is a cross sectional study of 100 patients infected with leptospirosis to analyse the clinical features, find out the different serotypes causing infection, complications seen in different types.

MATERIALS AND METHODS

340 patients were investigated for fever and around 120 had viral fever, 40 had malaria, 30 had urinary tract infection, 10 had cellulitis leg, 100 had leptospirosis and 40 had enteric fever.

100 patients with fever were leptospirosis positive diagnosed by (Microscopic agglutination test) MAT, (dark field microscopy) DFM tests over a period of one and half year were enrolled in this study. A detailed history was taken and lab investigations were done. Patients with other infections were excluded from the study and the results were analysed.

Results: Among the 100 patients there were 60 female and 40 male patients. Mean age of female: male was 38.1:35.2. Of the different serovars of leptospirosis, l.copenhageni infected 43% of patients, l.louisiana infected 27%, l.valbuzzi infected 18%, l.bratislava infected 9%, l.icterohemorrhagica infected 2% and l.bataviae infected 1% of patients with leptospirosis. Dark field microscopy showed 23 patients with l.copenhageni, 13 with l.louisiana, 9 with l.valbuzzi, 4 with l.bratislava, 2 with l.icterohemorrhagica and 1 with l.bataviae. Patients with l.valbuzzi had more thrombocytopenia. Patients with l.copenhageni and l.louisiana had raised liver
Fig. 1: Of the total patients with leptospirosis 60% were females and 40% were males.

Fig. 2: In our study, 43% had leptospirosis copenhageni, 23% had leptospirosis Louisiana, 18% had leptospirosis valbuzzi, 9% had leptospirosis Bratislava, 1% had leptospirosis bataviae and 2% had leptospirosis icterohemorrhagica. Of all patients 1 person who had icterohemorrhagica died due to multi organ dysfunction.

Fig. 3: DFM results of different serovars causing leptospirosis in our study.
Mean titre of MAT for Bataviae was 1:180, Bratislava was 1:150, Copenhageni was 1:160, Icterohemorrhagica was 1:180, Louisiana was 1:160 and Valbuzzi was 1:140.

transaminases and had nausea and vomiting as their presentation. The most serious of all the serovars prevalent, Icterohemorrhagica had the worst prognosis. Of the 2 cases one patient had DIC with multiorgan dysfunction and died. The other patient had renal failure which after hemodialysis recovered.

DISCUSSION

Leptospirosis is a biphasic disease. It was first described by Adolf Weil in 1886 when he reported an acute infectious disease with enlargement of spleen, jaundice and nephritis. Since 1980 the disease has been reported from various states during monsoon months in mini epidemic proportions [1, 2]. Infected animal may appear healthy even if it sheds leptospires in its urine. Human are dead end hosts for leptospire. Leptospirosis has been under diagnosed and under reported due to lack of awareness of the disease and lack of appropriate laboratory diagnostic facilities. As clinical features are nonspecific, diagnosis is only by laboratory tests [3].

Domestic animals like cattle, dogs, pigs are temporary carriers while rodents remain permanent carriers. Rodents are major reservoirs of infections. Illness occurs during monsoon months when human wade through stagnant rain water contaminated by infected urine of animals. Most important factors are rainfall and contact with contaminated environment [4].

The incubation period is 7—14 days, but ranges from 2—21 days.

The incidence rate ranges from 0.1 – 1/100,000 per year in temperate climates to 10–100/100,000 in tropical countries. During outbreak the incidence may reach over 100/100,000.

It begins with a flu like symptoms. After the first phase resolves the second phase begins with liver disease, renal failure and meningitis. Vasculitis may occur causing edema and potentially DIC, myocarditis, meningitis and uveitis. Complications include respiratory distress, acute renal failure and liver failure. Early diagnosis and treatment would prevent complications and death. Though, Icterohemorrhagica is not very common it causes serious life threatening complications which can be prevented by early diagnosis and effective treatment.

Transmission to humans usually occur by

- Ingestion
- Contact of skin of feet or intact mucous membrane of eye, throat or gut with infected urine contaminating soil, water or food.
Human infection is contracted from dogs, cats, rodents, farm livestock.

Human workers most at risk include
- Agriculture workers
- Miners
- Sewer workers
- Veterinarians
- Slaughter house workers.

**Leptospirosis bratislava** [7]: This serovar infects pigs, dogs, cats and horses and rarely humans transmitted through pigs urine. It causes renal failure, raised liver enzymes and hemolysis in pigs. It causes mild flu like symptom in humans.

**Leptospirosis batavia**: This serovar infects dogs. It causes icterus and flu like symptom in humans.

**Leptospirosis louisiana**: This serovar infects dogs. In humans it caused raised liver enzymes and flu like symptom.

Serovar canicola and grippotyphosa cause renal disease in dogs and serovaricterohemorrhagicaand Pomona produce liver disease.

**Lab Investigations**: 1. **MAT** [microscopic agglutination test]-Gold standard in diagnosis. Diagnoses leptospirosis after 5 days only.
   - Single high titre and raising titres are diagnostic. Raising titre 4 fold is diagnostic and is given a score of 25 according to criteria.
   - **MSAT** [macroscopic slide agglutination test]-helps in diagnosing current infection.
   - **ELISA**-IgM ELISA helps in diagnosing current infection.
   - Titre >=1:80 is positive.

   - **DFM** [dark field microscopy]-diagnostic. False positive results are common.
   - **Blood culture**-specific, but results come late and does not help in diagnosis or treatment of infection.
   - **PCR**.

**Diagnostic Criteria**

**Faine’s Criteria**: Uses 3 criteria for diagnosis-1. clinical criteria
   - Epidemiological criteria
   - positive serology.

**Modified Faine’s Criteria**: Uses same 3 criteria for diagnosis with modification in
   - Epidemiological criteria-gives a score of 5 for rainfall.
   - Serological criteria-gives a score of 15 for MSAT and ELISA.
In a study of 282 cases of leptospirosis from Calicut, hepatic (69.8%), renal (56.3%) involvement and thrombocytopenia (65.8%) were common complications noted. Mortality rate was 6.03% [8]. Canicola, Pomona were the common serotypes identified, male:female ratio was 7:1 [9].

From 1987-91 there has been a decline in mortality from 31% to 7.5% in 1995-2004 to 1% in 2011-2012. [10]. Serovar Autumnalis was most common serogroup seen in 1990-91 [11], in our study serovar Copenhageni was most common serogroup.

CONCLUSION

Leptospirosis is a common infection affecting a lot of people in tropical countries. Though infection in 90s had caused death up to 31% there has been a decline in death to 7.5% in 1995-2004 to 1% in our study. Serovar Autumnalis was most common serogroup seen in 1990-91. In the present study Serovar Copenhageni was most common serogroup. Male:female ratio was 7:1 late 90s and now it is 2:3. The increase in incidence in women is probably because more women are going to work as labourers, clerks, professionals and travelling to workplace through bad roads, wading through contaminated water, drinking contaminated water causes leptospirosis in them.

The decline in severe leptospirosis suggests greater awareness of disease, better diagnostic facilities and widespread use of antibiotics.

REFERENCES

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