



## LEPTOSPIRAL MENINGITIS AND MULTI-ORGAN DYSFUNCTION SYNDROME IN A PATIENT WITH AKD AND ANEMIA

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### ABSTRACT

Leptospirosis is a disease which is caused by bacteria and it spreads through the urine of infected animals. Leptospirosis is transmitted from infected animals to humans through soil, water, or food that is contaminated with their urine. It is commonly seen in warm climates. Leptospirosis leads to meningitis, respiratory disease, liver failure, and kidney damage. Multiple organ dysfunction syndrome (MODS) is a condition in which two or more organs in an organ system fail to perform their function. Acute kidney disease (AKD) is the condition where an illness or injury leads to loss of kidney function suddenly it develops rapidly over a few hours or days. Anemia is a disease that is characterized by a decrease in the hemoglobin levels in blood which results in a decrease in the ability of blood to carry oxygen to body tissues. Without treatment, Leptospirosis can lead to kidney damage, meningitis (inflammation of the membrane around the brain and spinal cord), liver failure, respiratory distress, and even death.

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### Introduction

Leptospirosis is caused by corkscrew-shaped bacteria of the genus *Leptospira*, this bacterial disease affects both humans and animals, the most common carriers are rats and other rodents [1, 2]. This can infect all kinds of wild and domestic animals. Soil, water, and food are contaminated by the urine of infected animals and when humans come into contact with urine, water, soil or food can get an infection [3, 4]. This leptospirosis leads to complications such as meningitis, respiratory diseases, liver failure, and kidney damage [5]. Hemodynamic collapse, if it is not treated, in some cases can lead to death. In multiple organ dysfunction syndrome (MODS) Various etiological factors like infections, allergy and shock, chronic illness, and malnutrition lead to the failure of multiple organs in the organ system simultaneously or sequentially [6]. This can be classified as primary, secondary, and accumulation type, in primary MODS dysfunction simultaneously occurs in two or more organs due to primary disease, in secondary MODS if any failure happens in one organ, other organs are sequentially dysfunctional, and accumulation type is developed by the dysfunction led by chronic disease [7]. Acute kidney disease (AKD), which is also called acute renal failure (ARF) is characterized by sudden damage of the kidney which leads to enable the kidney to perform its functions, in this condition, kidneys can't filter waste from the blood [8, 9]. Acute kidney disease is more common in critically ill and hospitalized people [10]. Anaemia is defined by low oxygen-carrying capacity and in other words, it is also known as a low amount of red blood cells [9]. It is caused due to blood loss, iron deficiency, B12 deficiency, folate deficiency, decreased blood cell production, and red blood cell destruction and it is characterized by fatigue, headache, chest pain, irregular heartbeats, dizziness, yellowish skin, and insomnia [1, 11].

#### Symptoms

High fever, Jaundice, rashes, Headache, Chills, Muscle aches, Vomiting, Abdominal pain, Red eyes [1].

#### Treatment

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*Antibiotic Therapy*

Mild leptospirosis is treated with Doxycycline 100mg PO BID or Amoxicillin 500mg PO TID or Ampicillin 500mg PO TID  
Moderate to severe leptospirosis is treated with penicillin 1.5 million units IV or ceftriaxone 1g/d IV or cefotaxime 1g IV [7, 12]

**Materials and Methods**

Study site: ACSR Govt. Hospital and Medical College.

Study duration: 3 months.

Study design: Prospective and observational study.

Study material: Patient informed consent form. A specially designed questionnaire.

Study procedure: The study was conducted after obtaining approval from Institutional Review Board and patient consent form from patient attendants.

*Case History*

A 73-year-old male patient was admitted to the hospital with chief complaints of fever and SOB, pain for 15 days, pain on lifting upper limb and lower limb, yellowish discolored eyes, loss of appetite, and slurred speech for 15 days, neck stiffness and generalized weakness since 15 days. He has liver disease and a history of falling from his bed. He has no history of similar complaints in the past. On admission, the patient is semi-conscious, noncoherent with the SPO2 90 % with a pulse rate of 120 bpm [8].

*Examination*

CVS- S1S2 normal, RS- NVBS positive, pupils unequalised, neck rigidity positive, 2D ECHO shows mild concentric LVH, minimal pericardial effusion, grade 1 diastole dysfunction [3].

*Test Performed*

Complete Blood Picture, Complete Urine Examination, Electrocardiogram, 2D Echocardiography, Renal Function Test, Liver Function Test, CT scan, Magnetic Resonance Imaging, X-ray, Lumbar puncture [5].

*Diagnosis*

Leptospirosis meningitis, multi-organ dysfunction syndrome with pre-renal AKI and severe anemia.

*Treatment*

**Table 1.** Shows drugs used for the patient for his medical condition

Treatment	Generic name	Class	No. of days	R.O.A	Frequency
Inj. Deriphylline	Theophylline	Bronchodilator	25	IV	BD
T. Paracetamol	Acetaminophen	Analgesic	15	Oral	TIDY
T. Doxycycline	Doxycycline Hyclate	Tetracycline antibiotics	25	Oral	BD
T. NODOSIS	Sodium bicarbonate	Alkalinizing agents	25	Oral	BD
T. Fluconazole	Diflucan	Antifungal	5	Oral	OD
Syp. Lactulose	Duphalac	Laxative		Oral	
T. Cefixime	Suprax	Cephalosporins	5	Oral	BD
T. Glimiperide	Amaryl	Sulfonyl ureas	25	Oral	BD
Inj. Ceftriaxone	Rocethin	Cephalosporins	25	IV	BD
Inj. Dexamethasone	Dexasone	Corticosteroids	15	IV	BD
Inj. Mannitol	Osmitrol	Diuretic	20	IV	BD
T. Shelcal	Cholecalciferol Vitamin D3	Vitamin supplement	5	Oral	OD
T. Sevalamer	Renvela	Phosphate binders	Continue	Oral	BD
Inj. Phenytoin	Eptoin	Anticonvulsant	15	IV	BD
T. Phenytoin	Fosphenytoin		10	Oral	BD
Inj. Lorazepam	Ativan	Benzodiazepines	5	IV	BD
Inj. Optineuron	Multivitamin	Vitamin supplement	15	IV	BD

Inj. Piptaz	Piperacillin and Tazobactam	Penicillin, beta-lactamase inhibitors	10	IV	BD
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## Results and Discussion

In our hospital, a male patient of age 73 was admitted with shortness of breath, fever, weakness, pain on lifting upper limb and lower limb, yellowish discolored eyes, loss of appetite, slurred speech, neck stiffness, liver disease, and history of falling from his bed, semi-conscious and noncoherent. He visited several centers and was finally brought to a government hospital, after admission Doctors advised several tests and scans After final reports they confirmed as Leptospiral meningitis, multi-organ dysfunction syndrome with pre-renal AKI and severe anemia, They provided blood transfusion on alternate days of more than 5 units to raise his blood levels, The patient is treated with Inj.xone, Inj.pantop, Inj.Deriphylline, Inj. Decadron, Inj. Mannitol, Inj. Paracetamol, T.Doxy, T.Nodosis, T.Glimeperide, T.Ca2+withD3, T.Flucanazole, T.PCM, Syp. Lactulose, T.Sevelamer, Inj. Phenytoin, Inj. Lorazepam, Nebasulf powder, PovidineIodineointment, Inj.Optineuron, Inj.Dexamethasone, Inj.Piptaz provided supplementation, There is no treatment prognosis during admission his neurological outcomes are not observed but the patient is in bed, so treatment is provided for more than 15 days but no recovery is observed.

Leptospirosis is a pathogenic disease of humans and animals that is caused by pathogenic spirochetes of the genus *Leptospira*. It is considered the most common zoonosis in the world and it is associated with poor sanitation and agricultural occupations involving contact with animals or water. Laboratory studies used to confirm the diagnosis of leptospirosis include DNA PCR of blood, urine, CSF, and tissue.



**Figure 1.** Patient on medical bed during the treatment for his condition

## Conclusion

Our study concluded that a patient with Leptospiral meningitis and MODS was admitted to our hospital with anemia with chief complaints of fever and SOB, pain for 15 days, pain on lifting upper limb and lower limb, yellowish discolored eyes, loss of appetite and slurred speech and treated with drugs, it's a rare bacterial infection (0.15 -0.66/100,000) population worldwide and leads to multi-organ failure and death. On continuous management, the patient recovered well, but the physician should manage well to overcome further complications. The patient should take care to not develop more organ failures.

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