

Leptospirosis with Multi Organ Dysfunction Syndrome - Cause of Concern!

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¹ Conception of study

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Abstract

Introduction: A clear majority of people in Pakistan reside in small villages and hamlets. Predominantly a large chunk of the population is employed in the Agrarian Rural economy. Leptospirosis is an emerging zoonotic, often overlooked as a cause of MODS, CRF and ESRD, presenting as ARF, Acute Liver Failure and other varied symptomatology. Contact with livestock and other risk factors is thus inevitable, which this report highlights. The purpose of our case report is to bring into consideration and address Weil's disease as an often-missed diagnosis, especially in patients with an agrarian background. We present an interesting case of Weil's disease with MODS in a farmer, who also had a prior history of multiple comorbidities such as Diabetes Mellitus and Smoking history, where due diligence was undertaken with timely diagnosis of Leptospirosis; instituting dialysis and antibiotics. The patient was advised upon discharge with instructions for follow-up especially to address and manage another anomaly of ESRD, which has also been observed years after initial Leptospirosis infection.

Abbreviations used: ESRD (End-stage Renal Disease), MOF (Multi-Organ Failure)/MODS (Multi-Organ Dysfunction Syndrome), ARF (Acute Renal Failure), CRF (Chronic Renal Failure).

Keywords: End stage Renal Disease, Leptospirosis, Weil's disease.

Introduction

Leptospirosis is a zoonotic ¹ infectious disease, caused as a result of infection from spirochete ² *Leptospira*(2), widely seen in tropical regions ³ and considered as a re-emerging infection with a high incidence as recently reported.² It's thought to be the most widely spread zoonotic disease ⁴, seen at a higher incidence in warm climate areas.⁵ A number of cases have been reported from drinking contaminated water ⁶, animal bites ⁷,

aerosol inhalation² and dogs which are considered as a very common reservoir of infection in tropical countries.⁸ Symptomatology ranges from subclinical Anicteric infection ², while a small percentage of patients exhibit a wide variety of symptoms such as myalgia, pruritus, nausea, abdominal pain, conjunctival suffusion, arthralgia ⁶ and aseptic meningitis.⁹ Some cases present with a severe headache, associated with photophobia and retro-orbital pain mimicking dengue.²

Weil's disease¹⁰ or Icteric leptospirosis² is a severe form of disease, associated with a high mortality rate; ranging from 5-15%.² It can result in acute renal failure^(14, 32) which can occur in up to 40% of cases^{2, 11, 12}, while rarely myocarditis has also been reported as well¹³. Treatment involves the use of amoxicillin and doxycycline^{15,16}, while intravenous Penicillin G and Erythromycin are reserved for severe infections.¹⁰ Due to the involvement of multiple organ systems, there is a need for inotropes, diuretics, mechanical ventilation and dopamine that may be warranted.¹⁰

ESRD is defined as the reduction in GFR of less than GFR <15 mL/min/1.73m²¹⁷, or those who can't survive without dialysis irrespective of their GFR¹⁸. Its prevalence is continuing to rise at a rapid rate of about 20,000 new cases annually.¹⁹ A number of complications such as Metabolic acidosis, hyperuricemia, hypophosphatemia, hypertension⁹, anemia due to loss erythropoietin^{20,21} can occur with coronary artery disease implicated as the most common cause of mortality.²²

MOF or now appropriately termed as Multiple Organ Dysfunction Syndrome is defined as a potentially reversible dysfunction of two or more organ systems such as the lungs, heart, and liver kidneys etc.²⁷ A wide array of Symptomology is observed depending on the system involved; in particular, the kidneys are involved progressing to ARF²⁸ with initial oliguria, steadily rising creatinine levels, normal electrolyte levels disruption to the point of requiring dialysis for reversal.²⁷ Gastrointestinal Bleeding and Liver dysfunction is another hallmark of MODS.²⁷

Case Report

We present a case of a 55 Y M, farmer, who presented to the emergency room with complaints of nausea and drowsiness for the past 1 weeks, associated with vomiting- continuous, progressive, odorless, white, containing no blood. The patient also complained of oliguria for the past 4 days, with no urination in the past 24 hours upon admission. Once anuria was suspected, the patient was admitted to the Inpatient ward.

Upon examination, the patient had normal vitals- Temperature of 98 Respiratory rate 22/min, Blood pressure of 130/90 mm/Hg, pallor and yellow discoloration of eyes, with bilateral pedal edema, Hepatosplenomegaly on Abdominal Examination, a GCS of E3V4M6. The lungs were clear on auscultation Bilaterally. Past History of Diabetes Mellitus

diagnosed 3 years ago, and smoking stopped 4 years ago, with smoking for 17 years half a pack per day.



Labs

On presentation Renal Function test showed a Urea level of 222 mg/dl, Creatinine of 8.3 mg/dl, e GFR of 7 ml/min/1.73m², while serum electrolytes showed a sodium level of 123 mEq/L. The patient exhibited borderline hyperammonemia at <81 umol/L, PTH levels at 277 pg/ml, hyperbilirubinemia at 13 mg/dl, Albumin-2.2 mg/dl, AST at 172 U/L and an LDH levels of 307 U/L. Conservative management with Dialysis⁽²³⁾ was started immediately. Later in the day, CSF analysis showed Spirochetes with a provisional diagnosis of Weil's disease was made.

Management and Outcome

The patient was managed in the dialysis unit, started on Motilium 1+1+1 10 mg, Augmentin 625 mg 1+1+1, Risk 40 mg, Calcium Gluconate 10 mg IV over 20 minutes. The patient started improving whereupon discharged after 3 days.

Discussion

Many cases of Weil's diseases are not considered and overlooked as a potential cause of Multi-Organ Failure (MOF)²⁴ especially with the re-emergence of this potentially life-threatening zoonotic infection.²⁵ This warrants the need to consider Leptospirosis as a potential cause of Multi-Organ failure especially in

patients in Pakistan where a sizeable majority still lives in rural communities-64% as of 2017²⁶, and a large chunk employed in agricultural setting.³³

With reemerge of leptospirosis², it's now being considered an emerging, often missed risk factor for Chronic Kidney disease^{29,30}, and in a country like Pakistan, it brings into attention the need to consider it as a potential cause of MODS and CKD. With this patient and a host of other comorbidities as mentioned, this warrants the need to consider *Leptospira* as a potential culprit for MODS, especially in patients received in tertiary care centers from rural areas where contact with livestock and contaminated water is rampant, so that prompt uniform response and action is undertaken when such cases present. Mortality associated with MODS is extremely high in a country like Pakistan³¹, especially in conjunction with sepsis which again magnifies the extent of the magnitude of curtailing leptospirosis.

Conclusion

In summation, this is a case of Weil's disease with MODS, seen in a tertiary care health system. The patient presented with Weil's diseases in conjunction with Multi-Organ Dysfunction Syndrome, with a prior history of Diabetes Mellitus and smoking. The patient was admitted to the Nephrology and ICU whereupon dialysis was started with requisite antibiotic regimen^{15,16}. The patient later survived and sent back with instructions for a follow-up to manage ESRD an expected recently reported complication²⁹. The purpose of this report is to impress upon the clinicians to consider Leptospirosis as an emerging unnoticed culprit of MODS and CKD/ESRD.

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