

Case Report

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Beyond the Usual Suspects: Unmasking a Rare Pulmonary Co-Infection

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ABSTRACT

This case report presents a 33-year-old male farmer with community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA) pneumonia complicated by *Leptospirosis*. The patient presented with a 2.5-month history of high-grade fever, chest pain, and weight loss. Investigations revealed multiple cavitary lesions in bilateral lungs. Blood cultures were positive for MRSA, and ELISA for leptospira was positive. The patient was successfully treated with vancomycin and anticoagulation therapy and discharged.

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Introduction

Community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA) pneumonia has emerged as a significant clinical entity, often presenting with severe and rapidly progressive symptoms [1]. This condition is particularly challenging due to its increasing prevalence and the potential for life-threatening complications. Concurrently, *Leptospirosis*, a zoonotic disease caused by spirochetes of the genus *Leptospira*, can further complicate the clinical picture when present alongside CA-MRSA pneumonia [2]. Through this case report, we wish to highlight the diagnostic and therapeutic challenges faced when managing a patient with this complex dual infection. CA-MRSA pneumonia typically presents with a rapid onset of fever, severe respiratory symptoms, and often hemoptysis. The presence of *Leptospirosis* can add additional symptoms such as myalgia, headache, and jaundice, potentially obscuring the initial diagnosis [3]. Timely identification and prompt, intensive treatment play a crucial role in ensuring the patient's survival.

Case Presentation

A 33-year-old male farmer presented with a 1-month history of high-grade fever associated with chills and rigors. The fever, reaching up to 103°F, was not relieved by medications and lacked diurnal variation or periodicity. It was accompanied by left-sided chest pain that worsened on inspiration, suggesting pleuritic involvement. The patient reported undocumented weight loss of 6 Kg over the past 1 month and a recent onset of dry

cough for 4-5 days. Notably, he denied any history of shortness of breath, abdominal pain, dysuria, vomiting, jaundice, bleeding manifestations, altered bowel habits, or joint pain. On examination, the patient appeared toxic-looking with mild pallor but there was no icterus, clubbing, cyanosis, or edema. He was tachycardic with a pulse rate of 108/min and tachypneic with a respiratory rate of 28/min. His blood pressure was 120/78 mmHg, temperature 98.2°F, and oxygen saturation 90% on nasal prongs at FiO₂ 30%. Cardiovascular examination revealed normal heart sounds without any murmurs. Respiratory system examination showed bilateral air entry with bronchial sounds in the right infra-mammary area. Abdominal examination was unremarkable, with normal appearance, no tenderness, tympanic percussion, and present bowel sounds. Neurological assessment revealed a fully conscious patient (GCS E4V5M6) with no meningeal signs, intact cranial nerves, and normal sensory function. His blood work (Table 1) revealed a hemoglobin of 8 g/dL with leukocytosis (18,000/cumm) with a shift to left. There was associated thrombocytopenia (90,000/mm³). The patient had transaminitis (SGOT and SGPT were 140 IU and 120 IU respectively). There was evidence of a nonoliguric acute kidney injury in the form of deranged KFT (Blood urea- 90 mg/dL and Serum creatinine- 2.0 mg/dL). Additional investigations uncovered notable results. His blood cultures grew methicillin-resistant *Staphylococcus aureus* (MRSA), which was sensitive to both vancomycin and linezolid.

ELISA for leptospira was positive with a value of 3.73, while scrub typhus, dengue and malaria were not detected. Ultrasound of the abdomen showed hepatosplenomegaly. A chest X-ray revealed a heterogeneous opacity in the right lower zone. A CT chest (Figure 1) was done, suggesting multiple small thick-walled cavities with

right parahilar opacity. The patient's erythrocyte sedimentation rate (ESR) was markedly elevated at 106 mm/hr, indicating significant inflammation. Echocardiography was done, suggesting a global left ventricular ejection fraction of 50% without any signs of infective endocarditis.

The patient was initially managed on the lines of community-acquired pneumonia with IV ceftriaxone with tab azithromycin. But, once the patient's blood culture was positive, vancomycin was added. Ceftriaxone was later escalated to meropenem in view of worsening oxygen requirement.

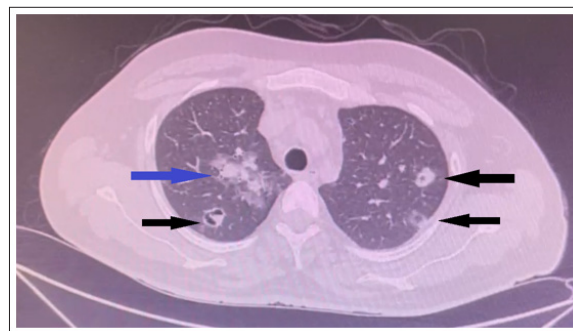


Figure 1: CT Scan of the Patient Showing Multiple thick-Walled Cavities (Black arrow) and a Heterogenous Opacity in the Right Hilar Area (Blue Arrow)

Table 1: List of Investigations

Investigation	Result	Reference Value
Hemoglobin	8 g/dL	13.5-17.5 g/dL
White Blood Cell Count	18000/cumm with left shift	4,500-11,000/cumm
Platelet Count	90,000/mm ³	150,000-400,000/mm ³
SGOT	140 IU/L	8-40 IU/L
SGPT	120 IU/L	7-56 IU/L
Blood Urea	90 mg/dL	7-20 mg/dL
Serum Creatinine	2.0 mg/dL	0.7-1.3 mg/dL (Males)
Blood Cultures	Positive for MRSA (sensitive to vancomycin, linezolid)	Negative
ELISA for Leptospira	Positive (3.73)	Negative
Scrub Typhus	Negative	Negative
Dengue	Negative	Negative
Malaria	Negative	Negative
Ultrasound Abdomen	Hepatosplenomegaly	Normal
Chest X-ray	Heterogeneous opacity in right lower zone	Clear
CT Chest	Multiple small thick-walled cavities right parahilar opacity	
Erythrocyte Sedimentation Rate	106 mm/hr	<20 mm/hr
Echocardiography	LVEF 50%, no infective endocarditis	

The patient responded well and the lab parameters improved. The patient was later discharged with a stable condition. This case emphasizes the need to accept the increasing incidence of community-acquired MRSA. Along with that, the patient had a co-infection of Leptospirosis, which made the matter more complicated. However, Early detection and diagnosis of these two diseases were crucial for the timely discharge of the patient.

Discussion

Community Acquired Methicillin-resistant Staphylococcus aureus (CA-MRSA), has become a serious issue as it's incidence is on rising trend [4]. Leptospirosis is also a common etiology of Fever with MODS in tropical and sub-tropical countries [5]. This case, is highlighting dual infection with CA-MRSA and leptospirosis. There is not much data in the literature on the dual infection with CA-MRSA and leptospirosis.

Staphylococcus aureus is a commensal but it also is a cause of various infections, such as mild soft skin and tissue infections (SSTIs), endocarditis, pneumonia, and sepsis. CA-MRSA pneumonia typically presents with acute onset fever, haemoptysis and respiratory distress syndrome. The signs and symptoms progress rapidly [6,7]. The patient, a young farmer, presented with multiple cavitory lesions in his lungs, which are a hallmark of severe CA-MRSA pneumonia. Early diagnosis and timely intervention with appropriate antibiotics are crucial for patient survival in such cases. In our case diagnosis was made on growth on blood culture and we started antibiotics based on sensitivity pattern. But the complexity was that the patient also had an infection with Leptospirosis which is a zoonotic disease having presentations ranging from mild febrile illness to severe life-threatening presentation like Weil's disease [8]. The diagnosis of leptospirosis was made using ELISA-based detection and symptoms. As both these agents can potentially present as life-threatening infections, early detection and appropriate antibiotic therapy are crucial for saving the patient's life. In this case, early diagnosis and antibiotic therapy played a crucial role in the management of the disease. A similar case was presented by Yeap et al in a pregnant female, who was managed in the same lines and had a positive outcome [9].

In Conclusion, this case highlights the importance of considering the potential possibility of dual infection with CA-MRSA and Leptospirosis and conducting future research on co-infections with CA-MRSA and Leptospirosis.

References

- Pham J, Asif T, Hamarshi MS (2018) Community-acquired Pneumonia with Methicillin-resistant Staphylococcus Aureus in a Patient Admitted to the Intensive Care Unit: A Therapeutic Challenge. Cureus.
- Tran KQ, Nguyen TTD, Pham VH, Pham QM, Tran HD (2023) Pathogenic Role and Antibiotic Resistance of Methicillin-Resistant Staphylococcus aureus (MRSA) Strains Causing Severe Community-Acquired Pneumonia in Vietnamese Children. Advances in Respiratory Medicine 30: 135-145.

3. Carty NJ, Ravichandran D, Carter C, Mudan S, Royle GT, et al. (1994) Randomized comparison of fine-needle aspiration cytology and Biopsy-Cut needle biopsy after unsatisfactory initial cytology of discrete breast lesions. *Br J Surg* 81: 1313-1314.
4. (2020) Centers for Disease Control and Prevention (CDC). MRSA and the workplace.
5. Bharti AR, Nally JE, Ricaldi JN, Matthias MA, Diaz MM, et al. (2003) Leptospirosis: a zoonotic disease of global importance. *Lancet Infect Dis* 3: 757-771.
6. Tong SY, Davis JS, Eichenberger E, Holland TL, Fowler Jr VG (2015) Staphylococcus aureus infections: epidemiology, pathophysiology, clinical manifestations, and management. *Clinical microbiology reviews* 28: 603-661.
7. Gillet Y, Issartel B, Vanhems P, Fournet JC, Lina G, et al. (2002) Association between Staphylococcus aureus strains carrying gene for Panton-Valentine leukocidin and highly lethal necrotising pneumonia in young immunocompetent patients. *The Lancet* 359: 753-759.
8. Vijayachari P, Sehgal SC, Goris MG, Terpstra WJ, Hartskeerl RA (2003) Leptospira interrogans serovar Valbuzzi: a cause of severe pulmonary haemorrhages in the Andaman Islands. *Journal of medical Microbiology* 52: 913-918.
9. Tat YB, Muniandy RK (2019) CA-MRSA and Leptospirosis Co-Infections: The recipe to a Successful Management. *Gazi Med J* <https://gazimedj.com/articles/doi/gmj.2019.23>.

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