

Case Report

Influenza A-induced Rhabdomyolysis Without Acute Kidney Injury: A Case Report



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ABSTRACT

Background: Rhabdomyolysis is a clinical syndrome characterized by the breakdown of muscle cells and release of intracellular contents into the bloodstream. Viral infections, including influenza A, are rare but important causes.

Case Presentation: A 27-year-old healthy male presented with fever and weakness. His creatine kinase (CK) level was 19,000 U/L, and CK-myocardial band (CK-MB) was 2,636 U/L. He tested positive for H1N1 by polymerase chain reaction. Despite severe rhabdomyolysis, he did not develop acute kidney injury (AKI). The patient received intravenous fluids (1-liter bolus, then 4 liters/day for 5 days). CK levels decreased to 2,500 U/L by day 5. Echocardiography was normal.

Conclusion: Influenza-induced rhabdomyolysis can occur without AKI, even with CK >19,000 U/L. Early fluid resuscitation may prevent renal injury.

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Introduction

Rhabdomyolysis is a clinical syndrome resulting from the release of intracellular contents from muscle cells into the bloodstream following muscle cell breakdown.

This condition can lead to complications such as acute kidney injury (AKI), electrolyte disturbances, and cardiac arrhythmias. Rhabdomyolysis typically occurs after physical trauma, intense exercise, or the use of certain medications. Additionally, viral infections can also act as a triggering factor [1]. Influenza A virus infection is primarily known for causing respiratory issues, but it can also lead to rare extra-pulmonary complications, such as rhabdomyolysis. Identifying this complication in patients with influenza A is difficult due to its clinical similarities to viral myalgia [2]. In this study, we present a case of rhabdomyolysis caused by influenza A virus infection. Although influenza-induced rhabdomyolysis is a known complication, cases with a creatine kinase (CK) level exceeding 19,000 U/L without subsequent AKI are rare in adults. This case is worth reporting because it deviates from the typical pattern and therefore requires specialists' attention.

Case Presentation

A 27-year-old male with a history of flu-like symptoms within the past week and no underlying disease or medication use complained of fever and weakness for two days. On presentation, the patient's vital signs were as follows: Temperature 38.5 °C, blood pressure 135/90 mm Hg, heart rate 120 beats per minute, respiratory rate 18 breaths per minute, and oxygen saturation 97% on room air. Physical examination revealed muscle tenderness in the bilateral thighs and calves, with muscle strength graded 4/5 in all four extremities. Urine color was clear. The patient appeared moderately dehydrated based on dry mucous membranes. The routine blood test revealed elevated CK levels of 19,000 U/L and CK-myocardial band (MB) levels of 2,636 U/L, despite a normal urine analysis and negative renal ultrasound. The patient was admitted to the nephrology service with a primary diagnosis of rhabdomyolysis and was treated with intravenous 0.9% saline: A 1-liter bolus followed by 4 liters daily as continuous infusion, with daily urine output monitoring. The patient underwent a cardiology consult due to elevated CK-MB and an infectious disease specialist consult due to C-reactive protein level of 111 mg/L, and he was tested for COVID-19 and H1N1 polymerase chain reaction (PCR). Echocardiography was performed and showed no evidence of wall motion

and thickening abnormalities, any sign of ischemia, or myopericarditis with a normal left ventricular ejection fraction (estimated 60%) and systolic and diastolic volume. The results for COVID-19 and H1N1 PCR showed a positive PCR for H1N1. Eventually, in the progression of administration, CK and CK-MB decreased. The final diagnosis was rhabdomyolysis due to influenza infection, and after five days of IV fluids, CK decreased to 2,500 U/L, and the patient was discharged in good condition (Table 1).

Discussion

In this case, a healthy young adult with influenza A (H1N1) developed severe rhabdomyolysis with a peak CK exceeding 19,000 U/L but did not progress to AKI. Traumatic causes (trauma, prolonged immobilization, excessive exercise, compartment syndrome, heat exposure) and non-traumatic causes, including substance abuse (cocaine, heroin, amphetamines, ethanol, methanol, ethylene glycol), were excluded with a negative toxicology screen. The patient was not taking any medications typically associated with rhabdomyolysis, including statins, fibrates, salicylates, or steroids. Therefore, based on the clinical presentation, an infectious etiology was considered the most likely cause.

A recent meta-analysis reported an AKI incidence of 20.98% among influenza patients, confirming that while AKI is a common complication, approximately 79% of patients do not develop AKI despite severe infection. Notably, the same study demonstrated that COVID-19 patients have a significantly higher AKI incidence (29.37%, odds ratios: 1.67) and worse renal outcomes, including lower recovery rates (57.02% vs. 80.23% in influenza) and higher in-hospital mortality among those with AKI (30.95% vs 5.51% in influenza) [3].

Various conditions, including both viral and bacterial infections, can trigger rhabdomyolysis. As Singh and Scheld reported, influenza and HIV as viral etiologies and *Legionella* species, *Streptococcus* species, and *Salmonella* species as bacterial etiologies are the most common causes among other infectious etiologies [4]. It is believed that the probable pathophysiology involves direct invasion of muscle tissue by the infectious agent and the production of a toxin [4, 5].

A literature review on the extra-pulmonary complications of influenza published by Sellers et al. in 2017 reported that among 2 514 articles published from 1959 to 2016, 27 articles reported rhabdomyolysis in the setting of influenza infection. The reported cases ranged in

Table 1. Timeline of clinical course

Day	Event	CK (U/L)	CK-MB (U/L)	Treatment
1	Admission, fever, weakness	19,000	2,636	1L NS bolus + 4L/day NS
2	H1N1 PCR positive, normal Echo	—	—	4L/day NS
3	Clinical improvement	9,800	1,200	4L/day NS
4	Ambulatory, no fever	4,500	620	4L/day NS
5	Discharged	2,500	412	—

CK-MB: Creatine kinase-myocardial band; PCR: Polymerase chain reaction.



age from 19 to 86 years old [6]. Although rhabdomyolysis is more common as a complication of influenza in children, the reported incidence in adults reinforces the importance of considering it as a secondary cause of infection. The proposed pathophysiology includes direct invasion of muscle tissue by the infectious agent or toxin production, though definitive evidence is lacking [4, 5].

Despite the markedly elevated CK, the patient did not develop AKI. AKI is a common complication in rhabdomyolysis. The incidence of this event varies due to differences in definition and clinical manifestations, ranging from 13% to approximately 50% [7]. However, not all cases necessarily progress to AKI. Experts note that while AKI risk begins to rise above CK 5,000 U/L, absolute risks remain relatively low in the 5,000–15,000 U/L range, especially with aggressive IV fluids, reflecting the re-evaluation of historical risk thresholds [8]. In our patient, several factors likely contributed to the absence of AKI: Early and aggressive intravenous fluid resuscitation (1-liter bolus followed by 4 liters daily for 5 days), young age without comorbidities, absence of dehydration or acidosis at presentation, and timely initiation of treatment. These protective factors prevented renal injury despite the peak CK exceeding 19,000 U/L.

Conclusion

This case demonstrates that severe influenza-induced rhabdomyolysis (CK >19,000 U/L) can occur without AKI in healthy young adults. Early recognition of myalgia in patients with influenza and prompt intravenous fluid resuscitation are critical. Clinicians should suspect rhabdomyolysis even in the absence of initial renal dysfunction.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the Research Ethics Committee of [Mazandaran University of Medical Sciences](#), Sari, Iran (Code: IR.MAZUMS.REC.1404.626). Written informed consent was obtained from the patient.

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Authors contribution's

Data collection and writing the original draft: Ilia Zamani and Mohammad Mehdi Niknam; Supervision, Review and editing: Keshvar Samadai.

Conflict of interest

The authors declared no conflict of interest.

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