Rhabdomyolysis from influenza b infection: A case report

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ABSTRACT

Rhabdomyolysis is a syndrome characterized by muscle necrosis and the release of intracellular muscle constituents into the circulation. Here, we report the case of an 18-year-old male with cerebral palsy who was admitted to the hospital with symptoms of lower respiratory tract infection and with high-grade fever. His initial blood workup revealed an elevated creatinine and CPK of 32,000 which was suggestive of rhabdomyolysis. His worsening renal function with acidosis and hyperkalemia required initiation of hemodialysis. A respiratory viral PCR profile revealed Influenza B. He was re-started on Oseltamivir with gradual clinical improvement. Respiratory viral PCR testing should be considered in patients with features of lower respiratory tract infection and rhabdomyolysis as this can detect influenza B and other viruses which cannot be detected by doing H1N1 PCR.

Keywords: *Creatinine phosphokinase, Influenza B, Oseltamivir, Rhabdomyolysis.*

Rhabdomyolysis is a syndrome characterized by muscle necrosis and the release of intracellular muscle constituents into the circulation. Creatine phosphokinase (CPK) levels are typically markedly elevated, and muscle pain and myoglobinuria may be present. The severity of illness ranges from asymptomatic elevation in serum muscle enzymes to life-threatening disease associated with extreme enzyme elevations, electrolyte imbalances, and acute kidney injury. The prevalence of rhabdomyolysis is around 26,000 cases annually as reported by the National Hospital Discharge Survey in the US[1]. The majority of these cases are related to trauma and toxins. The prevalence of rhabdomyolysis secondary to viral infections is unknown. Here, we report the case of an 18 years-old-male with cerebral palsy, developed rhabdomyolysis with acute renal failure due to Influenza B infection.

CASE REPORT

An 18-years-old male with cerebral palsy was admitted to the hospital for a cough with expectoration and a high-grade fever for 1 week. He was admitted to the ICU with complaints of respiratory distress and hypoxia. In the ICU, the patient's heart rate was 138/min, blood pressure was 104/60 mmHg, respiratory rate was 36/min on oxygen and his temperature was 102.6°F. He was empirically started on Piperacillin-Tazobactam and Azithromycin.

His initial investigations revealed deranged renal function (Serum creatinine -1.7, Blood urea – 67, Potassium- 5.4), and a grossly elevated CPK level of 32000 suggestive of rhabdomyolysis. His Alanine Transaminase (ALT) was 79 mg/dl and Aspartate Transaminase (AST) was 64 mg/dl. Ultrasound abdomen did not reveal any urinary tract obstruction or renal parenchymal abnormality. His chest X-ray showed bilateral peri-hilar infiltrates.

The differential diagnosis at this point included community-acquired pneumonia, fluid overload or alveolar hemorrhage. Given the patient's age, the most likely diagnosis was viral pneumonia. A nasopharyngeal swab for H1N1 polymerase chain reaction (PCR) was sent and empiric oseltamivir at a dosage of 30mg twice daily was initiated based on his creatinine clearance. His repeat CPK was 216,750 for which nephrology consultation was obtained and IV hydration continued for rhabdomyolysis. The H1N1 PCR was negative and oseltamivir was stopped. His work of breathing increased and he was started on non-invasive ventilation (NIV).

He remained febrile with a maximum temperature of 104°F and his CPK value was still very high (CPK-257,165). His vasculitis workup was negative. Since his respiratory status deteriorated further, he was intubated. A respiratory viral panel PCR based testing was sent which was positive for Influenza B and he was re-started on Oseltamivir 30mg once daily for a total duration of ten days. His renal failure worsened and he had persistent hyperkalemia and renal replacement therapy was initiated. His oseltamivir dose was changed to 30mg once followed by 30mg once daily after dialysis. He was weaned off from inotropic support. Despite improvement in his oxygenation, he had difficulty in weaning. A tracheostomy was performed. His renal function normalized. His CPK levels also returned to

Table 1: CPK levels of patient

Days from admission	Day 1	Day 3	Day 5	Day 7	Day 18	Post-discharge day 10
CPK Value	18,120	31,240	216,750	257,165	9,080	89

normal. Gradually, over a period of time, he improved and his tracheostomy was de-cannulated after 1 month in the ICU. He came back for a follow-up after 10 days and had normal renal, liver parameters and chest X-ray. The CPK levels were given in Table 1.

DISCUSSION

Rhabdomyolysis is a potentially life-threatening clinical syndrome that results from damage to skeletal muscle and results in the release of toxic intracellular contents. Potential causes of rhabdomyolysis can be broadly divided into: traumatic (eg, crush syndrome or prolonged immobilization), non-traumatic exertional (e.g. marked exertion in untrained individuals, hyperthermia, or metabolic myopathies) and non-traumatic non-exertional (e.g. drugs or toxins, infections, or electrolyte disorders). There are very few cases of rhabdomyolysis caused by Influenza-B infection in adults [2]. Our patient had cerebral palsy and with his clinical presentation, it was suspected that viral infection was the cause of his rhabdomyolysis [2].

Rhabdomyolysis has been associated with a variety of infections, both viral and bacterial [3]. Acute viral infections associated with rhabdomyolysis include influenza A and B, Coxsackievirus, Epstein-Barr, herpes simplex, parainfluenza, adenovirus, echovirus, human immunodeficiency virus, and cytomegalovirus [2,3]. The mechanism of muscle damage due to viral infections has not been established and could be due to direct viral invasion of muscle tissue or release of myotoxic cytokines. There were few case reports suggestive of Influenza causing rhabdomyolysis [2,4-9].

The common clinical practice is to check for H1N1 PCR, but this does not detect Influenza B infection which can also cause Rhabdomyolysis. We suggest that in patients with suspected viral pneumonia with rhabdomyolysis, testing for influenza B should also be done failing which, empiric oseltamivir be started. We suggest checking CPK levels in patients with suspected influenza infection. Studies have shown that patients with influenza A with elevated CPK levels tend to have more complications [10]. Although viral clearance is enhanced when early antivirals are started, studies have shown that viral clearance can be prolonged in the hospitalised patients, influenza B infection, advanced age and systemic steroid administration [11].

Hypovolaemia or dehydration and aciduria (urine pH <6.5) have been suggested as crucial factors in the development of renal failure from rhabdomyolysis; therefore, early and aggressive fluid repletion and bicarbonate therapy, if necessary, are the standard treatment to prevent acute renal failure. In our case, acute kidney injury (AKI) was so severe that patient required renal replacement therapy also.A recent review demonstrated that chances of developing AKI is less if initial CPK values were less than 15000-20000 IU//L while in our case it was 32,000 and on the next day it was 2,12,950 despite aggressive hydration[12].

As per current Centers for Disease Control and Prevention (CDC) guidelines, treatment options for Influenza B are: oral oseltamivir, inhaled zanamivir and intravenous peramivir [13,14]. The resolution of symptoms from the initiation of treatment is slower in influenza B compared to influenza A and Oseltamivir appears to be less effective [15]. The recommended dose is 75mg twice daily for five days although longer doses have been suggested in patients with acute respiratory distress syndrome (ARDS) or immunocompromised patients. Higher doses of 150mg have been suggested for patients with ARDS in patients with H1N1 but there is no evidence to support its use [16]. We used Oseltamivir through a nasogastric tube in our patient.

CONCLUSION

We conclude that very high CPK levels and acute kidney injury in the settings of respiratory infection should always raise the suspicion of Influenza B causing Rhabdomyolysis. The H1N1 PCR which is commonly done in India for detecting pandemic influenza fails to detect influenza B. We suggest that in patients with viral pneumonia and rhabdomyolysis, specific testing for influenza B should be performed, failing which oseltamivirfor viral influenza pneumonia be continued.

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