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H1N1 Induced Acute Renal Failure

Venkata S. Thammineni¹, Iza David Zabaneh², Emile D. Zabaneh²,
Lily Kamberov², Anvesh Kompelli³ and Raja I. Zabaneh^{2*}

¹Christus Highland Medical Center, Shreveport, Louisiana, USA.

²Northwest Louisiana Nephrology, Shreveport, Louisiana, USA.

³LSU Health Shreveport School of Medicine, Shreveport, Louisiana, USA.

Authors' contributions

This work was carried out in collaboration between all authors. Author VST documented the case report, wrote the first draft of the manuscript, managed the literature searches and provided approval for the final manuscript. Authors IDZ, EDZ, LK, AK managed the analyses of the case report. Author RIZ managed the literature searches, wrote and edited the final manuscript. All authors read and approved the final manuscript.

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(3) Matthew Adu, Antiretroviral Therapy Centre, Central Hospital, Agbor, Delta State, Nigeria.

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Case Study

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ABSTRACT

Acute renal failure (ARF) is a rare phenomenon when it occurs with viral infections. Most of these cases are seen in critically ill patients and result in negative outcomes due to multiple organs involved with associated hypotensive shock that is one of the major contributors to acute tubular necrosis [11]. We are reporting a case of a young non-pregnant female who developed swine flu and had multisystem organ failure requiring mechanical ventilation. She developed acute renal failure requiring renal replacement therapy and aggressive supportive care. Her kidney function recovered over 6 weeks ending the need of hemodialysis (HD).

Keywords: Acute renal failure; tubular necrosis; creatinine; H1N1 infection; renal replacement therapy.

*Corresponding author: E-mail: rz190@aol.com;

1. H1N1 INDUCED ACUTE RENAL FAILURE

Although rare, acute renal failure from influenza A infection can cause deleterious effects in intensive care unit patients. The clinical presentation does not differ from patients with renal failure and without influenza infection. Various etiologies may cause this condition and there is no clear underlying mechanism associated with the pathogenesis. ARF can be from renal hypoperfusion, pigment and microthrombi deposition, immune modulators, and superinfections.

2. CASE STUDY

A 35 year old nursing assistant who worked at a family practice clinic presented to the emergency room after experiencing flu like symptoms for 2 days. She complained of fever, cough, and shortness of breath. She denied any chills, sick contacts at home, recent travel, or significant past medical history, and did not receive influenza vaccine during that season. She also denied alcohol intake, smoking, or illicit drugs.

On initial presentation in the emergency room she had a fever of 101°F, 85 mm Hg systolic blood pressure, and hypoxia with oxygen saturation of 85% on room air. She was started on intravenous fluids and oxygen with nasal cannula. Laboratory values revealed blood urea nitrogen (BUN) of 76 mg/dl, serum creatinine of 4.6 mg/dl, aspartate transaminase (AST) 400 IU, alanine transaminase (ALT) of 200 IU, and platelet count at 80,00 per microliter of blood.

Urine analysis showed a large amount of granular casts with no evidence of eosinophils, and a pregnancy test was negative. Rapid testing for influenza with swab was negative, confirmation polymerase chain reaction (PCR) was sent. Initial chest X-ray revealed bilateral pneumonitis. During her course in the emergency room she developed respiratory distress requiring intubation and mechanical ventilation. APACHE II score was 27. Aggressive intravenous fluid resuscitation was initiated along with oseltamivir and antibiotic therapy for bacterial super-infections. Influenza A RNA PCR and Influenza H1N1 gene turned out to be positive. H1N1 pneumonia diagnosis was established. She was also initiated on dialysis for acute tubular necrosis secondary to multiple organ failure. During the hospital course significant improvement was noted in her

pulmonary, hepatic and hematological status without much change from renal point of view. Renal replacement therapy was continued and in three weeks the patient started to regain her renal function and was eventually taken off dialysis after the creatinine was down to 0.8 mg/dl with complete recovery. Liver enzymes slowly improved from the start of dialysis with slow decrease by 20 IU every other day till return to normal. This was attributed to the resolution of shock liver and multisystem organ failure and hypotension.

3. DISCUSSION

Acute renal failure is an uncommon complication in critically ill patients with H1N1 pneumonia [1,2,3]. It is associated with a high mortality rate [4]. Acute renal failure can be due to various etiologies like rhabdomyolysis, hemolytic uremic syndrome (HUS), acute glomerulonephritis (AGN), disseminated intravascular coagulation (DIC), Goodpasture's syndrome, and acute tubulointerstitial nephritis (TIN) [5]. The exact mechanism of the insult to the kidneys from the virus is not known but it has been postulated it might be secondary to direct injury from the influenza A virus, immune system modulation causing activation of mononuclear cells [5]. ARF can be prerenal due to hypoperfusion in ATN, intrinsic by deposition of myoglobin pigment and glomerular microthrombi as in rhabdomyolysis and DIC respectively [5,6,7]. It can also be due to bacterial superinfection (Streptococcus pneumonia) and complement dysregulation seen in HUS [5]. Rarely seen causes of renal failure due to H1N1 are AGN, Goodpasture's syndrome, and acute TIN [5] A small percentage of patients require renal replacement therapy which was associated with increased mortality [1]. Patients with elevated SOFA scores, creatinine phosphokinase and alanine transferase needed HD [1]. According to one study a good percentage of patients who underwent HD recovered [1]. Prognosis was based on factors like pregnancy [1], immunosuppression [1], high APACHE [1], SOFA [1] and MURRAY scores[1], time on mechanical ventilation assistance [1], hemodynamic instability [1], thrombocytopenia [1], older age[8], obesity [9], and influenza vaccination [10,11].

4. CONCLUSION

Our patient had a creatinine higher than the mean seen in previous cases along with bad prognostic factors which were elevated alanine

transferase 1 and thrombocytopenia. The possible explanation for the cause of renal failure was due to renal hypoperfusion causing ATN in this patient with clinical findings like low systolic blood pressure and granular casts noted on urinalysis which is validated by the study hypotheses. She recovered completely with renal replacement therapy which played a crucial role in recovery. In this report, we would like to emphasize the importance of early detection of H1N1 infection, the importance of supportive and aggressive measures which would improve outcomes.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Hernan Trimachi et al. H1N1 infection and acute kidney injury in the critically ill. *Clinical Kidney Journal*. 2009;2(6).
2. Sean M Bagshaw, et al. Acute kidney injury among critically ill patients with pandemic H1N1 influenza A in Canada: cohort study. *BMC Nephrology*. 2013;14: 123.
3. Chacko J, Gagan B, Ashok E, et al. Critically ill patients with 2009 H1N1 infection in an Indian ICU. *Indian J Crit Care Med*. 2010;14(2):77-82. DOI: 10.4103/0972-5229.68220
4. Kute VB, Godara SM, Goplani KR, et al. High mortality in critically ill patients infected with 2009 pandemic influenza A (H1N1) with pneumonia and acute kidney injury. *Saudi J Kidney Dis Transpl*. 2011;22(1):83-9.
5. Watanabe T. Renal complications of seasonal and pandemic influenza A virus infections. *Eur J Pediatr*. 2013;172(1):15-22. DOI:10.1007/s00431-012-1854-x Epub 2012 Oct 13.
6. Unverdi S, Akay H, Ceri M et al. Acute kidney injury due to rhabdomyolysis in H1N1 influenza infection. *Ren Fail*. 2011;33(4):450-1. DOI:10.3109/0886022X.2011.565137 Epub 2011 Mar 23.
7. Leebeek FW, Baggen MG, Mulder LJ, Dingemans-Dumas AM. Rhabdomyolysis associated with influenza A virus infection. *Neth J Med*. 1995;46(4):189-92.
8. Chaari A, Dammak H, Chtara K. Acute kidney injury in critically ill A (H1N1)-infected patients: A study of the prognoses. *J Ren Care*. 2011;37(3):128-33. DOI: 10.1111/j.1755-6686.2011.00224.x
9. Cruz-Lagunas A, Jiménez-Alvarez L, Ramírez G, et al. Obesity and pro-inflammatory mediators are associated with acute kidney injury in patients with A/H1N1 influenza and acute respiratory distress syndrome. *Exp Mol Pathol*. 2014;97(3):453-7. DOI: 10.1016/j.yexmp.2014.10.006 Epub 2014 Oct 8.
10. European Strategy for Influenza A/H1N1 vaccine Benefit-risk monitoring; 2009. Available:<http://www.emea.europa.eu>
11. Myers BD, et al. Hemodynamically mediated acute renal failure. *N Engl J Med*. 1986;31:97.

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