

Cytosorb for Management of Acute Kidney Injury due to Rhabdomyolysis in a Child

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This case reports on a 6-year-old, previously healthy girl who presented to the hospital with a febrile illness and profound pain in her lower extremities.

Case presentation

- There was no history of trauma, excessive exercise or insect bite
- Investigations showed elevated creatine kinase (CK) levels (5169 U/L) and negative dengue serology (NS-1 antigen, IgM and IgG). Her serum creatinine was 0.41 mg/dL
- The child was started on intravenous fluids and oral paracetamol
- The next day, the patient had an asystolic cardiac arrest that reverted after two minutes of cardiopulmonary resuscitation
- Subsequently, she was put on mechanical ventilation
- Furthermore, the patient also exhibited coagulopathy that was treated with fresh frozen plasma and platelet transfusions
- She was noted to have severe metabolic acidosis, elevated hepatic transaminases (SGOT 10,786 U/L, SGPT 3131 U/L) as well as a reduced ejection fraction (35%) diagnosed by 2D-Echo
- Subsequent laboratory investigations revealed hyperkalemia (serum K⁺ 5.9 mEq/L), hypoalbuminemia and a further rise in CK levels (23,586 U/L)
- Urine microscopic examination showed occasional red blood cells and positive urine myoglobin so she was given an infusion of sodium bicarbonate for alkalization of her urine
- Pharyngeal swab was positive for influenza B and enterovirus as diagnosed by polymerase chain reaction (PCR)
- Given the very high CK levels (600,000 U/L), positive fluid balance (3 liters) and dark colored urine, acute renal tubular injury was considered and the child was started on intermittent hemodialysis (IHD) with a high flux dialyzer (Fx 60)
- The following day she was then switched to continuous renal replacement therapy (CRRT) due to hemodynamic instability
- Additionally, a Cytosorb adsorber was integrated into the circuit to remove excess myoglobin

Treatment

- CytoSorb was used for 72 hours in total
- CytoSorb was used in combination with CRRT run in CVVHD mode

- CytoSorb adsorber position: pre-hemofilter

Measurements

- Markers of rhabdomyolysis (CK, myoglobin)
- Creatinine levels

Results

- CytoSorb treatment was associated with a significant decrease in rhabdomyolysis parameters. CK levels decreased from 480,000 U/L to 50,000 U/L and myoglobin levels from 3000 ng/mL to 500 ng/mL. Lowest levels were measured over time by day 27 (CK 219 U/L) and day 19 (myoglobin 171 ng/mL)
- Creatinine levels were stable (0.8 mg/dL) under combined CRRT and CytoSorb therapy

Patient Follow-Up

- After three days of Cytosorb and five days of continuous CRRT, the patient was switched back to IHD which was stopped on day 33 as a result of improved diuresis.
- The patient was transferred to the normal ward and subsequently discharged home after another week. Her serum creatinine was 0.26 mg/dL and the estimated glomerular filtration rate (eGFR) was 271 mL/minute

Conclusion

- In this child with acute kidney injury due to rhabdomyolysis the combination of CytoSorb hemoadsorption and CRRT was associated with a rapid and effective reduction of markers of rhabdomyolysis and a preservation of renal function
- This is the first published case of the use of CytoSorb for removal of myoglobin in a pediatric patient
- According to the authors, CRRT in conjunction with CytoSorb therefore represents a novel approach to the treatment of acute kidney injury associated with rhabdomyolysis in children
- Application of the combined therapy was safe and no complications were reported