

Extracorporeal hemoadsorption in a patient with hypermyoglobinemia due to rhabdomyolysis: our experience

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Introduction

Rhabdomyolysis is a syndrome characterized by muscle necrosis with the release of creatine kinase and myoglobin into the bloodstream, with a high likelihood of acute tubular renal damage and acute renal failure.

Methods

Male, 29 years old, silent medical history. Road accident with multiple compound and exposed fractures in the limbs, surgically stabilized. Left femoral artery severed, surgically reconstructed. In Intensive Care, medical therapy begins with valid respiratory exchanges and hemodynamics supported by norepinephrine (approximately 0.3 mcg/Kg/min) for 12 h.

Progressively increasing hypermyoglobinemia and initiation of hemodialysis treatment with CRRT and extracorporeal hemoadsorption using a Cytosorb:

- CVVHDF with heparin for 43 hours;
 Qb: 200 ± 5 ml/min, Qd: 5000 ± 200 ml/h, infusion: 2000 ± 300 ml/h, U.F.: 0
- Citrate CVVHD for 20 hours + extracorporeal hemoadsorption for 20 hours;
 Qb: 105 ± 9 ml/min, Qd: 2905 ± 102 ml/h, U.F.: 0
 Citrate dose: 3.7 ± 0.2 mmol/l, calcium dose: 1.6 ± 0.1 mmol/l.

Results

On admission to ICU: Blood Pressure: 77/40 mmHg, Mean Arterial Pressure: 50 mmHg. Heart Rate: 147 bpm, SAPS-II: 20, SOFA score: 14. Oligo-anuria with preserved GFR;

At discharge: Blood Pressure: 117/72 mmHg, Mean Arterial Pressure: 87 mmHg, Heart Rate: 95 bpm, Diuresis and GFR preserved.

	Creat mg/dl	GFR ml/min	K mmol/l	Ca ⁺⁺ mmol/l	AST UI/L	albumin g/dl	Hb g/dl	PLT n°	PCR mg/dl	ATIII %	Lactate mmol/l	CK UI/L	mioglob mcg/L
T.I. (IN)	0.55	141	5.2	1.23	172	2.18	6.1	64.000	14.24	69	5.8	7.263	3.421
T.I. (OUT)	0.78	122	3.4	1.21	84	2.9	8.3	545.000	4.26	130	0.8	3.421	704

	CK (T 0)	mioglob (T 0)	CK (T 15 h)	mioglob (T 15 h)	CK (T 20 h)	mioglob (T 20 h)
before- sorbent	5.511	2.922	4.182	2.849	4.532	1.982
after- sorbent	4.585 (-24%)	464 (-84%)	4.108 (-10%)	1.811 (-36%)	4.454 (-1.7%)	1.852 (-6%)

Conclusion

- There's no definitive agreement in literature about an exact myoglobinemia level for initiating extracorporeal hemoadsorption. In our experience treatment was started at 3,500 ng/ml.
- The comparison between pre/post sorbent myoglobin levels demonstrated excellent efficacy of the treatment in removing myoglobin from the bloodstream, and the sorbent maintained its effectiveness after 18-20 hours.
- The comparison between pre/post sorbent creatine kinase (CK) levels showed a good capacity of the treatment to remove creatine kinase from the bloodstream in the first 12-15 hours.
- Our data suggest that early treatment may better preserve renal function and diuresis, and rapidly stabilize hemodynamics, significantly improving the prognosis.

References:

- 1) A. Mudoni, F. Caccetta, M. Caroppo, F. Musio, A. Accogli, MD Zacheo, MD Burzo, V. Nuzzo; "Acute kidney injury and rhabdomyolysis after cocaine overdose: case report and literature review"; G Ital Nefrol 2018 Mar; 35(2): 2018-vol2;
- 2) J Guglielminotti, B Giudet; "Acute renal failure in rhabdomyolysis"; Minerva Anestesiol. 1999 May; 65(5):250-5
- 3) JJ Cornelissen, W Haanstra, HJ Haarman, RH Derksen; "Plasma exchange in rhabdomyolysis"; Intensive Care Med. 1989; 15(8):528-9
- 4) KM Schneider; "Plasmapheresis and immunoadsorption: different techniques and their current role in medical therapy"; Kidney Int Suppl. 1998 Feb;64:S61-5