Dear ladies and gentlemen, dear ADVOS users and interested parties,
we are pleased to present you another issue of our ADVOS Literature Service. We regularly select one or more papers from international journals which might be of interest to you in connection with our ADVOS procedure. This month we have selected the following:

SUCCESSFUL THERAPY OF MASSIVE RISPERIODINE-INDUCED RHABDOMOLYSIS USING DIFFERENT DIALYSIS AND ABSORBER DEVICES: A CASE REPORT.

Jarczak et al.

Key Message

Rhabdomyolysis is a rare, but so much more serious medical incident, which places the intensive medicine for complex challenges. A serious complication is the acute renal failure. The released myoglobin can harm the kidney. ADVOS can reduce myoglobin levels in a timely manner.

Background

Rhabdomyolysis is a condition in which damaged skeletal muscle breaks down rapidly. The muscle damage is most often the result of a crush injury, strenuous exercise, medications, drug abuse, infections, genetic dispositions and may cause multi-organ failure. Here, the case of a 21-year-old man, suffering from a pronounced rhabdomyolysis due to a therapy with risperidone because of paranoid schizophrenia, was presented. The patient developed an anuric kidney failure. This report shows the effect of a continuous venovenous hemodialysis and ADVOS alone or in conjunction with an adsorber for creatinine kinase (CK) and myoglobin until recovery of renal function.

Methods

The patient was subjected to different dialysis and adsorption treatments for 14 days, including hemodialysis and ADVOS sessions. Furthermore, a temporarily combined therapy with the CytoSorb adsorber was carried out, in both cases. Creatine kinase, myoglobin levels and further vital parameters were tightly controlled (Table 1).

Results

Despite risperidone withdrawal and forced volume resuscitation during the first 24 hours, creatine kinase, aspartate aminotransferase (AST), alanine aminotransferase (ALT) and serum creatinine increased to 754,400 U/L, 3,717 U/L, 505 U/L and 2.75 mg/dL, respectively, accompanied by anuria and hyperkalemia (5.6 mmol/L). The patient was transferred to the ICU at a university hospital due to multi-organ failure (rhabdomyolysis, uremia, liver failure, SOFA 3). Despite continuous hemodialysis, creatine kinase, myoglobin, AST and ALT levels increased to 928,961 U/L, 323,717 ng/mL, 5,492 U/L and 827 U/L, respectively. Conventional hemodialysis was switched to ADVOS due to progressive multi-organ failure (AKI), liver failure, hepatic encephalopathy, SOFA score 8. ADVOS was used, temporarily combined with the CytoSorb adsorber for three consecutive days. Myoglobin and creatine kinase decreased following ADVOS. The renal function fully recovered. Creatine kinase, myoglobin, AST, ALT and serum creatinine levels at discharge were 187 U/L,

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330 ng/mL 19 U/L, 20 U/L and 1.5 mg/dL, respectively. Hemodialysis, albumin dialysis and hemadsorption reduced the exposure to toxic substances, were associated with a gradual increase in urine output and stabilized electrolytes that improved the patient's overall condition and finally normalized the kidney function. Compared to standard dialysis, ADVOS was effective in reduction of myoglobin and creatine kinase by 40.9% and 62.2% and by 50.5% and 80.8% combined with CytoSorb compared to 0.8% and 11.5% by CVVHD, respectively. Systemic myoglobin and creatine kinase levels decreased by 66% and 56% during ADVOS compared to 32% both during conventional hemodialysis.

	Hospital Admission	Risperidone withdrawal and forced volume resuscitation	Continuous hemodialysis (CVVHD)	ADVOS, temporarily combined with CytoSorb
CK	48,180 U/L	754,400 U/L	928,961 U/L	187 U/L
AST	2,206 U/L	3,717 U/L	5,492 U/L	19 U/L
ALT	329 U/L	505 U/L	827 U/L	20 U/L
LDH	2,329 U/L	-	-	-
serum creatinine	1.72 mg/dL	2.75 mg/dL	-	1.5 mg/dL
anuria and hyperkalemia	-	5.6 mmol/L	-	-
myoglobin	-	-	323,717 ng/mL	330 ng/mL

Tabelle 1: Darstellung der unterschiedlichen Vitalparameter.

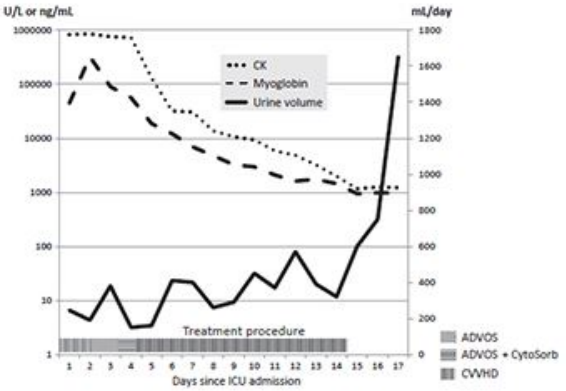

Figure 1: Time course of the different treatment procedures and their effect on the course of creatine kinase (CK), myoglobin and urine volume over the ICU days.

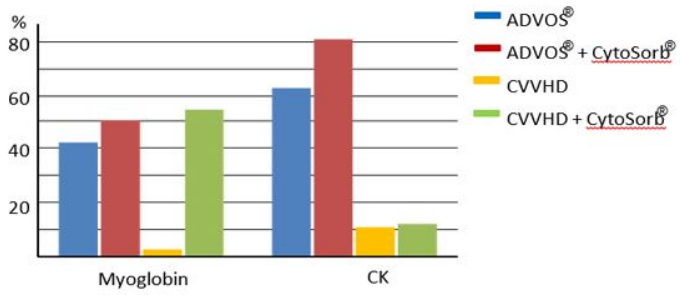

Figure 2: Comparison of the average elimination rates in the first two hours of application.

The authors conclude:

Early use of ADVOS might support recovery in refractory rhabdomyolysis. All used treatments were safe in their use. Elimination of myoglobin and creatine kinase was higher using ADVOS than conventional hemodialysis. In combination with CytoSorb gave the best results.

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We think that:

It was surprising to see the results from the study of Jarczak et al. Why ADVOS is removing myoglobin in such a good way is uncertain. About the reason it can only be speculated. If there are special binding sites (myoglobin to albumin) is under our consideration not fully investigated. Albumin has a binding site for heme groups. Maybe that`s the reason why albumin can remove the irony myoglobin from the plasma (Fasano et al.). In addition, ADVOS treatment works with two parallel dialyzers, resulting in a very large diffusion surface. Looking at water- and protein-bound substances, this is a critical factor to remove higher-molecular substances like myoglobin too. Maybe that is the crucial factor. Why creatine kinase is reduced by ADVOS is even a bigger mystery. Here, we also have no explanation. The most important point is that the ADVOS system can remove higher-molecular substances existing in a clearly excessive concentration in the blood. Until now this has not been systematically investigated.

If you have further questions or suggestions - please contact us at marketing@advitos.com.

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