THERAPEUTIC PLASMA EXCHANGE FOR THE MANAGEMENT OF IMMUNE MEDIATED VASCULITIS SUSPECTED TO BE CAUSED BY HUMAN ALBUMIN IN A DOG

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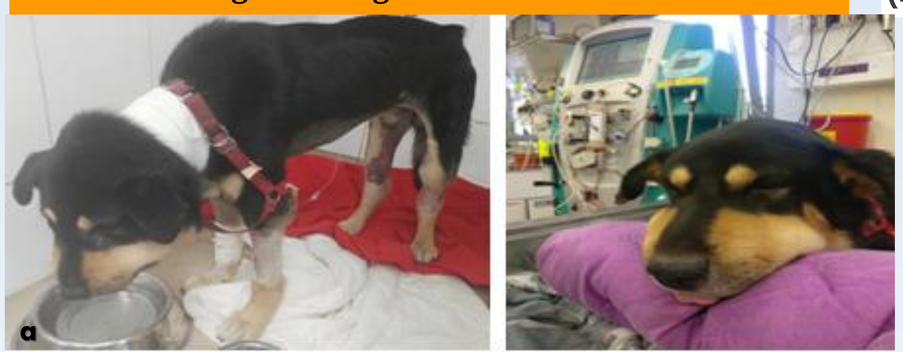
Introduction:

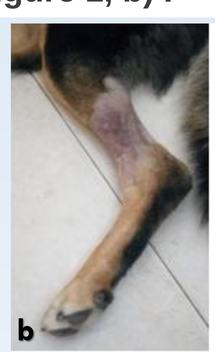
Hypoalbuminemia is a common complication of several disease processes in dogs and in some is associated with mortality. The use of human albumin (HA) in hypoalbuminemic, critically ill dogs has been advocated, but was found to be associated with development of anti-HA immunoglobulin (Ig) G, including life-threatening type III hypersensitivity reactions. Therapeutic plasma exchange (TPE) is an extracorporeal treatment, in which pre determined amount of the patient's plasma (and its constituent components, e.g. IgG) is removed via centrifugation or filtration and replaced with allogenic plasma transfusion, isotonic crystalloids, synthetic colloids or their combination. We describe TPE treatment for the management of immune mediated vasculitis and acute kidney injury (AKI) suspected to be caused by HA in a dog.

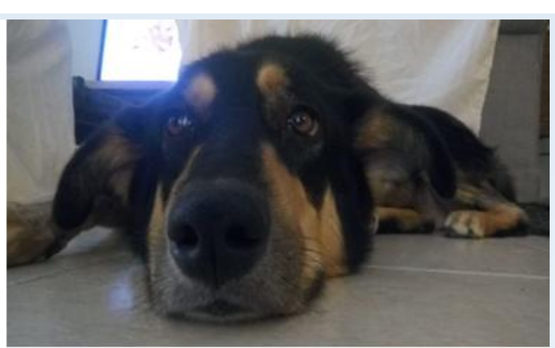
Case Presentation:

A 3-year-old male neutered mixed breed dog was diagnosed with severe immune mediated vasculitis, fever, hypoalbuminemia (2.6 g/dL; reference interval, 3.0-4.4), edemas and coagulopathy (Figure 1, a), 2 weeks after receiving HA (400 mg/kg) due to severe hypoalbuminemia (**1.1** gr/dl) as a result of septic peritonitis. The dog was treated with fresh frozen plasma (FFP) and steroids but remained severely hypoalbuminemic (1.8 g/dl) and developed AKI. Over four days, three TPE treatments were performed, with a total of 2.7 plasma volumes exchanged. Replacement fluids consisted of a combination of FFP, hydroxyethyl starch 6% and 0.9% saline solution (46%, 17% and 37% respectively) (Table 1). Following the TPE treatments, serum albumin increased (from 1.8 g/dL to 2.5 g/dL) (Figure 2), serum creatinine decreased (from 3.9 mg/dL to 0.98 mg/dL), clotting times normalized (activated partial thromboplastin time from 33 seconds to 14.5 seconds), and there was a gradual improvement of the edemas and overall clinical status of the dog. No significant adverse effects were noted during the TPE treatments and the dog was discharged after 6 days of hospitalization. Following discharge, the dog had complete resolution of vasculitis, edemas and AKI (Figure 1, b) .

Figure 1. a, A 3-year-old male mixed breed dog diagnosed with severe immune mediated vasculitis, AKI, and facial and limb edemas caused by human albumin. b. The same dog following TPE treatment.







Summery and Conclusion:

This is the first report describing successful use of TPE for the management of an immune mediated reaction (type III hypersensitivity) following HA administration causing severe vasculitis and subsequent complications.

Table 1. Plasma and replacement fluid in the 3 therapeutic plasma exchange (TPE) treatments

	Tx I	Tx II	Tx III	Total
PV exchanged	1.1	1.3	0.3	2.7
Volume of plasma filtered (mL)	2000	2300	500	4800
Volume of replacement fluid (mL)	2000	2300	500	4800
Replacement fluid Composition [mL (%)]:				
NaCl	500 (25)	770 (34)	500 (100)	1770 (37)
HES	500 (25)	300 (13)	-	800 (17)
FFP	1000 (50)	1230 (53)	-	2230 (46)

The fluids used as replacement of plasma included hetastarch (HES, 6%); saline (NaCl, 0.9%); and fresh-frozen plasma (FFP). Tx, treatment

Figure 2. Serum albumin concentration before and after TPE treatments (arrows) in a dog with serum sickness and immune mediated vasculitis