
Leibniz Institute for Zoo and Wildlife Research
(Leibniz-IZW)

European Association of Zoo and Wildlife Veterinarians
(EAZWV)

European College of Zoological Medicine
(ECZM)

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STRESS-HAEMOCONCENTRATION DURING THE CAPTURE AND TRANSPORT OF FREE-RANGING WHITE RHINOCEROSSES (*CERATOTHERIUM SIMUM*) SEDATED WITH EITHER AZAPERONE OR MIDAZOLAM

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Haemoconcentration indicates an increased ratio of red blood cells and large molecules (>69 kDa) to the plasma volume and has been associated with acute stress in laboratory animals. Here, we measured the response of common indicators of haemoconcentration (erythrocyte physical variables and serum proteins) to chemical-capture and transport in twenty-three free-ranging sub-adult white rhinoceros bulls sedated with either azaperone or midazolam. Rhinoceroses were captured from helicopter with a combination of etorphine (3-4 mg, i.m.; Captivon®, Wildlife Pharmaceuticals, 9.8 mg/mL) plus either azaperone (n=11, i.m.; Zapnil®, Wildlife Pharmaceuticals, 50 mg/mL) or midazolam (n=12, i.m.; Dazonil®, Wildlife Pharmaceuticals, 50 mg/mL) at five times the etorphine dose, mg. Once immobilised, an intravenous catheter was placed in an auricular vein and butorphanol (15-25 mg; i.v.; Wildlife Pharmaceuticals, 50 mg/mL) was administered to allow for loading of the rhinoceros, followed by an intravenous bolus of diprenorphine (9-15 mg, i.v.; Activon®, Wildlife Pharmaceuticals, 12 mg/mL) to reverse the immobilisation. Additional azaperone or midazolam, respectively, were administered at 25 times the etorphine dose, mg, every two hours during transport, and serial blood samples were collected from the intravenous catheter at (T1) capture; (T2) start of transport; and (T3) after six hours of transport. Changes in measured variables over time and between groups were compared using general mixed effects models.

Packed cell volume, red blood cell count, and haemoglobin concentrations were highest at T1 and decreased from T1 to T3 indicating haemoconcentration during capture likely resulting from the effects of stress-induced catecholamine-release (i.e. hypertension and splenic contraction). Mean corpuscular haemoglobin concentration (MCHC) and red blood cell distribution width (RDW) were higher at T1 compared to T2, but did not change from T2 to T3, probably reflecting red cell changes in response to alterations in plasma osmolarity. Concentrations of albumin and globulin were highest at T1; albumin concentrations tended to be higher in midazolam-rhinoceroses possibly reflecting differences in the cardiovascular effects of the drugs, or acid-base-equilibria. Globulin concentrations were significantly lower in midazolam-rhinoceroses likely indicating an immunosuppressive effect of the benzodiazepine. The results indicate that capture of white rhinoceroses is associated with acute stress. Better understanding the clinical relevance of the rhinoceroses response to the sedative drugs administered during transport is critical as it may play a role in the development of disease and translocation failure.