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Effects of Some Anaesthetics and Chemical Restraints on Blood Clotting in Camels

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Abstract: The effects of administration of propionylpromazine, xylazine, detomidine, and ketamine at therapeutic dose on many blood clotting variables in camel were investigated. Only platelet count was significantly ($P< 0.05$) affected by xylazine treatment. Such effect may be due to haemodilution or increase spleen storage function caused by xylazine.

Key words: Detomidine, investigated, xylazine, camel, blood clotting, anaesthesia

INTRODUCTION

Chemical sedation or anaesthesia may be required for surgery or restraining and handling in camels, which may bite, spit, kick or even rut. This utilizes drugs such as propionylpromazine, xylazine, detomidine, and ketamine. However, the effect of these drugs on hemostasis is not well recognized.

Hemostasis, the system for reducing leakage through a partial or complete defect in a blood vessel wall, and thus this is an essential defense mechanism for survival (Dodds, 1980).

Hemostasis involves a complex system of inter-related processes such as contraction of the damaged blood vessels, platelet aggregation and protein-protein interaction (Schalm *et al*., 1975).

Many drugs such as non-steroidal anti-inflammatory compounds, sulphapyrazole, phenylbutazone, aspirin and indomethacin can impair platelet function (Gilman *et al*., 1990).

Several depressants (tranquilizers, sedatives and anaesthetics) have been used in the camel but with different and sometimes contradicting results.

Propionylpromazine may be given at the dose of 0.5 mg kg^{-1} body weight I.M. It produces sufficient sedation. The drug causes muscle relaxation, vasodilation, hypotension and marked tachycardia (Khamisy *et al*., 1976). Penile prolapse has not been reported in camel, due to anatomical differences. Propionylpromazine, like other pheonthiazine derivatives, are contraindicated in shock and should be used with care in animals with circulatory instability as severe hypotension may result particularly when the circulating blood volume is reduced (White *et al*., 1986).

Xylazine, an alpha 2 adrenoceptor agonist has been used in camels (Dennig *et al*., 1972) at a dose rate of 0.1-0.15 mg kg^{-1} body weight. Another dose rate of 0.78 mg kg^{-1} and atropine sulphate(0.2 mg kg^{-1} body weight) is also recommended (Brander *et al*., 1982) . The drug has sedative, adrenergic, cholinergic and centrally mediated analgesic and muscle relaxant properties (Brander *et al*., 1982). Cardiopulmonary changes are typical of an alpha 2 adrenoceptor agonist in that there is a marked bradycardia, initial rise in arterial blood pressure, and then the pressure falls below the initial resting level, and respiratory depression (Hall *et al*., 2001).

Detomidine, an alpha 2 adrenoceptor agonist has been developed as a sedative and analgesic for animals. In a variety of laboratory animals its sedatives potency has been shown to be approximately 10 times that of xylazine, and theses relative potencies are not necessarily the same in all domestic animals (Virtanen *et al*., 1986). Cardiopulmonary effects are similar to those with the xylazine (Hall *et al*., 2001).

Ketamine, a derivative of phencyclidine, induces a rapid onset of peculiar state of unconsciousness often described as dissociative anaesthesia characterized by profound somatic analgesia but poor visceral analgesia. Muscle tone is increased resulting in involuntary movement. The eyelids remain open, oral and upper respiratory reflexes remain intact. Excitement during recovery period is common. Excitement may be prevented by xylazine. Respiratory function may be depressed and rapid I.V. administration often result in apnea (Peshin *et al*., 1992). Mild signs of central nervous system irritability, consisting of fine tremors of lip muscle, nostrils and limbs have been observed (White *et al*., 1987).

The present study was designed to investigate the effects of some anaesthetics on blood clotting in the camel.

MATERIALS AND METHODS

Animals: Males and females healthy camels (n=16) weighing from 170 to 240 kg and aging three to seven years were used. They were housed in one large pen and provided with hay, sorghum grains and water adlibitum. Before the start of the experiment, they were examined clinically for soundness, and their freedom from external and internal parasites is ensured.

Treatment: Four drugs were employed. Propionylpromazine (Compelen TM^{-1}Bayer) at a dose of 0.5 mg kg^{-1}. Xylazine (Xylazil^{TM}/Ilium) at a dose of 0.25 mg kg^{-1}. Detomidine(Domosedan^{TM}/Farmos) at a dose of 15 mg kg^{-1}. Ketamine (Ketamil^{TM}/Ilium) at a dose of 2.5 mg kg^{-1}. All these doses were given once, to four animals, by the intramuscular route in the neck region.

Blood collection: Blood (10 mL) was collected from the jugular vein using heparinized syringes before the administration of the drugs and at time of recovery from anaesthesia.

Clinical examination: This was performed every half hour after medication for six hours, by the same veterinarian, throughout the experiment. Rectal temperature was taken using a clinical mercury thermometer. Heart, pulse and respiratory rates were measured basically. as described elsewhere (Blood *et al*., 1983).

Degree of sedation was judged subjectively by approaching the unrestrained animal and examining it clinically.

Haemostatic investigation: Platelet counts: Platelet count was performed on sodium citrate-anticoagulant blood using the automated hematology analyzer (Baker 9010 Haematology Analyzer, Biocmmunochen, Allentown, USA).

Template Bleeding Time (TBT): TBT was measured by a template bleeding device (Surgicutt International, Technidyne Corp. Edison, NJ USA). Blood from incision on skin was collected periodically onto filter paper. The TBT is measured from the discharge of the device until bleeding had stopped.

Clotting variables: Blood Clotting Time (CT) was determined by capillary tube method (Schalm *et al*., 1975) in fresh blood taken from tip of the ear. Fresh blood obtained from jugular vein was also used for determination of clotting variables (Feldman *et al*., 2000).These Included the Activated Clotting Time (ACT), Prothrompin Time (PT) Partial Thromboplastin Time (PTT) and Fibrin Degradation Products (FDP). For ACT assays, blood was aspirated and placed in 20 mL syringes and quickly injected into 2 warmed (37°C) evacuated tubes containing diatomaceous earth (Sigma, UK). Tubes were mixed by gentle inversion and incubated at 37 °C for 1 min. Tubes then removed from the water bath, rocked gently, and returned to the water bath. The ACT was recorded as mean time to initial clotting in each tube. The PT was determined by addition of 0.2 mL of warmed rabbit thromboplastin reagent (Sigma, UK), to 0.1 mL of warmed (37°C) plasma (Sodium Citrate) and measurement of the interval until clot detection, using a fibrometer (Simplastin, Organon Teknika Corp, Durhan, USA). The PTT was determined as follows: 0.1 mL of plasma sample is added to 0.1 mL of warmed action-activated cephaloplastin reagent, incubated for 3 min at 37°C, and mixed with 0.1 mL of warmed CaCl2 solution, and the interval until clot detection is measured. Control values for PT and PTT were established, using human plasma (sodium citrate)

The Fibrin Degradation Products (FDP) and Reptilase Time (RT) were measured by a modification of Laurell's technique (Laurell *et al*., 1965) using commercial kits (Murex Biotech Limited, Kent, UK).

Statistical analysis: Values reported were means±SD, and are tested by the analysis of variance. Individual comparisons were made by the t-test. P values less than 0.05 was considered significant.

RESULTS AND DISCUSSION

Effect of anaesthesia on level of different coagulant variables in the camel are given in Table 1. Coagulation screening test such as CT, ACT, TBT, PT and PTT, and other clotting factors such as RT,FDB and platelet count were not affected by anaesthetics used. Only platelet count variables was significantly ($p<0.05$) affected by xylazine treatment. Similar effects of xylazine on platelet number in camels have been reported else where (Custer *et al*., 1977; Ahmad *et al*., 1996). Such effects may be due to haemodilution or increased spleen storage function (Ahmad *et al*., 1996). The decreased platelet count in the experiment did not affect any of coagulation screening tests or clotting factors studied. There is very little information on the platelet count of the camel (Higgincand Kock *et al*., 1986; Grundelm *et al*., 1986). However, Lewis, (1976) and Hussein *et al*. (1993) observed an elevated platelet count compared to other animal species. They noted that camel's platelet were much smaller in diameter than humans. Whether camel platelets being available in

Table 1: Effects of anaesthetics on level of different coagulant variables in the camel

Coagulant variables	Propionylpromazine treated camels		Xylazine treated camels		Detomidine treated camels		Ketamine treated camels	
	Before	After	Before	After	Before	After	Before	After
CT (min)	4.08±0.51	4.12±0.5	4.05±0.51	4.0±0.49	4.15±0.5	4.05±0.51	4.11±0.5	4.13±0.5
ACT (sec)	185.0±20.0	180.0±20	190.0±20.0	180±20	195.0±18.0	189±17	200.0±20.0	190.0±19.0
TBT (min)	4.8±0.3	4.6±0.3	4.5±0.4	4.2±0.3	4.2±0.3	4.3±0.3	4.7±0.3	4.0±0.3
PT (sec)	8.0±0.8	8.0±0.1	8.4±1.8	8.0±1.0	8.0±1.0	8.2±0.6	8.0±1.0	8.6±1.0
PTT (sec)	46.0±3.0	45.0±4.0	44.0±3.0	41.0±3.0	42.0±2.0	44.1±1.6	45.0±3.0	44.0±2.0
RT (sec)	12.0±2.0	13.0±2.0	11.0±2.0	11.0±3.0	11.0±2.0	12.1±1.6	13.0±2.0	12.0±2.0
FDP(mg mL^{-1})	13.9±0.9	14.1±0.8	14.4±1.6	13.8±0.8	14.3±0.9	14.1±0.8	14.2±0.8	13.8±0.8
Platelet count (15 cells mL^{-1})	1.6±0.05	1.7±0.04	1.7±0.05	1.1±0.04*	1.68±0.04	1.71±0.03	1.71±0.05	1.65± 0.04

*$p<0.05$

such higher numbers have a potential haemostatic role in camel remain to be determined. Depression causes by xylazine in animals is dose-related (Branderg *et al*., 1982), therefore for the studies on xylazine dose dependent effect on platelet count should by performed.

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