Some clinical, haematological and biochemical effects of four tranquilizers in camels (*Camelus dromedarius*)


Six dromadaires sains ont été traités avec les tranquillisants suivants : propionyl promazine (Combelen<sup>TM</sup>/Bayer), xylazine (Rompun<sup>TM</sup>/Bayer), acépromazine (Calmivet<sup>TM</sup>/NetoquinoI) ou chlorpromazine (Largactil<sup>TM</sup>/M&B) avec une dose unique de 0,5, 0,25, 0,1 ou 3 mg/kg respectivement, par voie intramusculaire. L'apparition, la durée et le degré de la sédation produite par chaque médicament ont été enregistrés pendant six heures. L'effet des traitements sur quelques paramètres hématochimiques et biochimiques a aussi été étudié. L'apparition et la durée d'action des tranquillisants étaient respectivement de 10 mn et 2,1 ± 0,5 h pour la propionyl promazine, 4 mn et 3,1 ± 0,4 h pour la xylazine, 5 mn et 3,3 ± 0,5 h pour l'acépromazine, 7 mn et 2,5 ± 0,4 h pour la chlorpromazine. On a observé que 5 à 10 mn après l'administration des quatre médicaments, les dromadaires ont montré de l'agitation avec ptôse de la lèvre inférieure en frottant leurs narines contre des objets. Durant la première heure suivant l'injection, les animaux ont uriné, déféqué et pleuré fréquemment. La xylazine a semblé supérieure aux trois autres médicaments dans son effet sédatif.

Aucun effet significatif sur la température rectale ou le rythme respiratoire des dromadaires traités n'est apparu après l'administration des four médicaments. Une baisse constante mais statistiquement non significative (environ 10 p. 100) a été notée dans la concentration de l’hémoglobine et la numération érythrocytaire, une heure après le traitement avec les tranquillisants. Les quatre médicaments, particulièrement la xylazine et la propionyl promazine ont provoqué une hyperglycémie significative mais n’ont altéré ni la concentration de l’urée plasmatique ni l’activité de l’aspartate aminotransférase.

**Mots clés :** Dromadaire - *Camelus dromedarius* - Médicament neurotrope - Hématochimie - Biochimie - Symptôme - Soudan.

Although camels are, in general, considered to be good subjects for depressants (1), there seems to be no unanimity regarding the recommended dosage, efficacy and safety of these drugs. Therefore it was thought useful to evaluate systematically the efficacy and safety of various depressants in camels in the Sudan, and in the present work some clinical, haematological and biochemical effects in camels treated with tranquilizers started to be investigated.

**MATERIALS AND METHODS**

**Animals**

Two male and four female healthy camels weighing from 175 to 235 kg and aging three to seven years were used. They were housed in one large pen and provided with hay, sorghum grains and water *ad libitum*. Before the start of the experiment, they were examined clinically for soundness, and their freedom from external and internal parasites was ensured.

**Treatment**

Four tranquilizers were employed. Propionyl promazine (Combelen<sup>TM</sup>/Bayer) was given at a dose of 0,5 mg/kg, xylazine (Rompun<sup>TM</sup>/Bayer) at 0,25 mg/kg, acépromazine (Calmivet<sup>TM</sup>/Vetoquinol) at 0,1 mg/kg, and chlorpromazine (Largactil<sup>TM</sup>/M&B) at 3 mg/kg. All these doses were given once, one week apart, 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 intervals thereafter. Part (2 ml) was used for haematological investigations, and the rest centrifuged at 900 g for 15 min to separate plasma. The plasma obtained was stored frozen (-20 °C) to await biochemical analysis, except for glucose which was estimated promptly.
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 by BLOOD, RADOSTITS and HENDERSON (2).

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

Biochemical determinations

The concentrations of glucose and urea were determined by the spectrophotometric methods (7, 13). The activity of aspartate aminotransferase (AST) was measured by the method of REITMAN and FRANKEL (10).

Haematological investigations

Erythrocyte and leucocyte counts, haemoglobin concentrations, and differential leucocyte count were performed by standard methods (11).

Statistical analysis

Values reported are means ± s.e.m. (number of observations), and were tested by the analysis of variance. Individual comparisons were made by the t-test. P values higher than 0.05 have been considered insignificant.

RESULTS

Clinical signs

Throughout the six hours of observation after treatment, the rectal temperature of the camels fluctuated between 35.0 and 38.5°C. The variations in the rectal temperature were not statistically significant. The heart rates of camels given the four drugs are shown in Fig. 1. Xylazine produced no significant change in heart rate throughout the experimented period (P > 0.1). Acepromazine, chlorpromazine and propionyl promazine produced significant rises in heart rates of camels, especially at 4 h (acepromazine), and at 3 h (chlorpromazine and propionyl promazine). Respiratory rates of camels during the six hours of study ranged from 9 to 14 cycle/min.

With the four drugs used, the onset of sedation was evident within 4 ± 2.1 min. for xylazine, 5 ± 2.1 min. for acepromazine, 7 ± 3.2 min. for chlorpromazine and 10 ± 3.4 min. for propionyl promazine. The duration of sedation was 3.1 ± 0.4 h for xylazine, 2.3 ± 0.5 h for acepromazine, 2.5 ± 0.4 h for chlorpromazine and 2.1 ± 0.5 h for propionyl promazine.

It was observed that 5 to 10 min. after administration of the drugs, the camels showed slight irritability, dropping of the lower lip and scratching of the nostrils against objects. This was followed by sedation. One hour after sedation with the four drugs, there was frequent urination, lacrimation and defaecation. Xylazine was more effective than the other three drugs producing sedation. Chlorpromazine and acepromazine came second, and propionyl promazine comparatively least effective in producing sedation.

Haematological findings

There were consistent decreases (averaged about 10 p. 100) in the haemoglobin concentration and erythrocyte counts of camels one hour after treatment with the four drugs. However these decreases were not statistically significant (P > 0.1) and disappeared six hours post-treatment. The variations in the leucocyte counts and differential leucocyte counts before and after treatment with the four drugs were inconsistent, and it was concluded that the drugs had exerted no statistically significant effects on these parameters.
TABLE I Some biochemical changes in camels following intramuscular injections of four tranquillizers.

<table>
<thead>
<tr>
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<th>0 h (base line values)</th>
<th>Percentage of base line value at given times after injection</th>
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<tr>
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<td>1 h</td>
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<td>Glucose (µmol/l)</td>
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<tr>
<td>Xylazine</td>
<td>3.5 ± 0.3</td>
<td>112 ± 4.1</td>
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<tr>
<td>Acepromazine</td>
<td>3.8 ± 0.4</td>
<td>102 ± 11.2</td>
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<tr>
<td>Chlorpromazine</td>
<td>4.1 ± 0.5</td>
<td>100 ± 12.1</td>
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<tr>
<td>Propionyl promazine</td>
<td>3.6 ± 0.4</td>
<td>141 ± 13.9</td>
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<td>Urea (mmol/l)</td>
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<tr>
<td>Xylazine</td>
<td>5.3 ± 0.6</td>
<td>108 ± 3.9</td>
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<tr>
<td>Acepromazine</td>
<td>6.4 ± 0.7</td>
<td>100 ± 3.8</td>
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<tr>
<td>Chlorpromazine</td>
<td>5.9 ± 0.8</td>
<td>106 ± 6.3</td>
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<tr>
<td>Propionyl promazine</td>
<td>6.7 ± 0.7</td>
<td>103 ± 8.0</td>
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<td>AST (IU/l)</td>
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<tr>
<td>Xylazine</td>
<td>72.7 ± 8.2</td>
<td>93 ± 9.1</td>
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<tr>
<td>Acepromazine</td>
<td>78.8 ± 9.0</td>
<td>103 ± 9.9</td>
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<tr>
<td>Chlorpromazine</td>
<td>71.1 ± 7.9</td>
<td>111 ± 12.1</td>
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<tr>
<td>Propionyl promazine</td>
<td>73.3 ± 8.5</td>
<td>109 ± 11.3</td>
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Values in the table are means ± s.e.m. (n = 6).
* P < 0.05. For drug dosages see text.

Biochemical findings

The results are shown in Table I. There were increases in the glucose concentrations 1-2 h following the use of the four drugs, and the effects were most marked with xylazine and propionyl promazine. No significant changes were evident in the concentration of urea or the activity of AST.

DISCUSSION

Sedation in camels is necessity in cases of painful or uncomfortable procedures, and to facilitate handling of difficult animals. The sedation produced by the four drugs in this study lasted two to four hours which is a sufficient period for minor operations and other procedures. Xylazine at the dose used was superior to other drugs in its onset of effect and duration of action. This result confirms that of KHAMIS et al. (8) who found that xylazine was also superior to acepromazine which is generally considered more potent than chlorpromazine (4).

The lack of consistent and significant haematological changes in the present study supports the finding of PESHIN et al. (9) in xylazine (0.4 mg/kg, i.m.), but differs from those of BOLBOL et al. (3) who gave xylazine at a dose rate of 0.25 mg/kg, i.m. (the same dose as the one used here) and found significant decreases in haemoglobin concentration, erythrocyte and leucocyte counts, and haematocrit values. These values returned to normal 24 h after the drug administration.

The significant hyperglycaemia seen following xylazine and propionyl promazine concurs with the results reported on xylazine by PESHIN et al. (9) in the dromedary, and CUSTER et al. (5) in the two-humped camel. As far as we know there is no information on the effect of other sedatives on glucose concentration in camels. The reason for the hyperglycaemia might be a consequence of increased adrenergic activity, a decrease in the effect (or secretion) of insulin, an increase in the activity (or secretion) of glucagon, or to other factor(s). Further research is needed to elucidate this point.

The lack of significant effects of the four sedatives on AST activity or urea concentration, indicates that these drugs exerted no significant damaging effects on the animals tissue (especially liver and kidneys). However, it has been reported (based on one case report) that xylazine should not be used in camels with uraemia (12). Apparently, the drug increased metabolic alkalosis and caused respiratory acidosis in the uraemic camel.
It would appear that xylazine should be considered, so far, the drug of choice for sedation of camels. However, further research on the use of xylazine antagonists (e.g. yohimbine and 4-amino-pyridine) should be studied in camels treated with the drug. Also, combinations of xylazine with other agents (e.g. ketamine) should be further investigated.

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REFERENCES

PATHOLOGIE


