

ANAESTHESIA IN DONKEYS USING KETAMINE ALONE AND KETAMINE XYLAZINE COMBINATION

E.G. MOGOA*, S.M. MBIUKI* and JK. MCDERMOTT†

*Clinical Studies Department, University of Nairobi, P.O. Box 29053, Nairobi, Kenya

†Department of Public Health, Pharmacology and Toxicology, University of Nairobi, P.O. Box 29053, Nairobi, Kenya

ANESTHESIE CHEZ LES ANES A L'AIDE DE LA KETAMINE UNIQUEMENT ET DE L'ASSOCIATION KETAMINE X XYLAZINE

Résumé

L'anesthésie avec la kétamine et la kétamine x xylazine a été comparée chez deux groupes de cinq ânes chacun. Le premier groupe (groupe A) a reçu une piqûre de kétamine uniquement et le second groupe (groupe B) une piqûre de kétamine x xylazine avec la même seringue. La kétamine a été injectée à raison de 4,4 mg/kg et la xylazine à la dose de 2 mg/kg. Dans tous les cas, les piqûres étaient faites par voie intramusculaire. L'association de médicaments a permis d'avoir une bonne induction et une durée plus longue de l'anesthésie (24,8 + 13,8 minutes) par rapport à la kétamine toute seule (18,8 + 9,4 minutes). Il y avait une analgésie suffisante pour les chirurgies de courte durée avec l'association de médicaments. La kétamine x xylazine n'avait pas d'effets notables sur le rythme respiratoire et la pulsation du cœur, ce qui n'était pas le cas avec la kétamine. L'association de médicaments a produit une bonne décontraction des muscles et le rétablissement se passait sans problèmes; en revanche, la kétamine n'a pas permis d'obtenir les mêmes résultats. Il a été conclu que l'association kétamine x xylazine est meilleure que la kétamine toute seule pour anesthésier les ânes.

Summary

Ketamine and Ketamine-xylazine anaesthesia was compared in two groups of 5 donkeys each. The first group (A) was injected with ketamine alone while the second group (B) was injected with ketamine-xylazine combination in the same syringe. Ketamine was injected at a dosage of 4.4 mg/kg and xylazine at a dosage of 2.0 mg/kg. In all instances, the injections were given intramuscularly. The drug combination provided smooth induction, longer duration of anaesthesia (24.8 + 13.8 mins) as compared to that of ketamine alone (18.8 + 9.4 mins). There was adequate analgesia for surgeries of short duration under the drug combination. Ketamine-xylazine combination did not have marked effects on the respiratory and heart rates whereas ketamine markedly increased these rates. The drug combination produced good muscle relaxation and recovery was uneventful, an attribute that ketamine lacked. It was considered that ketamine-xylazine combination was better than ketamine alone for anaesthetising donkeys.

INTRODUCTION

There is a need for reliable short term anaesthesia in the donkey under field conditions. An ideal anaesthetic should provide a rapid, quiet induction, good analgesia and muscle relaxation, minimal cardiovascular and respiratory changes and a quick smooth recovery with minimal after effects so that the animal can be left unattended. Ketamine has

been used successfully as an anaesthetic in several animal species including sheep^(1,2), cattle⁽³⁾ and horses^(4,5).

The use of a combination of ketamine and xylazine with satisfactory results has also been reported in many animal species including horses^(6,7), cats and dogs⁽⁸⁾, cattle⁽⁹⁾, sheep⁽¹⁰⁾, camels⁽¹¹⁾ and goats⁽¹²⁾.

There is no report on the comparison of ketamine alone and ketamine-xylazine

combination in the donkey. This paper reports on the use of ketamine and ketamine-xylazine in the donkey.

Materials and Methods

Ten donkeys divided randomly into two groups of 5 animals each were used. They were of mixed sex, ranging from two to eleven years of age and weighing between 80 and 200 kg. All animals were healthy and microscopic fecal examination revealed all donkeys to be apparently free of gastro-intestinal parasites. Food was withheld for 18 hours before each trial.

Group A animals were injected with ketamine alone and group B with ketamine-xylazine combination in the same syringe. In all instances, the injections were given intramuscularly at a dosage of 4.4 mg/kg for ketamine and 2.0 mg/kg for xylazine. Rectal temperature as well as heart rates and respiratory rates of each donkey were recorded before administration of the drugs, during anaesthesia and after full recovery. Analgesia was checked by pricking the skin with a hypodermic needle. Weak time, down to recumbency time, down time and standing time were recorded. Muscle relaxation rated as 1 (mild), 2 (moderate) and 3 (good) was recorded. Salivation, reflexes (Palpebral, pedal and anal), ataxia and other behavioural changes associated with the drugs were checked for and recorded. Recovery was considered complete when the donkeys were able to walk unaided. The results were analysed statistically using analysis of variance and covariance with repeated measures.

Results

From table 1, animals in both groups achieved weak time and went into recumbency within similar time ranges. However, those under ketamine-xylazine combination stayed in recumbency longer (24.8 + 13.8 mins) compared to those under ketamine alone (18.8 + 9.4 mins). Those under the drug combination were unconscious for 11.5 + 3.8 minutes whereas those under ketamine alone never became unconscious. Recovery time for the donkeys under the combination was longer (177.0 + 21.6 mins) than for those under ketamine alone (124.0 + 9.6 mins).

Whereas those under the combination went into recumbency smoothly and stayed calm in recumbency, those under ketamine alone collapsed into recumbency and had muscle tremors, paddled and showed non-purposeful movements throughout the time they were in recumbency. Recovery for those under ketamine-xylazine was uneventful with mild ataxia but those under ketamine had marked ataxia and staggering.

Salivation, protrusion of the penis and drooping of the lower lip occurred in 40 percent of the donkeys under ketamine-xylazine with none showing any of those signs in the group A under ketamine. All animals in the two groups 'sneezed' during anaesthesia. Grunting was evident in all the animals under ketamine alone (table 3).

No significant changes were observed in rectal temperature in the two groups during anaesthesia (table 2). There was a marked increase in the heart rate and respiratory rate during anaesthesia for

Table 1: Means \pm s.d. for the Anaesthetic times (mins.) for the two groups

	Group A (n=5)	Group B (n=5)
Parameters		
Weak time	6.0 + 1.6	7.0 + 2.0
Down to Recumbency time	11.0 + 2.5	10.0 + 2.4
Standing time	29.8 + 7.1	40.7 + 3.0
Down time	18.8 + 9.4	24.8 + 13.8
Unconsciousness time		11.5 + 3.8
Recovery time	124.0 + 9.6	177.0 + 21.6

Table 2: Means \pm s.d. for rectal temperature, heart rate, respiratory rate and muscle relaxation for the two groups

Parameters	Group A (n=5)		Group B (n=5)			
	Normal	Anaesthesia	Recovery	Normal	Anaesthesia	Recovery
Rectal temp. (°C)	37.4 + 0.8	37.2 + 0.9	37.1 + 0.8	36.0 + 0.8	36.1 + 0.8	36.5 + 0.7
Heart rate (min ⁻¹)	58.8 + 21.7	96.8 + 24.4	54.4 + 14.9	37.8 + 10.0	44.0 + 7.0	37.8 + 7.8
Respiratory rate (min ⁻¹)	22.8 + 7.8	45.2 + 11.6	16.6 + 5.8	15.4 + 5.8	22.0 + 10.6	14.4 + 4.3
Muscle Relaxation	0	0	0	0	0	0

Table 3: Observations made during anaesthesia for the two groups expressed as a percentage of animals in each group

Observations	Group A (n=5)	Group B (n=5)
Salivation	0	40
Protrusion of the Penis	0	40
Drooping of lower lip	0	40
Sneezing	100	100
Grunting	100	0

the donkeys injected with ketamine alone. However, these changes were not significant ($P > 0.05$).

Muscle relaxation was good during anaesthesia when the combination was used but absent when ketamine alone was used (table 2). The drug combination ketamine-xylazine produced surgical anaesthesia of short duration of the neck, inguinal area and extremities except below the fetlocks whereas ketamine alone did not produce any analgesia.

The drug combination eliminated the pedal reflex during recumbency and weakened the palpebral and anal reflexes within the first hour following the injection of the drug combination. However, ketamine alone did not affect the reflexes.

Discussion

In an attempt to achieve smoother induction and recovery from anaesthesia, to intensify analgesia and to decrease the amount of anaesthesia drugs needed, combinations with different doses of sedatives or analgesics have been reported in various animal species⁽¹³⁾. The smooth induction and quiet recovery in donkeys injected with the drug combination ketamine-xylazine agrees with find-

ings in horses⁽¹⁴⁾.

The excessive muscle tremors, rigidity and continuous paddling due to ketamine make it undesirable for use in donkeys as compared to the ketamine-xylazine combination which provided good muscle relaxation and uneventful recovery. The undesirable effects due to ketamine have also been reported in horses⁽¹⁵⁾.

The drug combination ketamine-xylazine produced good analgesia adequate for surgical manipulations of short duration but ketamine alone produced no analgesia which supports the findings in horses⁽¹⁶⁾ and in camels⁽¹¹⁾.

Ketamine on its own produced marked increases in the heart rate and respiratory rates. But, in the presence of xylazine, the effects of ketamine were subdued thus making the combination superior to ketamine alone. Although the 'sneezing' grunting and snoring noticed either with ketamine alone or ketamine-xylazine combination were not eventful, they have not been reported in donkeys.

The insignificant changes in rectal temperature due to either ketamine or ketamine-xylazine combination have also been reported in sheep^(2,17).

Drooping of the lower lip and protrusion of the penis can be attributed to the

