The immobilisation of wildebeest *Connochaetes taurinus* with etorphine and the use of diprenorphine as an etorphine antagonist

by
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ABSTRACT

13 Blue wildebeest were successfully captured with a standard dose of 2.5 mg etorphine hcl and 20 mg triflupromazine hcl. The narcotic/tranquillizer mixture was prepared prior to the capture operation thus eliminating the mixing of "drug-cocktails" in the field.

Diprenorphine hcl effectively antagonised the narcotic effects of etorphine hcl at a ratio of 1:1.

1 INTRODUCTION

It has become common practice in Southern Africa to capture various species of wild antelope with etorphine hydrochloride (M-99, Reckitt) combined with hyoscine hydrobromide and various tranquillizers. In their comprehensive and excellent paper on the capture of 16 species of large wild herbivores, Pienaar, van Niekerk, Young, van Wyk and Fairall (1966) recommended drug mixture of 2 mg M-99, 20 mg acetylpromazine maleate and 10 mg hyoscine hydrobromide for the drug immobilisation of adult blue wildebeest *Connochaetes taurinus* (Burchell). Harthoorn and Bligh (1965) recommended similar drug-combinations. In a later publication Pienaar (1968) recommended the use of drug-combinations incorporating fentanyl (Janssen Pharmaceutica) and the butyrophenone neuroleptics such as azaperone and fluanisone (Janssen Pharmaceutica) as well as hyoscine hydrobromide. Nalorphine hydrobromide was recommended in all three papers for antagonising the narcotic effects of the etorphine.

In the Etosha National Park wildebeest were immobilised to evaluate the efficacy of etorphine hcl and to obtain samples and data for a project on anthrax. At the same time the animals were marked with collars and ear-tags for a preliminary migration study. In the case of 13 animals immobilised, a constant dosage of 2.5 mg etorphine hcl and 20 mg triflupromazine hcl (Squill, Squibbs) and the etorphine antagonist — diprenorphine hydrochloride (R&S — 50–50 M. Hcl) was used. The results obtained are recorded in this paper.

2 METHOD AND MATERIALS

Wildebeest are shy and retiring animals and seldom allow a close approach by humans. In Etosha National Park they are found on open plains and usually gallop away when approached by a motor vehicle. Because of the disturbance caused at a waterhole, darting from waterhole hides cannot be recommended. Previously wildebeest were chased on an open plain and darted from a moving vehicle. This method required perfect co-ordination between the driver and the darter and good marksmanship. As wildebeest suddenly swerve and seldom run in a fixed direction many shots were missed. Chasing animals for long distances may precipitate muscular dystrophy and cause mortality (Ebedes, 1969).

For short periods during the rainy season territorial bulls congregate close to the main tourist roads in Etosha and are more concerned in defending...
their territories against intruding bulls than in passing motor vehicles. They can therefore be approached up to 50 metres and darted with relative ease. The Palmer Powder Charge Cap-chur gun, 1 ml projectile darts and either yellow or red ramsets were used for darting. 20 Mg etorphine hcl powder were dissolved in 8 ml triflupromazine hcl (Siquil, Squibbs) giving a solution of 2.5 mg etorphine and 20 mg triflupromazine hcl per ml. Hyoscine hydrobromide 100 mg/ml was used for three of the 13 animals darted. Diprenorphine hydrochloride (R&S 50-50 M. Hcl) is a new potent morphine antagonist supplied for experimental purposes by Messrs. Reckitt and Colman, Main Road, Rosebank, Cape Town. The powder was supplied in sterile bottles containing 100 mg and a solution of 10 mg ml was prepared by dissolving it in 10 ml of a special buffer solution consisting of 80 mg sodium citrate B.P., 80 mg anhydrous citric acid B.P., 41 mg sodium chloride B.P. and 0.1 % chloramphenicol. The powder is very soluble and dissolves within a few minutes.

Although the exact antagonistic action of morphine and morphine-like drugs is not known it is possible that the morphine antagonists compete successfully with the narcotics for occupation of the receptor surfaces in the brain. (Bentley, 1964). In reversing the narcotic effects of etorphine in immobilised zebra, Equus burchelli antiquorum, Ebedes (1971) found that diprenorphine was effective at a ratio of 1:1 and 1:2. In the case of the wildebeest the ratio used was kept at 1:1 i.e. 2.5 mg diprenorphine hcl for antagonising 2.5 mg etorphine hcl. All the animals captured were marked with collars and plastic ear-tags and injected intramuscularly with antibiotics and corticosteroids.

3 RESULTS
The table shows the results of the immobilisation of 13 wildebeest with 1 ml of a prepared standard dose containing 2.5 mg etorphine hcl and 20 mg triflupromazine hcl and the recovery times recorded after the injection of 2.5 mg diprenorphine hcl. The mean down time was less than 10 minutes (n = 13) and the mean recovery time recorded from the moment the intravenous injection of diprenorphine hcl was completed until the animal was on its feet was 1 minute 5 seconds (n = 12). In the case of No. 12 the antagonist was accidentally injected subcutaneously next to a superficial ear vein resulting in a delayed recovery time of 14 minutes. In all the other cases the diprenorphine was injected into the cephalic vein.

In the first three animals immobilised hyoscine hydrobromide was used, but for the remaining 10 animals this drug was left out of the immobilising-mixture and no effect on the immobilisation times was noted. Similar results were obtained with the capture of zebra (Ebedes, 1971). None of the animals ran for long distances after darting and the rectal temperatures recorded shortly after recumbency were several degrees lower than the temperatures recorded in gemsbok Oryx gazella that were chased prior to darting (Ebedes, 1969).

The results obtained were highly satisfactory, a statement born out by the fact that all the marked animals were seen after the immobilisations and two wildebeest travelled a distance of more than 160 km from the area in which they were marked.

4 DISCUSSION AND CONCLUSIONS
By dissolving etorphine hcl in triflupromazine hcl to obtain a standard concentration of these drugs and by eliminating hyoscine hydrobromide, we eliminated the mixing of "drug-cocktails" in the field. This is important when large numbers of animals have to be captured by unqualified field staff under the supervision and direction of veterinary personnel. Field staff can now be instructed to fill the projectile darts with 1 ml of the combined etorphine/tranquillizer mixture and the mixing of capture drugs in the field thus simplified.

As in the case of zebra (Ebedes, 1971), hyoscine hydrobromide can be eliminated from drug mixtures used for capturing wildebeest. Diprenorphine hcl proved to be an efficient and rapid etorphine antagonist in wildebeest and can be used intravenously with safety at a ratio of 1:1.

5 ACKNOWLEDGEMENTS
The writer wishes to thank all the Nature Conservationists who assisted with the project. Some of them have left Etosha National Park, but their willingness and enthusiasm will always be appreciated. The complimentary samples of diprenorphine hcl received from Messrs Reckitt and Colman, P.O. Box 1097, Cape Town, are gratefully acknowledged by the writer on behalf of the South West African Nature Conservation and Tourism Branches. Mr H.-D. Smith is thanked for typing the manuscript Drs E. Young and M. Keep are thanked for their critical comments on the manuscript.

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PIENAAR, U. DE V.
Table. The immobilisation of wildebeest with 2.5 mg etorphine HCl and 20 mg triflupromazine HCl.

<table>
<thead>
<tr>
<th>No.</th>
<th>Sex</th>
<th>Est. weight kg</th>
<th>Dart Site</th>
<th>Down Time</th>
<th>Temp. °C</th>
<th>Pulse</th>
<th>Resp.</th>
<th>R&amp;S 50-50 mg</th>
<th>Recovery Time</th>
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<tr>
<td>1</td>
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<td>220</td>
<td>Hip</td>
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<td>80</td>
<td>34</td>
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<td>2</td>
<td>F</td>
<td>210</td>
<td>Shoulder</td>
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<td>98</td>
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<td>3</td>
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<td>Hip</td>
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* 10 mg Hyoscine hydrobromide added to drug mixture
** R&S 50-50 = Diprenorphine hydrochloride (Reckitts)