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Anaesthetising hippopotamus: A veterinary challenge

Until relatively recently it has been virtually impossible to anaesthetise the common hippopotamus (*Hippopotamus amphibius*), especially in the wild in their aquatic environment.

Hippos are very sensitive to the conventional drug combinations used routinely on other ungulates. The drugs affect their respiratory system and there is a danger of them drowning under the effects of narcotics while they are in their aquatic environment.



Butorphanol (Torbugesic) was first used at the National Zoo for a Pygmy hippopotamus destined for San Diego Zoo in the USA.



Guss, the National Zoo's hippo bull, is confined to the night room of his enclosure for a dental procedure. A tranquilising dart has been placed in his neck.



Veterinary dentist Dr Gerhard Steenkamp cuts Guss's overgrown lower right canine with an angle grinder, while the mouth is held open with a steel frame. Blindfolds are essential to reduce visual stimulation during the procedure.

Hippos were well left alone by wildlife veterinarians until new drug combinations recently became available which are much safer to use on these animals. Butorphanol (Torbugesic) is a synthetic morphine derivative with potent sedative and analgesic effects. In the late 1990s in the USA, reports began to emerge in scientific literature of the drug being used successfully on zoo animals and in particular for the sedation of hippopotamus.

In South Africa the drug Torbugesic was not registered by the Medical Control Council (MCC), but under special licence from the MCC the drug could be obtained and used on specified patients only. At the University of Pretoria's Faculty of Veterinary Science, the drug was used by equine specialists to sedate horses and keep them in the standing position for minor procedures.

In 2000, the National Zoo obtained a licence for one bottle of Torbugesic for the examination of a hippo that had developed an acute large swelling over the left hip. The plan was to sedate her sufficiently to allow examination of the swelling using ultra sound and to insert a needle into the swelling to examine its contents under a microscope. But first we had to obtain Torbugesic. To do this required completing application forms for the MCC, submitting these and waiting for approval. When we eventually obtained the Torbugesic the swelling had significantly reduced in size, so we decided the procedure was no longer warranted and the hippo recovered uneventfully.

A new drug combination is used on a Pygmy Hippo

In 2004, we had an opportunity to use Torbugesic on a Pygmy Hippopotamus (*Hexaprotodon liberiensis*), but this time the challenge was to obtain a blood sample safely from the animal for pre-export testing for diseases as required by the import permit to San Diego Zoo in the USA. Dr Leon Venter prepared a dart with 20 mg Torbugesic and 7 mg Domosedan and shot the dart into the right shoulder of the hippo, which was confined in the night room. We all held our breath.

The animal was calm and eventually lay down, but we were still not able to handle the animal safely. Additional doses of the drugs were administered, which resulted in excellent sedation at 50 minutes after the first dart. This enabled us to get a blood sample from the vein on the inside of the back leg. Antidote drugs were given and the animal was up and about 10 minutes later. We were delighted with the success of the procedure and impressed with the good effects of the drug combination on the animal. But we needed to gain more experience with Butorphanol on hippos and other animals.

Dr Dave Cooper, wildlife veterinarian in KwaZulu-Natal Parks and Dr Markus Hofmeyr, wildlife veterinarian of SANParks, have had extensive experience with hippos in the wild and have worked out fairly safe drug combinations and doses for these animals.

In the zoo environment we are fortunate that we can manipulate the hippos in their enclosure to some extent. The hippos can be coaxed out of the dam and confined to a night room for examinations and procedures, while wild hippos will remain in the water, making it much more difficult to dart them. Once the hippo is in the night room it facilitates the sedating process and additional doses of tranquiliser can easily be administered depending on the response of the animal.

Dental procedure with a difference

Our hippo bull Guss is aging and literally "long in the tooth" -- he is 45 years old and has excessively long teeth. His lower canines do not wear properly on the upper canines and as a result they have grown too long and have started to protrude through the upper lip, especially on the right side of his face. It was necessary to cut these teeth shorter.

In February 2010 we asked Dr Markus Hofmeyr -- based on his experience with hippos -- to assist us, which he willingly did. The NZG's Dr Adrian Tordiffe administered a drug combination containing butorphanol to Guss and after about an hour the animal was sufficiently sedated for Dr Gerhard Steenkamp, veterinary dentist to work on his teeth.

An angle grinder had to be used to cut through the thick lower canine, but the vibrations of the angle grinder was enough stimulation for Guss to suddenly wake up. He stood up briefly during the procedure and people scattered in all directions. Fortunately there was no incident and he immediately went back to sleep. Additional drugs were administered to complete the procedure and he recovered well a few hours later when he was back in the pool with the rest of the group.

More recently we had to repeat the procedure on Guss because the canines grow quite fast and the lower right canine was pushing chewed grass material through the hole in his upper lip while he was eating.

Modern drugs have now found an important niche in veterinary medicine, promoting the welfare and care of our wild animals.

Dr Ian Espie, Chief Veterinarian, NZG

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CONTACT US

Tel: +27 12 339 2700
 Fax: +27 12 323 4540
 Email: info@nzg.ac.za

HOW TO FIND US



232 Boom Street, Pretoria
 GPS: S25°44.349' E028°11.329'

