Capture Myopathy

Introduction

Capture myopathy (CM) is the name given to a complex disease that usually involves events following stress of either capture, handling or transport. It can be caused by a single factor, but more often follows a series of intertwined events.

On game farms the disease is virtually certain to be caused by bad management, and on the well run operation should be a non-existent entity. The end point in a capture myopathy scenario is almost always death. This may occur over a very short period of time, or have a more prolonged onset that causes the animal to become chronically lame, unable to stand and finally creates enough damage to kill.

The name "capture myopathy" has emerged from a pack of many names by which the syndrome has been described over the years. Even now this name is not universal. In New Zealand it is known as post-capture myopathy. The very first scientific description was made in 1964 in some antelopes from Kenya, although of course the disease had no doubt gone unrecognized for many years prior.

Many species may be effected. Virtually all hoofed animals, many birds, and some others have been shown to be susceptible. Even humans can develop a very similar condition. On the other hand the disease has never been clearly demonstrated in a carnivore.

As the name implies the condition is often associated with capture, and used to be considered a major problem in the early days of the New Zealand deer farming industry, when many deer were helicopter captured for farm stocking.

Capture is not the only way that this problem can be induced in animals. Like many diseases, the conditions that can create it are complex. Among these are the species, the method of restraint, the season, the ambient temperature, and the mental and physical condition of the animal. Even within a species there are probably individual animal variations.

There is no doubt that acclimatized animals that are physically conditioned are less likely to develop CM than are more nervous ones.

Species

Of animals seen on game farms the pronghorn, a difficult animal to maintain in captivity in any case, is probably the most susceptible to CM. It has however been seen in bison and all the deer species.

Method of restraint

The most likely time for game farm animals to develop CM is during transport to a new property, especially if they have recently come from the wild. Vigorous exertion, combined with other stressful factors, will certainly predispose the animal to this condition. On a well managed game farm this type of situation should probably never arise.

However, chasing is not the only method of restraint that can lead to CM. It has been seen in both bighorn sheep and snow gesees that were caught at bait sites under drop or cannon nets. It is possible the vigorous isometric muscle exercise played a role in the development of the condition.

Drugs

The most commonly used drug on game farms is probably Rompun™. This, and other compounds including narcotics and drugs like Atravet™, can disrupt the ability of the animal to control it's own body temperature. If these drugs
are used on very hot days problems can ensue. An unfortunate sequel of narcotic use (which may be a rare event on a game farm) is the fact that recycling of the drug can occur many hours after its initial administration. If the animal becomes excited during this phase it can readily overheat.

**Season**

There are at least two ways in which season can have an effect on how an animal responds to restraint. The first is the animal’s nutritional state. The translocation of wapiti from Elk Island National Park has long been practiced. It has been found that moving animals after the end of February creates an unacceptable incidence of CM. Not only are they nutritionally stressed at this time of year, but the warmer weather in late winter can create overheating when the animal still has its winter coat. The very efficient insulation of the winter coat prevents the animal from cooling itself.

The nutritional stress should be alleviated by proper feeding on game farms. Of special importance is the vitamin E level in the ration. Dr. Duane Ulrey, working with white-tailed deer in Michigan, has found that high levels (above 200 IU per kg of feed) of this vitamin in the ration will protect the deer from capture myopathy that develops during handling procedures.

**Ambient temperature**

Environmental temperature can play a very important role in the capture myopathy story. Restraint should be avoided on hot days. Anything above about 25°C is probably too hot. In summer one should probably arrange to carry out any restraint during the early part of the day.

**Fear**

Of all the situations leading up to CM the degree of tameness, and the reduction of fear may play the most important role. Well acclimatized animals, trained to the handling system on a game farm, are unlikely to be frightened when being handled. Newly caught ones are obviously more nervous and certainly more susceptible to the condition. Even in the capture of wild animals for study, short helicopter chases are called for. In a study of Pronghorn during the 1970’s Chalmers and Barrett showed that if animals were released back into their own environment soon after capture they were less likely to develop CM when compared to those that were captured, held, and moved, either to a new environment or to a research facility.

**Mechanics**

An important way in which oxygen reaches the muscles is via their pumping actions as the animal moves. At the same time toxic materials are carried away. In a captured animal that is not moving this pump is no longer working. This can further compromise the animal. Not only is fresh oxygen not arriving, but lactic acid and other products are building up. Even cooling is reduced as the blood does not leave the area. This system plays an important part in the development of CM.

**Manifestations**

There are several interrelated ways in which CM can develop in an animal. In the most acute form there is a very rapid build up of acid in the animal’s blood and it can die within minutes. This should never happen on a game farm.

A form that may take a few hours to kill the animal involves a slightly less severe acid build up, combined with overheating, shock and severe muscle damage. The animal is usually depressed, has shallow rapid breathing, rapid pulse, muscular stiffness, elevated body temperature and often a build-up of fluid in the lungs. As the condition progresses the muscle damage becomes more severe. Muscle rupture can occur in this situation. If the muscle that ruptures is involved in standing the animal may collapse.

Less rapid in onset, but often also fatal, is a form that results from muscle and organ damage. One of the principal areas in which damage occurs, apart from the muscle, is the kidney. The animal may develop either a dark brown urine caused by damaged kidney tubules or even
a complete kidney shut-down. The muscle damage shows as lameness, torticollis, or even inability to rise. It is the torticollis, or twisted neck, that gave rise to the term "wry neck" in early New Zealand descriptions of this disease.

**Treatment and Prevention.**

Prevention is really the best form of treatment. In affected animals a considerable variety of treatments has been tried. Their success is dependent both upon the type of CM that is involved and the extent to which they can be administered without making things worse.

Sodium bicarbonate (4-6mEq/kg) administered intravenously was effective in very profoundly affected zebras very early in the disease. In less severe cases in both moose and red deer it had little effect. Vitamin E/Se injections are used routinely to treat cattle with "white muscle disease". This condition has some similarities to some forms of CM, but the injection is more likely to be of use in prevention than in cure. A variety of other medications including vitamins, anti-inflammatory and pain relieving drugs have been tried, usually with little success.

**T.T.&T.**

One of the simplest forms of prevention is to ensure that the animals are dealt with in the TT&T methods of handling. The three T's stand for Training, Taming & Tempo.

Training means that all the animals on the farm can be trained to use the corrals and handling systems to the point where they feel no stress. If you are starting young stock they can be fed in the yards and put through the chutes periodically without any actual handling. As they learn their way around the system they become less and less bothered by it all. Even fresh stock or older animals can be trained in this way. It will pay to run them with an animal or two that is tame or semi-tame and knows its way around.

Taming is just what it implies. The animals can be acclimatized to humans by regular feeding from a vehicle, or by the use of special calls at feeding time.

Tempo covers the pace and conditions under which handling is done. It never pays to hurry things. The animals (whether deer, wapiti, bison or anything else) will respond better to quiet handling. Windy days make the animals edgy, unless essential, all handling should be rescheduled.

**Drugs**

There are a class of products known as taming drugs which may have potential to help in situations where unavoidable restraint stress is to be placed upon animals. They have not yet been licensed for use in game farm animals, but they have been tested for suppression of anxiety prior to long journeys, with some success both in reindeer and African antelopes.

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**Key Points**

**Capture Myopathy is Preventable**

It is almost untreatable

- Avoid handling and trucking on hot days
- Train animals to yards and chutes
- Tame animals by frequent feeding and acclimatize them to humans
- Work at slow tempo
- Do not work animals on windy days