Abstract

Post velvetting deaths are a reasonably common occurrence but little is known about the risk factors for them. This paper is a review of previous work that has been done and also includes a few accounts from my own practice. The incidence of post-xylazine death in deer appears to commonly happen in multiple deer on the same farm from the same visit; this is for an unknown reason. There is no evidence to show that breed, age, time, weather conditions, stress, stag temperament, brand of xylazine used, dose of xylazine used or whether an antihistamine has been given have any effect on the outcome after sedating a deer with xylazine. More work needs to be done in order to determine the risk factors for stag death post xylazine use.

Introduction

This paper is a review of previous work done on post velvetting stag deaths as well as a few accounts from my own practice. It focuses on xylazine related stag deaths and is a refresher for what risk factors have been found to predispose stags to a fatal xylazine reaction and what factors have been dismissed.

Still, very little is known about the risk factors that increase the likelihood of deaths in stags post sedation with xylazine. Previous studies (Flint et al. 2006, Walker and Middleburg 1988, Walker 1989) have looked closely at post velvetting stag deaths using information from their own practices as well as survey data. My paper will mainly focus on the findings from these studies.

Possible causes of post-velvetting stag deaths

There are a few possible causes for stag deaths post-velvetting. These include acute or delayed xylazine hypersensitivity, inhalation pneumonia, bloat, respiratory depression, trauma, hyperthermia/hypothermia, potentiation of concurrent disease, blood loss/hypovolemic shock, stress related death. In my experience and the experience of my colleagues, xylazine hypersensitivity and undiagnosed deaths have been the most common causes.

Xylazine hypersensitivity

According to a past paper (Mackintosh and Cross 1989), the histological findings of pulmonary oedema and eosinophilic infiltration from a stag that died after xylazine sedation were consistent with hypersensitivity. Also most deaths occur between six and 48 hours after sedation (Flint et al. 2006) which is consistent with the late effect of Leukotrienes, or ‘slow-reacting substances of anaphylaxis’. Leukotrienes produce slow, prolonged contractile effects on peripheral airway tissue. They also increase systemic vascular permeability, contribute to airway oedema, increase the accumulation of mucus in broncho-constricted airways and sensitize the lung to a wide variety of non-specific stimuli (Fadal 1985). Xylazine is a basic lipophilic drug and is likely to be concentrated in the lungs.
Risk factors

Spatial and temporal patterns

There is evidence that there are predisposing factors that affect certain properties and certain groups of stags at a velvetting occasion (Flint et al. 2006). Flint et al. (2006) reported that 13 of 24 occurrences (54%) involved the death of more than one animal at the same visit and three of the 24 properties experienced deaths on multiple occasions. Anecdotally, clients of our practice have experienced multiple deaths on one occasion, as well as multiple deaths in a season and then some years have none. The season just gone we had a stag death (unreported) and then another on the same property from another visit a few weeks later (diagnosed as a hypersensitivity reaction). We also had a case where three out of 18 stags died after one visit.

Breed

There is insufficient data to make firm conclusions about breed predisposition (Flint et al. 2006). Deaths in Fallow deer have not been reported. From my understanding there have been no Wapiti losses post-velvetting at our practice but we velvet less Wapiti than we do Red deer.

Age

There is not enough data to support an age predisposition (Flint et al. 2006); although deaths commonly occur in older stags that have been previously sedated and velvetted with no adverse effects. This is very interesting as it suggests something has happened within the animal or environment that has now made the animal vulnerable to a hypersensitivity reaction.

Time and weather conditions

Stag deaths have been recorded in a wide range of weather conditions, temperatures and times of day so no clear link has been determined.

Stress and stag temperament

Once again there is insufficient data to say whether stress and stag temperament predispose a deer to post xylazine death as there have been multiple reports of dead stags that have been quiet and multiple deaths of stags that have been stressed. One case from our practice this season involved 18 animals that were extremely worked up, in hard antler and were being TB tested at the same time. They were very stressed and some of them were getting injured. Three of these stags died but one had a puncture wound into the thorax.
Drugs and dose rate

Walker (1989) suggested there may be subtle differences between different brands of xylazine which may influence the outcome after using them for sedation. The latest data (Flint et al. 2006) suggests the brand, formulation and concentration of sedative appear to be unrelated to stag deaths. High dose rates are also unlikely to be the cause of post-xylazine deaths and, in fact, the mean dose rate used in stags that died was lower than stags that did not die. In the majority of the stag deaths that have occurred in our practice the label dose rate has not been exceeded and a top-up has not been given.

Stags that have not been given reversal do not appear more prone to death compared to ones that were.

Local anaesthetic use and dose also do not appear to play a role in the post-velvetting death of stags.

Antihistamine use

Based on the stag deaths being caused by a delayed xylazine hypersensitivity reaction you would expect giving antihistamines at the time of reversal administration would aid in the prevention of this reaction. In the one stag death recorded in a 1989 survey (Walker 1989) an antihistamine was given at the time of reversal. There have also been multiple occasions in our practice where an antihistamine was given IV or IM at the time of reversal administration where the stag has died within the next 48 hours.

Diagnosis of a xylazine induced hypersensitivity reaction

In most cases there is no abnormal pathology apart from in the lungs (Flint et al. 2006). This is normally pulmonary oedema with fluid and froth in the airways. There are wider than normal interlobular septa, with severe infiltration of degranulated eosinophils. These pathological findings are considered by pathologists to be consistent with a diagnosis of hypersensitivity, the cause of which is speculative (Walker and Middelberg 1988).

References

Fadal RJ. The immunobiology and immunopharmacology of the allergic response. Otolaryngologic Clinics of North America 18, 649–676, 1985


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