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Short Communication

Bracken Fern Poisoning

Sheikh Uzma Farooq[1], Aditya Sharma[2]* and Prince Chauhan[3]

[1]*Department of Veterinary Pharmacology and Toxicology, Khalsa College of Veterinary and Animal Sciences, Amritsar, India*

[2]*Department of Veterinary Pathology, Khalsa College of Veterinary and Animal Sciences, Amritsar, India*

[3]*Department of Animal Nutrition, Khalsa College of Veterinary and Animal Sciences, Amritsar, India*

***Corresponding Author:** Aditya Sharma, Department of Veterinary Pathology, Khalsa College of Veterinary and Animal Sciences, Amritsar, India.

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Abstract

Bracken fern is the most common species of poisonous plants occurring in temperate and subtropical regions. The whole plant material is usually toxic but young plants are reported to be more toxic. It contains different active principles which have potential to manifest disease conditions in animals. Thiaminase, Quercetin, Aplastic anaemic factor and Haematuria factor are fully characterized toxic factors of ferns. Among these Quercertin is carcinogenic with reports of urinary bladder tumours after long term consumption of bracken fern. The fern poison has a depressive effect on bone marrow tissue. The thrombocytic count is most affected. The most common findings in simple fern poisoning are haemorrhages, usually found on the outside of the heart, occasionally in the kidney but more commonly involving the intestines. Until recently no specific treatment was available for affected animals. Sulpha drugs and antibiotics were used to prevent bacterial invasion but recuperation of blood forming tissues could not be stimulated. Di-butyl alcohol have a specific stimulating effect on bone marrow cells and is nowadays used as antidote for fern poisoning.

Keywords: Poisonous; Haematuria; Quercertin; Thrombocytic; Di-Butyl Alcohol

Introduction

Bracken fern is a delicacy consumed by humans and serves as animal forage around the world. It is said to be the 5th most common plant, an important toxic plant and the only higher plant known to cause cancer in animals. Occurrence of urinary bladder neoplasia is extremely high in cattle and it is associated with the continuous consumption of bracken fern. Animals are affected by bracken toxic active components, leading to huge economic losses. Bracken fern toxicity in cattle presents the following clinical signs of pyrexia, epistaxis, melena, chronic weight loss, dysphagia, incoordination and haemorrhagic lesions on the udder. The thiaminase content in bracken fern causes anorexia and incoordination in horses while the signs of bracken fern toxicity in ovines generally lead to retinal degeneration [1]. In bovines, bracken fern toxicity is a known aetiology in the depression of bone marrow haematopoietic activity characterised by anaemia, leucopenia, thrombocytopenia and haematuria which are cardinal haematopathology associated with bracken poisoning. Significant elevations in serum enzymes like aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP), urea and creatinine levels were seen in animals exposed to bracken fern [2].

Poison in the fern

The younger the fern the more toxic it is. On this basis a large proportion of losses can be explained, fairly common situations being

- Young animals in areas previously slashed or burnt.
- Young animals in infested pad-docks cut for hay.

In both situations the fern is all young and appears to be particularly attractive late in the year when fern is the only green growth in a paddock. To combat these situations it seems best to run calves in those paddocks with the least infestation of fern and to feed hay as much as possible to provide roughage in young lush pasture [3].

Avoid running young animals in the dry period in paddocks which have young fern in any quantity.

The two poisons are present in bracken fern are

- Thiaminase-an enzyme which in-activates Vitamin B, (Thiamine) and hence produces a Vitamin B deficiency in simple stomached animals such as the horse. This can be controlled by injections of Vitamin B.

- A fraction of bracken which is soluble in ethyl alcohol. This can be inactivated by steaming for one hour. This fraction effects ruminants, par-ticularly cattle and causes a depression of bone marrow activity.

Toxic effects on ruminants

The fern poison has a depressive effect on bone marrow tissue which in turn, causes a fall in the level in the blood of several types of cells. The types affected mainly are

- **Polymorphs:** Cells which are important in that they destroy bacterial invaders by digesting them. The pus seen in infected cuts is made up mainly of this type of cell.
- **Thromboctyes or platelets:** These cells are necessary for the proper clotting of blood. About the time that these cells have almost disappeared from the blood stream, the small blood vessels (capillaries) be-come fragile and there is a tendency for spontaneous haemorrhage to occur [4].

Depending on the toxicity of the bracken and the amount eaten by an animal, a chain of events could occur.

- The white cells disappear from the blood stream, and the animal then has a lowered resistance to infection.
- Continuous consumption of bracken fern by the animals leads to the urinary bladder cancer, in which the walls of the urinary bladder becomes neoplastic and leads to urination problems which also includes painful urination.
- The final stage of bracken fern poisoning is reached if an animal continues to eat enough toxic fern over a period, and the affected animal(s) have not already succumbed to infection.
- This stage is characterised by animals running a high fever which is not due to infection. The animals have characteristically drooped ears and sunken eyes and usually at least one of the group has stringy clear saliva running from the mouth and some discharge from the nostrils.
- The animals will usually continue to drink even if they do not eat.
- Sometimes clots of blood can be seen in the droppings of affected animals and occasionally strips of the lining of the intestine.
- As the effects progress, the animals collapse from weakness and sometimes show abdominal pain by kicking at their bellies and grunting. At this stage the discharge from the nose becomes blood stained and the animals usually die. This may take from a few days to a fortnight [5].

Post-mortem examination

- Features found can vary tremendously, the main constant characteristic being haemorrhage.
- The findings constant in simple fern poisoning are haemorrhages, usually found on the outside of the heart, occasionally in the kidney but more commonly involving the intestines [6].
- The intestines themselves may be filled with blood clots. Also haemorrhages are seen on the walls of the urinary bladder.
- In advanced cases haemorrhages are also found under the skin.

Treatment

- Until recently no specific treatment was available for affected animals. Sulpha drugs and antibiotics were used to prevent bacterial invasion but recuperation of blood forming tissues could not be stimulated. However, recent English work has shown that a naturally occurring alcohol, di-butyl alcohol, had a specific stimulating effect on bone marrow cells.
- This is now available in a commercial form as a proprietary preparation known as Bractol for intra-muscular injection and Bractol D for intravenous injection. Bractol treatment was used in the Warren and Greenbushes areas in 1962 with excellent results, the cost of one injection (10 ml.) was one pound, which is much lower than the original price [5].
- Generally, provided the animals had not started to show signs of haemorrhage from the nose or other areas something like an 80 per cent, recovery could be expected.
- Antibiotics or Sulpha drugs should be used at the same time. A feature of the treatment was not only the cure of the animals but also the rapidity of response, recovery taking a matter of days rather than weeks.

Prevention

With the break-through in treatment, more emphasis can be placed on preventive

measures.

- Avoiding feeding of bracken fern to animals can be the only preventive measure to prevent the poisoning.
- Checking upon the feed fed to animals if any of the symptoms of bracken fern poisoning is encountered by the farmer.
- Raising awareness among the farmers about the hazardous outcome of feeding bracken fern to animals as forage.

Vaccines

Two types of vaccine are available

- Killed Pasteurella suspension. This type has caused anaphylactic shock type reactions in animals. The number of animals affected has varied from property to property. It is characterised by uneasiness, slobbering, fast breathing, some abdominal pain with paddling which has ended in some animals coughing up froth and finally suffocating. Recommendations for this vaccine are 1 c.c. followed by 3 c.c. a week later.
- Adrenaline treatmen t has helped in most cases, 3 c.c. of 1: 1000 adrenaline into the musclebeing used [7].

- In an attempt to overcome the shock problem another type of vaccine in an oily base is now available. This is intended to give a very slow absorption over a long period of time. However, this type of vaccine is prone to cause a high incidence of cold abscesses even when given intra-muscularly as recommended. This may not be a problem in replacement animals but would interfere with carcase value of animals sold for beef [6].

Conclusion

Bracken Fern contains a bone marrow toxin. This causes a lowered resistance to infection which apparently can be offset to some degree by vaccination. In the final stages, if enough fern is eaten-whether an animal is vaccinated or not-death due to uncomplicated fern poisoning with high fever and hemorrhaging will occur. Butyl alcohol injections plus antibiotics or sulpha drugs have givenvery good results in the treatment of fern poisoning. The danger of bracken fern poisoning may be minimised by cutting down the chances of young animals eating large quantities of young growing fern in a short time. The only final solution is complete eradication of bracken, but with the techniques now available, such as rolling and slashing, care should be taken with handling paddocks which are at the stages where virtually only young fern is present [6].

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