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Popular Article

Diagnosis of Poisoning in Farm Animals

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Introduction

On the farm, keeping animals healthy is a top priority. But sometimes, despite our best efforts, they can fall ill due to poisoning. Farm animals are susceptible to toxins in their environment, feed and water resources. Accidental ingestion of poisonous plants, contaminated feed or chemicals can lead to severe health issues and even death among livestock. Detecting and diagnosing poisoning in farm animals is crucial for prompt treatment and prevention of further outbreaks. In this article, we'll talk about how to diagnose poisoning in farm animals, clinical signs, unusual behavior or changes in appetite and tools and techniques veterinarians use to pinpoint the cause of illness.

Common sources of poisoning: plants, industrial effluents, contaminated water bodies, pesticides

Common signs of poisoning in farm animals:

Gastrointestinal distress: symptoms such as diarrhea, vomiting**,** abdominal pain, decreased appetite are often indicative of poisoning in farm animals

Neurological symptoms: Tremors, seizures, ataxia or disorientation when exposed to certain toxins.

Respiratory distress: poisoning can lead to difficulty in breathing, coughing, or nasal discharge in affected animals.

Sudden death: In severe cases of poisoning, farm animals may succumb to the toxins rapidly

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without exhibiting noticeable signs.

Diagnostic methods to detect farm animal poisoning:

Diagnosis of a poisoning, as with any disease, is based on the history, clinical signs, lesions, laboratory examinations, and in some cases, analytical procedures. The circumstantial evidence is valuable and should be noted, but does not replace a thorough clinical and postmortem (P.M.) examination. History from the animal's owner can stress obvious factors and omit subtle, important details. 'Sudden death' is often actually 'tardy observation'. The concerned data and samples should be submitted to the diagnostic laboratory. A complete history is necessary for developing the scheme of laboratory investigation and may be valuable in case of litigation. The information should be detailed. The exact actions and signs should be described. Examples of concerned information include the following:

a. Number of animals exposed/sick/dead, age, weight, and a chronology of morbidity and mortality.
b. Clinical signs and course of the disease.
c. Any prior disease conditions.
d. Lesions observed at necropsy, with careful examination of ingesta.
e. Response to treatment (medication should be listed to avoid analytic confusion).
f. Related events, e.g., feed change, water source, other medications, feed additives pesticide applications, etc.
g. Description of facilities (a drawing or digital photograph may be helpful), access to refuse, machinery, etc.
h. Recent past locations and when moved.

The diagnostic laboratory should be contacted if there are questions regarding the appropriate sample, amount, or container.

Clinical evaluation:

- **Physical examination:** a thorough examination of animal is conducted to assess vital signs, overall health status, any visible abnormalities. Observations such as abnormal behavior, GIT distress or respiratory difficulties are noted.
- **Clinical signs:** specific signs indicative of poisonings such as convulsions, diarrhea, vomiting, jaundice or cyanosis are carefully observed and documented.

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History taking:

- **Environmental exposure:** detailed information about the animal's recent environment, including access to potential toxins such as chemicals, plants, contaminated water sources or spoiled feed, is gathered.
- **Recent changes:** any recent changes in diet, housing conditions, or management practices are noted, as they may be associated with the poisoning.

Laboratory testing:

- **Blood tests:** blood samples are collected for various tests, including complete blood count (CBC), serum chemistry analysis, and specific toxin screenings. Abnormalities in blood parameters, such as electrolyte imbalances, liver enzyme elevations, or metabolic acidosis, may provide clues to the underlying toxin exposure.
- **Urinalysis:** urine samples may be analyzed for the presence of toxins or abnormal metabolites.
- **Toxin screenings:** depending on the suspected toxin, specific tests may be performed to detect toxins or other metabolites in biological samples (e.g., blood, urine, feces).
- **Necropsy and tissue analysis:** In cases of fatal poisoning, postmortem examination of the animal's body, including tissue sample analysis, can provide valuable information about the cause of death and confirmatory evidence of poisoning.

Plant identification:

- Familiarity with common poisoning plants in that area can aid in early identification of potential toxins in the animal's environment.
- Common poisonous plants include:

Fig. 10: ***Papaver somniferum***

Fig. 11: ***Atropa belladonna***

Fig. 12: ***Nicotiana tabacum***

Fig. 13: ***Cinchona pubescens***

Fig. 14: Strychnine

Fig. 15: ***Strychnos nux-vomica***

Fig. 16: ***Erythroxylum coca***

Fig. 17: ***Piper nigrum***

Fig. 18: ***Ephedra sinica***

Fig. 25: ***Sorghum bicolor***

Fig. 26: ***S. bicolor*** **var.** ***drummondii***

Fig. 27: ***Linum usitatissimum***

Fig. 28: ***Acacia nilotica***

Fig. 29: ***Eucalyptus tereticornis***

Fig. 30: ***Holcus lanatus***

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Fig. 31: ***Prunus avium***

Fig. 32: ***Agrostemma githago***

Fig. 33: ***Phytolacca acinosa***

Fig. 34: ***Brassica campestris***

Fig. 35: ***Digitalis purpurea***

Fig. 36: ***Prunus amygdalus***

Fig. 37: ***Cassava utilissima***

Fig. 38: ***Strophanthus gratus***

Fig. 39: ***Gynocardia odorata***

Fig. 43: Ergot

Fig. 44: ***Melilotus officinalis***

Fig. 45: ***Calotropis gigantea***

Fig. 46: ***Lantana camara***

Fig. 47: ***Datura stramonium***

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Fig. 48: ***Ricinus communis*** **Fig. 49:** ***Nerium odorum*** **Fig. 50:** ***Cerbera thevetia***



Fig. 51: ***Argemone mexicana*** **Fig. 52:** ***Parthenium hysterophorus*** **Fig. 53:** ***Ipomea carnea***

Source: TOXICOLOGY LABORATORY MANUAL (By:Dr.Govind Pandey and Dr.Yash Pal Sahni)

Water testing:

- Regular testing of water sources for contaminants such as heavy metals, pesticides, or microbial pathogens can help prevent waterborne poisoning incidents in farm animals.

Feed analysis:

- Analyzing feed samples for mycotoxins, pesticide residues, or other contaminants is essential for identifying potential sources of poisoning in farm animals.

Training and education:

- Providing training to farm personnel on recognizing signs of poisoning, handling chemicals safely, and implementing emergency response protocols can improve overall preparedness and response to poisoning incidents on the farm.

A few common poisoning cases in farm animals along with their diagnosis:

Lead Poisoning:

Source: Lead can be found in old paint, contaminated soil, discarded batteries, and certain types of feed.

Symptoms: Lead poisoning can cause neurological symptoms such as ataxia, seizures, and blindness, as well as gastrointestinal issues.

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Diagnosis: Blood led levels are measured to confirm lead poisoning. Radiographs may also reveal lead particles in the digestive tract.

Nitrate/Nitrite Poisoning:

Source: High levels of nitrates/nitrites can be found in certain plants (e.g., sorghum, Sudan grass), contaminated water, or fertilizers.

Symptoms: Affected animals may show signs of methemoglobinemia, such as cyanosis (blueish mucous membranes), rapid breathing, and weakness.

Diagnosis: Blood samples are analyzed to measure methemoglobin levels. Testing for nitrate/nitrite level in feed, water, or forages confirms the source of poisoning in animals

Botulism:

Source: Clostridium botulinum bacteria produce toxins in decaying organic matter, contaminated feed, or improperly fermented silage.

Symptoms: Clinical signs include weakness, paralysis, difficulty swallowing, and respiratory distress.

Diagnosis: Clinical symptoms and history of exposure to potential sources of Clostridium botulinum are considered. Testing of feed or biological samples for botulinum toxin confirms diagnosis.

Plant Toxicity (e.g., Oleander):

Source: Plants like oleander contain cardiac glycosides, which are toxic to farm animals if ingested.

Symptoms: Signs may include colic, diarrhea, arrhythmias, and sudden death.

Diagnosis: Identification of plant material in the gastrointestinal tract during necropsy, along with characteristic clinical signs, helps confirm plant toxicity.

Mycotoxin Poisoning:

Source: Fungal toxins produced in moldy feed, hay, or grains (e.g., aflatoxins, fumonisins).

Symptoms: Mycotoxin poisoning can manifest as liver damage, reproductive issues, immunosuppression, and neurological symptoms.

Diagnosis: Analysis of feed samples for mycotoxin contamination and clinical signs in affected animals aid in diagnosis. Blood tests may reveal liver enzyme abnormalities

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Snakebite:

History of Encounter:

Obtain information from the owner or observer regarding the circumstances of the snake bite, including the location, time of occurrence, and any observed characteristics of the snake (e.g., color, size).

Clinical Signs: Assess the animal for signs consistent with snake envenomation, such as localized swelling, puncture wounds, bruising, bleeding from fang marks, pain, lameness, weakness, neurological symptoms (e.g., paralysis, tremors), respiratory distress, or systemic shock.

Progression of Symptoms: Monitor the progression of symptoms over time, as some manifestations of envenomation may develop gradually.

Physical Examination:

Document changes in clinical signs, vital parameters, and Conduct a thorough physical examination to assess vital signs, neurological status, cardiovascular function, respiratory rate, and mucous membrane color.

Evaluate the extent of local tissue damage, including swelling, tissue necrosis, and evidence of compartment syndrome (e.g., pain on palpation, decreased limb mobility).

Laboratory Testing:

Blood Tests: Obtain blood samples for hematological and biochemical analysis, including assessment of coagulation parameters (e.g., prothrombin time, activated partial thromboplastin time), platelet count, creatine kinase, electrolytes, and blood gases. Hematological abnormalities, such as thrombocytopenia or coagulopathy, may indicate systemic effects of envenomation.

Urinalysis: Analyze urine samples for evidence of myoglobinuria, hematuria, or proteinuria, which may indicate muscle damage or renal dysfunction secondary to snake venom toxicity.

Snake Venom Detection: In some cases, venom detection kits or immunoassays may be used to identify the specific type of snake venom involved in the envenomation. Monitor the animal's response to initial supportive care and specific antidote therapy (e.g., laboratory findings over time to assess the efficacy of treatment. (Antivenom administration)

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