LO 3: Identify and handle non-infectious disease of wild animals

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3.1. Identify non Infectious diseases of wild animals

Wildlife disease interest, activity, and reporting have primarily concentrated on parasitology and infectious diseases; disease entities with specific and identifiable etiologies. In the relatively new field of wildlife diseases this is understandable, and is based upon modern trends in human and veterinary medicine. With the discovery of pathogenic agents in the 19th century, a narrowing of the definition of disease from the time of Hippocrates was embraced. Hippocrates defined disease as disharmony within the body, between the body and mind, and between man and animal and the environment. The 20th century redefinition espoused that disease resulted from a collision between a pathogenic agent and a susceptible individual.

A. Allergies

Animal allergies are common, particularly in people who have other allergies or asthma. People may have an allergy to any animal, especially those with fur or feathers. However, most animal allergies result from a person coming into contact with cats and dogs. People with animal allergies usually react to harmless proteins that are present in an animal's:

- dander
- saliva
- urine
- feces

Dander is tiny flakes of dead skin cells in an animal's fur, hair, or feathers that may induce allergy. Like cats and dogs, smaller mammals, such as ***rats, guinea pigs, hamsters, rabbits, and birds,*** also shed dander. Allergens are substances that cause an allergic reaction. Pet hair itself is not an allergen. However, it may collect dander, saliva, and urine and carry other allergens, such as pollen or dust. ***Animals without fur,*** such as reptiles, amphibians, and fish, do not shed dander and have less chance of

triggering an allergic reaction. The number of people with animal allergies is increasing, and so is ownership of pets.

Causes

- When an allergen, such as animal skin flakes, pollen, or mold, causes inflammation inside the nose, allergic rhinitis occurs.
- Allergic rhinitis happens when the immune system mistakenly identifies a harmless allergen, such as a specific animal protein, as a threat. People with allergies to animal proteins inhale them or have them touch their skin, the immune system may trigger a reaction.
- The immune system responds to an allergen by releasing histamine. Histamine is a chemical in the body that causes the nose, throat, and skin symptoms that people associate with an allergic reaction.
- Antihistamines, such as Benadryl and Zyrtec, are medications that may help alleviate allergy symptoms.
- Some people with animal allergies may experience allergic contact dermatitis. This type of dermatitis occurs when an allergen contacts the skin and causes an allergic reaction.
- Proteins from animals may become airborne on microscopic particles. Dander may remain airborne for long periods or collect on furniture or clothing.
- Animal saliva may stick to furniture, clothing, and carpets and become airborne once dry.

Symptoms

Animal allergies produce an inflammatory response in the nasal passages, lungs, or skin. Nasal passage and lung symptoms of an animal allergy may include:

- itchy nose, eyes, roof of the mouth, or throat
- runny nose
- stuffy nose
- sneezing
- red or watery eyes
- blue-tinted skin under the eyes
- difficulty breathing

- wheezing when exhaling
- interrupted sleep due to shortness of breath

Skin symptoms of an animal allergy may include:

- raised red patches, or hives
- itchy skin
- eczema
- a burning sensation
- swelling or tenderness

Treatment and management

Managing an animal allergy involves avoiding the allergy-causing animal whenever possible. Minimizing exposure to the animal may help reduce allergic reactions and their severity. To help control symptoms, a doctor may recommend medications, such as:

- **Antihistamines:** These may reduce the amount of histamine causing an allergic reaction and alleviate itching, runny nose, and sneezing.
- **Corticosteroids:** These steroid nasal sprays may reduce inflammation and ease sneezing and a runny or stuffy nose.
- **Decongestants:** These lessen swelling in the nasal passages, which makes breathing through the nose easier.
- **Leukotriene modifiers:** A doctor may prescribe these when antihistamines and corticosteroids are not a suitable option. They block the actions of certain chemicals the body releases, and they reduce inflammation and nasal congestion.
- **Immunotherapy:** This involves exposure to incremental increases of an allergen, which may reduce sensitivity to the substance over time.

Prevention and control methods

It can be challenging to eliminate exposure to animal allergens, particularly if the animal is a pet or the person works with animals. People may also encounter animal allergens that other people carry around on their clothing. The following suggestions may help reduce exposure to animal allergens:

- **Create a pet-free zone:** Making chosen areas of the house pet-free can help lessen allergens in those areas.

- **Remove furnishings that attract dander:** Pet dander collects on carpets, curtains, and horizontal blinds. If possible, replace carpet with tile, vinyl flooring, or wood that cleans easily.
- **Clean the carpet frequently:** Choosing carpets with a low pile and regularly steam cleaning them may help reduce pet dander in the room.
- **Wash pets frequently:** Washing a pet every week may decrease airborne allergens.
- **Ask for help:** Ask someone without a pet allergy to clean the pet's bedding, cage, or litter tray. The helper could also brush the pet outside to remove some dander.
- **Change clothing:** After spending long periods with a pet, change clothing to reduce allergen exposure.
- **Try high-efficiency filters:** High-efficiency particulate air purifiers may decrease the amount of airborne allergens.

B. Chemical toxicities

C. Genetic

D. Metabolic and Nutritional Diseases in Wild Animals

Metabolic Diseases mean the diseases that occur due to the "imbalance between the rate of 'input' of dietary nutrients and the 'output' of products (product like new born, milk for young one etc.) and lead to the occurrence of metabolic derangements in the affected wild animal species.

E. Nutritional and starvation

Description

Malnutrition (poor or inadequate nourishment) and its negative consequence starvation are the most prevalent disease syndromes in freeroaming mammal populations. **Starvation** is a **severe deficiency in caloric energy intake**, below the level needed to maintain an organism's life. Both can occur at any time of year.

Causes (Etiology)

- Injuries
- Poor Teeth
- Parasitism
- Disease
- Foreign Bodies In The Digestive Tract
- Tumors
- An increased motility of the digestive tract
- Inadequate in one or more of the required nutrients

- Winter is when mortality usually occurs due to the negative energy balance brought about by the cold weather, deep snow, increased energy demands, snow covered food, and human and predator induced stress.
- Winter season, scarcity as result of land cultivation or vegetation. E.g. ungulates and other herbivores
- Developed experience greater food storage behaviours. For example, wolves (Canis lupus) on the Kenai Peninsula depend primarily on moose (Alces alces) for food, and are aided in their predation by deep crusted snow and peak pack organization. During summer the pack is less organized (whelping and pup raising) and of course there is no snow. Weight, general condition, and blood parameters in summer are lower than in winter from Kenai Peninsula wolves (Paterson and Franzmann, unpub).

Clinical signs

- Eliminates the young, old, weak, and sick animals by eating or starving those milkers
- Mass death
- Clinically, **mammals** suffering from malnutrition or starvation are lethargic, unsteady, listless, and unafraid of humans.
- The skin may appear loose, the hair coat erect, dull, and rough and the body more angular
- The animal may have a humped or sagged back, a swollen appearing face, sunken eyes, and a small tucked up abdomen.
- Due to atrophy (shrinkage) of the muscles, there is usually an increased prominence of the bones of the shoulders, ribs, vertebrate, and pelvis.
- The muscles appear more prominent, but usually do not appear full, and consequently a definite demarcation may be seen between the neck and shoulders and the upper forelegs and chest.
- Clinical signs of an avian species dying from malnutrition or starvation are ***listlessness, unsteady locomotion, ruffled feathers, and a lack of fear of humans.***

Pathology

Pathological changes which occur in a starved animal are many and varied. The most striking gross change is:

- A ***lack of fat*** in the subcutaneous, visceral, and bone marrow locations, and atrophic changes which occur in the musculature.
- ***Serous atrophy***, a reddish gelatinous appearance to the fat tissue.
- The organs of the ***body decrease in size and weight***.
- The ***digestive tract*** of most species is empty and/or shrunken with dark green bile staining of the lining and contents.
- The ***stomachs of ruminant*** species usually contain food, but the contents are often dry and of poor quality.
- The **rumen lining** may be ulcerated, have erosions present and shrunken villi.
- The ***femur marrow***, due to a lack of fat present, will be red or yellow in color, transparent, and gelatinous in a starved animal.
- ***Avian starvation and malnutrition*** pathological changes:

- ✓ Severe weight loss (up to 50%)
- ✓ Absence of fat deposits and atrophy of the musculature, with breast muscle atrophy being the most noticeable.
- ✓ The digestive tract is shrunken and/or empty with dark green stained linings, and there is a marked increase in the size (possibly 2 to 3 times normal) of the gall bladder due to an accumulation of bile.
- ✓ Increase the susceptibility of the bird to parasitic infection (lice and other end parasites are more common), and may result in the drawing of contaminants from the fat deposits being used, thereby resulting in the circulating and redistribution of these compounds.
- ✓ Chronic infections of aspergillosis and lead poisoning are highly developed.

Diagnosis

Starvation can be diagnosed either by field techniques through gross examination, or by laboratory analyses. To grossly diagnose starvation, the overall physical condition of the animal must be determined by examining for the presence or lack of adipose tissue (fat deposits) in the various subcutaneous and visceral locations. In ruminants, the femoral or mandibular bone marrow fat can be examined, and the percentage of fat present estimated visually. Some care must be taken when examining the femur marrow as it is used for fat storage in adult animals but serves as a production area for red blood cells rather than fat storage in young animals. Laboratory methods that are used nationwide are varied. There is a femur marrow compression method, ether-extract method, kidney fat index, and wet weight-dry weight method. We have used the latter 3 methods for determining physical condition of the various mammals we examine. Blood parameters provide little information that can't be gained from gross examination of the carcass. Gross examination of birds dying from malnutrition or starvation is sufficient for a diagnosis providing other disease entities are investigated and ruled out.

Prevention

Supplemental feeding of starving wildlife is an alternative to allowing wildlife species to die. This, however, involves a philosophical question of maintaining wildlife populations at a level

above their normal carrying capacity, interfering with nature's checks and balances on populations and encouraging transmission of diseases (bovine tuberculosis). It may also be cost prohibitive. If a feeding program is to be used to maintain a high plane of nutrition it needs to be started early in the winter, continued throughout, and a surplus of food must be provided. If food is not provided (especially in ruminants) until malnutrition is in its advanced stages, the animal will probably die anyway. This is because once food is made available, the ruminant must be able to live in a negative energy balance for up to 2 weeks, before its digestive tract can adjust to the new diet and change to a positive energy balance. Generally, starved ruminants do not eat large quantities of food when sudden access to unlimited food occurs. However, due to an altered microbial population in the stomachs, it is possible to observe mortality in deer when shelled corn is overeaten. The reason for this is that lactic acid from the fermentation of starch accumulates to toxic levels. High quality palatable feed is essential in a feeding program: feed which contains readily available carbohydrates, roughage, minerals, and vitamins. Pelleted formulated feeds are the best ration that can be provided for ruminants. Elk can survive on high quality second or third cutting alfalfa, but deer have greater difficulty in obtaining adequate energy from roughages like this that are high in fiber. If baled hay is all that is provided for deer, it must be high quality alfalfa fed at a level where the deer do not have to consume anything but the leaves and small stems.

Supplemental feeding of birds is usually only done for songbirds but does occur with waterfowl species and turkeys under certain circumstances. The feeding of waterfowl during the winter may encourage alterations of normal migration patterns and possibly be of disease importance. Avian species respond faster to the providing of food once physical condition has been affected. Consequently, if the necessity arises, supplemental feeding can be started at anytime and probably be successful.

Post Mortem signs

Fat deposition in most ungulates first disappear over the rump, chronologically followed by the disappearance of subcutaneous fat, kidney and mesenteric fat and pericardia] fat (Harris 1945). The last fat deposits to disappear are those of bone marrow (Cheatum 1949), and consequently measuring this fat reserve has been utilized to reveal condition of ungulates (Anderson et al. 1972, Franzmann and Arneson 1976, Greer 1968). Other indices of carcass fat such as bled

carcass weight, eviscerated carcass weight, kidney fat index, carcass density, percentage of carcass fat, and depth of back fat have been used to evaluate ungulate body conditions (Anderson et al. 1972). Elk (Cervus elaphus) were considered in excellent condition with femur marrow fat of 80% or more and in poor condition below 20% (Greer 1969). Femur marrow fat values below 10% dry weight may reliably identify moose that have starved (Franzmann and Arneson 1976). Fat deposits can be used as a direct measure of an animal's condition by reflecting its physiological adjustment to the environment (Riney 1955).

Post mortem examination of the quantity and quality of stomach, rumen, or digestive tract contents may assist in assessing potential malnutrition. Skeletal ratios were used to reflect range related growth differences in black-tailed deer (Odocoileus hemionus) (Klein 1964). Histopathological changes in starved Wisconsin white-tailed deer were described as; abundant hemosiderin in the spleen, decreased fat in marrow, a reduction in number and size of follicles in the spleen and fatty degeneration of the heart (Rausch 1950). Signs and causes of neonatal starvation were reported for white tailed deer (Cook et al. 1971, Verme 1962) and elk (Cowan 1950).

F. Neoplastic

G. Physical traumas

3.2. Identifying prescribed treatments for the diseases and their usage protocol

3.2. Identifying and outlining diseases prevention and control methods

3.4. Identifying and advising economic importance of the diseases