



Tikrit University
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Diseases of skin diseases

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Lecturers link

Diseases of the Skin

Introduction

- The major functions of the skin are:
 - Maintaining a normal body temperature.
 - Maintaining a normal fluid and electrolyte balance within the animal.
 - Creating a mechanical barrier to protect the body from noxious agents and organisms.
- The major effects of skin diseases in large animals are esthetic and economic but can be considered an animal welfare concern. (e.g., discomfort and scratching interfere with normal rest and feeding.)
- Diseases of the skin may be primary or secondary in origin.
 - In primary disease, lesions are restricted initially to the skin (may spread to other organs).
 - In secondary lesions, the disease is originated in other organs.

Manifestations of Skin Disease

- Lesions: discrete or diffuse.
- Abnormal coloration: jaundice, pallor, erythema, or blue (e.g., gangrenous mastitis).
- Pruritus or itching: the sensation that gives rise to scratching.
- Increased or decreased sweating: (e.g., generalized anhidrosis in horses and occasionally in cattle.)
- Alopecia: deficiency of hair or wool.

Principles of Treatment of Diseases of the Skin

- Accurate diagnosis of the condition and the identification of underlying cause must precede the selection of any topical or systemic treatment.
- Primary Treatment
 - Hair coat and debris on and around the affected area must be removed to enable topical applications to come into direct contact with the affected skin.
 - Specific skin diseases caused by bacteria, fungi, and metazoan parasites are treatable with the appropriate specific remedy.
- Supportive Treatment
 - Prevention of secondary infection due to damage from scratching.
 - Reduction of central perception of itch sensations (by sedative or narcotic medications).
 - Losses of fluid and electrolytes should be compensated by oral or parenteral fluids therapy.
 - Ensure an adequate dietary intake of protein, particularly sulfur-containing amino acids, to facilitate the repair of skin tissues.
- It is important to prevent the absorption of toxic products during application of absorptive dressings.

Pityriasis

- Pityriasis scales are accumulations of keratinized epithelial cells, sometimes softened and made greasy by the exudation of serum or sebum.
 - When the overproduction occurs, it begins around the orifices of the hair follicles and spreads to the surrounding stratum corneum.

- o Pityriasis is identified by the absence of parasites and fungi in skin scrapings.
- Primary pityriasis
 - o Characterized by excessive bran-like scales on the skin and is caused by overproduction of keratinized epithelial cells.
 - o The scales are superficial, accumulate where the coat is long, and associated with a dry, lusterless coat.
 - o Itching or other skin lesions are not features.
 - o The etiology is uncertain. It can be causative or predisposing factors to:
 - ♣ Hypovitaminosis A.
 - ♣ Nutritional deficiency of B vitamins.
 - ♣ Poisoning by iodine.
 - o The diagnosis is based on clinical presentation
- Secondary pityriasis
 - o Characterized by excessive desquamation of epithelial cells.
 - o It is usually accompanied by the lesions of the primary disease.
 - o It is usually associated with the following:
 - ♣ Scratching in flea, louse, and mange infestations.
 - ♣ Keratolytic infection (e.g., with ringworm fungus).
 - Treatment
 - o Primary treatment: correction of the primary cause.
 - o Supportive treatment: thorough washing, followed by alternating applications of emollient ointment and an alcoholic lotion.

Hyperkeratosis

- Epithelial cells accumulate on the skin as a result of excessive keratinization of epithelial cells.
- The skin is dry, scaly, thicker than normal, usually corrugated, hairless.
- Local hyperkeratosis may be caused by the following:
 - o Mechanical stress on pressure points (e.g., elbows, hocks, or brisket) when animals lie habitually on hard surfaces.
 - o Mechanical and/or chemical stress (e.g., teat-end keratosis of dairy cows that can be caused by improper milking machine settings).
 - o Parasitism (e.g., hyperkeratotic form of sarcoptes mange of small ruminants).
- Generalized hyperkeratosis may be caused by the following:
 - o Poisoning with highly chlorinated naphthalene compounds.
 - o Chronic arsenic poisoning.
 - o Infection with *Scopulariopsis brevicaulis*, a fungus reported in calf and goat kid.

Parakeratosis

- It is a skin condition characterized by incomplete keratinization of epithelial cells.
- Initially the skin is reddened, followed by thickening and gray discoloration.
- Large, soft scales accumulate, are often held in place by hairs, and usually crack and fissure; their removal leaves a raw, red surface.
- The lesions may be extensive and diffuse but are often confined to the flexor aspects of

joint

- Causes can be:
 - o Nonspecific chronic inflammation of cellular epidermis.
 - o Dietary deficiency of zinc.
 - o Part of an inherited disease.
- Differential Diagnosis
 - o Hyperkeratosis.
 - o Pachyderma.
 - o Ringworm.
 - o Sarcoptic mange.
- Treatment
 - o Primary treatment: correction of any nutritional deficiency (specifically, zinc).
 - o Supportive treatment:
 - ♣ Removal of the crusts by the use of keratolytic agent (e.g., salicylic acid ointment) or by vigorous scrubbing with soapy water.
 - ♣ Followed by application of an astringent, which must be applied frequently and for some time after the lesions have disappeared.

Impetigo

- Impetigo is a superficial eruption of thin walled, small vesicles, surrounded by a zone of erythema, that develop into pustules, then rupture to form scabs.
- Two specific examples of impetigo in large animals:
 - o Udder impetigo (udder acne) of cows
 - o Contagious impetigo: known as exudative epidermitis.
- Confirmation of the diagnosis is by isolation of staphylococci from vesicular fluid.
- Differential Diagnosis
 - o Cowpox/buffalopox.
 - o Pseudocowpox.
 - o Ringworm
- Treatment
 - o Primary treatment with antibiotic topically.
 - o Supportive treatment to prevent the occurrence of secondary lesions and spread of the disease to other animals.
 - ♣ Twice-daily bathing with an efficient germicidal skin wash is usually adequate.

Urticaria

- Topical dermal edema apparent as cutaneous wheals.
- Horses are the most commonly affected species.
- Urticaria can occur as localized allergic reaction only affecting parts of the skin or as part of a more severe systemic allergic reaction.
- Primary urticaria can be caused by:

- o Insect stings
- o Contact with stinging plants
- o Ingestion of unusual food, with the allergen
- o Administration of a particular drug
- o Allergic reaction in cattle following vaccination for foot-and-mouth disease
- o Infection—parasitic, bacterial, fungal, viral.
- Secondary urticaria occurs as part of a syndrome, such as respiratory tract infections in horses, including strangles and the upper respiratory tract viral infections.
- Treatment
 - o Primary Treatment: Spontaneous recovery is common in acute
 - ♣ In chronic or recurrent cases:
 - ♣ Identification and removal of the allergen
 - ♣ A change of diet and environment.
 - o Supportive Treatment
 - ♣ Corticosteroids, antihistamines, or epinephrine
 - ♣ Local application of cooling astringent lotions such as calamine or white lotion or a dilute solution of sodium bicarbonate.

Dermatitis and Dermatoses

- Etiology: any disease of skin, including those characterized by inflammation.
 - o All pathogens, infectious, chemical, physical, allergic, autoimmune.
- Epidemiology: Sporadic or outbreak; acute or chronic course.
- Pathogenesis:
 - o Dermatitis is an inflammation of the deeper layers of the skin involving the blood vessels and lymphatics.
 - o In all cases, there is increased thickness and increased temperature of the part.
 - o Pain or pruritus is present, and erythema is evident in unpigmented skin.
 - o Histologically there is vasodilatation and infiltration with leukocytes and cellular necrosis.
 - o The changes are much less marked in chronic dermatitis.
- Clinical signs: primarily localized to skin, including lesions varying from parakeratosis and pachyderma to weeping, through necrosis, vesicles, and edema.
- Treatment:
 - o Primary treatment is removal of the causative agent.
 - o Supportive treatment includes treatment for pruritus, secondary infection, fluid and electrolyte loss.

Photosensitization

- Etiology: accumulation of photosensitizing substances (PSs) in the skin, resulting in the local irritation of unprotected, unpigmented skin after exposure to sunlight.
 - o Four types of photosensitization are differentiated based on the underlying etiology:
 - ♣ Type I, or primary, caused by intake of primary PS.
 - ♣ Type II, as a result of inherited defects of porphyrin metabolism.
 - ♣ Type III, or hepatogenous, as a result of liver damage.

♣ Type IV, or idiopathic, as a result of undetermined etiology.

- Pathogenesis

- o Penetration of light rays to sensitized tissues causes local cell death and tissue edema.
- o Irritation is intense because of the edema of the lower skin level.
- o Hepatogenous photosensitization involves production of a toxin, by a higher plant, fungus that causes liver damage or dysfunction, resulting in the retention of the photosensitizing agent phyloerythrin.

- Clinical signs:

- o Primary cases have cutaneous signs only (erythema, edema, necrosis, gangrene of light-colored skin or mucosae exposed to sunlight).
- o Secondary cases have also signs of hepatic dysfunction (jaundice).

- Treatment:

- o Primary: remove from exposure to sunlight and PS.
- o Supportive: treat for infection, shock, toxemia.

Alopecia and Hypotrichosis

- Alopecia and hypotrichosis: lack of hair in any quantity on a normally haired body surface.

- o Alopecia: hair loss of a skin surface with previously normal hair growth.
- o Hypotrichosis: no hair growth or abnormally low hair growth in the first place.

- Etiology

- o Failure of follicles to develop (e.g., congenital hypotrichosis)
- o Failure of the follicle to produce a fiber (e.g., congenital hypotrichosis, follicle infection).
- o Loss of follicles (e.g., scarring after deep skin wounds that destroy follicles).
- o Loss of preformed fibers (e.g., ringworm, malnutrition or severe illness)

- Pathogenesis

- o Inflammation or mechanical trauma results in disturbed or interrupted synthesis in the hair bulb and ensuing shedding or fracture of hairs.
- o Cytotoxic agents can cause cytoplasmic degeneration in some of the germinative cells of the bulb of the wool follicle.
- o Alopecia can be associated with damage to growing hair mediated by T lymphocytes.

- Diagnostic confirmation

- o Visual recognition.
- o The diagnostic problem is to determine the primary cause of the hair or fiber loss.

- Treatment

- o Remove causes of trauma or other damage to fibers.

Seborrhea

- Etiology

- o The etiology is still not understood.
- o Historically, seborrhea is excessive secretion of sebum onto the skin surface.
- o More recently, disease of abnormal cornification and keratinization of the skin.
- o In large animals it is always secondary to dermatitis or other skin irritations that result in excessive crusting, scaling, or oiliness, such as the following:

- o Greasy heel of horses, including infection with *Staph hyicus*.

- o Greasy heel of cattle.
- o Flexural seborrhea of cattle.
- Clinical Findings
 - o In primary seborrhea there are no lesions, only excessive greasiness of the skin.
 - o The sebum may be spread over the body surface like a film of oil or be dried into crusts, which can be removed easily.
 - o Flexural seborrhea
 - o Most common in young periparturient dairy cows.
 - o Severe inflammation and a profuse outpouring of sebum appear in the groin between the udder and the medial surface of the thigh.
 - o Extensive skin necrosis causing a pronounced odor of decay.
 - o Irritation may cause lameness, and the cow may attempt to lick the part.
 - o Greasy heel of cows:
 - o Grazing constantly irrigated, wet pastures or in very muddy conditions.
 - o Local swelling, with deep fissuring of the skin
 - o Outpouring of vile-smelling exudate on the back of the pastern.
 - o Affected animals are badly lame, and their milk yield declines sharply.
 - o Moving the cows to dry land and treating systemically with a broad spectrum antibiotic lead to a rapid recovery.
 - o Greasy Heel of Horses (Scratches):
 - o Horses stand continuously in wet, unsanitary stables.
 - o Secondary infections associated with either Staph aureus and Dermatophilus congolensis.
 - o Lameness and soreness to touch.
 - o The skin is thick and greasy.
- Treatment
 - o In secondary seborrhea: treat the primary cause.
 - o Topical and symptomatic treatment of the affected skin relief and assist in control of the disease.
 - o In severe cases associated with pyoderma or even skin necrosis:
 - ♣ Local and systemic broad-spectrum antibiotics.

Folliculitis

- Etiology
 - o Infection of hair follicles by suppurative organisms (often staphylococci).
 - o Secondary to follicular trauma.
 - o Obstruction of sebaceous gland ducts.
 - o Result of an autoimmune reaction (rare).
- Identifiable forms of folliculitis are:
 - o Staphylococcal dermatitis of horses.
 - o Contagious acne of horses.
 - o Benign facial folliculitis of sucking lambs.
 - o Staphylococcal folliculitis of goats.
 - o Bovine sterile eosinophilic folliculitis.
- Pathogenesis
 - o Inflammatory cells infiltrate the walls and lumen of hair follicles.

- ♣ In more extensive inflammation, neutrophils may also infiltrate perifollicular tissue, resulting in formation of larger abscesses (furunculosis).
- o Increased pressure and tissue lysis will result in a rupture of the hair follicle with an ensuing granulomatous dermal reaction.
- Clinical Findings
 - o Early stages present as papules or pustules with hairs emerging through the lesions.
 - ♣ Pustule rupture leads to contamination of the surrounding skin and development of further lesions, such as ulcerations and draining tracts.
 - o Focal crusting and alopecia and pruritus may develop.
 - o Severe cases can be associated with pain, pyrexia, and feed-intake depression.
- Diagnostic confirmation: biopsy specimen.
- Differential Diagnosis
 - o Udder impetigo of cattle: lesions do not involve hair follicles in the first place.
 - o Viral infections: e.g., bovine parapox virus, cowpox, buffalopox, bluetongue virus, vesicular stomatitis, foot-and-mouth disease, ecthyma (orf)
 - o Facial eczema of sheep: caused by hepatogenous photosensitization
- Treatment
 - o Identifying and eliminating possible primary causes.
 - o Topical treatment:
 - ♣ Clipping and cleaning the skin.
 - ♣ Washing followed by a disinfectant rinse (e.g., chlorhexidine-based products).
 - ♣ Antibacterial ointments or lotions.
 - o If the lesions are extensive, the parenteral administration of antibiotics is recommended.
 - o The course of treatment should last 1 week
 - o In chronic cases this may need to be at least 1 month; a broad-spectrum preparation.
 - o Supportive treatment:
 - ♣ Infected animals should be isolated.
 - ♣ Grooming tools and blankets disinfected.

Subcutaneous Edema (Anasarca)

- Extensive accumulation of edema fluid in the subcutaneous tissue
- Etiology
 - o Increased Hydrostatic Pressure
 - ♣ Congestive heart failure
 - ♣ Vascular compression by a mass (e.g., lymphosarcoma, large hematoma)
 - ♣ Vascular obstruction of blood vessels or lymphatic vessels (e.g., thrombosis)
 - o Hypoproteinemic (Hypoosmotic) Edema
 - ♣ Reduced albumin production in the liver associated with chronic inflammation or liver insufficiency (e.g., fascioliasis or liver cirrhosis)
 - ♣ Proteins in the blood tend to pull water into blood vessels. When the level of protein in the blood is low, water may leave blood vessels and collect in the tissues.
 - ♣ Nephrotic syndrome with protein loss into urine (e.g., renal amyloidosis in cattle)

- ♣ Protein-losing enteropathy (e.g., intestinal nematodiasis or paratuberculosis in cattle)
 - o Increased Blood Vessel Permeability
- ♣ Inflammation (e.g., equine infectious anemia, bacterial infections by *Clostridium* spp.)
- ♣ Allergic reaction (e.g., purpura hemorrhagica of horses, insect stings)
 - o Fetal Anasarca: e.g.: congenital absence of lymph nodes and some lymph channels causes edema to be present at birth.

- Clinical Findings

- o Visible swelling (local or diffuse).
- o The skin is puffy and pits on pressure.
- o No pain, unless inflammation is present.
- o In large animals the edema is usually confined to the ventral aspects of the head, neck, and trunk and is seldom seen on the limbs.

- Treatment

- o Primary treatment: correction of the primary causal abnormality.
- o Supportive treatment: depend on the primary cause.
- ♣ Anti-inflammatory or diuretic therapy in cases of inflammatory or allergic edema.

Angioedema (Angioneurotic Edema)

- Transient localized subcutaneous edema as a result of an allergic reaction and caused by endogenous and exogenous.
 - o Angioedema occurs most frequently in cattle and horses on pasture, especially during the period when the pasture is in flower.
 - o Angioedema can also occur as adverse reaction to parenteral administration of certain antibiotics, vaccines, blood, plasma, or other IV fluids.
- Most cases appear to be associated with a type I or type III hypersensitivity reaction.
- Clinical Findings
 - o Local lesions: affect the head, with diffuse edema of the muzzle, eyelids, conjunctiva, and cheeks.
 - o Perineal involvement: includes vulvar swelling, perianal skin, and sometimes the skin of the udder.
 - o Systemic signs: rare cases.
- Treatment
 - o Vascular lesion is always administered even though spontaneous recovery is the rule.
 - o In acute cases with suspected anaphylaxis, epinephrine should be administered parenterally.
 - o For subacute cases, corticosteroids or other antiinflammatories are preferred over antihistamines.

Subcutaneous Emphysema

- Free gas in the subcutaneous tissue, occurs when air or gas accumulates in the subcutaneous tissue.
- Etiology
 - o Air entering through a cutaneous wound made surgically or accidentally.
 - o Extension from pulmonary emphysema.
 - o Air entering tissues through a discontinuity in the respiratory tract lining (e.g., in fracture of nasal bones; trauma to pharyngeal, laryngeal, and tracheal mucosa, or lung puncture by a

fractured rib).

- o Extension from vaginal lacerations in cattle, particularly in cattle following dystocia.
- o Gases migrating from abdominal surgery.
- o Gas gangrene infection (Clostridial infection).

- Clinical Findings

- o Visible subcutaneous swellings.
- o In gas gangrene, discoloration, coldness, and oozing of serum.
- o Affected areas of skin are moderately painful to touch.

- Treatment

- o Primary treatment: address the source of the air (may be impossible to locate or to close).
- o Supportive treatment: only necessary in the extremely rare case where emphysema is extensive
- o Gas gangrene requires immediate and drastic treatment with antibiotics.

Hematoma

- Hematoma: extravasation of whole blood into the subcutaneous tissues.

- Etiology

- o Traumatic rupture of large blood vessel.
- o Purpura hemorrhagica in horses.
- o Systemic disease associated with disseminated intravascular coagulopathy (DIC).
- o Inherited hemophilia.

- Pathogenesis

- o Leakage of blood from the vascular system can cause local swellings, which interfere with normal bodily functions.

- Clinical Findings

- o Subcutaneous swellings (there may be no evidence of trauma).
- o Visual examination of a needle aspirate confirms the existence of subcutaneous hemorrhage.

- Treatment

- o Primary Treatment: removal or correction of the cause.
- o Supportive Treatment:
 - ♣ The hematoma should not be opened until clotting is completed.
 - ♣ Parenteral injection of coagulants if the hemorrhages are recent and severe.
 - ♣ If blood loss is severe, blood transfusions may be required.

Lymphangitis

- Inflammation and enlargement of the lymph vessels and is usually associated with lymphadenitis.

- Etiology

- o Local skin infection with subsequent spread to the lymphatic system. Common causes are:
Cattle • Bovine farcy caused by *Mycobacterium* spp.

- Cutaneous tuberculosis associated with atypical mycobacteria.

Horse • Epizootic lymphangitis (equine histoplasmosis): *Histoplasma capsulatum*.

- Ulcerative lymphangitis: *Corynebacterium pseudotuberculosis*

- Glanders (farcy) caused by *Burkholderia mallei*
- In foals, ulcerative lymphangitis: *Streptococcus zooepidemicus*.
- Pathogenesis
 - o Spread of infection along the lymphatic vessels cause chronic inflammation and thickening of the vessel walls.
 - o Abscesses often develop, with discharge to the skin surface through sinuses.
- Clinical Findings
 - o An indolent ulcer usually exists at the original site of infection.
 - o Local edema may result from lymphatic obstruction.
 - o In chronic cases: fibrous tissue in the subcutis, and chronic thickening of the skin.
 - o The medial surface of the hind limb is the most frequent site, particularly in horses.
- Treatment
 - o Primary treatment: surgical excision or specific antibiotic therapy.
 - o Supportive treatment: removal of fluid and inflammatory exudate and relief of pain.

Necrosis and Gangrene

- Necrosis is tissue death, while gangrene is sloughing of dead tissue.
- Types of gangrene:
 1. Dry gangrene • Primarily caused by arterial occlusion resulting in tissue ischemia.
 - Affected tissue appears dry and shrunken, with dark discoloration and a clear demarcation line from healthy tissue.
 - There is no bacterial infection or putrefaction because bacteria fail to survive in the desiccated tissue.
 2. Wet gangrene • Most common after sudden blockage of venous blood flow resulting in ischemia.
 - Tissue trauma (e.g., from mechanical trauma or burns) and ischemia result in release of tissue water and give the affected area a moist and swollen appearance.
 - Because the moist and protein-rich tissue facilitates bacterial growth, infection with saprogenic microorganisms is common.
 - This infection results in the putrid and rotten aspect and odor of the tissue and may cause septicemia.
 3. Gas gangrene • Caused by *C. perfringens* (Malignant Edema).
 - Pathogenesis
 - o The basic cause of gangrene is interference with local blood supply by external pressure due to severe swelling of the skin.
 - Clinical Findings
 1. Dry gangrene • The area is cold and sunken with red–brown discoloration and without offensive odor.
 - Sloughing of dry tissue may take a long time, and the underlying surface usually consists of granulation tissue.
 2. Wet gangrene • The initial lesion is moist and oozing.

- The affected area is swollen, raised, discolored, and cold.
- The affected skin may slough before it dries, the underlying surface is raw and weeping.
- Because wet gangrene is in most cases accompanied by, affected tissue often has a putrid and rotten aspect and odor.
- Treatment
 - o Primary treatment: removal of the etiology.
 - o Supportive treatment:
 - ♣ Application of astringent and antibacterial ointments (wet gangrene).
 - ♣ In severe cases, amputation of affected body parts may be required.
 - ♣ Systemic antibiotics do not reach gangrenous tissue but are indicated whenever septicemia is suspected.