

Skin - Pathology

ABNORMALITIES OF HAIR

Hypotrichosis

- Presence of less hair is called hypotrichosis

Apennosis

- Congenital lack of feathers (local or general) in fowls is called apennosis

Defluxion/Effluvium

- Shedding of hair is called defluxion/effluvium

Alopecia

- Loss or lack of hair, wool, or feather is called alopecia
- *Etiology*
 - Ageing: Falling of old hairs and further growth does not occur
 - Nutritional: Deficiency of Vitamin- A, biotin, zinc and fatty acid deficiency
 - Pathological: Dermatitis, eczema and mange

Dry Lusterless Hair

- *Etiology*
 - Nutritional: Fatty acid deficiency
 - Minerals-Deficiency of Zn

Greying of hairs

- Nutritional deficiency of copper

Rough hair

- Roughness of hair may be seen in fatty acid deficiency

Breakage of hairs / fibres

- Here the hair shaft is weak and easily breaks
- *Etiology*
 - Chemicals Poisoning: Chronic poisoning with thallium
 - Nutritional: Feeding excessive palm oil, soy oil, whale oil as milk replacers

ALTERATION IN THE SKIN SURFACE

Seborrhea

- Increased secretion of sebum leading to greasy skin and hair



Ichthyosis

- Scaly skin is called ichthyosis
- (The skin is scaly normally in fishes and reptiles)



DRIED MATERIALS ON THE SKIN

Scales

- Bran like grayish thin flakes on the skin is called scales

May be seen in

- Dandruff
- Chronic dermatitis
- Fine scaling occurs in fatty acid deficiency

Dandruff / Pityriasis

- presence of excessive scales on the skin

Crust (Coagulated exudate)

- Crust is a material formed by drying of exudates or secretions on the surface of skin

Comedo

- Comedo is a plug of keratin and dried sebum in a hair follicle

Erosion / Excoriation

- Partial or complete loss of superficial epithelium

Ulcer

- Break in the continuity of epidermis exposing the underlying dermis. It is deeper than erosion.

Fissure / Rhagade

- Deep linear defect in the epidermis often extending into the dermis
- Occur in the dry crusty skin in which elasticity is lost

Etiology

- Cracking of soles occurs in pigs due to biotin deficiency
- Cracking of thickened skin occurs in vitamin –C deficiency in calves

Acanthosis

- Diffuse epidermal hyperplasia (thickening of the skin).
- It implies increased thickness of the Malpighian layer (stratum basale and stratum spinosum).



Epidermolysis

- Separation of epidermis and dermis

Hyperkeratosis

- Excessive formation of keratin over the skin surface
- Corneum and granulosa thickened.
- Occurs in hypothyroidism due to diseases of pituitary or atrophy of thyroid gland
- Diseases of other organs: Cirrhosis in dogs and cattle

Parakeratosis

- *Definition*
 - Accelerated imperfect keratinization is called parakeratosis
- *Gross pathology*
 - Grossly, there is production of scales.
- *Histopathology*
 - Microscopically, stratum granulosum is reduced in size. Nuclei of horn cells are retained.

Dyskeratosis

- In dyskeratosis, cells of Malphigian layer undergo abnormal, premature imperfect keratinization.
- It suggests developing malignancy.

Pseudoepitheliomatous hyperplasia

- Severe acanthosis with deep downward growth of rete pegs (resembling carcinoma)
- Seen in-
 - Margins of burns
 - Indolent ulcers
 - Chronic focal inflammations

Lichenification

- Thickening of skin in irregular areas is called lichenification
- Seen in chronic dermatitis

Pachyderma

- Synonym - Elephantiasis
- Thickening of skin involving all the layers is
- Here individual cells are normal. Here connective tissue may be hyperplastic.

Etiology

- Bacteria: *Actinomycotic pachyderma* in swine- Here the ears are very much enlarged and hard
- Nonspecific dermatitis: Seen in hind limbs of horses and scrotum of old dogs.

Pimple or Papule

- It is a small, circumscribed, cone shaped elevation of skin.

Proud flesh

- If irritant, movement or trauma prevents healing of wounds then excessive granulation tissue is produced and is known as proud flesh.

Keloid

- Connective tissue proliferation below the scar. It may recur after excision.
- It is not a true tumour.
- *Occurrence*
 - Horses
 - In Negroes, it is due to genetic or familiar predisposition
 -

Calcinosis Circumscripta

- Raised, elevated or bulging mass of 1-10 cm diameter under the skin

Hydropic or Ballooning degeneration

- Intracellular edema is called hydropic or ballooning degeneration. Here cells are swollen and become isolated from one another. The prickles disappear (acantholysis).

Spongiosis

- Intercellular edema of the epidermis is called spongiosis
- Seen in inflammations.

Wheal / Urtica

- It is a small sharply circumscribed flat round or irregular shaped elevation of the skin.

Urticaria

- Allergic swelling of skin

Plaque

- Several urtica coalesce to form large plaques

- **Blister / Vesicle -**

- It is a cavity (diameter $<5\text{mm}$) in the epidermis or beneath the epidermis containing serum, plasma or blood. It is raised above the surface of skin. It is covered by a thin rim of epithelium.
- It is a form of severe spongiosis.

Bulla / Bleb

- It is a space containing fluid situated intraepidermally or subepidermally.
- It is a large vesicle (size $>5\text{mm}$).

Pustule

- Pustule is a small circumscribed cavity in the epidermis containing pus.

CHANGES IN COLOUR OF SKIN

Black Mole

- it is a hyperpigmented spot in the skin
- Hyperpigmentation
- In hypothyroidism due to diseases of pituitary or atrophy of thyroid gland, diffuse or local hyperpigmentation occurs.
- *Etiology*
 - Nutritional deficiency of zinc

Leucoderma

- *Etiology*
 - Scars after healing of wounds
 - Congenital defect in certain breeds of dogs
- *Sequelae*
 - If exposed to sunlight, the affected area is inflamed.

Erythema

- It is a reddish spot in the skin
- *Etiology*
 - Nutritional deficiency of zinc
 - Erythema is due to focal congestion of capillaries. It is the first stage of inflammation of skin. In some cases, the inflammatory process does not proceed beyond the stage of congestion and it is these cases that may be termed erythema secondary to some specific fevers
 - e.g. Swine fever and swine erysipelas infection

Makula

- it is a discoloured spot of skin due to focal hyperaemia or haemorrhage.
- It is not elevated above the surface of skin.

Contusion (Bruise)

- An injury caused by blunt force resulting in breach of the subcutaneous tissue, disruption of blood vessels and infiltration into surrounding tissue of blood. There is no loss of continuity of skin.

Albinism

- Albinism is complete absence of melanin pigment in the skin (white skin)
- Tyrosine deficiency

DISCOLOURED AND ELEVATED SPOTS IN THE SKIN

Eruption

- It is a small rapidly developing elevated red spot.

Boil or Furuncle

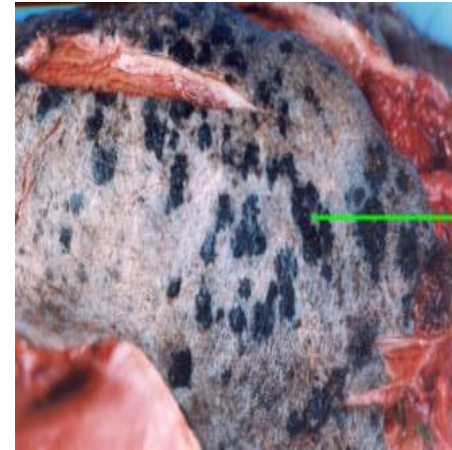
- It is a small suppurative inflammation (Abscess) of skin involving a hair follicle or sebaceous gland.

Carbuncle

- A cluster of boils situated close to each other. They open onto the skin through several pores.

Acanthosis Nigricans

- Acanthosis nigricans is a raised rough black patch of skin.
- *Occurrence*
 - This condition is mostly seen in dogs.
- *Etiology*
 - Hormonal
 - In dogs it is due to hypothyroidism
 - Pathological
 - Adenocarcinoma of liver
 - Sertoli cell tumour leads to increased estrogen production
 - Hypoplasia of pituitary
- *Gross pathology*
 - Bilateral skin lesion (ventral side of body, axilla, inner side of thighs, inguinal and circumanal region) is characteristic.
 - Small poorly circumscribed patches of skin will be thick, folded with alopecia and increased pigmentation (Black coloured)



Blackish thickened elevated patches in the skin

Folliculitis

- Inflammation hair follicle is called folliculitis

Acne

- Inflammation of sebaceous gland is called acne

Miliaria

- Blockage of sweat duct is called miliaria

Scar / Cicatrix

- Scar is a healed skin defect having neither hair follicle nor sweat gland.

ANOMALIES OF SKIN

Epitheliogenesis Imperfecta

- It indicates a condition wherein the skin fails to develop around nose, ear and feet.
- *Occurrence*
 - Species: Calves, piglets, pups, lambs, kids and foals
- *Etiology*
 - Genetic defect: Autosomal recessive character
- *Sequelae*
 - The skin may be infected leading to septicemia quickly.

Hypotrichosis Congenita

- *Synonym*
 - Congenital alopecia
 - Mendelian recessive trait

COLD INJURY / FROST BITE

- Well acclimatized long haired animals can tolerate temperatures of -50°C for indefinite periods.

Occurrence

- Cold injury occurs most commonly on the tips of the ears and tail of cats, the scrotum of male dogs and bulls and the tips of the ears, tail and teats in cattle.

Gross pathology

- Gross lesions include
 - Alopecia
 - Scaling
 - Dry gangrene
 - Sloughing of affected skin

THERMAL INJURY

Etiology

- Thermal injuries in domestic animals can be caused by hot liquids, steam, fires, and friction from rope “scalds”, electrical burns from chewing electrical wires and lightning strikes.

Pathogenesis

- The lowest temperature at which skin can burn is 44°C.
- Dry heat causes desiccation and carbonization of skin
- Moist heat causes “boiling” or coagulation of skin
- Longer exposure to lower temperature is more damaging than short exposure to higher temperatures

Gross pathology

- Animals struck by lightning may show a jagged line of singed hair running down the shoulder or flank.

Histopathology

- Burns are classified into four degrees according to depth of injury
 - First degree burns involve only the epidermis
 - In second degree burns, the epidermis and part of the dermis are damaged
 - In third degree burns, the destructive effect of the burns extends full thickness through the epidermis and dermis causing coagulation necrosis of connective tissues, blood vessels and adnexa.
 - Fourth degree burns are similar to third degree burns but also extends to the subcutaneous fascia.

DIRECT EFFECT OF SOLAR RADIATION

Solar dermatitis / Sun burn

- Sun burn occurs most frequently in cats, dogs, pigs, cows and goats.
- The lesions in cats typically affect the tips of the ears, nose, eyelids and lips of white, blue –eyed animals.
- The initial lesion is erythema followed by alopecia, scaling and crusting.

Photosensitization dermatitis

- Photosensitization dermatitis occurs in animals when photodynamic or fluorescent pigments are deposited in sunlight exposed skin.
- Phylloerythrin, a degradation product of chlorophyll and haematoporphyrin may accumulate in the skin.
- The initial reaction is erythema followed by edema which is more prominent in sheep than in cattle.
- Histologic lesions include coagulative necrosis of the epidermis and dermis.

DERMATITIS

- Inflammation of the skin is called dermatitis
- If the skin is moist, then it is called moist eczema (Acute condition)
- If the skin is dry, then it is called dry eczema (Chronic condition)
- **Serous dermatitis**- sunburn, mild friction due to ill fitting saddle, chemicals, hot and cold.
- **Acute vesicular dermatitis**- pox
- **Impetigo** – pustular dermatitis usually caused by *Staphylococci* & rarely by *Streptococci*

Dermatosis

- Non inflammatory lesion of skin is called dermatosis.

NON-NEOPLASTIC CYSTS

Epidermoid Cyst

- Species affected: Dogs
- *Pathogenesis*
 - If the hair follicular duct is occluded, then the desquamated epithelium and keratin are trapped inside and develop into a cyst.
 - The development of cyst is slow.
- *Gross pathology*
 - Location: If in the dermis, it is fixed. If in the subcutis, it is movable.
 - Shape: Round or oval
 - Size: Few millimeters to few centimeters
 - Number of cysts: Solitary, clusters or generalized
 - Wall: Thin
 - Margin: Well demarcated
 - Contents: Color is gray or brown; May contain hair/wool
 - Consistency: Semisolid or dry
- *Histopathology*
 - At the centre of cyst, keratin is deposited concentrically.
 - The cyst wall has a collagenous capsule, surrounded by squamous epithelium and is devoid of adnexae.
- *Sequelae*
 - Usually benign and rarely become ulcerated if infected or malignant
 - If the contents escape into tissue foreign body reaction sets in.

Dermoid Cyst

- It is a round or oval soft mobile cyst at the junction of dermis and subcutis.
- Its wall contains skin appendages.
- It communicates to outside through tiny pores.
- It is a benign lesion. It may contain desquamated cells, hairs, keratinized greasy substance, calcium and cholesterol.

Sebaceous Cyst

- It is a dilatation of duct or sebaceous gland leading to cyst formation.
- It may contain greasy sebum and cholesterol.

Sudoriferous Cyst

- It is a cyst formed by the occlusion of sweat gland.
- It contains watery fluid.
- The capsule is thin and lined by single layer of columnar or cuboidal epithelium.

- **Laminitis** – inflammation of the sensitive laminae of the hoof
- Occurs usually in horses but may be seen in cattle.

Eczema – inflammatory condition of skin characterized by vesicle formation, infiltration of inflammatory exudate, oozing discharge and development of scales and crusts

- Allergic condition of skin

- **Iridocyclitis** – iris +lense +ciliary body
- **Ptosis** – drooping of eyelids

