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Concurrent and Many Diseases That Affect Skin of Equines

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Summary: Habronemiasis is a condition that affects many horses. The disease has worldwide in distribution. Adults normally inhabit the equine stomach and eggs and larvae are passed in the feces and are ingested by maggots of intermediate hosts. Many diseases of skin also affect the skin of horse, donkey and mule such as dermatophilosis, dermatopytosis/ring worm, and tick infestation.
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Key words:- *Disease, equines and Skin*

1. Introduction

Habronemiasis (summer sores, Swamp cancer or Bursattee) Habronemiasis is a condition that affects many horses and usually manifested as a dermatologic condition, and is the result of infestation of the affected region with the larvae of certain types of parasites of the class nematodes.

Cause: three nematode species are involved:- *Habronema muscae*, *H. majus (H. microstoma)* and *Draschia megastoma*

1.1. Epidemiology:

The disease is worldwide in distribution and is of importance only sporadically in warmer climates; especially in wetter areas where the intermediate hosts are common, Horses of all age groups are susceptible, but the disease is most common in adults.

1.2. Pathogenesis:

Adults normally inhabit the equine stomach and eggs and larvae are passed in the feces and are ingested by maggots of intermediate hosts (e.g., *Musca domestica, Stomoxys calcitrans*). Infectious larvae are deposited on the horse, particularly in moist areas or open wounds while flies are feeding includes the i) Larvae that are deposited near the mouth are swallowed and complete the life cycle in the stomach, ii) Those deposited on the nose migrate to the lungs and iii) Larvae deposited in wounds or moist areas of the body produce both a local inflammatory and allergic reaction.

1.3. Clinical findings:

1) Gastric Habronemiasis- Although signs are not typical, affected animals may have poor coat, pyloric obstruction and gastric distention (large tumors); depression, fever (up to 41^{o}C), colic, pain and heat on the left side (if perforation occurs). Involvement of the spleen may result in marked anemia and a gross increase in the total leukocytic count with left shift regeneration.

2) *Cutaneous Habronemiasis*: @ Most commonly occurs in sites of the skin where skin wounds can easily occur and flies cannot be easily displaced (face, bellow the median cantus of the eye, the midline of abdomen extending to the prepuce and penis in case of males), @ Lesions include: small papules with eroded scab-covered centers with a coarse red granulation tissue covered by a grayish necrotic m/m and raised and thickened edges, Sores do not heal spontaneously rather they regress in colder weather and recur in the coming summer.

3) *Conjunctival Habronemiasis*: Here, conjunctivitis with small yellowish necrotic masses (≈1mm diameter), soreness and lacrimation are some of the signs related to the eye.

1.4. Diagnosis:

1) Difficult in its gastric form as the eggs and larvae are not easy to find in the feces. Only necropsy findings of tumor-like lesions bulging in to the stomach lumen (up to a golf ball size) are confirmatory in cases the animal dies. **2.** Skin scrapings and biopsy samples of conjunctival sac and wounds may reveal the larvae. Deep scraping or smears of lesions, particularly if yellow granules are

retrieved, may reveal larvae with numerous surrounding eosinophils and mast cells. However, smears are often negative.

1.5. Differential diagnosis:

1) Gastric form- Gastrophilus and other GI nematodes 2**)** Cutaneous form- Fungal granuloma, Equine Sarcoids and over growth of granulation tissue following a wound. Also, Habronema and Draschia larvae will invade secondarily sarcoid, squamous cell carcinoma, and other infective granulomas, which may cause errors in diagnosing the primary skin disorder.

1.6. Treatment:

1) Ivermectin (0.2mg/kg) is effective for both the gastric (single dose) and Cutaneous (often a second dose is recommended) forms, 2**.** Fenbendazol (10mg/kg for 5 d.) and Mexidectin are also proved to be effective. 3**)** Topical therapy includes combinations of larvicidal, antimicrobial, anti-inflammatory, penetrating, and protective agents that are applied daily under bandages. An example would be 0.03% echothiophate (phospholine iodide) with ophthalmic ointment (maxitrol) containing neomycin, polymyxin, and dexamethasone.

1.7. Control: 1) interruption of the life cycle by careful disposal of horse manure, soiled bedding and fly population control, **2)** Adult Habronema should be eliminated from the stomach by using injectable ivermectin and **3)** In enzootic areas, all skin wounds and excoriations should be treated symptomatically and early to promote healing and protection against flies.

2. Fistulous Wither (Poll evil)

Fistulous Wither is the term used to describe the term supraspinous bursitis. Due to mainly (mostly) to localized infections with brucella abortus, occasionally found in the Atlanta bursa , causing Pool evil

2.1. History and clinical findings is

1. The first signs of fistulous wither is sensitivity of the wither regions together with swelling, 2. The swelling is usually localized and fluid filed although occasionally it is more diffused and 3.After a variable time course, a discharging sinus usually develops. With purulent discharging sinus

2.2. Diagnosis

Diagnosis is possible from the clinical findings although serum (aspirated fluid) can be taken for antibody titer

2.3. Treatment

If the conditions are diagnosed before the discharging sinus developed, administration of oxy tetracycline helps in the resolution of infections. However, after a discharging sinus developed, there is seldom response to antibiotics therapy, surgery to establish effective drainage is the only useful treatment.

3. Mange

Mange is an intensely itchy skin disease caused by tiny spiderlike insects called mites. Mites live on the surface of the skin or in tunnels a few millimeters beneath the skin. Females deposit eggs in burrows or beneath scabs. Eggs hatch in about four days. Mites reach maturity soon thereafter and live only one to two weeks. The whole cycle takes only 15 to 20 days.

There are four species of mites that infect the horse, these are: - Sarcoptic mite, the cause of scabies, burrows beneath the skin of the head, ears, neck, chest, flank, and abdomen. Small red bumps appear around the burrows. As the horse rubs, paws, and bites at the skin to relieve the irritation, the resulting trauma produces further skin injury with crusts, weeping serum, loss of hair, and thickening of the skin. Secondary bacterial infection is common and complicates the picture. Sarcoptic mange is highly contagious and is easily transmitted to people, **Psoroptic mite,** also called the tail mite, produces lumps and patches of hair loss over the poll, mane, and tail. It is not transferable to humans. This mite has been eradicated from horses in the United States and **Chorioptic mite** causes leg or foot mange. It is found below the hocks and knees. These mites live on the surface of the skin and produce scabs, crusts, and patches of hair loss. The disease may be difficult to distinguish from grease heel. Ringworm and summer sores may look like mange, but can be distinguished by examining skin scabs and scrapings under a microscope; or, in difficult cases, by taking a skin biopsy to look for mites.

Treatment: Horses with mange should be isolated or quarantined to prevent transmission to other horses. Be sure to keep their tack separated, as well. Mange should be treated by a veterinarian. Treating sarcoptic, chorioptic, and psoroptic mange involves the use of topical insecticides. A thorough dipping or high-pressure spray application is required to saturate the skin. While washing, dislodge scabs with a stiff brush. Several applications at seven- to ten-day intervals are required. There is little information on the use of ivermectin for treating mange mites in horses, but available reports suggest

that the drug may be effective in the usual recommended dosage. There is no satisfactory treatment for demodectic mange in horses.

4. Dermatophilosis

Synonyms: Mycotic dermatitis; cutaneous streptothricosis; senekebo disease of cattle; lumpy wool of sheep; cutaneous actinomycosis.

Definition: This is a superficial skin infection of animals and man characterized by exudation and matting of hairs and wools and formation of crusts and scab.

Etiology: *Dermatophilus congolensis*. The organism is a gram positive. The organism invades hair follicles, sweat glands and other epidermal structures.

Occurrence: The disease is prevalent throughout the tropical and temperate regions of the world. The disease appears to be most common under low moist climatic conditions.

Species Affected: The disease is most commonly encountered in cattle, sheep, and horse. But, it has been also reported in goat, donkey, dog, cat and pigs. Man is readily infected with dermatophilosis.

Transmission: All ages of animals are susceptible and the disease is usually transmitted through direct contact with infected animals or infected materials. Mechanical transmission through contaminated instrument, brush, bedding materials is possible. The disease may be transmitted through arthropod vectors like flies, ticks and sheep kids.
Moisture and cold weather are predisposing factors to transmit the disease and most of the outbreaks have been found to occur during rainy season. Skin abrasion is also another predisposing factor of dermatophilosis.

Clinical Findings: In cattle, lesions occur on the neck, body or back of the udder and may extend over the sides and down the legs and the ventral surface of the body. In adult cattle the characteristic lesions are thick, horny crusts, varying in color from cream to brown and they are 2-5 cm in diameters. In the early stages the crusts are very tenacious and attempts to lift them cause pain. Beneath the crusts there is granulation tissue and some pus. In the later stages, the dermatitis heals and the crusts separate from the skin but are held in place by penetrating hairs or wool fibres and are easily removed. In young calves crust formation does not occur. There is extensive hair loss with tufting of the fibres, heavy dandruff and thickening and folding of the skin in later stages.

Necropsy Findings: In the occasional animals that die, there is extensive dermatitis sometimes a secondary pneumonia, and often evidence of concurrent disease.

Diagnosis: Microscopic examinations of stained exudates with Giemsa or Gram's stain. The causative organism may be isolated from skin scrapings or a biopsy section and is much easier to isolate from an acute case than a chronic one

Differential Diagnosis: Photosensitization

Treatment: There is no completely satisfactory treatment for cases that show very extensive involvement. In general terms, better results are obtained during dry hot weather and in dry climate, Penicillin and streptomycin at a very heavy dose rates (70mg streptomycin and procaine penicillin G 70000 Iu/kg body weight) is recommended as being 100% effective in animals, Tetracycline (5mg /kg body weight repeated weekly as required is recommended and long acting tetracycline (20mg/kg body weight) in one injection has been reported to give excellent result in cattle and Topical application of astringent or antibacterial solution as spray or dip has been considered as rational approach. For this, copper sulphate, Zinc sulphate are useful.

Control:

Contact with infected animals and grooming materials are to be avoided, Control of tick and fly population are to be made with appropriate insecticide application and Quarantine of the affected animals may be made to prevent possible spread.

5. Dermatophytosis (Ringworm)

Ringworm of the skin is caused by the invasion of the keratinized epithelial cells and hair fibers by dermatophytes.

Etiology: caused by fungi that grows on hair or skin or both. Dermatophytes are classified in to three genera; Microsporum, Trichophyton and Epidermophyton.

Occurrence: Dermatophytosis occurs in every parts of the world affecting human and animal population. Young animals are more susceptible to the infection. The disease is more commonly seen in animals housed in close proximity to each other for long periods.

Species Affected: Horses, donkeys, cattle, pig, sheep, goat, dog and cats are affected. Man is also affected.

Transmission: Direct contact with infected animals is a common method of spread of ringworm and licking with the tongue undoubtedly aids spread of the fungus. However, indirect contact with any inanimate objects, particularly bedding, harness, grooming kits and horse blankets, is probably more important.

Clinical Findings: In cattle the lesion is a heavy, grey- white crust raised perceptibly above the skin. The lesions are roughly circular and about 3 cm diameter. In the early stages the surface below the crust is moist. In older lesions the scab becomes detached and pityriasis and alopecia may be the only obvious abnormalities. Lesions are most commonly found on the neck, head and perineum. Itching does not occur and secondary acne is unusual. In horses the lesion commence as round patches of raised hair and soreness of the lesion to touch. After about 7 days matting of the hair, which becomes detached leaving a bald, grey, shining area about 3 cm in diameter will be resulted.

Diagnosis - The diagnosis of ringworm depends on evidence of infectivity, the appearance of characteristics lesions and the presence of fungal mycelia and spores (from scrapings and culture).

Treatment: There is spontaneous recovery but treatment greatly reduces contamination of the environment by infected animals. Local or systemic treatments are used, the later when lesion are wide spread.

For local application - weak solutions of iodide (2-5 %), white fields ointment, 10% ammoniated mercury ointment, etc For systemic treatment - IV injection of NaI (1g/14kg b.wt) as a 10% solution. Griseofulvin 5-7.5 mg/kg for 7 days for cattle and horses, 18/100kg for pig 630-40 days).

Control:-Isolation and treatment of infected animals, Provision of separate grooming tools, horse blankets and Feeding utensils and disinfection of the items after use on infected animals, Calves should be **vaccinated** against ringworm with LTF 130 vaccine at 1 month of age. A live vaccine can also be used in horses.

5.1. Neoplastic conditions (Sarcoids)

Sarcoids are locally aggressive but non-metastatic, fibroblastic skin tumors of Equids. They are the most common neoplasm of horse donkeys and mules, accounting for an estimated of 20% of equine tumors and 90% of skin tumors of Equids, Sarcoids can occur at any site of the body but have predilection site for the head, ventral abdomen, eyelids, legs, armpit, groins and limbs. Lesions are usually firm on palpations because of fibroblastic proliferations. The overlying epidermis may be thick, rough and with hyperkeratosis or ulcerated. ***Why do Sarcoids occur? (Etiology):*** There is strong evidence that Sarcoids are caused by a virus. Some genetic families of equines appear particularly susceptible to developing Sarcoids more readily than others, but there is no difference in susceptibility between horses of different coat colors. Some breeds may be more Susceptible than others. Often a proud flesh, the exuberant granulation tissue that develops in healing of equine wounds believed to transform into Sarcoids.

Types of Sarcoids:

The gross appearance of Sarcoids may vary but lesions are generally classified as 1) Verrucous Sarcoids 2) Fibroblastic Sarcoids 3) Mixed Sarcoids 4) Nodular Sarcoids 5) Occult Sarcoids and 6) Malevolent sarcoids

1)Verrucous Sarcoids: Resembles equine warts with dry, scabby (horny) cauliflower–like surface, that is partially or totally hairless. The extent of hyperkeratosis variables with those occurring in the periorbital and facial skins often being very thin and almost smooth and hairless. They may be sessile with abroad base or pedunculated. Verrucous sarcoids are slow growing and mild, seldom become more aggressive and transform into fibroblastic sarcoids, with aberrations.

2) Fibroblastic Sarcoids: It has both the dermal and sub dermal component**,** much more aggressive both in appearance and character. Small lesions are often pedunculated, ulcerated and have fleshy mass with red in color. They may enlarge rapidly, especially those occurring on the lower limb to attain considerable size with in a month or weeks. Fibroblastic sarcoids are highly vascularized and may bleed significantly following minimal trauma.

3) Mixed (Veruco-fibroblastic) sarcoids: this involves a combination of both of the forms described above. It is more severe than the separate forms.

a) Nodular Sarcoids: are entirely subcutaneous, occasionally erupt through the over lying skin. More usually one or many, often spherical nodules lying below the skin. The over lying skin is often normal with the nodules mobile under it, with the exception of the nodular sarcoids occurring in the eyelids which are often adherent to the overlying skin. This form appears to have a more benign character and is reasonably amenable to surgical excision.

b) Occult Sarcoids: these are slow growing tumors that are flat with slightly thickened skin and mildly roughened surface. This presentation is partially or totally devoid of hair and seems to favor areas of the body with spare hair growth, including the skin around the mouth, eye, neck and the medial aspect. Trauma to occult sarcoids and surgery can stimulate fibroblastic proliferations of the tumor and should be avoided if possible.

c) Malevolent Sarcoids: A particularly aggressive fibroblastic sarcoid which spreads along lymphatic vessels creating extensive nodules and multiple, ulcerating fibroblastic masses. It is occasionally encountered and advanced stages are

with a very poor prognosis. This is the most aggressive type in which the tumors spread extensively through the skin with the cords of tumor tissue with nodules. It is commonly found in the elbow and face regions.

Treatment: There are several options for treatment of Sarcoids and more than one treatment may be used at the same time. The important thing to remember is that Sarcoids have a great tendency to recur either at the site of removal or near by. The choices of treatment will depend upon several factors: The number and size of the sarcoids present, The part of the horse affected, and The facilities and drugs available and include:

***Surgical removal*:** Surgical resection, even with wide margins of normal tissue, is not generally recommended as a sole therapy for equine sarcoids because of a recurrence rate estimated as 50% to 64% within a month. Instead surgical resections (including normal tissue margins of 0.5-1cm) are best used to debulk tumors and improve the effectiveness of adjunctive therapies (e.g. Cryosurgery, Applying ligatures, photodynamic therapy, BCG injection (immunotherapy) and Chemotherapy).

Freezing (Cryosurgery): -The sarcoid may be frozen by using liquid nitrogen, which causes the tissue to die away. If the sarcoid is large, most of it can be cut away first (debulking), leaving only the base to be frozen. This method is more effective at preventing recurrence than surgery alone, but often results in the development of scarring and patches of white hair.

***Applying ligatures or rubber rings*:** It is possible to remove the bulk of some sarcoids, especially those with a short stalk or neck, by fixing a tight ligature around its base or applying rubber rings. The ligature cuts off the tumor's blood supply and it dies away or falls off usually 10 days to two weeks later. This method is useful for short-term control of relatively large Sarcoids on the inside of the hind limbs or abdomen but does not usually give long-term resolution of the problem. This method requires a specialized tool for the application of small strong rubber rings. There may be some local swelling after their application but this usually subsides once the sarcoid drops off.

BCG (Bacilli Calmette- Guerin) Injections: BCG vaccine can be injected directly into sarcoids, often with useful results. Several injections over several weeks or months may be required. This treatment is aimed at provoking an immune reaction from the horse's body to destroy or reject the sarcoid tissue. It is most commonly used for eyelid tumors because, if effective, it allows the eyelid to be saved. There is often initial swelling and there may be skin damage following injections.

Chemo (Cytotoxic) therapy: Specially-prepared cytotoxic (tissue killing) creams have been widely used to treat sarcoid tumors. These attack the abnormal cells in the sarcoid and are often highly effective. They can be used on smaller and flat sarcoids or larger ones after surgical debulking. Treatment usually takes 2-3 weeks. No matter which treatment option is chosen, it can take many months to remove some sarcoids and the effect might not be permanent. Treatment may need to be repeated or changed if new sarcoids appear. These creams include: **5- fluorouracil** and fluorinated pyramidine antimetabolite that interferes with DNA Biosynthesis.
Photodynamic therapy: It involves intratumoral administration a photo sensitizer to a patient. The drug accumulates in the tumor tissue and is activated by visible light to higher energy state in which free radicals and reactive oxygen are formed. (E.g. hypericin).

6. Others

6.1 Friction and Pressure Sores

A poorly fitting or improperly padded saddle can cause a pressure sore, also called a **saddle sore** or a sitfast. Skin injuries also occur as a consequence of ill-fitting bridles and harnesses. The rubbed and chafed areas become swollen, bare, and tender to pressure. With continued trauma, these friction sores become infected.

Galls, also caused by ill-fitting equipment (especially saddles), are painful, swollen pockets of serum that develop either under the skin or beneath the deeper connective fascia. Subfascial galls, which are extremely painful, are found most often on the withers.

Rope burns are friction burns, and may involve the full thickness of the skin.

Treatment: Following an acute injury, apply ice packs several times a day for two to three days. This helps reduce pain and swelling. Apply zinc oxide salve to raw areas to dry and protect the skin. For deep wounds, such as those produced by rope burns, clip the hair, cleanse the area with Betadine, and apply a topical antibiotic such as nitrofurazone or triple antibiotic ointment. Cover with a sterile dressing. Rest the horse.
Galls beneath the skin usually resolve in 7 to 10 days, but subfascial galls take considerably longer. If the horse must be used at saddle, protect the site with an extra blanket or a foam pad. Cut the pad out around the gall or saddle sore to relieve direct pressure.

Rope burns usually occur with ropes made of nylon and hemp. Cotton, which is less likely to produce a burn, is better for tying and picketing. A spray such as Granulex hastens healing.

6.2. Pyoderma

Pyoderma means pus in the skin. It is caused by infections, inflammations, and/or any abnormal growth such as a tumor. Most commonly, pyoderma refers to a bacterial infection of the skin that drains pus. Many cases are the result of self-mutilation. When a horse rubs or bites at a persistent irritant, the skin becomes infected. The infection arises only because another itchy skin disorder was present first. Always look for another skin disorder before concluding that pyoderma is the only problem.

The skin infection can manifest in a variety of forms, including:

Cellulitis is an infection of the deep layer of the skin. Most cases are caused by puncture wounds, scratches, and lacerations. Horses are particularly prone to such injuries. Many wound infections can be prevented by proper early treatment of wounds, as described in *Wounds* (page 32).

Signs of cellulitis include pain (tenderness to pressure), warmth (the skin feels hotter than normal), firmness (not as soft as normal), and change in color (skin appears redder than normal). As infection spreads out from a wound, you may feel tender cords, which are swollen lymphatic channels. Regional lymph nodes may enlarge. This is a stage beyond cellulitis and is characterized by ulcerative lymphangitis (page 76) and malignant edema (page 74).

Abscess is a localized pocket of pus. Pimples, *pustules*, furuncles, and *boils* are examples of small skin abscesses. An abscess is usually not fixed and firm, and feels like fluid under pressure.

Folliculitis (summer rash) is an infection of the hair pores. It is nearly always caused by a *Staphylococcus* bacterium. It tends to occur in hot weather as a consequence of excessive sweating and friction to the skin from ill-fitting tack. Small pimples appear, usually at points of contact in the saddle or harness areas. These pimples enlarge and form pustules. The pustules rupture and exude pus. Crusts form and the hair becomes matted. Folliculitis can be prevented by good hygiene, including brushing and cleaning the skin and coat after workouts and using clean, dry blankets beneath saddles.

Furunculosis is a deep-seated hair-pore infection with draining sinus tracts and patchy hair loss. It is a progressive form of folliculitis and is more difficult to treat.

Tail pyoderma begins as an itchy skin disorder caused by mange mites or pinworms. As the horse scratches, rubs, and abrades the skin of her tail, a secondary staph infection occurs and pustules develop. The ailment is complicated by furunculosis and by abscesses that rupture and drain in an unending cycle. Hair is lost on the top of the tail. Treatment is most difficult.

General Treatment of Pyoderma

Any underlying itchy skin disorder should be treated to eliminate rubbing, biting, and self-mutilation. Localize the skin infection by clipping away the hair and applying warm soaks for 15 minutes, three times a day. Saline soaks, made by adding 1 cup (290 g) of Epsom salts to 1 gallon (3.8 l) of warm water, make a good poultice. Daily Betadine scrubs help loosen scabs and promote cleanliness. Topical antibiotics, such as nitrofurazone or triple antibiotic ointment, should be applied two to three times a day. If the horse does not show improvement with these over-the-counter medications, consulting with your veterinarian will provide the best treatment for your horse. Pimples, pustules, furuncles, boils, and other small abscesses that do not drain spontaneously should be lanced with a sterile needle or a scalpel. Abscesses may be *cultured* to identify the bacteria and to determine appropriate antibiotics. If a cavity is present, flush with a dilute antiseptic surgical scrub (see *Wounds,* page 35). Keep the skin open and draining until the cavity heals from below.

Foreign bodies beneath the skin, such as splinters, must be removed with forceps, as they are a continuing source of infection. Oral or injectable antibiotics are used in treating wound infections, cellulitis, abscesses, furunculosis, and tail pyoderma. Most skin bacteria respond well to penicillin, oxytetracycline, or trimethoprim-sulfadiazine.

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