A 1-year-old Hereford heifer presents with a large 13x5 cm, slightly raised, thickened, alopecic area with multiple crusts on the ventral midline at the level of the caudal sternum above the umbilicus. Many others within the herd have similar lesions.
Picture 2: H&E, 20x overview.

Picture 3: H&E, 40x

Picture 4: H&E, 100x
What is your top differential?

1. *Ostertagia ostertagi*
2. *Stephanofilaria stilesi*
3. *Trichostrongylus axei*
5. *Pelodera strongyloides*
Answer:

Signalment:
1-year-old Hereford heifer

Clinical history:
A 1-year-old Hereford heifer presents with a large 13x5 cm, slightly raised, thickened, alopecic area with multiple crusts on the ventral midline at the level of the caudal sternum above the umbilicus. Many others within the herd have similar lesions. Multiple sections of the lesions were taken for biopsy.

Question: What is your top differential?

Answer:
1. *Ostertagia ostertagi*
2. *Stephanofilaria stilesi*
3. *Trichostrongylus axei*
5. *Pelodera strongyloides*

Histopathologic description: Diffusely infiltrating the dermis are moderate numbers of lymphocytes, plasma cells, eosinophils, histiocytes, and few neutrophils that often surround adnexal structures. Infiltrating the follicular wall, epidermis, crusts, sebaceous glands and free within the dermis are numerous 100x40 um adult filarid nematodes with a 5-um thick smooth to ridged cuticle, coelomyarian-polymarian musculature, a pseudocoelom, lateral alae, intestines, and reproductive organs. Microfilaria are often enclosed in a clear membrane (vitelline membrane) within the superficial dermis or lymphatics. Multifocally hair follicles are often dilated with large amounts of keratin (follicular keratosis) and containing viable and degenerate neutrophils (luminal folliculitis). Lymphatics are mildly ectatic (edema) and apocrine glands are moderately dilated. There are large amounts of mature fibrous connective tissue within the dermis (fibrosis). Numerous small caliber blood vessels are evident within the superficial dermis (neovascularization). The walls of deep dermal vessels show mild smooth muscle hypertrophy and dilated vessel lumina. The epidermis is multifocally eroded and ulcerated with pustules and serocellular crusts composed of fibrin, viable and degenerate neutrophils, small numbers of coccobacilli and hemorrhage. The epidermis is markedly hyperplastic often with deep rete peg formation. Marked orthokeratotic hyperkeratosis is evident.
**Morphologic Diagnosis:** Moderate, perivascular, interstitial and peridnexal, chronic, lymphoplasmacytic, eosinophilic, histiocytic dermatitis and luminal folliculitis with intrallesional adult filarid nematodes and microfilariae, epidermal hyperplasia, pustules, and crusts.

**Comments:** Stephanofilariasis is a common incidental finding that often causes no significant clinical disease within cattle. *Stephanofilaria stilesi* is the filarioid nematode that is responsible and usually causes a circumscribed crusting dermatitis along the ventral midline of the body between the sternum and umbilicus. The disease is most common in the south and southwestern United States with a higher prevalence in beef cattle compared to dairy.

The horn fly (*Haemotobia irritans*) acts as an intermediate host and is a common and prevalent pest among cattle that is found commonly on stephanofilarial lesions. Horn flies are infected with microfilaria after feeding on stephanofilarial lesions. Microfilaria develop in the abdominal hemocoele over 18-21 days to third-stage larva. When the fly goes to feed again on uninfected animals, the third stage larvae are inoculated into the skin and an eosinophilic crusting dermatitis develops within two weeks. Nematodes develop and produce microfilaria and the cycle self-perpetuates.

Gross lesions are prominently found on rangeland and irrigated pastures because these environments are ideal for horn flies. However, cattle usually do not become infected until 8-10 months of age because the horn fly prefers to feed on adult animals. Lesions often start as a raw, crusted, and bloody lesion covered by a serous exudate. Over time, it slowly heals, becoming a smooth and dry thickened area of skin over years. Cattle can recover fully from the disease between 7-11 years old.

Microscopically, adults are usually present within hair follicles, and microfilaria are free within the dermis, or within lymphatics. An eosinophilic perivascular dermatitis with eosinophils and lymphocytes can be present. Secondary furunculosis and folliculitis along with epidermal hyperplasia, ulceration, and erosion is often evident.

The number of nematodes found in any particular lesion is quite variable depending on the animal's age. When the animal is less than 10 months old or older than 7 years, fewer than 1 nematode may be evident per square centimeter. However, when animals are between 3 and 5 years old, up to 10 adult nematodes may be found in any square centimeter of the lesions. Nematodes are often found within the superficial dermis, around 1-2 mm below the epidermis, and microfilariae within the dermal papillae. Microfilariae are often enclosed in a thick semi-rigid fluid-filled oval fluid membrane.

**References:**


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