ANGIOSTRONGYLOSIS IN A BRUSHTAIL POSSUM (*Trichosuris vulpecular)* (CASE 630.1)

CASE HISTORY

An adult brushtail possum (*Trichosuris vulpecula*) was found dragging its back leg. The possum was in very poor condition, with patchy dermatitis at base of its tail. Numerous stickfast fleas were attached to the ear margin. The oral mucosa was pale. The possum was treated with anabolic steroids, penicillin, fluids, vitamin B complex, and ivermectin, but it was euthanased after it failed to respond to three days of therapy.

GROSS PATHOLOGY

External examination: There is alopecia, erythema, and crusting of the skin at the tail base, and axillary regions. Hydration: poor, Muscle mass: good, Fat deposits: fair
Internal findings: The axillary lymph nodes are enlarged and wet. The gastrointestinal tract is filled with ingesta. The lungs are voluminous and wet. The myocardium is markedly mottled pale tan/purple and there are multifocal epicardial ecchymosis. The blood appears thin and does not clot.

HISTOPATHOLOGY

Lesions are not evident within bladder, small intestine (autolytic), colon, lymph node (autolytic), stomach, skeletal muscle, eye, peripheral nerve and kidney.
Skin: The epidermis is multifocally coated with a thick crust composed of keratin and cellular debris. There is a focal epidermal ulcer, which is covered with a thick crust. The dermis beneath the ulcer contains an intense infiltrate of small mononuclear cells, plasma cells, mast cells and eosinophils. The deep dermis beneath the ulcer contains a large focus of caseous necrosis, which contains a large number of neutrophils, macrophages, and the cell types described above. There is a diffuse perivascular dermal infiltrate composed of lymphocytes, plasma cells, mast cells and occasional eosinophils.
Spleen: The spleen is well populated with lymphocytes.
Myocardium: The subepicardial myocytes segmentally exhibit contraction band formation and have pale myofibrils.
Lung: The pulmonary interstitium contains many polymorphonuclear cells. Alveolar macrophages are prominent throughout the airways.

Fig 1. Spinal cord - Longitudinal section H & E 40x

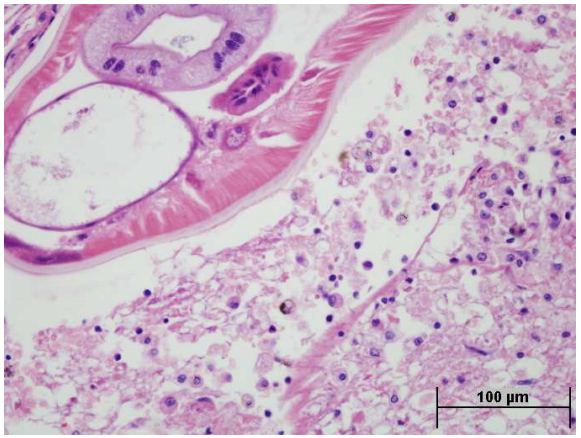

Fig 2. Spinal cord (see inset fig 1) H & E 400x

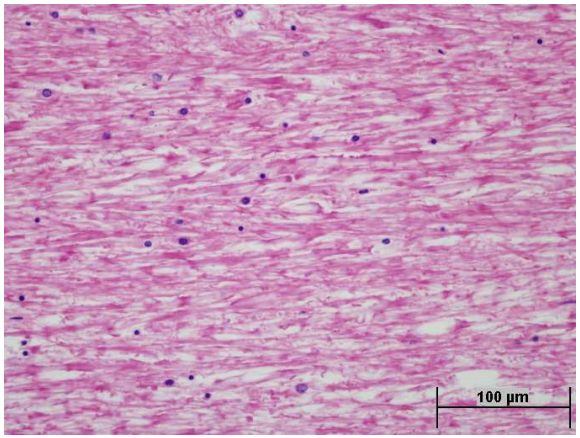

Fig 3 Spinal cord - cranial to parasites H & E 400x

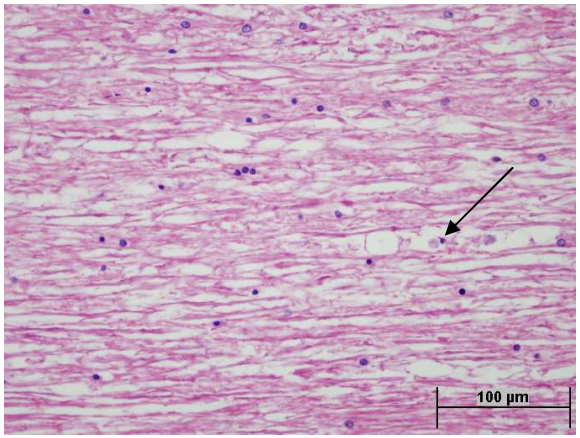

Fig 4. Spinal cord - caudal to parasites - Digestion chamber (arrow) H & E. 400x

Task: Describe the changes in the preceding sections.

Case interpretation: Karrie Rose. Ccase construction: Damien Higgins

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Lumbar spinal cord: Cross sections of large adult nematodes are evident within the central grey matter of the spinal cord. These parasites have a coelomic cavity, intestinal tract and a hyaline cuticle. There is extensive and severe malacia throughout the central grey matter adjacent to the nematode (Fig 1). This lesion is characterised by disruption of the normal tissue architecture and replacement with large numbers of macrophages that have abundant foamy cytoplasm, scattered erythrocytes, and occasional polymorphonuclear cells. Macrophages often exhibit cytophagia. Gemistocytic astrocytes are evident throughout the malacic regions (Fig 2). Swollen axons and digestion chambers (arrow fig 4) are scattered throughout the white matter tracts (Fig 4).

Cervical spinal cord: Astrocytes within the white matter tracts have a mildly increased quantity of eosinophilic cytoplasm. A small number of digestion chambers are also evident within the white matter tracts.
Brain: There is a focal perivascular infiltrate of small mononuclear cells within the meninges covering the cerebral cortex.

MORPHOLOGICAL DIAGNOSIS
Euthanasia
Marked lumbar poliomyelitis – *Angiostrongylus cantonensis*
Ulcerative dermatitis

COMMENTS
The possum's partial paresis is attributable to the large malacic focus within the lumbar spinal cord. It is very interesting that the paresis was unilateral, considering the severity of the spinal cord lesion. The parasite associated with the spinal cord lesion is *Angiostrongylus cantonensis*, the lung and heart worm of rats.

Most often *Angiostrongylus cantonensis* infection in rats is a subclinical infection. Nematode larvae are coughed up and shed in the faeces to then be ingested by snails and slugs, which act as intermediate hosts. Rats and other animals become infected with this lungworm by ingesting infected intermediate hosts. In hosts other than rats, the nematode travels through the spinal cord and then ascends to the brain rather than transiently migrating through the pia mater and then returning to the pulmonary arteries (as occurs in the rat). Clinical signs in non-adapted hosts usually begins with paresis, but then progresses to ataxia, paralysis and other clinical signs associated with the parasite's ascension through the central nervous system.

Diagnosis of *Angiostrongylus cantonensis* infection in live animals is very difficult. CSF from affected animals often has an increased cellularity with no bacteria, fungi or glucose detectable. Although eosinophils would be expected in the CSF of affected animals, the fluid most often contains only lymphocytes. These findings make it difficult to differentiate nematodiasis from viral or protozoal meningoencephalitis.

Angiostrongylus cantonensis was introduced into Queensland from the Pacific Islands and has since migrated south to Sydney. In both Brisbane and Sydney, the parasite was first identified in dogs, flying foxes, and then in brushtail possums, macropods, zoo primates, and ultimately humans. More recently, avian *Angiostrongylus cantonensis* has been recognised.

The predominance of lymphoid cells, mast cells and eosinophils within the dermis beneath the epidermal ulcer is most consistent with an allergic or parasitic dermatitis. The distribution of the skin lesions is most consistent with hypersensitivity to ectoparasites.

The myocardial lesion noted on gross post mortem examination appears to be a very acute, and perhaps terminal lesion.

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