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NEOPLASTIC DISEASE

A Rare Variant of Multicentric Large B-cell Lymphoma with Plasmacytoid and Mott Cell Differentiation in a Dog

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Summary

This report details the diagnosis and immunohistochemical characterisation of a disseminated B-cell lymphoma with a predominant Mott cell phenotype in a 5-year-old, neutered male Australian shepherd dog. The dog presented with progressive neurological signs as a result of cerebrocortical involvement.

Keywords: B-cell lymphoma; dog; immunohistochemistry; Mott cell

Lymphoma is a relatively common canine tumour, with multicentric and intestinal distribution as the two most common presentations (Teske, 1994). A large proportion of canine lymphomas express B-cell markers with reported rates of 58.9–73.9% (Sueiro *et al*., 2004), but B-cell lymphoma with Mott cell differentiation is reported rarely. In domestic animals seven cases have been reported, including six in dogs (Kodama *et al*., 2008; De Zan *et al*., 2009; Stacy *et al*., 2009; Seelig *et al*., 2011) and one in a ferret (Gupta *et al*., 2010). This variant of B-cell lymphoma is characterized by the presence of large amorphous hyaline eosinophilic cytoplasmic inclusions on routine haematoxylin and eosin (HE) stained sections.

A 5-year-old, neutered male Australian shepherd dog was presented to the Ontario Veterinary College Health Sciences Centre for evaluation of lymphadenopathy and mydriasis. Physical examination identified marked generalized lymphadenopathy, a palpable mass within the cranial abdomen, an enlarged spleen and marked tachycardia (168 beats/min). A complete neurological examination revealed normal mentation, mydriasis of the left pupil and complete absence of the menace and direct pupillary light reflexes with an intact consensual response. Comprehensive thoracic radiographs and ophthalmological and fundic examination did not reveal any additional abnormalities. A complete blood count revealed mild thrombocytopenia (106×10^9/L; reference interval $117–418 \times 10^9$/L). A serum biochemical profile revealed hypercalcaemia (3.80 mmol/L; reference interval 2.50–3.00 mmol/L), including elevated ionized calcium (1.74 mmol/L; reference interval 1.23–1.45 mmol/L). Urinalysis was not performed.

Fine needle aspirates of peripheral lymph nodes (Fig. 1) yielded approximately 70% atypical round cells with eccentric nuclei and 4 to 10 μm, homogenous, basophilic, oval to round cytoplasmic inclusions (resembling Mott cells). Approximately 25% of the cells were atypical large lymphocytes with a large round nucleus, fine granular chromatin, light to deeply basophilic cytoplasm and occasional indistinct nucleolus. A further 5% of the cells were cytologically-normal small lymphocytes. Differential diagnoses based on cytology included myeloma, lymphoma or abnormal plasma cell hyperplasia with Mott cells.

On the evening of admission, the dog developed generalized motor seizure activity progressing to status epilepticus. Treatment with diazepam and phenobarbital was administered and overnight support in intensive care was instituted; however, the animal's clinical condition continued to deteriorate. Due to a suspicion of metastatic disease to the brain in association with a poor therapeutic response and prognosis, the dog was humanely destroyed on the following day.

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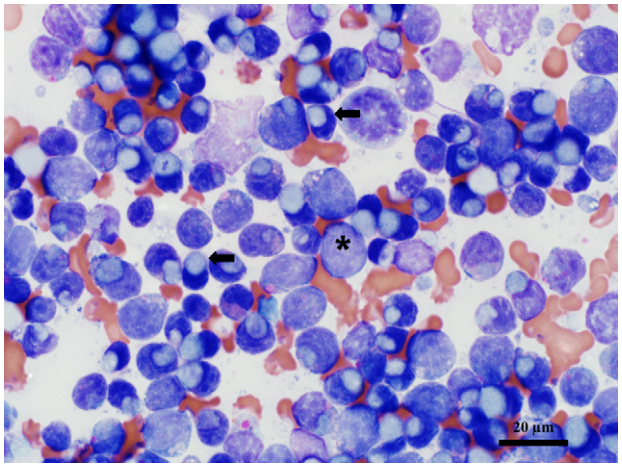

Fig. 1. Fine needle aspirate of a peripheral lymph node. Note the Mott cells have homogenous, basophilic cytoplasmic inclusions (4 to 12 µm; arrow) and atypical large lymphocytes (asterisk). Rare small cytologically-normal lymphocytes are also present. Wright's stain.

At post-mortem examination, all peripheral and visceral lymph nodes were enlarged and diffusely tan coloured. Multiple tan-coloured, irregular-shaped nodules, ranging from 4 to 25 mm in diameter, protruded from the serosal surface at several sites along the gastrointestinal tract and were found throughout the cortex of the kidney and lung. The spleen was diffusely enlarged, pale and meaty in consistency. A focal and poorly-demarcated, soft, pale tan mass (3 × 5 cm) was located on the subdural surface of the cerebral cortex in the right parietal lobe and extended into the underlying brain parenchyma (Fig. 2). A presumptive diagnosis of multicentric lymphoma was made pending histological evaluation. Tissues were collected and fixed in 10% neutral buffered formalin, further dissected and embedded in paraffin wax. Sections (4 µm) were mounted on silane-treated glass slides and stained with haematoxylin and eosin (HE).

Within the neuropil of the superficial occipital cerebral cortex, the overlying dura mater and leptomeninges, and within the Virchow—Robin spaces adjacent to cerebrocortical vessels, there were several poorly circumscribed and infiltrative masses composed of large round cells. These cells had distinct cell membranes, small quantities of eosinophilic cytoplasm, large round to oval nuclei (8 to 10 µm) with occasional irregular and convoluted indentations, anisokaryosis, condensed and roughly-stippled heterochromatin and prominent and occasionally multiple central nucleoli. An average of six mitotic figures per ×400 field was observed. Seventy percent of the population contained round to oval, homogeneous, pale, eosinophilic glassy cytoplasmic inclusions (5 to 12 µm) that displaced the nucleus eccentrically (Fig. 3).

The spleen, tonsils and all sampled visceral and peripheral lymph nodes were diffusely infiltrated and there was transmural infiltration within several sites throughout the small intestine, with numerous infiltrative nodules within the renal cortices and lungs. The proportion of neoplastic cells containing the brightly eosinophilic cytoplasmic inclusions in different organs was approximately 20% in the lung, 40% in the small intestine, 50% in each of the spleen,

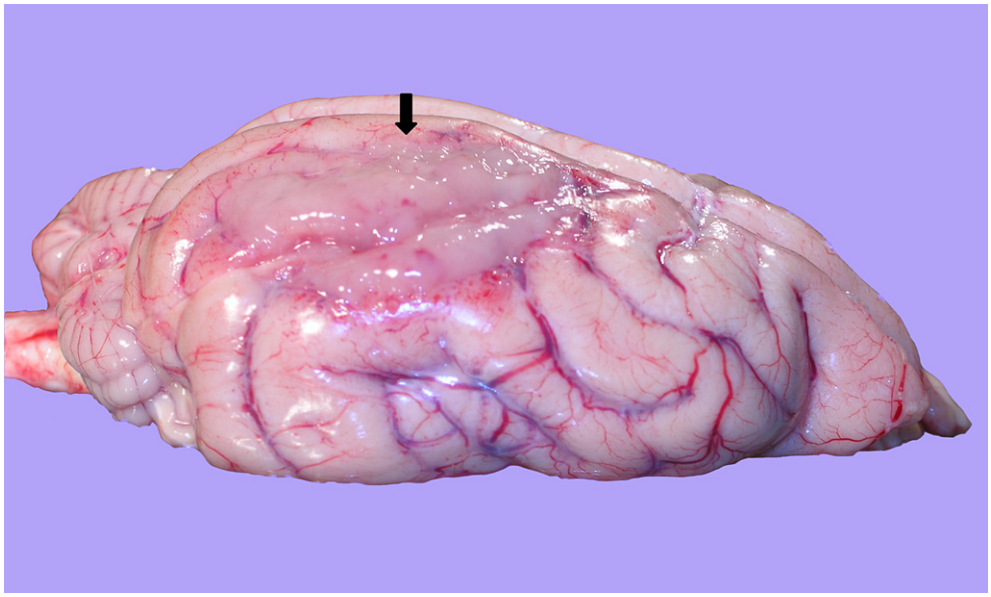

Fig. 2. Brain: right lateral aspect. Focal, poorly-demarcated, light tan, 5 × 3 cm soft mass in the right parietal lobe (arrow).