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## Short Communication

## Extradural spinal cord lesion in a dog: First case study of canine neurological histoplasmosis in Italy

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## ABSTRACT

A 7-year-old intact male mixed dog was presented with a history of acute and progressive paraparesis. Abnormal clinical signs consisted of non-ambulatory paraparesis, hind limbs hypertonia and severe thoracolumbar pain. Magnetic resonance imaging demonstrated an isointense in T1 and T2 WI epidural lesion, with good contrast enhancement, extending from T-10 to T-13. Laminectomy was carried out to remove the epidural mass. Histological examination revealed a pyogranulomatous lesion characterized by numerous macrophages containing yeast-like Grocott and PAS-positive bodies. Immunohistochemistry and PCR performed on formalin-fixed paraffin-embedded tissue confirmed *Histoplasma capsulatum* as the causative agent.

*H. capsulatum* has a worldwide distribution in temperate and subtropical climates but its presence as an autochthonous fungus in Europe is now recognized. To the authors' knowledge this is the first report of canine histoplasmosis in Italy with lesion confined to the central nervous system.

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## 1. Introduction

Histoplasmosis is a known mycotic infection of man and animals, caused by the dimorphic soil-borne fungus *Histoplasma capsulatum* (*H. capsulatum*). Soil containing nitrogen rich organic matter such as bird droppings or bat guano promotes the organism growth accelerating its sporulation process (Lyon et al., 2004). The organism exists in the environment as a mycelial form and in the host as a yeast (Brömel and Sykes, 2005) of 2–4 μm in diameter surrounded by a 4 μm thick wall (Olson and Wowk, 1981; Sanford and Straube, 1991). *H. capsulatum* has a worldwide

distribution in temperate and subtropical climates and it is endemic in the Ohio River and Mississippi River valleys in North America, Mexico, Argentina, Brazil, Colombia, Venezuela and in other tropical countries in Southeast Asia and sub-Saharan Africa (Chakrabarti, 2007). Histoplasmosis also occurs sporadically outside recognized endemic areas, like Canada (Sanford and Straube, 1991), Australia (Mackie et al., 1997) and Central California (Jhonson et al., 2004). Canine histoplasmosis can generally affect dogs of all ages but it is reported predominantly in young animals, with a mean age of 4.3 years (Mitchell and Stark, 1980; Wolf, 2006). Sporting and working canine breeds and more specifically Terriers, Pointer, Weimaraners, and Brittany Spaniels are reported at increased risk for histoplasmosis (Clinkenbeard et al., 1989). *H. capsulatum* is primarily acquired via aerosol exposure with the inhalation of microconidia or hyphal fragments

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(Nosanchuk and Gacser, 2008). It produces a wide spectrum of diseases ranging from a mild influenza-like illness to disseminated forms virtually involving any tissue (Nosanchuk and Gacser, 2008). CNS is protected by a mechanical barrier from mycotic colonization. However in suitable condition *H. capsulatum* can reach the CNS by a hematogenous route or when the anatomic barrier is breached by trauma, surgery or by direct extension from paranasal sinus or ear canal (Chakrabarti, 2007).

In this report we describe a case of canine histoplasmosis occurring as an isolated spinal cord extramedullary lesion in Southern Italy.

## 2. Case description

A 7-year-old, intact male, mixed dog was referred to the “Pingry” Veterinary Hospital of Bari (Italy) with a history of acute and rapidly progressive paraparesis. The dog lived in a private kennel with other sixteen dogs. Clinical signs consisted of non-ambulatory paraparesis, hind limb hyper-tonia, and severe thoracolumbar pain. Complete blood count and serum biochemistry profile revealed mild hypergammaglobulinemia (21%, range 6.4–14.5%), increase in the platelet count ( $476 \times 10^3/\mu\text{l}$ , normal range  $176\text{--}479 \times 10^3/\mu\text{l}$ ) and in the fibrinogen degradation products (FDPs) ( $>20 \mu\text{g/ml}$ , normal range  $<5 \mu\text{g/ml}$ ). Thoracic radiographs were unremarkable. Magnetic resonance imaging (MRI) of thoracolumbar spine was performed under general anaesthesia with sagittal and transverse Fast Spin Echo

T2-weighted sequences, dorsal and transverse Spin Echo T1-weighted sequences, before and after intravenous administration of paramagnetic contrast medium, dorsal 3D HYCE sequences, and with transverse fast STIR sequences. Magnetic resonance imaging demonstrated an infiltrative-expansive extradural lesion  $72.9 \text{ mm} \times 3.4 \text{ mm} \times 7.7 \text{ mm}$  in size, extending from T10 to T13 spinal cord segments. The mass was isointense in T1 and T2 WI and showed good contrast enhancement (Fig. 1). An irregular hyperintensity was observed in T13 paravertebral muscles (Fig. 1). Based on MRI findings the main differential diagnoses we considered for the spinal mass were extradural tumour, inflammatory lesion involving epidural fat, and granuloma-like mass. The dog was submitted to T10–T13 laminectomy to remove the epidural mass. After surgical excision the lesion was fixed in neutral-buffered 10% formalin for histopathological examination. A sample collected from paravertebral muscles was also submitted to optic microscopy. Tissue samples were routinely processed, embedded in paraffin, cut at  $5 \mu\text{m}$ , and stained with haematoxylin and eosin (HE). At histological examination the lesion consisted of neutrophilic and epithelioid macrophagic aggregates plunged in reactive collagen connective tissue (Fig. 2a). The macrophages had many small oval or round-shaped yeast-like cells in the cytoplasm. The yeast-like cells were  $2\text{--}4 \mu\text{m}$  in diameter, and showed a lightly basophilic body surrounded by a clear zone or “halo” which was encircled by thin, poorly stained cell wall. These organisms were positive for

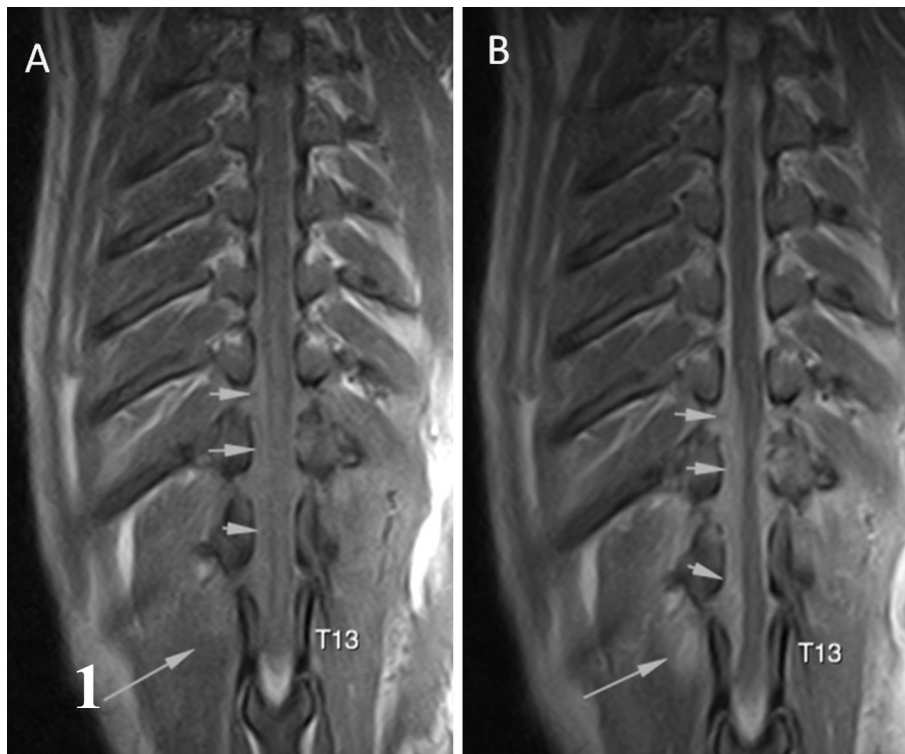


Fig. 1. Magnetic resonance imaging. Dorsal T1-weighted (A) and T2-weighted (B) images show the isointense extradural lesion growing from T10 to T13 (arrowheads). Irregular intensity is also evident in paravertebral muscles (arrow).

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