

## Systemic canine histoplasmosis: A case report from Ecuador



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### ABSTRACT

Histoplasmosis is a zoonotic systemic mycosis caused by *Histoplasma capsulatum*. We report a case of a female canine, 4 years old, presenting multifocal lymphadenitis and skin and gingival lesions, in Ecuador. Based on cytological, histopathological, histochemical analyses, fungal culture and DNA sequencing of the ITS region of the fungus, the diagnosis confirmed the presence of *H. capsulatum* as the agent of infection. The treatment plan included ketoconazole with a satisfactory outcome.

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## 1. Introduction

*Ajellomyces capsulatus* is the holomorphic name for *Histoplasma capsulatum*, the etiological agent of histoplasmosis, a systemic mycosis. This thermo-dependent dimorphic fungus is soil-borne [1] and in organic nitrogen rich soils fungal growth and sporulation are accelerated [2,3]. Therefore, places where bird and bat droppings enrich the soil with organic nitrogen, represent a potential environment for proliferation of the fungus and increases the risk of infection [4,5]. In this environment, the fungus exists in mycelial form, whereas in the host it exists as a yeast-like form [6,7].

Commonly, exposure occurs when histoplasma spores become airborne and are inhaled, less frequently, ingestion and infection via open wounds can occur [4,8–10]. In its most severe form (disseminated) histoplasmosis can affect almost any part of the body; which depends strongly on the genetic predisposition of the subject, according to recent experimental evidence [7,11]. Severe clinical disease can result from high doses of infectious spores or if the infected host is immunocompromised [10].

*H. capsulatum* is distributed worldwide [3] with certain evidence of its origin in Latin America [12]. Despite this knowledge, there are still few reports published about histoplasmosis in

domestic animals in this region [9,13–15], considering that it is common in Latin America for domestic animals to live in backyards with poultry where the potential risk of infection is higher. Here, we report a case of histoplasmosis with multifocal lymphadenopathy, skin and gingival lesions in a dog that lived in close proximity to bird guano, used as fertilizer.

## 2. Case

A 4-year-old female sterilized dog (Schnauzer) presented initially mild gastrointestinal problems (mucous diarrhea) and respiratory affections (sneezing), which were treated with oral hydration (day 0) after veterinary evaluation. In day +20, the patient returned to the veterinary hospital because several dermatological problems appeared. These consisted of multiple crusted papules located over lips, back of head, neck, thorax and lumbar region (Fig. 1a). Furthermore, the dog presented swelling of submandibular and popliteal lymph nodes and left maxillary gingiva (Fig. 1b). Hematologic findings showed thrombocytopenia (44 K/ $\mu$ L). No imagenological abnormalities were identified.

Cytological examination using Diff-Quick<sup>®</sup> staining method of a fine needle aspiration of papules and submandibular and popliteal lymph nodes, showed mixed cellularity represented by lymphocytes, plasma cells, neutrophils, eosinophils and epithelioid histiocytes in the background inflammatory component. The latter

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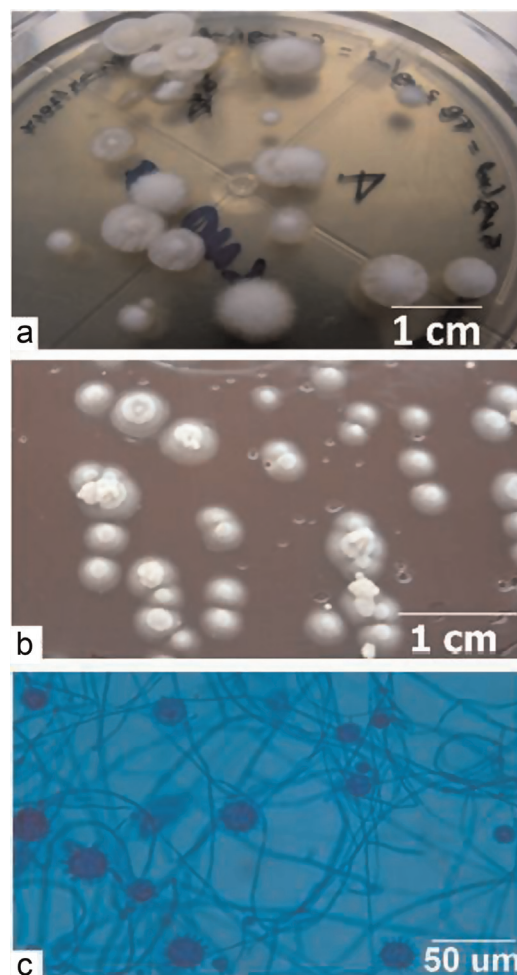


**Fig. 1.** Macroscopic view of the lesions (day +20). (a) Dorsal neck skin presented multiple crusted papules and (b) gingiva of left maxilla is erythematous and swollen.

contained numerous rounded to oval yeast-like structures in their cytoplasm, 2–4 μm in diameter, surrounded by a thin clear halo and an eccentric purple core of crescent shape, compatible with *H. capsulatum* (Fig. 2a).

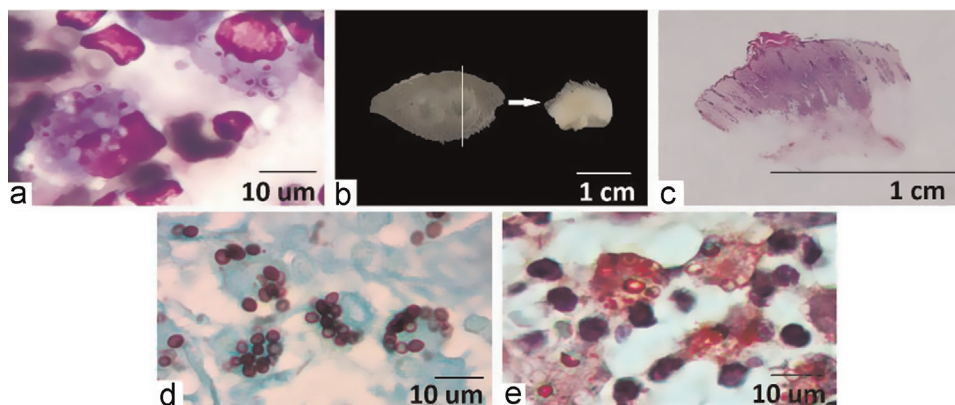
Excisional biopsy of a skin nodule located in the dorsal neck was submitted for histopathology. Macroscopic examination revealed that the sample consisted of crusted papules composed of a well-defined, solid, yellow and firm granuloma (Fig. 2b). Microscopy showed a partially delimited non-encapsulated pyogranuloma inside the epidermis, dermis and adipose tissues (Fig. 2c). The inflammatory cells were mainly comprised of neutrophils (many degenerated), epithelioid macrophages (some binucleated) and a few reactive lymphocytes. Inside the macrophages' cytoplasm, numerous yeast-like structures (2–4 μm in diameter) were present, with shapes from round to oval, and surrounded by a clear thin halo, and an eccentric nucleus, compatible with yeast-like structures of *H. capsulatum*.

Fungal samples obtained by fine needle aspiration of



**Fig. 3.** *Histoplasma capsulatum* cultures. Fungal samples were obtained by fine needle aspiration of submandibular and popliteal lymph nodes. (a) *H. capsulatum* filamentous form in Potato Dextrose Agar (PDA) cultured for 28 days at 25 °C; (b) *H. capsulatum* yeast-like form in Brain Heart Agar (BHA) cultured for 28 days at 35 °C and (c) microscopic structure of filamentous form of *H. capsulatum* stained with a drop of methylene blue (400 ×).

submandibular and popliteal lymph nodes were cultured in Potato Dextrose Agar (PDA) and Brain Heart Agar (BHA)+5% human blood; both media were supplemented with antibacterial agents, amoxicillin/clavulanate 5 μg/mL, tobramycin 2 μg/mL and chloramphenicol 5 μg/mL. In order to obtain the filamentous form of



**Fig. 2.** Cytological and histopathological examination. (a) Diff-Quick® stain of fine needle aspiration of submandibular and popliteal lymph nodes, samples show *H. capsulatum* structures within macrophages (1000 ×); (b) skin biopsy; (c) focal pyogranulomatous dermatitis, hematoxylin-eosin stain (1 ×); (d) Yeast-like structure of *H. capsulatum* inside macrophages, Grocott's methenamine silver stain (1000 ×) and (e) Yeast-like structure of *H. capsulatum* inside macrophages, Periodic acid-Schiff stain (1000 ×).

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