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SHORT COMMUNICATION/NOTA PRÉVIA

Toxoplasmosis in emperor tamarin (*Saguinus imperator*): case report

Toxoplasmose em sagüi-de-bigode (*Saguinus imperator*): relato de caso

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SUMMARY

A case of toxoplasmosis in an adult male emperor tamarin (*Saguinus imperator*) is reported. The primate was found dead and no clinical sign was noticed before death. Pathological findings included moderate to severe interstitial pneumonia, multifocal necrotizing hepatitis and multifocal to coalescing necrotizing lymphadenitis. Immunohistochemistry assays (strepto-avidin-biotin-peroxidase) performed on paraffin embedded tissues (lung, lymph nodes, liver, spleen, heart, intestine and adipose tissue) were strongly positive for *Toxoplasma gondii*.

UNITERMS: *Toxoplasma gondii*; Primates; *Saguinus imperator*; Immunohistochemistry.

Toxoplasmosis is an acute and frequently fatal zoonotic disease caused by *Toxoplasma gondii,* an obligatory intracellular parasite. It can be transmitted congenitally or by ingestion of contaminated foodstuff[8].

Toxoplasmosis has already been described in New World non-human primates[1,3,6,7,13]. Due to factors not yet completely understood, neotropical primates seem to be much more susceptible to the disease than Old World non-human primates[2,6,9,10].

This report describes a case of toxoplasmosis in an adult male *Saguinus imperator*, the emperor tamarin, belonging to the Fundação Parque Zoológico de São Paulo (FPZSP) primate collection. To our knowledge, this disease has never been reported in this South American primate species.

The monkey was fed twice daily with fruits, vegetables, boiled eggs and cooked meat (frozen beef). Crickets (*Grillus* sp.) and *Tenebrio* sp. larvae were offered weekly. Water was offered *ad libitum*. The animal was kept along with another tamarin of the same species in a metal cage, daily cleaned and exposed to sunlight on a regular basis. No clinical signs were noticed previous to death. *Postmortem* examination revealed regular body condition, mild hidrotorax, enlargement of the liver and mesenteric lymph nodes, pulmonary and splenic congestion. Other organs, including cerebrum, cerebellum, heart, intestines and kidneys were grossly unremarkable. Fragments from multiple organs were fixed in 10% buffered formalin, embedded in paraffin, sectioned at 4-6 mmm, and stained with hematoxylin-eosin (HE).

Microscopically there were multiple lesions, including subacute, diffuse, moderate to severe interstitial pneumonia with desquamation of pneumocytes and exudation of alveolar macrophages into the alveolar lumen. Pneumocyte type II proliferation was seen, along with edema and congestion (Fig.1). The liver had multifocal, randomly distributed, acute, moderate to severe necrotizing hepatitis (Figs. 2 and 3). Other alterations included coalescing necrotizing lymphadenitis; necrotizing follicular splenitis with lymphoid depletion; subacute, diffuse enteritis. No histopathologic lesions were observed in the brain, cerebellum, adrenals, urinary bladder, tongue and salivary glands.

Microscopically associated with the lesions observed in the lungs, liver, mesenteric lymph nodes and spleen there were oval-shaped to piriform structures, with a central

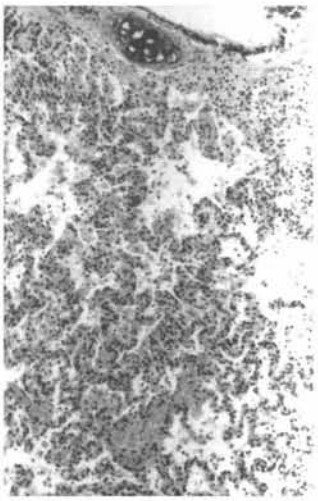

Figure 1
Lung, note the presence of moderate interstitial pneumonia, edema and congestion. Hematoxilin and Eosin stain (HE). 34x.

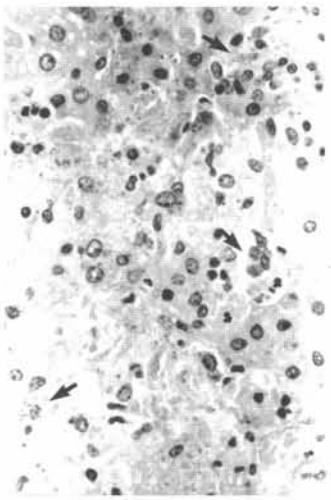

Figure 2
Liver, note the severe necrotizing hepatitis, with intralesional *Toxoplasma gondii* organisms (arrows). Hematoxilin and Eosin stain (HE). 138,5x.

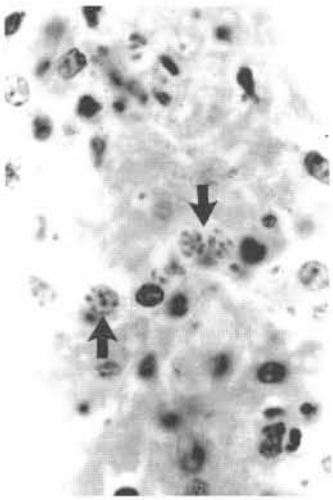

Figure 3
Liver, note oval to piriform structures containing central endossome. (*Toxoplasma gondii*). Hematoxilin and Eosin stain (HE). 138,5x.

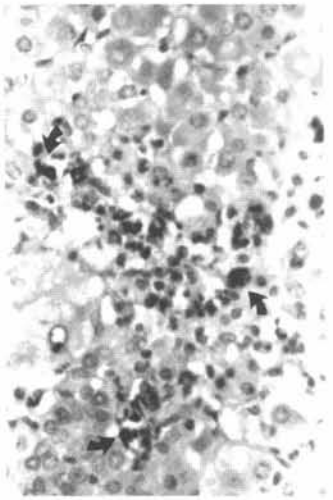

Figure 4
Adrenal, strongly positive immunohistochemical reaction for *Toxoplasma gondii* (arrows). Strepto-avidin-biotin Complex. 138,5x.

endossome, morphologically compatible with *T. gondii* organisms[11]. These zoites were seen individually or forming small groups.

Immunohistochemistry assay for *T. gondii* was performed on available paraffin-embedded fragments of lung, lymph nodes, liver, spleen, heart, intestine and adipose tissue, using a previously described method[14] and modified by Bourne[4] and Gimeno[12]. The polyclonal antibody to *T. gondii* was acquired from Dako (Carpinteria, CA). The results were strongly positive for *T. gondii* (Fig. 4).

Toxoplasmosis can affect all homoeothermic animals. Domestic and wild felids are the definitive hosts; cats and other mammals can act as intermediate hosts[11]. Usually it is a severe and generalized infection in New World primates, being frequently fatal. *T. gondii* can be transmitted to intermediate hosts both horizontally, by ingestion of contaminated foodstuff or transplacentally.

In the present case, it is not clear how the tamarin was infected. Due to its age, the possibility of transplacental infection was ruled out. A common described source of horizontal infection is uncooked meat[8]. However, all beef offered to the primates at FPZSP was cooked before frozen. These combined procedures are usually efficient in preventing contamination through ingestion of oocysts and/or cysts[9].

The gross and microscopic lesions observed in the present case are similar to the ones previously described in New World primates, including acute and severe pneumonia, associated with edema and congestion; mesenteric necrotizing-hemorrhagic lymphadenitis, splenitis and acute hepatitis. The characteristic microscopic lesion observed in toxoplasmosis is multifocal necrosis induced by tissue multiplication of tachyzoites, associated or not with inflammation and involving multiple organs[5,7,11].

The differential diagnosis includes several protozoal and fungal organisms. *T. gondii* tachyzoites can resemble *Histoplasma* sp. and *Leishmania* sp. in macrophages and *Trypanosoma* sp. in muscular tissue[2]. *T. gondii* bradyzoites in tissue cysts must be differentiate from pseudocysts of *Encephalitozoon cuniculi* in different organs and from *Sarcocysts* sp. in muscles.

Immunohistochemistry clearly demonstrated the nature of the agent. The results obtained were strongly positive for *T. gondii*.

Due to the severity and high mortality observed in toxoplasmosis outbreaks in New World primates[5,6,7], rigorous control procedures are strongly recommended to prevent the occurrence of this important disease among neotropical primates collections.

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RESUMO

É relatado um caso de toxoplasmose ocorrido em sagüi-de-bigode (*Saguinus imperator*). O animal foi encontrado morto sem que tenham sido observados sinais clínicos. Achados de necropsia e histopatológicos incluíram pneumonia intersticial moderada, hepatite necrótica multifocal e linfadenite necrosante multifocal a coalescente. A técnica imunoistoquímica (strepto-avidina-biotina peroxidase) realizada em pulmão, fígado, linfonodos, baço, coração, intestino e tecido adiposo foi fortemente positiva para *Toxoplasma gondii*.

UNITERMOS: *Toxoplasma gondii*; Primates; *Saguinus imperator*; Imunoistoquímica.

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