

CANINE TOXOPLASMOSIS *

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Toxoplasmosis in the dog appears to be extremely rare. Mello¹ in Italy, in 1910, described the first case. The symptoms observed in this animal were anorexia, weakness, anemia, emaciation, dry and firm skin, poor development of the skeleton, atrophy of the muscles, respiratory disturbances, diarrhea, vomiting, and a weak pulse.

Carini,² in 1911, upon microscopic examination of the lungs, spleen, liver, kidneys, and bone marrow of a dog, was able to demonstrate organisms having the characteristics of *Toxoplasma cuniculi*. He was able to reproduce the condition in pigeons.

Yakimoff and Kohl-Yakimoff,³ in 1911, reported a case in a dog. The injection of an emulsion of bone marrow into 8 white mice, 4 rats, 4 rabbits, 3 dogs, and 2 pigeons produced death in the mice, pigeons, and 2 dogs, and organisms were isolated from the organs.

Nicolau and Kopciowska,⁴ in 1935, found the organisms of toxoplasmosis in the brain, bone marrow, spleen, lymph nodes, lungs, small intestine, colon, and cardiac muscle of a dog dead from this disease.

Machattie,⁵ in 1939, observed 2 cases of toxoplasmosis in dogs. At autopsy one animal showed marked congestion of the lungs and enlargement of the spleen, while the other exhibited necrosis of the lungs and liver.

Olafson and Monlux,⁶ in 1942, reported the first cases in the dog in the United States. In addition to describing the disease in 4 dogs, they also described it in a cat and a sheep. The infection was characterized by a sudden onset, high temperature, extreme depression, and a short course. The tissues most commonly attacked were lymph nodes, liver, lungs, and intestines. The organisms occurred in a variety of cells: Monocytes, hepatic cells, vascular endothelium, smooth muscle cells, and pancreatic epithelium.

Perrin,⁷ in 1943, made a study of the protozoan organisms toxoplasma and encephalitozoon, which are easily confused with each other. He injected these organisms into mice, guinea-pigs, hamsters, and rats. He used special stains for bringing out differential characteristics of the two in sections of tissue and smears.

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Hagan,⁸ in 1943, gave a good summary of the disease as it occurs in animals.

The illustrative case which we wish to report is not recent, going back to 1924.

REPORT OF CASE

A young fox terrier, weighing 10 lbs., was brought to the clinic for examination. Pneumonia was diagnosed and the animal died despite treatment.

AUTOPSY FINDINGS

At autopsy the lungs were dark red and showed numerous light gray foci. These pneumonic nodules suggested tuberculosis, but no tubercle bacilli were demonstrated. The liver displayed numerous dull-gray, pin-point lesions which, with the congestion, gave it a nutmeg appearance. The mucosa of the stomach was very congested and revealed numerous ulcers, measuring from 1 to 10 mm. in diameter. Several small ulcers were present in the intestinal mucosa. There were several hemorrhages, the largest measuring 12 mm. in diameter. Other organs and tissues were somewhat congested.

Histopathologic Findings

Microscopically, the lungs showed a very acute and severe pneumonia. There was extensive congestion, and a large number of alveolar lumina contained erythrocytes. In other areas there was serofibrinous exudate. The accumulation of fibrin in the alveolar walls and lumina was somewhat patchy. Some polymorphonuclear leukocytes and macrophages were present, with an occasional macrophage revealing cytoplasm filled with toxoplasma. Several giant cells were present. The bronchi and bronchioles showed some desquamation of the epithelium and hemorrhagic exudate in the lumina.

In the liver there were very extensive areas of patchy necrosis (Fig. 1). There were numerous hepatic cells at the edges of the necrotic areas that appeared to be invaded by individual toxoplasma. A few Kupffer cells had large numbers of parasites in the cytoplasm (Fig. 2).

The intestines showed an ulcer extending into the submucosa and surrounded by an inflammatory process. With the necrotic debris were large numbers of polymorphonuclear cells, some lymphocytes, fibrin, and some hemorrhage. Outside of this zone was another characterized by large macrophages, lymphocytes, and some congestion. This inflammatory zone extended through the submucosa, muscle layers, and serosa. The smooth muscle layers showed marked atrophy and necrosis. There were numerous toxoplasma present in smooth muscle cells, and in the

cytoplasm of many macrophages and occasional giant cells (Fig. 3). The walls of some arteries, especially the media, contained them.

The organisms appeared round or oval, and were about 2 to 4 μ in length and 1.5 to 2.5 μ in width. Each had an eccentrically placed nucleus, staining deep blue. The cytoplasm was stained uniformly pink or pale blue (hematoxylin and eosin). The toxoplasma were found free, loosely grouped within the cell cytoplasm, or in compact, cyst-like accumulations. It appeared that these cyst-like accumulations were contained usually in the cytoplasm of macrophages or giant cells (Fig. 4). The isolated organisms showed their outlines a little more clearly than did those in the cysts.

After comparing the pathologic findings and the staining characteristics of the parasites of this case with those described by Perrin,⁷ we consider the organism to be toxoplasma.

SUMMARY

An acutely fatal disease in a dog was characterized by pneumonitis, gastric and intestinal ulcers, and foci of hepatic necrosis. The parasites found in the microscopic sections had the structure and distribution described for *Toxoplasma cunicula*.

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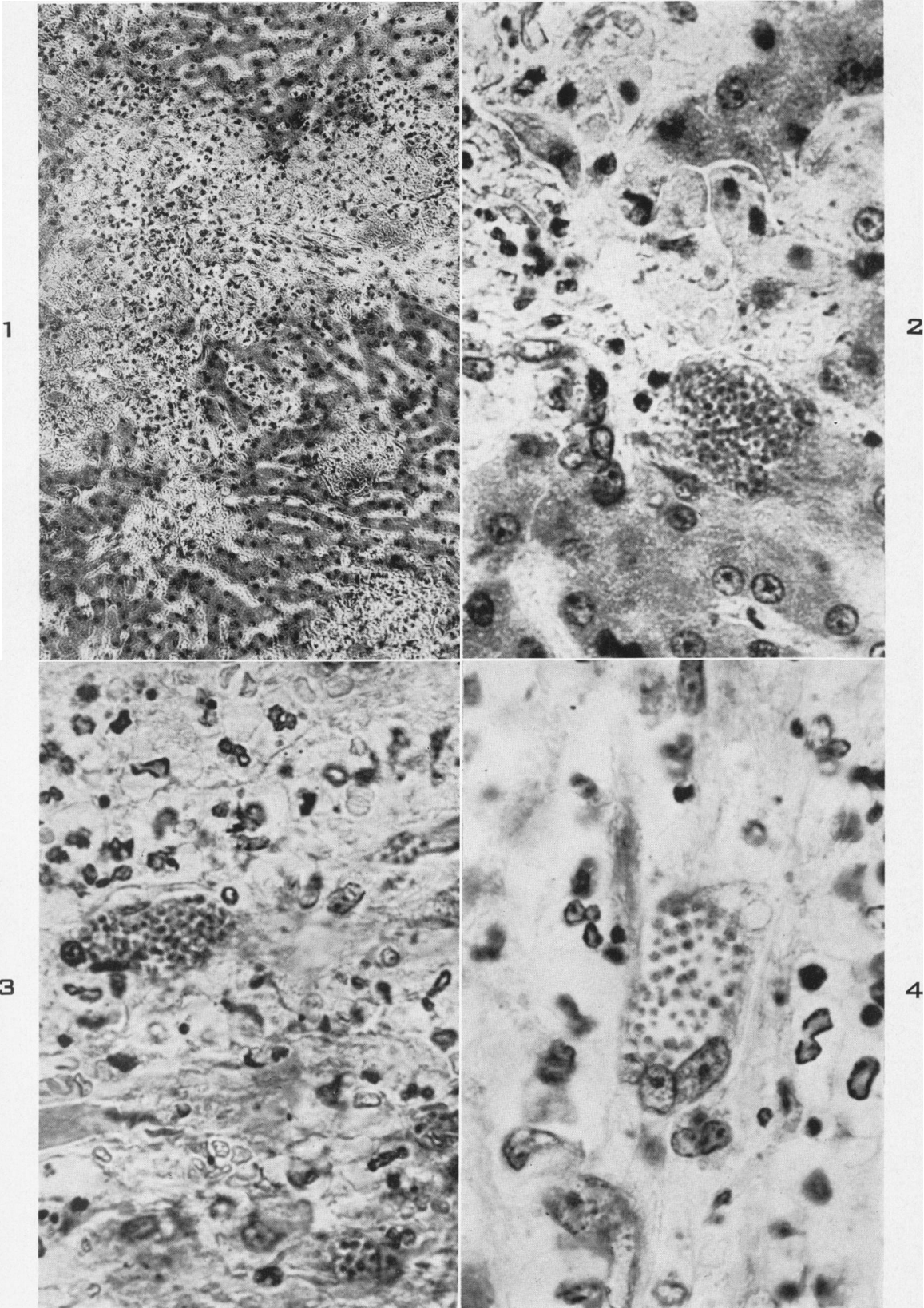
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[Illustrations follow]

DESCRIPTION OF PLATE

PLATE 85

- FIG. 1. Liver, showing patchy areas of necrosis. Hematoxylin and eosin stain. $\times 160$.
- FIG. 2. In the liver, a macrophage at the margin of a necrotic area is filled with toxoplasma. Hematoxylin and eosin stain. $\times 780$.
- FIG. 3. The intestinal wall shows necrosis of the muscle and macrophages containing the organisms. Hematoxylin and eosin stain. $\times 780$.
- FIG. 4. A giant cell filled with toxoplasma, as seen in the intestinal muscle. Hematoxylin and eosin stain. $\times 1240$.



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