

## ACTINOMYCOSIS IN A *HYDROCHOERUS ISTHMIUS* GOLDMAN (ISTHMIAN CAPYBARA OR PONCHO)<sup>1</sup>

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The purpose of this paper is to report a case of Actinomycosis in a captive *Hydrochoerus isthmus* Goldman (Isthmian Capybara or Poncho) at the Gorgas Memorial Laboratory, with primary apparent localization of the infection in a tumor-mass under the liver.

*Report of the case:* male animal, nine years of age, of the species *H. isthmus*, was taken from the Darien Province, Republic of Panama, to the Gorgas Memorial Laboratory on September 25, 1939, where it was kept in captivity, with other animals, for experimentation. During this time it had no disease, and its food was prepared and controlled by the caretaker of the laboratory. The animal ate this food well.

His food consisted of a mixture of apples, bananas, melon, corn, sugar cane, bread and cooked rice. In addition, it ate grass in the yard of the laboratory as well in the cage where he was kept at night.

The animal grew and was in good health in the laboratory for six years and eight months; at the end of this time it was noted that the animal presented anorexia and started to lose weight and was lame in the right fore leg. In view of a possible tuberculous infection the animal was killed to determine the exact etiology of its disease.

*Autopsy* revealed the following *macroscopic findings*.<sup>4</sup>

Male Poncho, Lab. No. 15, admitted to the animal house of the Gorgas Memorial Laboratory on September 25, 1939. At that time it weighed 36 lbs. and was considered as a half-grown animal since the average weight of fifteen adult Capybaras was 65 lbs.

The animal was killed with an anesthetic on August 2, 1946. Weight at time of death was 43 lbs.

*External Appearance:* Emaciation; the skin over the left shoulder was almost hairless and the skin was parchment-like, hard and wrinkled. The sole of the right fore-foot was swollen.

*Head and neck:* The skull was saved for a museum specimen and was not opened. The brain, therefore, was not examined. Eyes, tongue and neck structures were all normal.

*Thorax:* The pleura, visceral and parietal, of both lungs showed many miliary milk-white plaques. The left lung revealed many more than the right one.

<sup>1</sup> The authors are much indebted to Dr. Herbert C. Clark, Director of the Gorgas Memorial Laboratory, for the excellent facilities provided for this work and his valuable suggestions.

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<sup>3</sup> From the Gorgas Memorial Laboratory.

<sup>4</sup> Gross notes by Dr. Herbert C. Clark, Pathologist and Director of the Gorgas Memorial Laboratory.

Both lungs were inflated but the base of the right lung contained two white nodules that were snow white on section and each was about 1 cm. in diameter. The thoracic lymph nodes were slightly enlarged and the sets in both axillary spaces were greatly enlarged.

*Heart and pericardium:* The mitral valve was thin and transparent except for the large leaflet which contained two thin acute vegetations about 3 mm. in diameter. The myocardium and pericardium were normal. The aorta and its large branches were normal. Oesophagus was normal. Thymus gland was normal.

*Abdomen:* The peritoneal fluid was as clear as water and about 6 ounces in amount. No flukes or other parasites were found.

*Stomach and intestines:* Normal. No parasites.

*Liver:* The liver, gallbladder and ducts were normal. Attached to the under surface and pushing upward into the Spigelian lobe was a snow-white mass as large as an English walnut and on section it contained a yellow-white, dry cheesy material. The other epigastric glands were enlarged but not cheesy in character.

*Spleen:* Normal consistency, color and size. No adhesions.

*Kidneys and Adrenals:* Normal.

*G. U. system:* All organs normal.

The *microscopic examination* of the *tumor* located *under the skin* of the right fore-foot showed actinobacilliform masses, resembling clubs, in the periphery of what appeared to be a Ray-fungus, as reported by one of us in cases of Pulmonary Actinomycosis (1) and Madura Foot (2). Around the border of the masses there was intense leucocytic infiltration of neutrophils and especially of polynuclear eosinophils, with foam cells, limited peripherally by a distinct capsule of adult connective tissue. In the center of the granuloma and within the space limited by the *clubs* were many bodies which by their form and especial distribution we suspected as being spores.

Lobulated nodules were observed, with peri-capsular adult connective tissue. In some of the lobules thus formed, we noted foam cells and marked polymorphonuclear eosinophil infiltration.

In the center of other lobules and forming the center of another granuloma (fig. 1), there were adult giant cells, some with and others without phagocytized actinobacilliform masses.

Some granulomas presented in the center, round, spore-like bodies and branching filaments coming out in a mass of foam cells (fig. 2), and eosinophil infiltration surrounded by a capsule of fibrous connective tissue.

Not all the granulomas were of the type III described as adult (3). In fact, in the same tumor-mass, there were granulomas with young giant cells, described as type I (4), generally surrounded by young connective tissue. None of these young giant cells contained *clubs*.

The round *tumor* located *under the liver* was surrounded by a thick capsule of adult connective tissue with eosinophil infiltration. The nucleus of the nodule was formed by necrotic tissue in which we could distinguish thick fibrous tissue

cords with irregular distribution; irregular bodies that appeared like degenerated clubs according to the findings previously reported, but in itself not sufficient to permit a definite diagnosis; also, a large infiltration by polymorphonuclear eosino-

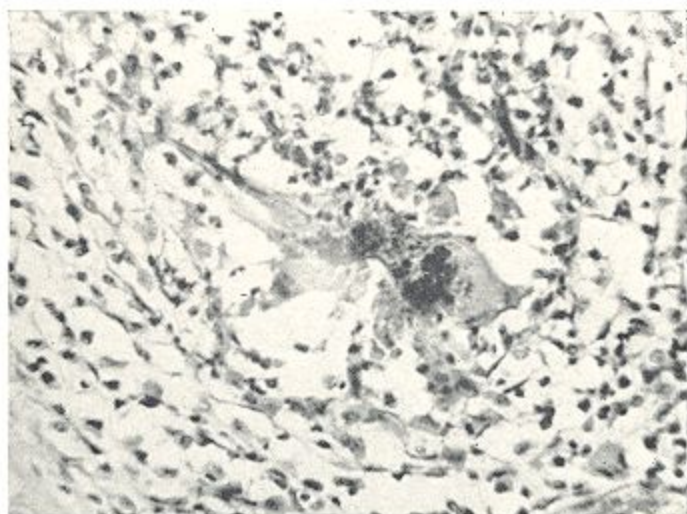


FIG. 1. ADULT GIANT CELL WITH PHAGOCYTED ACTINOBACILLIFORM AND SPORES MASSES.  $\times 200$

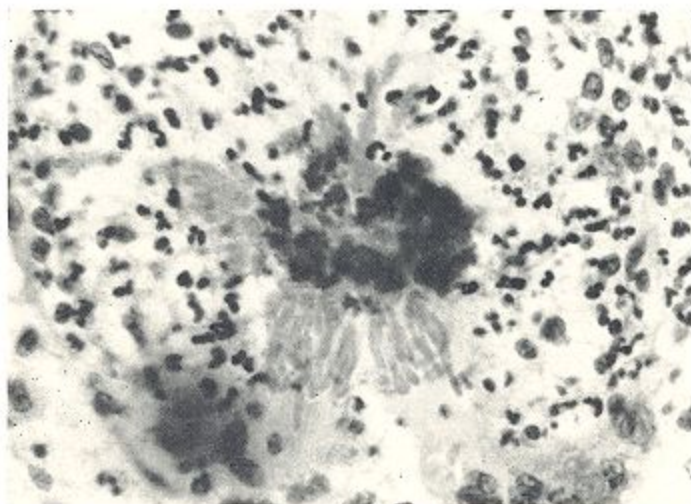


FIG. 2. ROUND SPORE-LIKE BODIES AND BRANCHING FILAMENTS.  $\times 500$

philic cells in the periphery of the tumor. There was no invasion of the liver tissue.

The tumors located in the base of the right lung were encapsulated by a thick layer of adult fibrous connective tissue, at the periphery of which there was a layer of young connective tissue with marked infiltration by round cells and especially by eosinophil cells. The nucleus of each tumor-mass was formed by

necrotic tissue in which it was not possible to establish any cellular differentiation. There was congestion of the lung vessels around the tumor.

We did not see any pathology in the lymph nodes and spleen with the exception of marked eosinophil infiltration.

The examination of a piece of striated muscle fibres showed a large Sarcocystis of about 0.4 cms., with the typical microscopic arrangement reported (5), as was identified by Dr. Herbert C. Clark of this laboratory.

*Animal Inoculation:* With the findings previously reported several portions of the tumor-mass located under the skin of the right fore-foot and liver (which had been preserved for 10 days in a 10% formalin solution) were washed in running water to be cultured and inoculated, in spite of the fact that negative results have been reported in similar conditions. At the end of this period, the



FIG. 3. GRAM NEGATIVE ACTINOBACILLIFORM BODIES.  $\times 750$

tissues were triturated in normal saline solution and 1 c.c. of fine suspension was inoculated subcutaneously in a rabbit, a mouse and a guinea pig; and equal doses were injected intraperitoneally in a mouse and a guinea pig.

The investigation, as might have been expected, was negative.

*Culture:* A portion of the triturated tumor tissue located under the skin of the right fore-foot was inoculated in Sabouraud's prouve medium and incubated at room temperature (between 26 and 30 degrees C.), aerobically and anaerobically. Daily observations were made of the plates for 28 days. The investigation was negative.

*Staining characteristics:* Examination of the organism encountered regarding its staining properties with the colorants commonly used in pathology (hematoxylin and eosin) showed (fig. 1), that the central area of what resembled Ray-fungus, consisting of the round sporocytic bodies, stained deeply with hematoxylin; and that the peripheral portion, formed of the actinobacilliform rods, had a marked affinity for eosin.

It was also demonstrated that the organism was (fig. 3) Gram-negative (6) and acid-fast.

## COMMENTS

Considering the time the animal was in captivity in the laboratory and the site of localization of the tumor-mass with actinobacilliform bodies we think that the animal acquired the infection during captivity.

Autopsy of the animal, performed twenty minutes after it was killed, showed a tumor-mass under the skin of the right fore-foot in which we found microscopically an organism like Ray-fungus, with actinobacilliform bodies, peripherally located, which were Gram-negative, acid-fast and had marked affinity for eosin; and by round bodies, centrally located, with marked affinity for hematoxylin.

The appearance of the organism found (fig. 2) gave the impression that the disease of the *H. isthmus* (Capybara) was due to a species of Actinomycosis which we consider, according to its morphology and staining properties, in the family Streptomycetaceae of Waksman and Henrici (7). We were unable to classify the organism more specifically because of negative animal inoculation and culture of the tumor-tissue, which had been preserved for 10 days in a 10% formalin solution.

It is important to call attention to the polymorphonuclear eosinophilic infiltration found in each of the slides prepared of the various tumor-masses found at autopsy. And finally that the histopathologic findings in the tumor masses located under the liver and in the base of the right lung were so similar that it was impossible to distinguish one from the other and that in neither was there found any pathogenic actinobacilliform organism.

## SUMMARY

A case of Actinomycosis is reported in a captive *Hydrochoerus isthmus* Goldman (Isthmian Capybara or Poncho), at the Gorgas Memorial Laboratory.

Staining characteristics showed that the actinobacilliform rods had a marked affinity for eosin and were Gram-negative and acid-fast; and that the central area of what resembled Ray-fungus, consisting of the round sporocytic bodies, stained deeply with hematoxylin; giving the impression that the organism was due to a species of Actinomycosis of the family Streptomycetaceae of Waksman and Henrici (7).

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