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SPONTANEOUS ARTERIOSCLEROSIS IN A BROWN HARE

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Abstract: A free-living brown hare (*Lepus europaeus*) was found to have arteriosclerosis of the thoracic segment of the descending aorta. The lesions were well advanced and resembled Mönckeberg's medial sclerosis. The animal was also suffering from a severe purulent metritis.

INTRODUCTION

Spontaneous lesions of the aorta in rabbits are generally of the type known as Mönckeberg's medial sclerosis. This condition was first recorded in rabbits in 1881 by Israel,[4] who described it as a medial degeneration and calcification, and named it chronic endo-aortitis deformans. This disease which has occurred in experimental rabbits with prevalence varying from 6%[8] or even less up to 45%[2,5,6] is reviewed extensively by Haust and More.[3] The only reference to the disease in wild rabbits is by T-W-Fiennes.[9]

An erroneous report has been perpetuated in the literature[9] that the disease also occurred in a 'hare'. The original paper by Lucien and Parisot[7] actually describes and experimentally induced atheromas in the rabbit, making no mention of a hare at any point.

It is believed that this paper describes the first recorded case of arteriosclerosis in a free-living brown hare.

HISTORY

The specimen, an adult female hare was found on the estate of the Institute for Research on Animal Diseases at Compton on 30th October, 1971. The animal was in a moribund, severely emaciated state and was easily caught and killed.

METHODS

Prior to autopsy, which was performed within 5 hours of death, the hare was weighed, sexed, and bled by cardiac puncture; the eye-lens was also removed for the purpose of ageing, and treated according to the method of Broekhuizen.[1]

Heart-blood and diseased tissues were cultured on ox-blood agar and McConkey's agar at 37C and room temperature for 48 hours.

Tissues for histopathology were fixed in 12% neutral buffered formalin, embedded in paraffin, sectioned at 6 microns, and stained with haematoxylin and eosin, alcian blue and, where relevant, by the methods of Masson, Gram, Verhoeff-Van Gieson, Weigert-Van Gieson, von Kossa and periodic acid-Schiff (P.A.S.). Oil red O stain was used on fixed tissue before it was embedded in paraffin.

RESULTS

a) Necropsy

Externally the animal was extremely thin, and weighed only 2.2 kg (mean for an adult non-pregnant female = 3.3 kg). Lice were present around the back of the neck and the base of the ears.

The weight of the dried eye-lens revealed that this hare was in her second year.

[1] Work performed at the A.R.C., Institute for Research on Animal Diseases, Compton, Newbury, Berkshire, England.

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The abdominal viscera had been displaced anteriorly by grossly distended right and left horns of the uterus which occupied the posterior third of the peritoneal cavity. Both horns showed numerous sacculations approximately 2 cm long x 1½ cm wide, which on opening revealed thick, greenish-yellow pus of the consistency of clotted cream. Considerable adhesions were present between the parietal peritoneum, the mesometrium of both uterine horns and the mesentery of the rectum. The liver showed a few scattered, greyish-white necrotic foci of ½ mm - 1 mm diameter on the surface and also in the parenchyma. The spleen was enlarged by approximately three times and sausage-shaped; no macroscopic lesions were present in this organ. The mesenteric lymph-nodes were slightly enlarged. Both kidneys were apparently normal, whilst the adrenals were markedly enlarged with a total weight of 700 mg (mean norm. for that age of animal = 200 mg. Unpublished observations.)

No abnormalities were observed elsewhere apart from the aorta which upon gross examination showed multiple, white, fibrous, foliate-shaped thickenings of the wall; the size of the lesions varied from 2 mm diameter when roughly circular, to 5 mm long x 2 mm wide irregularly-shaped lesions. On the intimal surface there was a similar pattern with affected areas being whitish, fibrous and slightly raised. Virtually the whole of the thoracic segment of the aorta was affected, the lesions commencing 2 cm anterior to the outlet from the heart, and extending through the diaphragm to 1 cm posterior to the *hiatus aorticus.*

b) Bacteriology

Culture of uterine pus and mesenteric lymph-nodes on blood agar yielded a mixed flora, of which the predominant organism was a gram-positive rod. This was identified on morphological and biochemical characteristics as a species of the genus *Kurthia.* No significant organisms were isolated from the liver or spleen at 37C, nor at room temperature, on either medium.

c) Histopathology

The lesions in the aorta were confined to the *tunica media* which was hyalinized, with only a few elastic lamellae remaining (Fig. 1). In certain areas the increase in wall thickness, due to the medial lesions, caused the intima to bulge into the lumen. Frequently only the endothelium was present over the lesions.

In the most recent areas to be affected, the nuclei of the smooth muscle cells were pyknotic and surrounded by pale, eosinophilic, necrotic cytoplasm. Also in these areas the interlamellar spaces were widened and the elastic membranes were frayed and interrupted (Fig. 2). In slightly more advanced lesions which represent areas of active repair, there was fibroblast infiltration (Fig. 3) with the occasional foreign-body giant cell present with four to six nuclei. There was a noticeable absence of polymorphonuclear leucocytes and only a few macrophages. In most areas a few intact lamellae were present, but they were irregularly thickened, straightened, or increasingly wavy and encrusted with fine calcium deposits. The thickening was presumably due to oedema in the damaged lamellae. Mineralised deposits were present in a finely dispersed granular form in all but the earliest of lesions. The deposition tended to be concentrated along the lines of the remaining lamellae, but was present throughout the damaged zones (Fig. 4). The arrangement of certain nests of cells in the midst of these organising areas was strongly reminiscent of chondoblasts in cartilage and could well have represented early cartilage formation, especially in view of the concentration of P.A.S.-positive material around them.

Lipid material was not identified in any of the lesions.

DISCUSSION

The spontaneous lesions in the aorta of the free-living hare described in this paper were not of an atherosclerotic variety as seen commonly in primates. The condition was one of medial sclerosis resembling so-called Mönckberg's

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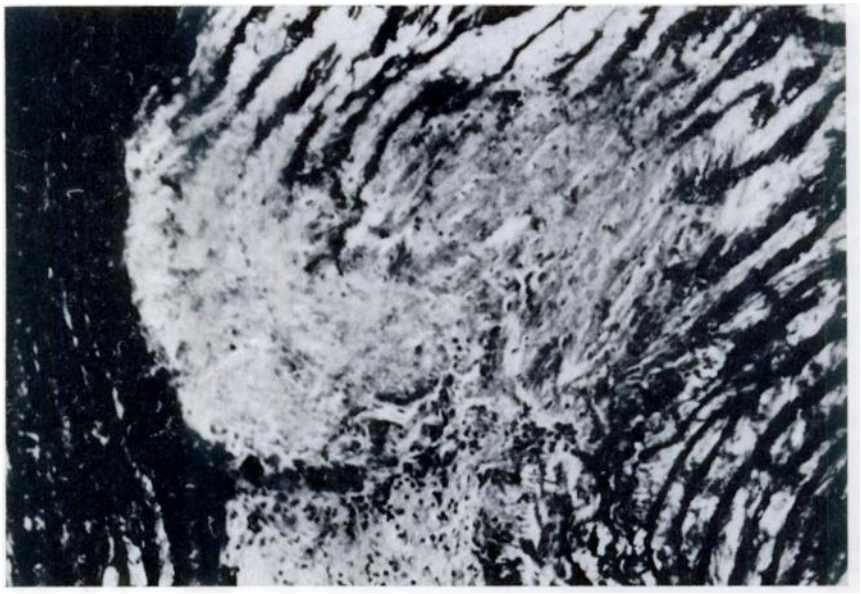


FIGURE 1. Aorta, organised medial lesion consisting of connective-tissue elements in which are embedded a few frayed elastic lamellae. Weigert-Van Gieson x 133.

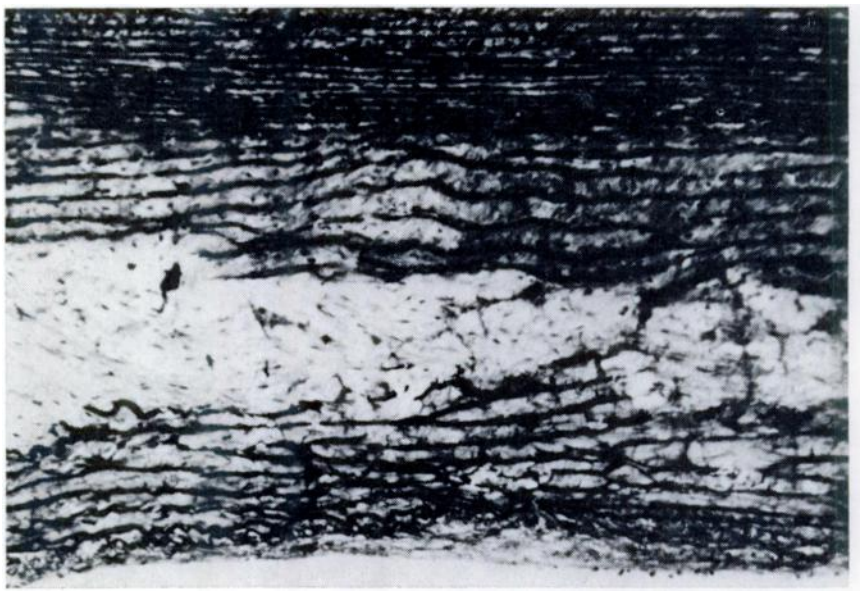


FIGURE 2. Aorta, advancing medial lesion showing widened interlamellar spaces bounded by frayed and interrupted elastic lamellae. Verhoeff-Van Gieson x 133.

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medial sclerosis. Therefore the term arteriosclerosis and not atherosclerosis seems appropriate. The characteristic features were the confinement of lesions to the tunica media, the absence of lipid, and the pattern of lamellar degeneration with subsequent organization. The possibility of early cartilage formation is not remote since in a small proportion of cases in rabbits even bone deposits may be found.

The severe chronic metritis, which must have been present for many weeks, cannot be discounted in consideration of the cause of this condition. The adrenals were grossly enlarged, indicating severe stress over a prolonged period, and this stress most likely produced by chronic disease could have accounted for the initiation of the condition. Alternatively, the sclerotic changes which may have been only very mild when the uterus became infected, would most likely be exacerbated by the chronic suppurating condition. Since this hare was only in her second year, it is apparent that relatively advanced arteriosclerosis can occur in a young animal in the wild.



FIGURE 3. Aorta, lesion undergoing active organisation with extensive infiltration. Weigert-Van Gieson x 100.

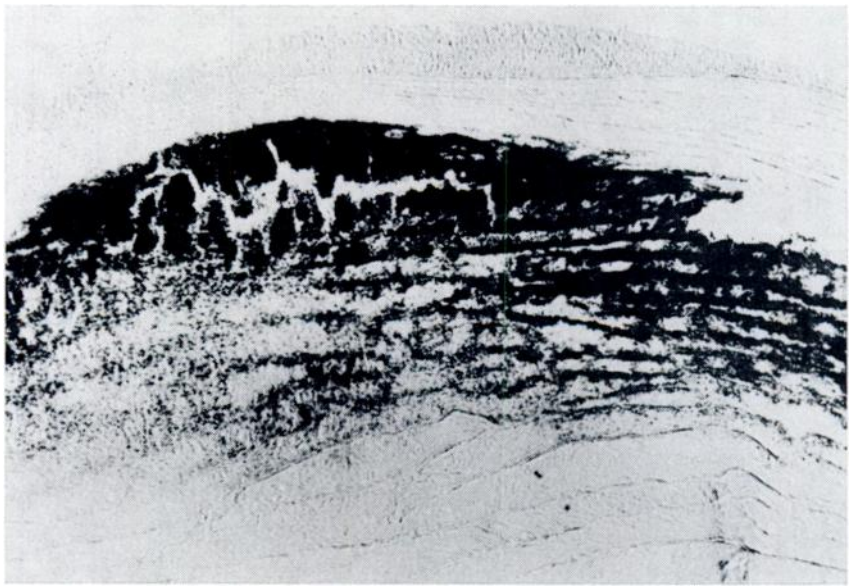


FIGURE 4. Aorta, typical distribution of mineralised deposits in damaged zone. von Kossa x 133.

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