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- كلية : الطب البيطري - جامعة أسيوط
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التغيرات الباثولوجية في الشريان الرئوي
للكلاب المعدية بالديروفلايا أميتس

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- تم تشخيص الإصابة بديدان القلب في بعض الكلاب الضالة بمحافظة أسيوط، ولقد لوحظ أن إصابة الشريان الرئوي كانت شديدة ومصحوبة بتغيرات باثولوجية واضحة •
- وقد استنتج من الدراسة أن التغيرات في جد الشريان الرئوي تلعب دورا في ظهور الاعراض الاكلينيكية للابتهذه الديدان من خلال اعاقه سير الدم •

**PATHOLOGICAL CHANGES IN PULMONARY ARTERY OF DOGS
INFECTED WITH DIROFILARIA IMMITIS**
(With 4 Figures)

By

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(Received at 10/3/1988)

SUMMARY

Dirofilaria immitis was incidently found in the pulmonary arteries of dogs. the parasite induced extensive intimal fibrosis, and the changes etended to involve both th Media and adventitia. It has been concluded that lesions in the wall of pulmonary artery may, through obstruction and hinderance of the blood flow, play a role in the clinical manifestations of direfilariasis.

INTRODUCTION

The literature on *dirofilaria immitis* infection although voluminous, was directed in large part either to the geographic distribution of the parasite and its vectors (KEEGAN *et al.*, 1986 and YOUNG, 1956), to report the clinical signs in dogs (DIBBELL, 1951; ORIHIL and BEAVER, 1965) or to Methods of treatment (JACKSON, 1963). Lesions of *dirofilaria immitis* in pulmonary arteries in dogs were described by PORTER (1951), HENIGER and FERGUSON (1957) and WILEOX (1960). ADEOCK (1961) in a histologic study of the lungs of 50 dogs with heartworms infection described alteration of the pulmonary arterial tree. ADAMS (1956) reported a case of *dirofilariasis* with obstruction of the hepatic vein. TULLOCH *et al.* (1970) discussed the clinical, pathological and serological changes in dogs infected with *dirofilaria immitis*. JONES and HUNT (1983) stated that the principal effect of the parasite was produced by adult worms which interfere with the circulation through the right heart. In the present study *dirofilaria immitis* were incidently found in dogs in postmortem room. Infected animals were investigated especially with respect to changes in the pulmonary arteries.

MATERIAL and METHODS

Gross lesions in pulmonary arteries were incidently observed in five out of 50 dogs sent to the department of pathology faculty of Vet. Med. Assiut University for postmortem examination. samples from the affected blood vessels were taken and fixed in 10% neutral formalin solution. Paraffin sections were made at a thickness of 4-6 micron, stained by H & E and examined.

RESULTS

Grossly, the wall of the pulmonary arteries was thickend and firm. The intima showed villous projections which were mostly arranged in transverse rows. The lumen of the arteries were greatly narrowed.

Microscopical examination of these pulmonary arteries revealed the presence of the parasites which were associated with severe destructive changes of the intima and intimal fibrosis. The inflammatory connective tissue consisted of dense collagen bundles completely encircling the lumen of the blood vessels. Not infrequently, this connective tissue projected

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into the lumen forming thick papillary projection or intimal ridges. The proliferating connective tissues were heavily infiltrated with lymphoid cells (Fig. 1). Areas of myxomatous degeneration were also observed in the inflammatory connective tissue. Parasites in cross section were constantly seen in the proliferating papillary connective tissue encapsulated by dense fibrous capsule (Fig. 2). Areas of necrosis with neutrophilic cell infiltration were occasionally observed in the vicinity of the parasite. The parasite in sections appeared to be adult worms consisting of an outer layer of cuticle and hypodermis which lie just under the cuticle. Continuous with the hypodermis is the musculature of the worm. The digestive tube lies at one side of parasite. The middle part of the parasite was occupied by the uterine tube which was usually distended with microfilariae.

The smooth muscle of the media of the affected pulmonary arteries showed prominent hypertrophy. Multiple focal areas of degeneration were not infrequently observed in the media. The adventitia were prominently thickened and showed multiple focal areas of intense cellular inflammatory reactions (Fig. 3). The reacting cells were lymphocytes, neutrophils and eosinophils. Aggregations of macrophage cells distended with dark brown pigment were a constant findings in the adventitia (Fig. 4).

DISCUSSION

The arterial changes associated with dirofilariasis were often considered by many authors (HENNIGAR and FERGUSON, 1957, WILEOX, 1960 and JONES and HUNT, 1983) to be the result of embolic dead adult filaria or were dismissed as bearing a suspected but unconfirmed relationship to the parasite (ADEOCK, 1961). However, evidence seems ample to support believe that dead adult dirofilariasis may become embolic, leading to thrombosis and granulomatous response (JUBB and KENNEDY, 1985). In the present study living adult dirofilariasis were observed in the wall of pulmonary arteries and were accompanied with parasitic thrombosis. This fact indicated, that most probably the live filaria may cause endarteritis and obstructive fibrosis, in the affected pulmonary vessels.

The parasite was not observed free in the lumens of blood vessels contrary to the result obtained by TULLOCH *et al.* (1970).

From the present study, we can conclude that pulmonary arterial lesions in canine dirofilariasis exert their effect on pulmonary circulation through arterial obstruction and hindrance of the blood flow. These effects are manifested clinically by chronic congestive heart failure with dilation and hypertrophy of the right side of the heart (ADEOCK, 1961).

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LEGENDS OF FIGURES

- Fig. (1):** Proliferating connective tissue with abundant lymphoid cells (H & E, 10 x 16).
- Fig. (2):** Adult worms encapsulated by connective tissue. (H & E, 10 x 16).
- Fig. (3):** Inflammatory reaction of theadventitia (H & E, 10 x 25).
- Fig. (4):** Macrophages laden with dark pigment in the adventitia (H & E, 10 x 25).



