EXPERIMENTAL INFECTION OF RABBITS WITH
Dictyocaulus filaria - PATHOLOGICAL FINDINGS

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SUMMARY

This experiment was designed to evaluate rabbit as
an experimental animal for Dictyocaulus filaria (of sheep
origin) infection, using parasitological and pathological
parameters. Fifteen adult rabbits of local breed were
divided into 3 equal groups and given orally 1000, 2500
and 5000 infective larvae per animal respectively. One
animal from each group was sacrificed 6, 10, 15, 21 and 30
days post infection. Results showed that most rabbits of
all groups resisted infection with D. filaria as
evidenced from the clinical and pathological findings and
the reduced numbers of the recovered parasites and their
stunted growth. It is concluded that rabbit are not good
laboratory animal model for reproduction of D. filaria
infection.

INTRODUCTION

Small laboratory animals including guinea pigs, mice
and rabbits could serve as experimental animals for the
study of ovine and bovine lungworm infection (1, 2, 3, 4).
However, the results are contradicting. Soliman (1) and
Tewari et al (4) found that when the infective larvae of
Dictyocaulus filaria experimentally infect small
laboratory animals, especially guinea pigs, they may
reach the stage of sexual maturity and induce pneumonic
lesion similar to that reported for the natural host.
However, this findings was different from that of Wade et
al (3) and Al-Dabagh and Ali (5), who stated that
rabbits when experimentally-infected with infective larvae of *D. filaria*, the infective larvae do not reach sexual maturity in their lungs. The above authors considered the guinea pigs as the most satisfactory host for the experimental infection with *D. filaria*.

The present communication is to evaluate the suitability of rabbits as an experimental laboratory animal for *D. filaria* infection of sheep.

**MATERIALS AND METHODS**

Larvae of *D. filaria* were obtained from experimentally-infected lambs. The larvae were cultured using the procedures described before (4,6). The third stage larvae were stored at 4-6°C and within two weeks of their reaching the infective stage, they were given orally to (15) adult rabbits of local breed and of both sexes.

Rabbits were randomly divided into three equal groups and were given a dose level of 1000, 2500 and 5000 infective larvae per animal respectively.

One animal from each group was sacrificed 6, 10, 15, 21 and 30 days post infection and their lungs were examined for gross lesions. For histopathological study, small pieces of lung tissue were fixed in 10% neutral buffered formalin, processed routinely, cut at 5 mm thickness and stained with hematoxylin and eosin (H&E).

**RESULTS**

The parasitological findings are reported elsewhere (5) but briefly, it was found that numbers of recovered worms from each inoculated animal were few, immature and indeed no worms could be recovered on days 21 and 30 post inoculation. The measurements (length and width) of the recovered parasites were quite small. The sexual differentiation did not occur until day 10 post inoculation. Furthermore, none of the animals developed
clinical sings of lungworm disease or passed larvae in its faeces.

Pathologically, the lungs of examined animals did not show superficial gross lesions. However, ecchymotic hemorrhages were seen on the diaphragmatic lobes of lungs of four rabbits given 2500 and 5000 infective larvae and on days 30 and 21 post infection respectively.

Histologically, the lungs of those rabbits with gross pulmonary lesions had edema, congestion and occasional hemorrhages and in two of them mild interstitial reaction is seen and characterized by increased thickness of alveolar septae caused by their infiltration with mononuclear cells (macrophages and lymphocytes) and eosinophils (Fig.1). In one of the above 2 cases, a focal granulomatous lesion was seen and consisted of a central necrotic eosinophilic mass (fig.2) surrounded by epithelioid cells mixed with lymphocytes, eosinophils and giant cells. Further outside this inflammatory zone, there was a fibrous tissue capsule. Adjacent pulmonary tissue showed atelectasis.

DISCUSSION

The measurements (length and width) of the recovered parasites were quite low and were less than those reported for the same parasite in guinea pigs experimentally-infected through the same route (7). Pathologically, other than the ecchymotic hemorrhages seen on one lobe, there were no detectable gross pneumonic lesions. Such finding is not unusual, since it has been found (8) that in goats, only few mature lungworms were present in the lungs which were free from any gross lesion.

Histologically, the pulmonary congestion, edema and hemorrhage and occasional mild interstitial pneumonitis are also reported in experimental (guinea pigs) and natural (goats) infection with D. filaria (4,9). Furthermore, the chronic focal granulomatous pneumonia is
Fig. 1: Interstitial pneumonia. Notice thickening of alveolar walls due to its infiltration by mononuclear cells (macrophages and lymphocytes) and eosinophils. (H&E) X 250.

Fig. 2: Granulomatous pneumonia. Notice the central necrotic eosinophilic mass surrounded by epithelioid cells, mixed with giant cells, lymphocytes and eosinophils on the outside. (H&E) X 125.
reported in goats (8) and is explained as an indication of resistance of the animal to the lungworm infection.

In this study, the aborted infection as evidenced by the general absence of lung lesions, can be explained on the basis that few worms reached pulmonary tissue, and gradually became degenerate. From results of recovery of parasites, clinical and pathological findings of this study, it is concluded that rabbits are not good laboratory animal for reproduction of D. filaria infection at least when compared with other laboratory animals (guinea pigs) and definitely when their lesion is compared with the disease in its natural host.

REFERENCES

1- Soliman, K.N. (1953). Migration route of Dctyocaulus viviparus and Dicyocaulus filaria infective larvae to the lungs. J. Comp. Path. & Therap. 63 75-84.


الخمنج الجريبي بطفيلي

نتيجة

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الخلاصة

تهدف هذه التجربة لمعرفة مدى صلاحية استخدام الأرانب بطفيلي Dictyocaulus filaria كنموذج تجريبي لدراسة الخمنج.

وقد استخدمت خمسة عشر ارنبًا حرًا، قسمت إلى ثلاثة مجموعات متساوية. كل مجموعة من ارانب كان لديها خمسة نقلات قدم، وظهرت النتائج أن حقن كل حيوان على التوالي في كل مجموع في الأيام 6، 10، 15، 21 و 27 بعد الخمنج.

أوضح النتائج مقاومة الأرانب للخمنج بـ D. filaria من خلال النمو البطيء، وقلة عدد الطفيلييات المكتشفة، ومختلفة عن الدراسات السابقة.

بعد أن تمت الدراسة، تم تقييم الخمنج الجريبي بالطفيلي.