

Histological evidence for inoculative action of immature *Linguatula serrata* in lymph nodes of intermediate host

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Abstract The histopathological examination of 11 mesenteric lymph nodes from adult sheep infected with immature stages of *Linguatula serrata* revealed acute and chronic lesions with the presence of bacterial colonies and yeast cells. Bacteria were mainly present in acute, hemorrhagic, or necrotic lesions while yeast cells were seen mostly in the structure of chronic granulomas.

Introduction

Linguatula serrata is a cosmopolitan parasite. Adults occur in the nasal and respiratory passages of canid definitive hosts, while immature stages are found in mesenteric lymph

nodes of herbivorous intermediate hosts (Kaufmann 1996). Although infection in natural intermediate hosts is considered clinically inapparent (Kaufmann 1996), accidental infection of humans can cause severe pathology and symptoms (Drabick 1987).

With the exceptions of humans, there are little literature data about microscopical lesions in visceral linguatulosus in intermediate hosts. This paper is intended to present histological evidence for inoculative action of immature *L. serrata* in its migrations from the intestines to mesenteric lymph nodes of sheep.

Materials and methods

Eleven adult sheep, aged between 2 and 7 years and reared in traditional pastoral system in different areas of Romania, were examined by necropsy during 1995 and 2000. All mesenteric lymph nodes containing immature stages of *L. serrata* were fixed in 10% formalin for 72 h and then in Susa–Heidenhain mixture for another 4 h. All samples were subsequently fixed in paraffin and sectioned in 6- μ m-thick pieces. Histological sections were stained routinely with hematoxylin–eosin and Goldner trichromic.

Results and discussions

Gross appearance of mesenteric lymph nodes consisted of hemorrhagic and necrotic lesions. Most of the affected lymph nodes contained larval and nymphal *L. serrata*. Histopathology revealed typical migration lesions, surprisingly hetero-

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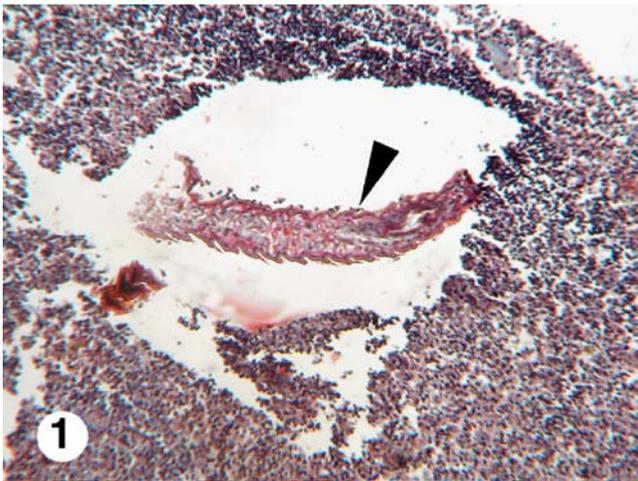


Fig. 1 *Linguatula* larva (arrowhead) in mesenteric lymph node (GT, $\times 100$)

genic, depending on their stage. Acute lesions consisted of traumatic foci, with hemorrhage and/or necrosis. In this case, lesions are severe and all lymph node structures are involved. Destroyed tissues are replaced by edema. In some of these acute lesions, sectioned migrating immature stages of *L. serrata* are clearly visible (Fig. 1). In older lesions, edema is gradually replaced by large necrotic areas. Chronic lesions were represented by parasitic granulomas with variable fibrosis. Peripheral cell structure of these granulomas contained giant multinucleated cells while, in the central area, necrosis was present sometimes with the degenerating parasite (Fig. 2).

In many histological sections, bacteria were clearly visible. The colonies consisted of polymorphic bacteria (Fig. 3), bacillar bacteria or cocci, arranged in short or long chains. Acute lesions were richer in bacteria than chronic

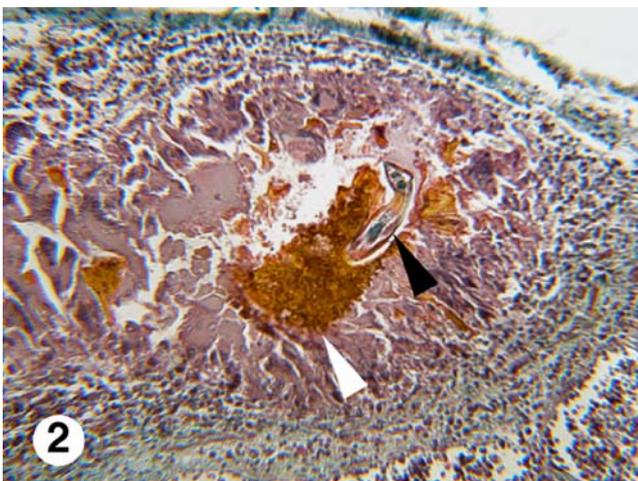


Fig. 2 Granuloma in lymph node with larval remains (black arrowhead) within the necrotic content (white arrowhead; GT, $\times 100$)

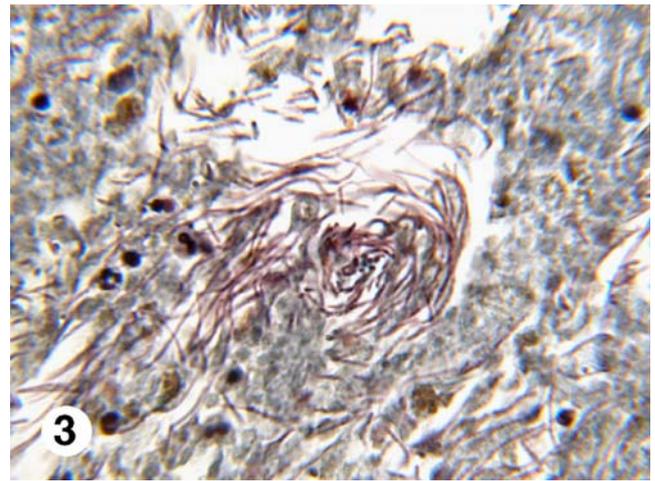


Fig. 3 Polymorphic bacteria in affected lymph node (GT, 100x)

lesions. Moreover, in chronic granulomas, yeast cells were also noticed within the central necrosis area and between infiltrative cells (Fig. 4).

In both acute and chronic lesions, cell population of lymph nodes was decreased. The most severe cellular decrease was observed in the outer cortical region where most of the lymphoid follicles are vestigial. Lymphocytes were the most affected. Nonetheless, number of eosinophiles was increased, in some cases accounting for 20–25% of the cellular population of the lymph node.

Inoculative effect is well known for many parasite species, mostly migratory helminths (Şuteu and Cozma 2007). The inoculation mechanism is either due to contiguity between nonsterile (especially intestine) and sterile organs or by direct transportation by helminths. Our histological findings support inoculative action of *L.*

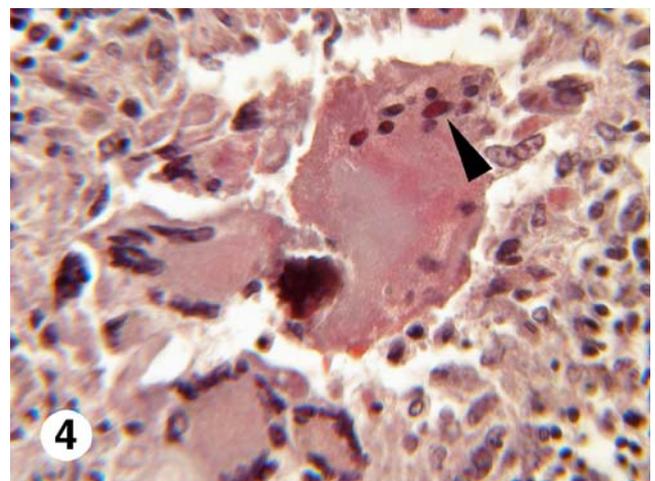


Fig. 4 Yeast cells (arrowhead) in a lymph node granuloma (H & E, $\times 400$)

serrata immature migratory stages into the structure of the lymph nodes. Presence of bacteria mostly in acute lesions sustains the hypothesis of their parasitic origin. Presence of yeast cells in the internal structure of granulomas indicates a high resistance of these to immune mechanisms of the hosts.

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