Pathological lesions associated with internal parasitosis in donkeys in Kiambu district, Kenya

A.K. Lewa1, T.A. Ngatia2, W.K. Munguia1 AND N.E. Maingi1
1Veterinary Research Laboratories, PO Kabebe, Kenya
2Department of Veterinary Pathology and Microbiology, Faculty of Veterinary Medicine, University of Nairobi, PO Box 29053, Nairobi, Kenya

Abstract

Six donkeys, both males and females were purchased from Limuru area, Kiambu District and sacrificed so as to investigate parasites and lesions present. The donkeys were in poor body condition. At post-mortem, Dictyocaulus arfiefieldi was isolated from the lungs. In the stomach there were inflammatory lesions associated with Gasterophilus larvae, Habronema and Trichostongylus. In the intestines, several species of helminth parasites were isolated. Some of these were associated with enteritis. Other lesions were traumatic hepatitis and cranial meningeic arteritis associated with Strongylus larvae.

Introduction

The donkey is found mainly among the nomadic people and less frequently among the settled populations of West Africa (Epstein et al., 1984; Fidberg, 1987). This is partly because of their nutritional and water requirements, that make them well adapted to these regions. They feed mainly on coarse pastures, thistles, thorn bushes and paper. Generally they require water every two to three days (Epstein et al., 1984) but they could also survive for as long as eight days (Maloiy and Janer, 1972).

In Kenya, donkeys are found in many parts where they provide transport or act as draught animals. In some semi-arid and arid areas of Kenya for example Garissa, Isiolo and Marsabit, donkeys are virtually the only available means of transport.

Because of the increasing recognition of the usefulness of the donkey in many parts of Kenya and a dearth of information on its health aspects, there is a need to look at some problems that may affect its performance. This study was conducted in an attempt to add more information on the diseases of donkeys. Such information would assist in the management and formulation of control measures against diseases in order to improve their health.

Materials and methods

The six donkeys used in this study comprising of both male and females were purchased from Limuru area 'Kiambu District'. The animals were sacrificed and a thorough post-mortem examination conducted on each of them. Any abnormalities encountered were recorded.

Tissues for histopathology were taken from affected organs and fixed in 10 percent formalin solution, processed routinely according to the method described by Carleton and Drury (1957) and stained with hematoxylin and eosin.

Results

External examination revealed that the donkeys were in poor body conditions. In all cases, thoracic cavity contained large amounts of blood stained pleural fluid. The lungs were haemorrhagic, edematous and in some areas emphysematous. Numerous mature Dictyocaulus arfiefieldi were observed in bronchial and bronchiolar froth (Fig. 1). Microscopically, the alveoli of most of the lungs were filled with leukocytes majority of which were eosinophils. Both the bronchioles and the bronchi had leukocytes and an excessive amount of mucous. The exudate occluded the bronchioles in some places leading to consolidation, emphysema and atelectasis of the alveoli (Fig. 2). There was wide spread alveolar wall necrosis and abscess formation. The alveoli in one of the lungs were filled with red blood and bacterial masses (Fig. 3). In this case, the interlobular septa were infiltrated with inflammatory

Fig. 1. Lungs from donkey No. 1 showing froth (arrow) in the bronchi
cells, and the abscesses were associated with *Streptococcus haemolytica*.

In the liver was traumatic hepatitis and abscess formation. The lesions were associated with *Strongyles* species larvae. In addition, the bile ducts were thickened. Sections of parasitic larvae were observed to be associated with haemorrhage and cellular degeneration (Fig. 4). In all six donkeys, the liver tissue was heavily infiltrated with eosinophils.

Larvae belonging to the species *Gasterophilus intestinalis* were isolated from the stomachs of two out of the six donkeys. Helminths of the genera *Trichostrongylus axei* and *Habronema muscae* were also isolated, each from one out of the six donkeys. These were associated with inflammatory reactions of varying degrees of severity.

The small *Strongyles* among them, *Cylicocyclus radiatus* and *Cyathostomum cuniculatum*, which were found mainly in the colon and caecum, together with the large *Strongyles* (*S. vulgaris, S. edentatus* and *S. equinum*) found mainly in the caecum and colon, were associated with enteritis. The mucosal surface in all the cases had many parasitic nodules. The intestinal mucosa in the majority of the donkeys was excessively folded (Fig. 5), and was covered with mucoid material. There were focal infiltrations of both mucosa and submucosa with eosinophils, macrophages, lymphocytes and occasional plasma cells which involved deeper layers of the enteric wall.

There was cranial mesenteric arteritis in all the six donkeys associated with *Strongyles* larvae. Strongyloids were firmly attached to the intima leading to the proliferation of both intima and the endothelium. Fibrous tissue as well as cellular debris accumulated over the roughened intimal areas, extending out into the lumen (Fig. 6). Sometimes, this caused occlusion.

**Discussion**

The inappetence state of the donkeys and the rough hair coats were attributed to heavy helminth infections; particularly with large *Strongyles*, that can exert adverse effects even when present in small numbers (Duncan and Dargie, 1975).
Fig. 6. A section of the mesenteric artery from donkey No. 1 showing a cross-section of a larva in the lumen (arrow head) and eosinophilic inflammation.

The greatest damage to the cranial mesenteric arteries by Strongyloides worms can cause considerable haemorrhage and the subsequent loss of blood and tissue fluids. This could also account for the anaemia and fever associated with intestinal eosinophilic inflammation (Urkraft et al., 1987). In a similar report on disease conditions of donkeys in Kenya, Ngugi and Kuria (1991) reported that 41.8 percent donkey carcasses examined during post-mortem had thrombocytopenia and eosinophilic inflammation caused by internal parasites. The lesions in the mesenteric arteries were attributed to the larval stages of *S. vulgaris*. The animals affected by the intestinal helminths were also emaciated and had excessive amounts of fluids in the body cavity. The current study, the fact that some donkeys with a low egg counts as 100 or none at all had anaemia are an indication that apart from helminths and haemoparasites, other factors such as nutritional factors contributed to the haematological values observed.

The infiltration of lymphocytes, neutrophils and eosinophils throughout the walls of all the digestive ducts, as well as the formation of nodules was due to the penetration of the third stage *S. vulgaris* larvae through the intestinal wall. The 3rd stage larvae of *S. equinus* also contained is some of these nodules, eventually developed into 4th stage larvae. These then migrate through the peritoneal cavity to the liver where they cause traumatic hepatitis and haemosiderosis.

The 4th stage larvae of *D. ovifieldi* found in the lungs were responsible for the haemorrhages observed in the lungs and the alveoli. The haemorrhages, together with the reparative process that followed larval migration within this organ, were responsible for the consolidation observed. Similar changes have been reported by Crawford (1981) in Britain.

Biopsies with lymphoid inflammatory infiltrate observed in all the examined donkeys is consistent with the observations made by Nicholas et al. (1979).

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