

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

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Abstract

Six donkeys, both males and females, were purchased from Limuru area (Kiambu District) and sacrificed so as to investigate the parasites and lesions present. The donkeys were in poor body condition. At post-mortem, *Dictyocaulus arnfieldi*, was isolated from the lungs. In the stomach there were inflammatory lesions associated with *Gasterophilus larvae*, *Habronema* and *Trichostrongylus*. In the intestines, several species of helminth parasites were isolated. Some of these were associated with enteritis. Other lesions were traumatic hepatitis and cranial mesenteric 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, 1984, Fielding, 1987). This is partly because they are well adapted to these regions. They feed mainly on coarse pastures, thistles, thorn bushes and paper and have a lower water requirement than cattle. Generally they require water every 2 - 3 days (Epstein, 1984) but they could also survive for as long as 8 days (Maloiy and Boarer, 1972).

In Kenya, donkeys are found in many areas where they provide transport or act as draught animals. In 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 the disease problems that may affect its performance in Kenya. This study was conducted to obtain 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 donkey health.

Materials and methods

Some of the six donkeys used in this study were male and some were females, 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% formalin solution, processed routinely according to the method described by

Carleton and Drury (1957) and stained with Haematoxylin and Eosin (H and E).

Results

External examination revealed that the donkeys were in poor body conditions. In all cases, the thoracic cavity contained large amounts of blood stained pleural fluid. The lungs were haemorrhagic, oedematous and in some areas emphysematous. Numerous mature *Dictyocaulus arnfieldi* were observed in the bronchioles and bronchiolar froth. Microscopically, the alveoli of most of the lungs were filled with leucocytes, the majority of which were eosinophils. The bronchioles and the bronchi had leucocytes and an excessive amount of mucous. The exudate occluded the bronchioles in some places leading to consolidation, emphysema and atelectasis of the alveoli. There was widespread alveolar wall necrosis and abscess formation. The alveoli in one of the lungs were filled with red blood and bacterial masses. In this case, the interlobular septa were infiltrated with inflammatory cells, and the abscesses were associated with *Streptococcus haemolytica*.

In the livers of the donkeys there were traumatic hepatitis and abscess formation. The lesions were associated with *Strongylus* species larvae. In addition, the bile ducts were thickened. Sections of parasitic larvae were observed to be associated with haemorrhage and cellular degeneration. In all the six donkeys, the liver tissue was heavily infiltrated with eosinophils. Larvae belonging to the species *Gasterophilus intestinalis* were recovered 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 from of the six donkeys. These were associated with inflammatory reactions of varying degrees of severity. The small strongyles, among them, *Cylicocyclus radiatus* and *Cyathostomum catinatum*,

together with the large strongyles (*S vulgaris*, *S edentatus* and *S equinus*) were all found mainly in the caecum and colon. They 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 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 *Strongylus* larvae. Strongyle worms 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. Sometimes, this caused occlusion.

Discussion

The unthrifty 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). The gross damage to the cranial mesenteric arteries by strongyle worms can cause considerable haemorrhage and the subsequent loss of blood and tissue fluids. This could also count for the unthriftiness and anaemia associated with intestinal helminthosis (Urquhart, *et al.*, 1987). In a similar report on disease conditions of donkeys in Kenya, Ngatia and Kuria (1991) reported that 42% of donkey carcasses examined during post-mortem had thromboendoarteritis and enteritis caused by internal parasites. The lesions in the mesenteric arteries were attributed to the larvae of *S vulgaris*. The animals affected by the intestinal helminths were also emaciated and had excessive amounts of fluids in the body cavity. In the current study, the fact that some

donkeys with as low egg counts as 100 or none at all had anaemia is an indication that apart from helminths and haemoparasites, other factors, such as nutrition could have contributed to the haematological values observed.

The infiltration of lymphocytes, neutrophils and eosinophils observed throughout wall of the intestines as well as the nodule formation was due to the penetration of the third stage *S vulgaris* larvae through the intestinal wall. The third stage larvae of *S equinus* also contained in some of these nodules eventually developed into fourth stage larvae. These then migrated through the peritoneal cavity to the liver where they caused traumatic hepatitis and haemorrhage.

The fourth stage larvae of *D arnfieldi* found in the lungs were responsible for the haemorrhages observed in the lumen of 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 Trawford (1981) in Britain. Bronchiolitis with lymphoid inflammatory infiltrate observed in all the examined donkeys is consistent with the observations made by Nicholls, *et al.* (1979).

Acknowledgements

The authors thank Dr. R.S. Kimanzi, Dr. W.T.Chong, and Dr. M. Wright for their assistance when carrying out this study. Thanks are also extended to staff members of the Department of Veterinary Pathology and Microbiology for their assistance during parasitological analysis and the post-mortem examinations. This project was funded by the University of Nairobi; and DANIDA.

References

- Carleton, H.M; and Drury, R.A.B. 1957. *Histological techniques for normal and pathological tissues and the identification of parasites*. 3rd ed. Oxford University Press, London. pp. 1-74
- Duncan, J.L. and Dargie, J.D. 1975. The pathogenesis and control of strongyle infection in the horse. *Journal of the South African Veterinary Association* **46**, 81-85.
- Epstein, H. 1984. *Ass, Mule and Onger*. (ed I.L. Magon); Evolution of domesticated Animals. Longman, London pp 174 - 184.
- Fielding, D; 1987. Donkey power in African rural transport. *World Animal Review* **63**, 22-30.
- Maloiy, G.M.O. and Boarer, C.D.H. 1972. Response of the donkey to dehydration, haematological changes. *American Journal of Physiology*. **221**, 37-41.
- Ngatia, T.A and Kuria, J.K.N. 1991. Some diseases of donkeys in Kenya as seen during post-mortem examination. *Bulletin Animal Health and Production in Africa* 1991. pp 237-240.
- Nicholls, J.M; Clayton, H.M; Duncan, J.L. and Buntain, F.D. 1979. Lungworm infections in Donkeys. *Veterinary Record*. **104**, 567-570.
- Trawford, A.F. 1981. Pneumonia in a donkey. *Veterinary Record*, **108** 42.
- Urquhart, G.M; Armour, J; Duncan, J.L; Dunn, A.M and Jennings F.W. 1987. *Veterinary Parasitology*. Essex: Longman, pp 43.