

SARCOSPORIDIOSIS IN DOMESTIC CHICKEN IN KENYA

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ABSTRACT

Two adult birds from Kabete and Kiambu area of Kenya were found to have microscopic sarcocysts in their muscles. Heart and oesophagus muscles were affected. Degenerative changes were observed on affected muscles and fatty tissues. One of the birds had concurrent infection with *Salmonella gallinarum*.

INTRODUCTION

Sarcosporidiosis is a parasitic infestation of striated muscle fibres of the domesticated animals and a number of birds. It is common in horses, cattle, sheep, pigs and ducks (Jubb et al., 1985; Runnels et al., 1967; Spindler, 1972). *Sarcocystis* species are often described after the host animal in which they are found. *Sarcocystis rileyi* affects ducks and is regarded as the species observed in other birds (Cornwell, 1963). The earliest reports of *Sarcocystis* infection in chicken were made in Europe in 1965 and in USA in 1894 (Spindler, 1972).

So far the disease has been reported in 58 avian species within 11 orders of birds (Springer, 1984). However, it has only been reported six times among the domestic chicken (Springer, 1984).

In many hosts, the lesions are microscopic but in sheep, cattle and ducks the cysts are often large enough to be seen by the naked eye. In such cases, parts or even the whole carcass are condemned during meat inspection (Cornwell, 1963; Spindler, 1972).

Worldwide information on incidence and distribution of *Sarcocystis* is based mainly on finding on post-mortem examination (Spindler, 1972). Sarcosporidiosis has been reported in birds in Kenya and we hereby report its occurrence in two domestic birds from Nairobi and Kiambu districts, Kenya.

MATERIALS AND METHODS

Two cases are reported, diagnosed in March and July 1992 at the Faculty of Veterinary Medicine, Kabete.

Case 1

This was a high breed cockerel bird, one year old from around Kabete. The bird was brought dead for post-mortem

examination. This farmer had 100 other birds in the flock all kept for poultry meat.

Case 2

This was a local indigenous hen, kept by the farmer in a farm in Kiambu District, 40 km from the faculty. It was brought in a recumbent state from the farm and its age was approximately one and a half years old.

In both birds there was a history of stiff legs, twisted necks and whitish diarrhoea. Routine necropsy was carried out and various organ sections taken for histology. The organs were processed routinely, embedded in paraffin wax, cut at 6 μ m thickness and stained with Hematoxylin and Eosin. In addition, livers, spleens, hearts and intestinal portions were taken for bacterial culture.

RESULTS

Gross Lesions

Case 1

The bird was in poor nutritional state and generalized congestion of organs and the carcass was evident. The liver had small pin-point grayish areas while the heart had a patch of grayish area. There was haemorrhage enteritis and *Salmonella gallinarum* was isolated from the various organs or tissue.

Case II

Hyperemia and haemorrhages were observed under the wings skin, while its organs were congested. Thigh muscles had grayish steaks and the liver had grayish spots. On bacteriology there was no significant growth.

Histopathology

Case I

Lungs—acute pneumonia characterized by hyperemia and infiltration with numerous heterophils.

Intestine—hyperemia, degeneration and necrosis of the intestinal epithelium.

Heart and skeletal muscles—hyaline degeneration of myofibres and fibrinous deposition between the muscles and fatty degeneration of the intermyofibre fatty tissue. Three

sarcocysts were seen in the heart muscles. Two of these were cut transversely while one was cut longitudinally. They were elongated, with long axis parallel to the muscle fibres. They measured 91.0 μm long by 40.8 μm . The cysts were within the muscle fibre and appeared elongated and spindle shaped. Each parasite (cyst) had a wall of 2.2 μm in thickness. Inside there were crescent-shaped spores (banana-shaped cystozoites enclosed by the wall. All cysts appeared purplish blue with H/E stain. The affected muscle fibre was enlarged and its content either displaced or totally replaced by the sarcocyst.

Case II

Live—hyperemia and focal necrosis with mononuclear cells infiltration.

Cecum—there was degeneration, necrosis and diphtheroid reaction on the mucosa.

Brain—hyperemia of blood vessels, mild haemorrhage, demyelination and occasional mild perivascular cuffing with mononuclear cells mainly lymphocytes.

Oesophagus—hyperemia of blood vessels, mild muscle fibres degeneration. The sarcocysts were cut transversely. They measured 72.0 μm in length by 49.0 μm in diameter. They had similar structures, staining characteristics and were inside myofibres as in Case I above. The affected myofibre was occasionally degenerated too.

DISCUSSIONS

Sarcosporidiosis appears neither widespread nor economically important in domestic fowl. However sarcocysts that are apparently not injurious to most birds may cause heavy infection and clinical disease in ducks, making them fly low and slowly (Spindler, 1972).

Naturally occurring sarcosporidiosis has been found in a variety of birds (Cornell, 1963; Vande, 1966). The pathogenicity in most birds appears to be unknown (Springer, 1984). However, birds experimentally infected with *Sarcocystis tenella* have shown petechiation within the musculature, anaemia and nephrosis (Springer, 1972). In our report both birds were adult and more than a year old.

In most animals the disease appears harmless, usually discovered only at slaughter, just like in our two cases. The tissues commonly affected are skeletal muscles, muscles of the tongue, heart, diaphragm and oesophagus. In many hosts the lesions are microscopic (Cornwell, 1963; Springer, 1978). In our cases the sarcocysts were found in heart and oesophagus and all were microscopic in size.

The definitive hosts are carnivores (dogs, cats and cheetahs) while birds act as intermediate hosts (Springer, 1978).

Sarcosporidiosis in wild ducks is significant as infected bird is discarded on aesthetic reasons by causing economic losses to the hunters (Cornwell, 1963; Spindler, 1972). In Kenya, we have both wild and domestic ducks. Infected domestic birds and carnivores may therefore pose a threat to the duck industry. Furthermore sarcocysts are known to contain an endotoxin (sarcocystin) which can be injurious to the central nervous system, heart, adrenal glands and intestines of some animals.

The cysts have also been associated with disseminated focal eosinophilic myositis (focal green areas) in some animals (Runnels et al., 1967).

The parasite is killed by cooking and storage at sub-freezing temperatures, hence it does not appear to be a major public health hazard (Springer, 1984). However, mild symptoms are reported in infected human volunteers (Markus et al., 1974).

Diagnosis of sarcosporidiosis is based on identification of sarcocysts or cystozoites in tissue (Springer, 1978). Histologically the affected tissues may show fatty degeneration of muscles, enlarged or ruptured muscle fibres (with subsequent eosinophilic granulomatous reaction) especially in older infections (Springer, 1978). Microscopic differences in the wall substance of microcysts has revealed that there are at least five different species of sarcocystis in birds (Drouin and Mahrt, 1980). It was not possible to differentiate these microcysts although both appeared similar in structure.

Sarcocysts from some birds have been referred to as *Sarcocystis* species (Spindler, 1972). We believe that the ones observed here are *Sarcocystis* species, most likely *Sarcocystis rileyi*. The presence of sarcocysts in our domestic birds makes them possible carriers and may act as a source of infection to carnivores and the duck population in Kenya.

Sarcosporidiosis needs to be investigated and its extent determined among the domestic and wild birds in Kenya.

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