

A SURVEY OF MAREK'S DISEASE OUTBREAK IN MOROGORO TOWNSHIP

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SUMMARY

Outbreaks of paralytic syndrome affecting chickens aged between 2-8 months were reported in Morogoro. The syndrome caused mortalities as high as 75% especially so in the younger stock. It was diagnosed as Marek's disease by the clinical signs, gross pathology, histopathology and virus isolation via the yolk sac and chorioallantoic membrane (CAM) of embryonated chicken eggs. Most birds examined had both neural and visceral forms of Marek's disease. The disease was found in breeds like:- NY-line, Rhode Island Red, Ross I, Ross Brown, and White Leghorn. Light to massive lymphocytic infiltration was observed in nerves and visceral organs. Of the 13 suspected cases collected from four different farms, 8 gave positive results to viral isolation (that is 62%) using both yolk sac route and chorioallantoic route of chickens embryonated eggs.

INTRODUCTION

Marek's disease is a virus induced neoplastic disease of chickens, characterized by lymphocytic infiltration of peripheral nerves, iris, gonads, muscle, skin and various internal organs. It is the most common lymphoproliferative disorder of chickens; (Churchill and Biggs, 1967; Biggs, 1967; Biggs, *et al.*, 1968).

Before the discovery of vaccines this disease used to be one of the major threats to poultry industry; for example USA experienced annual losses of 150 million dollars while Great Britain lost 40 million dollars annually (Biggs, 1967). However, when Churchill and his colleagues, (1969) managed to produce an attenuated virus vaccine, losses due to the disease have since been reduced tremendously. The use of the vaccine has reduced the losses so much that this disease had taken a low position in the list of killer diseases in most countries. It is therefore, surprising to find poultry farmers in Morogoro Township complaining of big losses from a paralytic syndrome in young adults. The project was then envisaged to find out whether the condition was Marek's disease and its prevalence in the vicinity.

MATERIALS AND METHODS

A questionnaire was used to seek information

pertaining to the state of occurrence of Marek's disease in Morogoro Township. Most of the information was obtained from individual poultry keepers as well as the Regional and District Livestock Development Offices (RLDO and DLDO). The information required in the questionnaire included the source of birds, breeds affected, morbidity and mortality rates and type and source of feed.

Specimen collection

Thirteen live chickens with clinical signs compatible with Marek's disease were collected. Post mortem was done and pathological findings recorded. Samples for histopathology were preserved in 10% formalin and they included:- brain, feather follicle epithelium, liver, heart, spleen, intestine kidneys, sciatic nerve, vagus nerve, and tumour mass on the gizzard. Similar selections were preserved at - 20°C for virus isolation.

Histopathology

The tissues collected above were fixed in 10% formalin and embedded in paraffin. The sections were stained with haematoxylin and eosin, and then observed under light microscope for changes.

Virus isolation

The inoculum was prepared by pooling portions of liver, spleen, tumour mass from gizzard, kidneys, sciatic and vagus nerves. The pooled material was ground using sterile fine sand and phosphate buffer saline (PBS) to make a 10% solution. The mixture was centrifuged at 3000 rpm for 5 minutes and the supernatant used as inoculum. Eggs of white Leghorn chicken (disease free birds) were used for virus isolation. The eggs were incubated for 4 days for yolk sac route and for 12 days in case of the chorio-allantoic membrane route inoculation. A total of 4 trials of virus isolation were done of which 2 trials were through the yolk sac and 2 trials via the chorioallantoic membrane for each specimen. In each trial 12 eggs were inoculated with one of the inocula. The inoculated eggs were then incubated and candled daily for signs of viral multiplication.

RESULTS

Data collection

The data collected from both the DLDO and RLDO and individual farmers indicated Marek's disease is prevalent in Morogoro Township. The incidence rate was as high as 75%, third highest to coccidiosis and fowl typhoid.

Clinical signs

A sample of 10 poultry farms were visited and of these 4 farms had chicken with signs similar to those of Marek's disease. The signs which appeared common to these chicken included: dullness, dehydration, emaciation, paleness and diarrhoea. Unilateral drooping of wings was seen in some of chickens. Paralysis of legs was seen in others whereby one of the legs was stretched forward while the other one was trailed backwards or had both legs spread to the sides. And two chickens had even paralysis and dilatation of the crop. One hen had torticollis and head shaking.

Gross pathology

The birds with unilateral drooping of wings had enlarged brachial plexus twice as thick as the

normal ones, gray yellow in colour and without the normal cross striations. In the viscera they had grayish tumour masses on the liver and kidneys. The birds with unilateral paralysis of legs had enlarged sciatic nerve plexus thrice as thick as normal ones, dull yellow in colour and without striations. Visceral tumours were found on the liver, spleen, proventriculus, gizzard, kidneys and ovaries.

The birds with dilated crop had enlarged vagus nerve about 0.75 cm thick, dull yellow without cross striations. The birds crippled by lateral spreading of legs had gross enlargement of tibio metatarsal joints, bending of the distal end of tibia and the tendons of gastrocnemius muscles had slipped out of condyles.

Histopathology

In the spleen there was massive lymphocytic infiltration which was dominated by small and medium lymphocytes and plasma cells. The skin had hyperkeratosis and massive infiltration by small and medium lymphocytes. Large cells without nuclear details were also seen.

In the intestines the scene was dominated by lymphocytic infiltration into the lamina propria and also in between the serosa and longitudinal muscles. Mitotic figures were seen in some of the lymphocytes. A few monocytes and plasma cells were seen in the intestines.

The liver had foci of cellular infiltration composed of small and medium lymphocytes, monocytes, lymphoblasts and a few eosinophils. There was leukaemia as shown by presence of large number of lymphoblasts in the blood vessels.

The kidneys were also infiltrated by small and medium lymphocytes. A large number of cells in the renal tubule epithelium had undergone necrosis as indicated by pyknosis and karyorrhexis.

The heart had lymphocytic infiltration and some blood vessels had large number of lymphoblasts indicating leukaemia. In the sciatic nerve the cellular infiltration was composed of numerous lymphocytes, a few monocytes and mast cells. A

few Marek's disease cells were seen large in size with pale nucleus and poorly staining chromatin. There was marked oedema indicated by wide spaces in between the nerve fibres. Cellular infiltration was not uniform along the nerve, some areas had few cells while others had massive cellular invasion.

In the brain there was perivascular cuffing by lymphocytes which occupied the Virchow - Robin space. Focal distribution of lymphocytes was also evident.

Clinical signs were seen in chickens over 8 weeks of age. This seems late when compared to the appearance of clinical signs at 4 - 20 weeks as reported by Sevoian *et al.*, (1962); Biggs and Payne (1962). However in this survey clinical signs were seen in chicken as old as 32 weeks (8 months). The clinical signs were seen in chicken of breeds like:- Hy-line, Rhode Island Red, Ross I, Ross Brown and White Leghorn. The disease has been reported in similar breeds elsewhere by Biggs, *et al.* (1963). Biggs, *et al.*, (1968) and Cole (1968).

In this survey only two clinical forms of Marek's disease were reported namely:- neural and visceral forms. The clinical signs described in the results section are similar to those described by Sevoian, *et al.*, (1962), Vickers, *et al.* (1966), Biggs (1967) Calnek, *et al.* (1970). A third clinical form of Marek's disease involves the iris and is called ocular form (Sevoian, *et al.*, 1962., Biggs 1967). The ocular form was not observed during this survey.

The gross pathological features seen in the sciatic nerve plexus, brachial plexus and vagus nerve were very similar to those described by Biggs (1967). The visceral tumour were seen on the liver, kidney, spleen, proventriculus, gizzard and ovaries. Similar lesions were described earlier by Biggs and Payne (1963) AAAP (1967), Biggs (1967), Vickers, *et al.*, (1966), Lapen and Kenzy (1972).

Histopathology was done on the spleen, skin, small intestines, brain, heart, liver, kidney and sciatic nerve. These sections had mild to severe lymphocytic infiltration dominated by small and medium lymphocytes. The details of

these sections as described in the results section are very much similar to those described by others like:- Helboldt, *et al.* (1973), Vickers, *et al.* (1966) Biggs (1967), AAAP (1967), and Doak, *et al.*, 1973.

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