A Case Study on *Sarcocystis* in Laboratory Rabbit

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Abstract

Sarcocystosis spp. was diagnosed in Newzealand white rabbit which was brought for the purpose of experiment. The rabbit was brought from the local market and rearing in group in cage and feed locally available grasses. No any clinical signs were observed infected rabbit. The physiological along with biochemical and hematological test were performed. At necropsy and tissue harvest, a gross lesion was not observed in heart. During histo-pathological observation, an oval round shape along with longitudinal shape cyst was observed in the myocardium.

Key words: Sarcocystis, rabbit, cyst

Introduction

Sarcocystis is a genus of apicomplexan protozoa with a global distribution that includes both wild and farmed species. Sarcocystis species have an obligatory two-host cycle, with a carnivorous final host and an herbivorous intermediary host. Following ingestion by the intermediate host, infective sporozoites infiltrate the intestinal mucosa and multiply asexually in vascular endothelium, creating schizonts containing merozoites. Merozoites enter the bloodstream and spread to muscle tissue, where they penetrate myofibers, form a sarcocysts divide, and develop into bradyzoites. Sarcocystis forms in muscle about 3 months after an infected intermediate host consumes the oocysts. The cycle is also completed when the definitive host consumes sarcocyst-containing muscle tissue. Sarcocystosis is common in wild rabbits whereas uncommon in domestic rabbits and has been recently reported in laboratory rabbit. Two species are generally reported in laboratory rabbit; Sarcocystis cunilli in domestic and Sarcocystis leporum in wild cotton tail rabbits (Pritt et al., 2012). The definitive host for both Sarcocystis cuniculi and Sarcocystis leporum is the domestic cat (Crum & Prestwood, 1977). Sarcocystis was present with numerous crescent shape bradyzoites in tongue and similar bradyzoites were seen in eyelid without inflammation and degeneration (Serfilippi et al., 2020). Rabbits become infected by swallowing

cat feces-contaminated forages or feeds, and Sarcocystis grow in skeletal and cardiac striated muscle. The Sarcocystis can be commonly found in oesophagus, tongue, thigh, diphagarm and thoracic wall muscle (Pritt et al., 2012). There are no distinct clinical indications of sarcocystosis. When cysts in skeletal muscle rupture, an inflammatory response occurs. Lameness may result in severely affected animals. Although both microscopic and macroscopic cysts have been discovered in cottontail muscle. Fayer & Kradel, 1977 Claims that cyst size varies with age and has no diagnostic significance for species.

Materials and methods

A number of rabbits were purchased from the market for experimental purposes. The rabbit was kept in a cage for a week to acclimate before the experiment and given access to normal drinking water and locally available grass. The rabbit was used in a study and was killed in accordance with the protocol at study termination. They were not treated with any known infectious or immunomodulatory agents. The blood sample and urine sample were collected for study purpose. Different biochemical tests were performed. No gross observation was noted in muscle tissue. A full sample of the heart was collected, preserved in 10 % neutral buffered formalin, proceed section and stained with hematoxylin and eosin. The rabbits were submitted for histopathological procedure.

Results and discussion

The temperature was decreased at 98.6 °F while the other parameters were normal. Haematological test was performed using automatic analyzer and manually. No any abnormalities were noted.

Table 1: Physical Examination and Findings

Parameter	Result	Normal range
Temperature	98.6 °F	101.5-104.2°F
Heart rate	244 beat/min	180-350 beat/min
Respiration rate	152/min	120-200 breathe/min

Haematological test was performed using automatic analyzer and manually. No any abnormalities were noted.

Table 2: Haematology Laboratory Report

Analysed Parameter	**Result**	**Normal Range**	**Units**
Hemoglobulin	10.1	9.4-17.4	g/dl
Red blood cell or erythrocyte	4.51	3.8-7.9 $\times 10^6$	/mm
Total WBC	8.97	5-13	/l
Lymphocyte	44	43-80	%
Mean Corpuscular Hb	22.6	18-24	pg/cell
Mean Corpuscular Hb concentration	28	27-34	%

The ALP increased to 124.1 IU/L and AST got decreased to 21.99 IU/L whereas the ALT, Creatinine and BUN value remain constant as shown in table 3.

Table 3: Biochemical Laboratory Report

Analysed Parameter	**Result**	**Normal Range**	**units**
Alanine aminotransferase (ALT)	67.36	55-260	IU/L
Alkaline Phosphatase (ALP)	**124.1**	12-96	IU/L
Asparate aminotransferase (AST)	**21.99**	35-130	IU/L
Creatinine	1.55	0.5-2.6	mg/dl
BUN	22.02	13-30	mg/dl

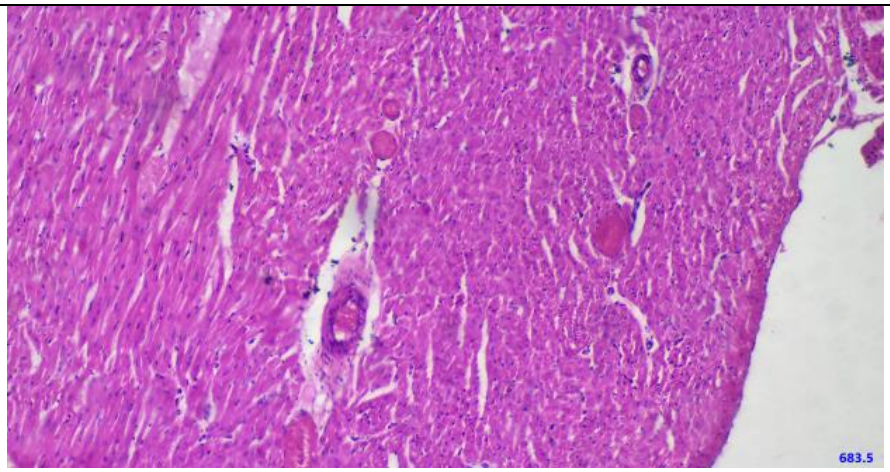

Figure 1: Sarcocystosis, skeletal muscle, myocardium in Heart Hematoxylin and esosin stain; magnification 4x

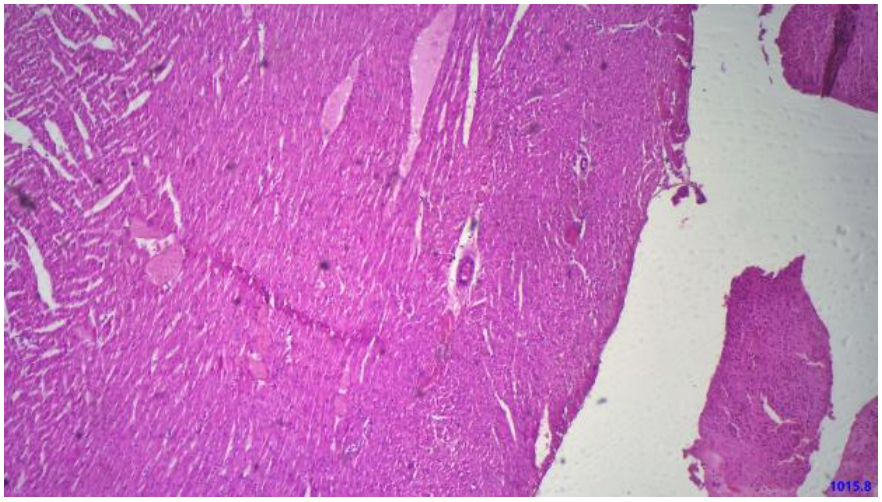

Figure 2: Sarcocystosis, skletal muscle, myocardium in Heart Hematoxylin and esosin stain; magnification 10x

Histopathologic evaluation of figure 1 and 2 revealed the presence of Sarcocystis in rabbits. No gross observation was noted. The Sarcocystis was elongated and some were found round shaped with moderate fatty degenerative change in myocardium. The bradyzoites were not distinct. No severe inflammation was observed in adjacent myofibres.

The case is for a description of sarcocystosis in laboratory rabbit.The Sarcocystis infection in this rabbit was mild and incidental. Mild infections of Sarcocystis in skeletal muscle are unlikely to interfere with the majority of research project because many species of Sarcocystis are typically innocuous and self-limiting (Pritt et al., 2012). Although the individual Sarcocystis can rapture and trigger local inflammation and the free bradyzoites were not visible for differentiation of species of Sarcocystis (Sykes et al., 2011). The diagnosis of S. cuniculi was made based on the microscopic appearance in the rabbits (Munday et al., 1980) and the suggestion provided by (Fayer & Kradel et al., 1977) that Sarcocystis leporum is not infective in domestic rabbits. Many crescent shape bradyzoites were found in muscle of eyelid and tongue with no gross lesion observed in laboratory rabbit (Serfilippi et al., 2020). According to (Januškevičius et al., 2018), the amount of ALP increased significantly with greater invasion of Sarcocystis in bull and its change leads to disorders with degeneration and necrosis of heart muscle and liver. Also, changes in ALP, AST are related to the intensity of the Sarcocystis infection. The ALP activity increased in cases of experimental pig sarcocystosis and that the different levels of activity of this enzyme depend on the pig breed. Serological diagnosis of sarcocystosis has been performed by using indirect

immunofluorescent antibody testing. When antibody level was evaluated after experimental transmission from cat to rabbit, peaked at 50 days, and were gone by 100 days (Cerna et al., 1981). As a result, the efficacy of indirect immunofluorescent antibody testing for sarcocystosis is dependent on the infective dose and time since infection, and it can only detect recent or recurring infection. Although molecular technique is used to differentiate and special Sarcocystis, but no published study (Stojecki et al., 2012) have used molecular tools to differentiate Sarcocystis cuniculi from Sarcocystis leporum but here it was not able to pursue such methods for these animals. Because our rabbits were of 5 to more months longer. Sarcocystis form occurs approximately 3 months after ingestion of infective oocyst. So immunofluorescent was consider ineffective for confirmation of Sarcocystis infection and hence was not performed (Januškevičius et al., 2018).

Conclusion

Rabbits maintained for biomedical research should be kept apart from cats to prevent infection. It's important to take precautions to keep cat waste from contaminating the hay provided as enrichment, food, especially fresh veggies, and bedding.

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