HISTOPATHOLOGICAL EFFECTS AND BIOCHEMICAL ANALYSIS OF THE LIVER TISSUE OF GOAT FROM JAWHAR, DIST. PALGHAR, MAHARASHTRA, INDIA.

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ABSTRACT : Jawhar is a Tribal Taluka from Dist. Palghar, Maharashtra, India. Liver tissue of Goats infected with helminth parasites were analysed and studied. Biochemical analysis of Total protein, lipids and Glycogen content measured and histopathology of the liver tissue was done. The above studies were done to check nutritious status of the available meat.

Keywords: Histopathology, Parasites, Helminths, Infection.

INTRODUCTION:

Goats and sheep are the earliest ruminants to be domesticated. Theycan withstand a period of drought better than any other livestock. Goats can survive under limited fodder need and they are capable to withstand water scarcity. Sheep and goats are important source of animal protein. Recurring losses in productivity due to widely prevalent parasitic infection is important and common recurrent problem for small ruminant's production in most parts of the world.[Gall, C.(1981).]Goats due to improper management and unhygienic conditions are suffering from various parasitic diseases. Parasitic infections ranges from acute disease frequently with high rates of mortality and premature culling to subclinical infections, where goat may appear relatively healthy but perform below their potential. In broader sense, the factors dictating the level and extent of parasitism are climate, management conditions of pasture and animals, and the population dynamics of the parasites within the host and in the external environment. Gastrointestinal parasitism is one of the major health problems severely limiting the productivity of dairy animals, in the Himalayan and other hilly regions of India. (Jitendran and Bhat, 1999). The diverse agro climatic, animal husbandry practices and pasture management largely determine the incidence and severity of various parasitic infections in grazing animals (Arambulo and Moran,1981; Joshi, 1998 and Jitendran and Bhat, 1999).The effects of helminth infections on the physiology of the host animal as a result of a specific host/parasite combination, are highly dependable upon the size of the infectious dose, the predilection sites of the parasite and the population density at these sites combined with its ability to evade the immune response by the host. Moreover, the physiological impact of the infection can directly or indirectly be influenced by the presence of other infectious agents such as other helminths, protozoans and/or various microbes. The immunopathological interaction between these agents are only partly understood and the attempt to explain a more than additive effect of combined infections in pathophysiological and /or energetically terms has not been successful. Goats get infected by picking up harmful worm burdens over a short period of time from the pasture and clinical disease is a consequence of exposing insufficiently resistant animals to heavily infected grazing so that animals pick the infective larvae at an excessive rate. The susceptible animals encounter heavy infections either when they graze a pasture contaminated by another group of animals (simple transmission) or when they themselves build up an infestation on

pasture without in doing so, becoming resistant (autoinfection) .sometimes the disease producing infection is derived from both sources. Susceptibility of goats is enhanced by the environment. Parasitic infections cause a substantial decrease in meat, milk and wool production and are a leading cause of mortality in sheep and
goats. One of the visible losses due to helminth infection is loss of body weight of animals (Coop, 1982). The reason for the reduction in feed intake is not clear. Several factors have been implicated local pain and inflammation causing disinclination to forage, changes in hormone levels, alterations in gut physiology and associated changes in digestion and availability of amino acids (Coop, 1982; Bremner, 1982). Live weight is a factor vital in increasing dressing percentage values (Mahgoub and Lodge, 1998). Live weight was reduced in infected goats. MacLean et al. (1992) showed that protein as a percentage of body weight was higher in animals free of internal parasites than in the infected ones. This is because, helminth infection lowers the efficiency with which digested and metabolized nitrogen is retained (Akinbamijio et al.,) In addition to infectious and systemic diseases, the diseases of the Liver are of major importance. Liver is one of the most vital organ of the body with multiple functions. Some of the major functions are detoxification of noxious materials, metabolism of protein, carbohydrate and fat; bile secretion,; red blood corpuscle and prothrombin formation; formation and storage of glycogen; synthesis of protein, glucose and fats; defensive mechanism against infectious agents; storage of vitamins and minerals etc.
Liver is the excellent source of high biological quality protein and vitamins and is valuable for its anti-anaemic factors. It is also indispensable accessory organ of digestion and normal assimilation. The liver is affected with a number of diseases or due to local infection. Among those diseases, liver fluke disease, black disease,
toxaemic jaundice, pyaemic hepatitis and white liver disease are important ones. The present research was therefore undertaken to study the gross pathological alteration in liver due to helminth infection.

MATERIALS AND METHODS:

Liver and gall bladder were collected from 50 goats of 3-5 years from Jawhar taluka (Tribal taluka), District palghar, Maharastra, India. Flukes were found in the ventral lobe of the liver of 20 animals. Representative portions from the ventral and other lobes of the liver were fixed in 10% formal saline for histologic examination. From each liver six tissue sections were prepared following the paraffin method, cut at 6µ thickness and stained with haematoxylin and eosin (Luna, 1968). Diagnosis of infection in animals is based on detection of the cysts during meat inspection where the other methods such as serological ELISA biochemical and haematological tests can be useful in live animals. (Berezhko 1989). Total proteins, lipids and Glycogen from liver were determined by lowry's, chloroform-menthol and Anthrone Method respectively.

OBSERVATIONS

Examination of liver, gall bladder and collection of parasites In the lab, the liver and gall bladders were subjected to thorough investigation for the collection of parasites as well as for pathological studies. The gross pathological changes were recorded
carefully. The bile ducts were opened first for chronic fascioliasis. For generalized liver fluke infection (Fascioliasis) incision was given in different parts of the liver to examine the presence of fluke in the parenchyma. The liver was cut into slices of 4-5mm thickness using a sharp knife and pressed to squeeze out flukes from its tissue and smaller bile ducts. Normal saline was used for quick removal of flukes from the liver tissue.

Histopathology

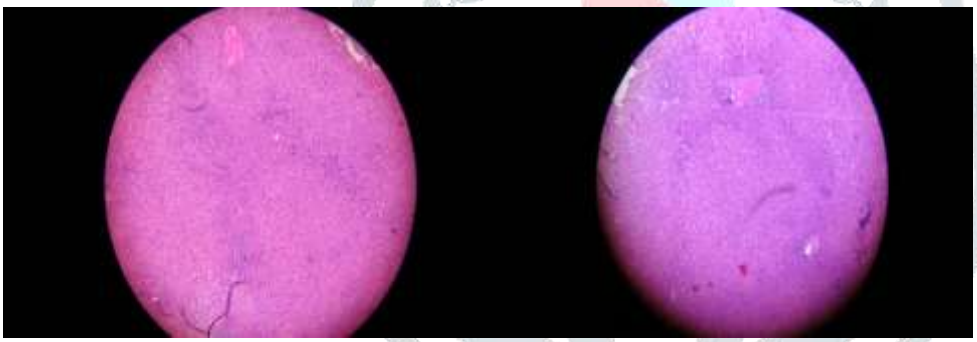
The histopathology was carried out in the lab. The fixed liver tissue of animals having helminth infection was processed, sectioned and stained according to the method of Arora and Iyer (1973) for histopathological

studies. Pieces of diseased liver tissue about one cubic cm in size were fixed in 10 percent buffered neutral formalin.
The well-fixed tissues were transferred to running water and after proper washing they were dehydrated through a series of ascending grades of alcohol, cleared in two changes of chloroform and finally embedded in hard paraffin (58º C). Sections were cut at 6 µ by using rotary microtome. All the sections were stained routinely with Harris's Haematoxylin and eosin for detailed Histopathological examinations.

Microscopic lesions in the liver included large concentric foci of haemorrhages in migration stage and decreased number of hepatocyte, dilation of sinusoids presence of inflammatory cells in portal areas and doubled layer parasitic cyst formation in chronic stages in conclusion, various changes in parameters could have dexterous effect on mortality of the herd.

Slide 1: Normal liver tissue with hepatocytes.
Slide 2: Infected liver tissue in which migratory tract in blue is clearly visible. Lymphocyte infiltration and atrophy of the tissue is seen. Biochemical Analysis:
1. Normal liver showed 6.2 mg per gm of Liver tissue. The concentration of proteins decreased in infection it was as low as 4 mg per gm of liver tissue.
2. Normal liver showed 15.6mg per gm of liver tissue and infected tissue showed marked increase in total lipids it showed 26 mg per gm of liver tissue.
3.Normal liver showed 2.78mg Glycogen per 100 mg and in infected 2.07mg per 100 mg.

Slide 1 **Slide 2**



DISCUSSION:
In 20 liver samples immature flukes were found. Histologic examination of the liver showed that there is focal infiltration of lymphocytes in the lobules. patches of local accumulation of Neutrophils and eosinophils were also observed in the liver tissue. Some plasma cells and macrophages were also observed in the affected area. This result agreed with the work of Bitakaramire and Bwangamoi (1969) in calves where they found lymphocytes mast cells and eosinophils in the necrotic smooth muscle of the bile ducts. The interpretation of the invasions of eosinophils indicated the parasite burden of the animal. On the other hand, invasion of lymphocytes indicated that a cellular response was taking place in the infected animals but the process was too slow to develop.

The common histopathological changes found in the study were the migratory tract with lymphocytic infiltration, atrophy, necrosis and fatty changes in the liver. Infection in goats not only shows histopathological changes but also alters the biochemical composition. There is decrease in protein and glycogen but increase in total lipids.
CONCLUSION:

The study has shown that helminthiasis affects goat production by reducing the live weight gains, body conditions and carcass values in terms of quantity and quality. However, the goats protected by anthelminthic intervention were not affected. It is therefore important that the rural communities, who keep goats should be made aware of the dangers caused by gastrointestinal infections to their goats and appropriate steps should be taken to mitigate problems associated with helminthiasis in their goats. Anthelminthic intervention in a short term scenario would provide the solution. However its use should not be abused as it may cause anthelminthic resistance in the helminths.

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