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Review Article

BIOLOGICAL AND SCIENTIFIC OPINION ON STUDY ON THE VARIOUS ASPECTS OF 'HUMPSORE' IN CATTLE POPULATION OF INDIA: A REVIEW

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*Correspondence	Abstract
<p>Ganguly Subha AICRP on Post Harvest Technology (ICAR), Department of Fish Processing Technology, Faculty of Fishery Sciences, West Bengal University of Animal and Fishery Sciences, 5, Budherhat Road, P.O. Panchasayar, Chakgaria, Kolkata, India</p> <p>DOI: 10.7897/2321-6328.01215</p> <p>Article Received on: 12/07/13 Accepted on: 10/08/13</p>	<p>In the present article, the prevalence, transmission, characteristics of the parasite <i>Stephanofilaria assamensis</i> and pathology of the disease caused by <i>Stephanofilaria assamensis</i>, commonly known as 'humpsore' is discussed. <i>Musca conducens</i> and <i>Haematobia sp.</i> are identified as intermediate hosts. The histopathology of the biopsy materials reveals almost identical changes like hyperplasia, fibrosis, acanthosis with huge number of adult parasites and microfilariae in dermis layer of cross sections of skin.</p> <p>Keywords: Cattle, Humpsore, <i>Stephanofilaria assamensis</i>.</p>

INTRODUCTION

Skin of cattle is often affected by Stephano-filarial infection in the Indian subcontinent and is commonly known as 'Humpsore'. Nine species of the Stephanofilarial parasites have been reported from different parts of the world, but only *Stephanofilaria assamensis* has been reported as the causal agent of hump sore in eastern India. Though the name 'Hump sore' implies appearance of sore in the hump region but the stephanofilarial dermatitis also occurs in other parts of the body. The disease is transmitted by the fly *Musca conducens* and is prevalent in tropical countries like India¹ and other countries. The disease is widely prevalent in West Bengal, India.

The presence of the parasite *Stephanofilaria sp.* which affects domestic animals may harm human health². Hence, keeping in view of its prevalence in West Bengal, India as well as its economic importance, a fresh initiation has been undertaken to investigate the present status of prevalence, transmission dynamics and pathology of the disease. It was observed that the prevalence of the disease increased from the month of May till it reached the peak in August and declined thereafter, lowest in winter till December. Thus, influence of season on prevalence indicated that it was highest in rainy season followed by summer and winter.³

Characteristics of the parasite

Adult parasites and/or microfilariae are recovered from skin scrapings impression smears of tissue sections. Microfilariae in peripheral blood are also recovered only from 12 cases. The adult worms appear as small, slender and whitish. The male parasites ranged from 3 to 5 mm and females 7 to 11 mm. Under light microscope, a crown like cephalic structure is noticed; at a short below there is a row of cephalic spines.

Except the cephalic structures, the cuticle is finely serrated at regular intervals throughout the body length and the serrations became gradually faint towards the posterior region. In males the body is almost of uniform thickness except the anterior end and posterior end, which is slightly bent ventrally. Whereas, both the ends of females remain tapered, but the thickness increased gradually towards the posterior part and the tail is straight. The centrifuged sediment and extractives of tissues in physiological saline revealed slender microfilaria, of which anterior end is blunt and the posterior end is pointed.

Examination of impression smears revealed that most of the microfilariae are sheathed; only a few are unsheathed. Above to the nerve ring, the cephalic portion is narrow and ends somewhat rounded; on the other hand towards the posterior end, the microfilaria are narrow and tapered posteriorly. Most of the microfilariae were in open 'C' posture or coiled, while undulating forms and straight forms of the microfilariae were also observed in few cases. The length of the microfilaria varies between 120-150 µm.

Potential vectors for transmission of the infection in cattle

In coastal South Bengal *Musca conducens* and *Stomoxys calcitrans* flies feed on the lesions of stephanofilaria. On dissection, unsheathed crescent shaped infective larvae were recovered from the *Musca conducens* flies only and no larvae from *Stomoxys calcitrans*.

In North Bengal, India plenty *Haematobia sp.* and a few *Stomoxys calcitrans* were caught from the body of the host. On dissection of both the flies and thorough examination revealed a few larvae in the thorax and salivary gland of *Haematobia sp.* but not in *Stomoxys calcitrans*.³

Histopathological findings and revelations

The gross and histopathological changes in different stages of stephanofilarial dermatitis of cattle were almost same irrespective of the site involved. The diameter of the gross lesions varied from 2 to 10 cm. Exudation of serum and oozing of blood leading to crust formations, acanthosis, proliferation and annular zones of leukoderma surrounding the lesions were noticed. Raw eroded ulcerated red areas were observed at around the junction of skin and hoof. Scab, dry crust formation and acanthosis were common. In dewclaw region, lesions with excoriation proliferation and complete loss of hairs and tumorous growth up to hen's egg size were quite common.

The histopathological sections prepared from skin biopsies revealed hyperkeratinization of cornified layers of the epidermis, stratum granulosum and stratum spinosum of the epidermis were hyperplastic and micro-cavities filled with tissue debris and inflammatory cells in the epidermis. Some of the retepegs of epidermis showed proliferation and extended deep into the dermis. Transverse and longitudinal sections of adult *Stephanofilaria* sp. parasites were found in the dermo-epidermal junction, just beneath the tips of retepeg and the parasite sections were surrounded by a zone of inflammatory cells. Longitudinal sections of adult parasites were also seen in the superficial layer of dermis near the epidermis along with the infiltration of inflammatory cells. Coiled and slender microfilariae without egg capsule were noticed amidst the granulation tissue in the superficial dermis and vicinity of that microfilaria was infiltrated with few inflammatory cells. The dermis showed extensive inflammatory reaction consisting of formation of granulation tissue, especially at the superficial part of dermis and deeper part of dermis showed fragmentation of tissue. The infiltrating cells of dermis consist of neutrophils, eosinophils and mononuclear cells. Increased activity of fibroblasts with hypertrophy and atrophy of the hair follicles were observed.

Prevalence and pattern of infection in cattle

The highest prevalence among the animals of 4 to 5 years of age group with gradual increase in rate of prevalence with the advancement of age up to five years and there after gradual decrease was observed.² The increased percentage of clinical cases in adult male cattle (4 to 5 years) might be due to their various exposure like ploughing, pulling carts and other drought purposes and chaining with iron-chain, thick ropes etc. These lead to external injury to hump, which attracts the vector flies and is one of the predisposing factors of Stephanofilariasis.

The highest prevalence during rainy season might be due to high temperature, humidity and rainfall resulting into increased population of transmission vectors by their increased breeding performance during rainy season. During rainy season majority of the animals are utilized for ploughing of lands for agriculture and the hump and other parts of the body are exposed to injury which attract flies. When animals are reluctant for ploughing in the field, farmers often beat them with whip or sticks etc. to make them active which makes scratches over the skin thereby attracts the flies and might be the cause of stephanofilarial dermatitis in these sites.

The small slender and whitish parasites are observed and the 'C' shaped microfilariae with a slightly bent knob like cephalic and a sharply pointed tail in deep skin scraping have

been recovered earlier. The parasites may remain as sheathed or as unsheathed. The dewclaws are pushed out and might be shed completely leaving behind a crater like ulcer. Acanthosis, thickening of the epidermis as a result of hyperplasia of the malpighian layer, especially the prickle cell layer, is a common feature in chronic inflammatory condition. Parakeratosis might be due to rapid cell turnover. The presence of inflammatory cells and tissue debris in the micro-cavities of epidermis was observed by Singh *et al.*² It is suggested that these are degenerating Stephanofilariae and the inflammatory reaction is against those parasites. Changes in typical hump sore were identical affecting mostly the hump region of the cattle in North Bengal while in South Bengal the sores in other parts of the body particularly the legs were quite common.³

Endemicity of *Stephanofilaria assamensis* in India is well established and information about its prevalence, epidemiology, transmission and pathology are available¹. But it was found that the incidence and character of the disease in hilly area (Himalayan foots) is not same with coastal plains of South Bengal, India. It is assumed that some factors in relation to the host parasite relationship and genetic variation in strains of the parasite are related to the limitation of the disease mostly to the hump region of the cattle of foot hills area. This type of observation in relation to variation in sites of infection in respect of eco-climatic variation has never been reported so far.³

Various characteristics lesions have been observed and interpreted by the earlier workers.⁴ Exudation of serum and crust formation continuous as the lesion advances; subsequently, when the lesion becomes old and chronic, there is a granulomatous swelling on the area. Section of skin revealed acanthosis, hyperkeratosis and parakeratosis of epidermis which has been also been observed earlier.⁵ There were spongiotic changes in the epidermis and epidermal retepegs proliferation and penetration in the dermis was noticed and this epidermal retepegs proliferation may be due to chronic parasitic infection. These parasitic sections suggest that the pathological tissue changes and inflammatory reactions are brought by the parasites.⁶ In bulls, chronic eosinophilic dermatitis in the scrotal area associated with stephanofilariasis has been reported.¹

CONCLUSION

The eco-climatic differences between different agro-climatic zones are responsible for the differences in prevalence and characteristics of Stephanofilarial dermatitis, intermediate hosts and also in the genetic character of strains prevalent in these areas.

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