Bovine hypodermosis in indigenous cattle herd and its successful therapeutic management

Amit Kumar Jaiswal · Vikrant Sudan ·
Pradeep Kumar · Ashish Srivastava ·
Daya Shanker

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Abstract Warble fly infestation in cattle is a serious problem throughout the world. In India, it is mainly reported from northern parts of the country and is caused by the larvae of *Hypoderma lineatum*. The disease causes huge economic losses to animal production like milk and leather industry. The present article reports the outbreak and subsequent successful treatment of Warble fly infestation from an indigenous cattle herd. The animals were clinically examined for the presence of warbles and the larvae were collected by pressing the swellings on the back. The larvae were brought to the laboratory and were morphologically examined and morphometry was done. The animals were administered specific therapy consisting of two doses of subcutaneous injection of Ivermectin at weekly intervals. The epidemiology of the disease, its patho physiological impact on the animal and various strategies for clinical management are being described in the article.

Keywords Indigenous cattle · Ivermectin ·
Hypoderma lineatum · Warbles

Introduction

Bovine hypodermosis, commonly known as warble fly or cattle grub infestation, is a world widely distributed notorious veterinary problem. The warble is an Anglo-Saxon word used for boil (Scholl 1993). The condition is the result of subcutaneous myiasis caused by larvae of *Hypoderma* species in wild and domesticated ruminants (Hassan et al. 2010). The biology of hypodermosis is very much complex as it passes through ecto as well as endoparasitic stages in the life cycle. Moreover, the parasitic stage of hypodermosis lasts about 1 year in domesticated as well as in the wild animals, while in the adult stage, a free-living fly lasts only for few days. Only one species viz., *Hypoderma lineatum* has been described from India affecting the bovidae with a prevalence rate of 50–90 % (Soni and Khan 1945). The present paper deals with the outbreak of bovine hypodermosis, its pathobiology, significance, control and treatment in a semi organized herd of indigenous cattle.

Materials and methods

The field veterinarian at Aligarh was approached by the owner of a semi organized dairy farm and intimated about the outbreak of a condition resulting into nodular eruptions on body of most of the animals. The affected animals were reported to be procured from another dairy farm few months back. Upon the visit to the farm, the affected animals were clinically observed. Most of them had nodular eruptions on the back, thigh and flank region and were reported to have decreased their feed intake and drastic decrease in the milk yield of the affected milch cows was also reported. Few of the nodules present on the body of some of the animals had opened up at the middle and

A. K. Jaiswal · V. Sudan (✉) · D. Shanker
Department of Parasitology, College of Veterinary Sciences &
Animal Husbandry, U P Pandit Deen Dayal Upadhyaya Pashu
Chikitsa Vigyan Vishwavidyalaya Evam Go Anusandhan
Sansthan (DUVASU), Mathura 281001, India
e-mail: viks.sudan@gmail.com

P. Kumar · A. Srivastava
Department of Veterinary Medicine, College of Veterinary
Sciences & Animal Husbandry, U P Pandit Deen Dayal
Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go
Anusandhan Sansthan (DUVASU), Mathura 281001, India

posterior end of larvae residing inside were visible. Some of such nodules were squeezed and larvae were pushed out, paddock was also searched for the dropped out larvae and all the larvae were collected in sealed plastic bags and brought to Department of Parasitology, DUVASU for further identification. The larvae were brought to the laboratory in PBS and were grossly as well as microscopically examined under a stereoscopic microscope for morphological characteristics using standard tools (Bowman et al. 2003). The animals were given specific treatment consisting of sub cutaneous injection of Ivermectin (Hitek) @ 1 ml/50 kg body weight repeated at weekly interval. All animals were kept under close observation for 2 weeks for any ill effect of the treatment.

Results and discussion

The clinical examination of the infected animals revealed presence of a large number of nodular eruptions on the back, thigh and flank region (Fig. 1). Few of the nodules present on the body of some of the animals had opened up at the middle and posterior end of larvae residing inside were visible (Fig. 2). A detailed microscopic examination of the white coloured (when fresh and subsequently turned darker) bots, measured 18–25 mm in size (Fig. 3), and possessed a number of flat tubercles and small spines on all the segments except the last one. Morphological characteristics of ‘D’ shaped, opened, dark black coloured, deep seated stigmal plates with radially arranged respiratory holes (Fig. 4), confirmed the identification of the warbles.

Warble fly infestation has been historically recognized as economically important pest of cattle, goats, and sheep (Hall and Wall 1995). A number of factors viz., damage to hides, gadding, decrease in milk production, carcass depreciation resulting in the butcher’s jelly, etc. contribute

to the economic losses (Macchioni 1984). The direct effects include reduction in the weight gain and milk production that is due to the activity of the adult fly and the grubs within the host, while the indirect effects are due to the activities of the migrating grubs and the grubs present on the back of the affected animals (Colwell 1992). Amongst all the effects caused by the hypoderma species,

Fig. 2 Larva inside the nodular eruption

Fig. 3 Morphometry of the larvae

Fig. 1 Nodular eruptions on animal body

Fig. 4 Characteristic spiracles of *H. lineatum*

hide damage is one of the most important one (Tarry 1986). The young animals are more susceptible than the older ones owing to the development of immunity against the warble larvae in the latter (Karatepe and Karatepe 2008). Male animals are more prone to warble infestation as compared to the females (Kara et al. 2005).

Ivomec, moxidetin, duramectin, and eprinomectin are the compound commonly used to treat and control the disease (Hassan et al. 2010). The avermectins have also ability to kill the migrating larvae as well as the second and third instars of hypoderma species (Khan et al. 1985). This is the unique characteristic that permits the use of these compounds in the later season to control this disease while the other systemic insecticides cannot be used during that time. Another benefit to avermectins is to reduce the level of infestations up to 100 %. But the treatment of animals during colder months is still a matter of debate. During that time the larvae are killed while undergoing migratory phase towards back of animal leading to sever anaphylaxis (Taylor et al. 2007) coupled with bloat in case of *H. lineatum* as the developmental stages are found near oesophagus and their killing there leads to inflammation and subsequent failure of full term eructation. Hence it is strongly recommended that the systemic treatment with avermectin group should be given during warmer times when most of the larvae have reached the back of animal thereby, decreasing the chances of post therapeutic complications.

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