

Clinical Response to Autohaemotherapy as an Adjunct to Anthiomaline Treatment in Bovine Cutaneous Papillomatosis: A Field Observation

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Abstract

Bovine papillomatosis is a contagious proliferative disease caused by bovine papillomavirus, characterized by the development of benign cutaneous and mucosal papillomas in cattle. This field study evaluated the clinical response to autohaemotherapy as an adjunct to Anthiomaline-based treatment in naturally occurring bovine papillomatosis. Fourteen crossbred heifer calves (10–18 months old) diagnosed with bovine papillomatosis were divided into two groups of seven animals each. Group I received Anthiomaline (15 ml intramuscularly at 48-hour intervals) injection, while Group II received the same treatment supplemented with autohaemotherapy using 20 ml of autologous blood administered via intramuscular and subcutaneous routes. Clinical response was assessed based on lesion regression and recovery period. Group I showed only partial regression with persistence of residual lesions. In contrast, Group II exhibited visible lesion regression within one week and six of seven animals achieved complete or near-complete recovery within 40 days. No adverse reactions were observed. The findings suggest that autohaemotherapy may enhance the efficacy of Anthiomaline-based treatment and serve as a practical, economical adjunct therapy for bovine papillomatosis under field conditions.

Key words: Bovine papillomatosis, Autohaemotherapy, Anthiomaline, Crossbred heifer calves, Immunotherapy

Bovine papillomatosis is a viral proliferative disease of cattle caused by bovine papillomaviruses (BPVs), characterized by the development of benign epithelial and fibroepithelial growths commonly known as papillomas or warts. Although the disease is often self-limiting, extensive lesions can interfere with feeding, growth, milking and reproduction, resulting in economic losses and increased susceptibility to secondary infections [1]. More than 20 BPV genotypes have been identified, and infection occurs through abrasions that allow viral entry into the basal epidermal layer, leading to hyperplastic wart-like lesions [2]. The disease predominantly affects calves and young heifers due to their immature immune status and commonly involves the head, neck, eyelids, ears, muzzle, shoulders and teats [3-4].

Various treatment modalities, including surgical excision, cryotherapy, autogenous vaccination, immunomodulatory therapy, herbal preparations and lithium antimony thiomalate (Anthiomaline), have been employed with variable success [5-6]. Anthiomaline is widely used because of its reported antiproliferative and immunomodulatory effects; however, complete regression of lesions is not consistently achieved, particularly in animals with extensive papillomatosis [7]. Autohaemotherapy, which involves the administration of

autologous blood, has gained attention as a simple and economical immunotherapeutic approach. It is believed to stimulate host immune responses and enhance lesion regression, although its exact mechanism remains unclear. Previous studies have reported encouraging outcomes following autohaemotherapy in bovine papillomatosis [8-9]. However, information regarding its efficacy as an adjunct to Anthiomaline treatment under field conditions remains limited. Therefore, the present study was undertaken to evaluate the clinical response to adjunct autohaemotherapy in naturally occurring bovine cutaneous papillomatosis.

MATERIALS AND METHODS

The study was conducted in two organized dairy farms in Cuddalore district of Tamil Nadu, India. Fourteen naturally occurring cases of bovine papillomatosis were identified in crossbred heifer calves aged 10-18 months, comprising eight Jersey crossbreds and six Holstein Friesian crossbreds. Clinical history, lesion duration and treatment records were obtained from farm owners. Diagnosis was based on characteristic cauliflower-like papillomatous lesions observed predominantly on the eyelids, ears, muzzle, neck and shoulder regions (Plate

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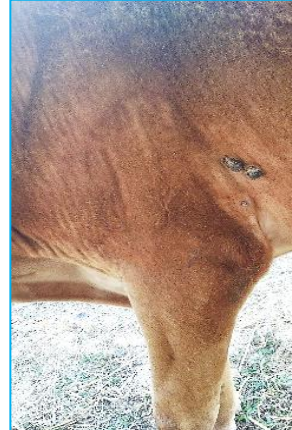
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1). Physiological parameters were within normal limits in all animals. Histopathological examination, PCR testing and molecular characterization were not performed; therefore,

diagnosis was based solely on clinical history and lesion morphology.



Papillomatous lesions on the muzzle and oral region.



Cutaneous papilloma on the shoulder region



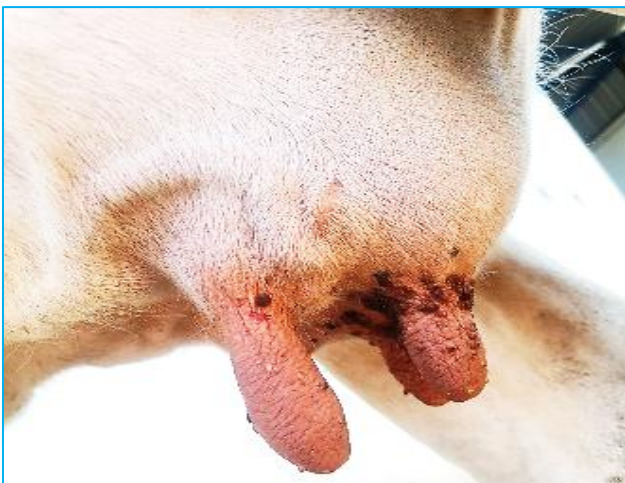
Severe cauliflower-like cutaneous papillomas in neck



Cauliflower-like cutaneous papillomas in eye



Auricular papillomatosis.



Teat papillomatosis lesions in affected cattle

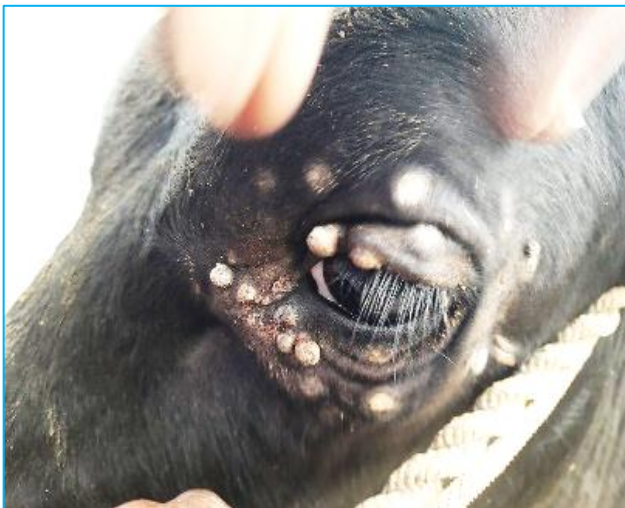
Plate 1 Distribution of bovine papillomatosis lesions at different anatomical sites observed in the present study

The fourteen affected animals were allocated into two treatment groups comprising seven animals each. Allocation was performed under field conditions based on the availability of affected animals and owner consent for the respective treatment protocol. Randomization was not performed. Group I (n = 7) received lithium antimony thiomalate (Anthiomaline) at a dose of 15 ml administered intramuscularly at 48-hour intervals for a total of five administrations, followed by one injection weekly for three consecutive weeks. Group II (n = 7) received the same Anthiomaline treatment regimen. In addition, autohaemotherapy was performed under aseptic conditions. Approximately 20 ml of autologous blood was collected from the jugular vein of each affected animal using sterile disposable syringes and needles. Immediately after collection, 10 ml of blood was administered intramuscularly in the gluteal musculature and the remaining 10 ml was injected subcutaneously in the cervical region. The procedure was

repeated at 48-hour intervals for five administrations, followed by one treatment weekly for three consecutive weeks. All injections and blood collection procedures were performed using standard aseptic techniques.

Animals were monitored during treatment and for eight weeks thereafter. Clinical response was assessed through serial observations of lesion size, texture and regression. Indicators of recovery included lesion shrinkage, drying, sloughing and disappearance of papillomatous growths. Complete recovery was defined as total lesion regression with restoration of normal skin, while partial recovery indicated reduction in lesion size without complete disappearance. As objective lesion measurements and scoring systems were not employed, treatment outcomes were evaluated descriptively under field conditions. Owing to the small sample size and absence of objective lesion measurements, formal statistical analyses were not performed and outcomes were interpreted descriptively.

Bovine papillomatosis lesions before treatment (Day 0)



Partial regression of bovine papillomatosis lesions following treatment (day 40)



Plate 2 Clinical response in animals treated with Anthiomaline alone

RESULTS AND DISCUSSION

A total of fourteen crossbred heifer calves affected with bovine papillomatosis were included in the present investigation. The lesions were predominantly distributed over the eyelids, ears, muzzle, neck and shoulder regions. Grossly, the lesions appeared as sessile or pedunculated proliferative growths with a characteristic cauliflower-like appearance. The size and number of papillomas varied among affected animals. In most cases, the lesions initially appeared as small nodular

growths and gradually enlarged over a period of one to three months before veterinary intervention. Clinical examination revealed no significant abnormalities in rectal temperature, pulse rate or respiratory rate, and all physiological parameters remained within normal limits throughout the study period. The affected calves exhibited normal appetite, behaviour and general health status despite the presence of extensive papillomatous lesions.

Animals in Group I (Plate 2) exhibited gradual reduction in lesion size during the observation period. Regression of

papillomas became evident approximately two weeks after initiation of treatment. However, complete disappearance of lesions was not observed in the majority of animals. Residual papillomatous growths persisted at the end of the observation period, indicating only partial clinical recovery. In contrast, animals in Group II (Plate 3) demonstrated a more rapid clinical response. Initial signs of lesion regression were observed within the first week following treatment initiation. Progressive reduction in lesion size continued throughout the treatment period and was accompanied by drying, shrinkage and gradual

detachment of papillomatous tissue. By approximately 40 days after commencement of treatment, complete or near-complete regression of lesions was observed in most animals. Animals were monitored throughout the treatment period and follow-up observations. No recurrence of visible papillomatous lesions was observed during the follow-up period following completion of treatment. No adverse reactions or treatment-related complications were observed following administration of Anthiomaline, autohaemotherapy in any of the animals included in the investigation.

Bovine papillomatosis lesions before treatment (Day 0)



Marked regression of bovine papillomatosis lesions following treatment (day 40)



Plate 3 Clinical response in animals treated with Anthiomaline and Autohaemotherapy

Bovine papillomatosis remains one of the most frequently encountered viral dermatological disorders affecting young cattle and is characterized by the development of proliferative epithelial and fibroepithelial lesions following infection with bovine papillomaviruses (BPVs). In the present investigation, all affected animals were heifer calves between 10 and 18 months of age, supporting the established observation that bovine papillomatosis predominantly affects young animals prior to the development of effective virus-specific immunity. Previous studies have consistently demonstrated a higher incidence of papillomatosis in calves and heifers younger than two years of age, suggesting that age-associated differences in cellular immune competence play a critical role in disease susceptibility. Terziev *et al.* [10] reported that

papillomatosis occurred predominantly in young heifers maintained under intensive management systems, while Ugochukwu *et al.* [11] emphasized that immature immune responses permit persistence of BPV infection and continued proliferation of infected keratinocytes. The occurrence of disease exclusively in young animals in both dairy farms investigated in the present study is therefore consistent with the recognized epidemiological characteristics of BPV infection.

The gross morphology and anatomical distribution of lesions observed in the present study were typical of naturally occurring bovine papillomatosis. Papillomatous growths were predominantly localized on the eyelids, ears, muzzle, neck and shoulder regions and ranged from small nodular proliferations to large cauliflower-like masses. Similar lesion distribution has

been described in several clinical investigations. Geethanjali *et al.* [12] observed extensive papillomatous growths involving the periocular region, ears, poll and neck of affected cattle, whereas Bhat *et al.* [13] reported lesions affecting the muzzle, eyelids, ears and various exposed regions of the body. Such predilection sites are likely related to repeated mechanical trauma and increased opportunities for viral entry through disruption of the epithelial barrier. Because BPV requires access to basal keratinocytes for successful infection, areas subjected to abrasion are considered particularly vulnerable to lesion development.

A notable finding of the present investigation was the moderate therapeutic response observed following administration of Anthiomaline alone. Animals managed under this protocol exhibited gradual reduction in lesion size; however, complete regression was not observed in the majority of cases. Although lithium antimony thiomalate has been used extensively in veterinary practice for the treatment of papillomatosis, published evidence regarding its efficacy remains inconsistent. Bhat *et al.* [13] reported that treatment with lithium antimony thiomalate alone resulted in complete recovery in only a proportion of affected animals, whereas the addition of immunomodulatory agents was associated with improved therapeutic outcomes. The findings of the present study are generally consistent with these observations and suggest that Anthiomaline alone may be insufficient in animals with multiple or extensive lesions.

In contrast, incorporation of autohaemotherapy into the treatment protocol was associated with earlier lesion regression and greater overall clinical improvement. Clinical regression of papillomas became evident within the first week of treatment and complete or near-complete disappearance of lesions was observed in most animals by approximately 40 days after treatment initiation. Similar favourable outcomes have been documented in previous studies investigating immunotherapeutic approaches for bovine papillomatosis. Nehru *et al.* [14] reported complete regression of teat papillomas following repeated administration of autologous blood and suggested that autohaemotherapy may enhance lesion resolution through stimulation of host immune responses. Likewise, Geethanjali *et al.* [12] observed marked reduction in wart size following a multimodal therapeutic approach incorporating autohaemotherapy, surgical excision and autogenous vaccination. Although the therapeutic protocols differed from those employed in the present study, the collective findings suggest that immune stimulation may contribute to papilloma regression.

The precise mechanism through which autohaemotherapy may influence recovery remains incompletely understood. It has been proposed that administration of autologous blood may stimulate innate and adaptive immune responses through macrophage activation, cytokine production and enhanced antigen presentation. The spontaneous regression of bovine papillomas is largely dependent upon cell-mediated immunity, any intervention capable of enhancing T-lymphocyte responses may accelerate clearance of BPV-infected keratinocytes. The rapid onset of

lesion regression observed in the present investigation supports the hypothesis that immune-mediated mechanisms play a central role in therapeutic success [15]. However, the precise mechanisms underlying the observed clinical response remain unclear, as immunological parameters were not evaluated in the present investigation.

From a practical perspective, autohaemotherapy offers several advantages over alternative therapeutic approaches. The procedure is inexpensive, technically straightforward and can be performed immediately following diagnosis without the need for specialized laboratory facilities. In contrast, preparation of autogenous vaccines requires tissue collection, vaccine production and quality control procedures that may not be readily available under field conditions. Similarly, surgical excision is often impractical in animals with numerous lesions distributed across multiple anatomical sites. Consequently, the combination of Anthiomaline and autohaemotherapy represents a feasible and economically attractive option for veterinarians managing bovine papillomatosis in rural production systems.

Despite encouraging outcomes, the study was limited by the small sample size, lack of BPV genotyping, absence of histopathological confirmation and omission of immunological assessments. Therefore, the mechanisms underlying lesion regression could not be elucidated. Further studies involving larger populations and laboratory-based evaluations are needed to validate these findings and establish standardized treatment protocols.

CONCLUSION

Bovine papillomatosis remains a common viral dermatological disease of young cattle under field conditions. In the present study, adjunct autohaemotherapy combined with Anthiomaline treatment resulted in earlier lesion regression and greater clinical improvement compared to Anthiomaline therapy alone. The findings suggest that autohaemotherapy may serve as a simple, economical and practical supportive treatment for bovine papillomatosis. However, further controlled studies involving larger animal populations and objective diagnostic assessments are required to validate its therapeutic efficacy and establish standardized treatment protocols.

Ethical approval

The present investigation involved naturally occurring clinical cases of bovine papillomatosis presented for veterinary treatment under field conditions. The therapeutic procedures employed were part of routine veterinary clinical management and did not involve experimental induction of disease or invasive procedures beyond standard treatment practices. Therefore, separate approval from an Institutional Animal Ethics Committee was not required in accordance with institutional guidelines governing routine clinical case management. Informed consent was obtained from the owners of all animals prior to initiation of treatment, and all procedures were carried out in accordance with accepted standards of animal welfare and veterinary clinical practice.

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