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Papillomatosis in buffalo: Efficacy of autogenous vaccine and parammunity inducer

Randhir Singh, BK Bansal, D Pathak and ST Singh

Abstract

A case of severe papillomatosis in Murrah buffalo, which occurred in dairy farm of Punjab during 2018, is described. Diagnosis was based on presented clinical signs and histopathological findings. Animal successfully recovered following four consecutive weekly treatment with the autogenous vaccine and a parammunity inducer.

Keywords: Papillomatosis, wart, autogenous, immunomodulator, histopathology

Introduction

Papillomatosis or wart is a common viral disease of skin occurring in various domestic and farm animals across the globe. Bovine papillomatosis is a contagious disease of cattle/ buffaloes manifested as benign tumors or warts/papilloma on skin and mucosa, caused by BPV types 1 to 10 (Vidhya *et al.* 2009) ^[1]. Papilloma virus infection in buffaloes can result in chronic weight loss along with retarded growth and reduced market value. These neoplasms most often regress on their own, occasionally persist and in the presence of additional critical genetic or environmental factors, can progress to cancer (Campo, 1987) ^[2]. Furthermore, papillomavirus infection in cattle/ buffaloes could be connected with serious metabolic disorders (like energetic, mineral and nitrous) probably caused by damage of hepatic and renal cells with mutagenic, carcinogenic and immunosuppressive arsenic, cadmium and lead (Lesnik *et al.* 1999) ^[3]. Infection by BPV occurs as a result of virus exposure to single or multiple lesions of the epithelium. Transformation and multiplication of basal cells in Papilloma viral infection lead to wart formation, but most warts are benign and rarely proliferate indefinitely (Shah and Howley, 1996) ^[4]. Different methods have been previously used to treat bovine papillomas ranging from surgical removal, homeopathic medications to a more commonly used autogenous vaccine for effective treatment and prophylaxis of bovine papillomatosis (Süveges and Schmidt, 2003) ^[5]. There are few reports about combined therapy of bovine papillomatosis using the autogenous vaccine and a parammunity inducer in cows (Turk *et al.* 2005) ^[6] but no such report is available for buffaloes.

Although numerous cases of papillomatosis in buffaloes have occurred in different parts of India over past few years, but written data regarding diagnosis and treatment are still scarce. Thus, in order to obtain a better insight into papillomatosis in buffaloes, we report here on a severe case recently observed in Punjab, histopathological study, treatment with the autogenous vaccine and a parammunity inducer, and clinical recovery of animal.

Materials and methods

Animal

A 1.5 year old Murrah buffalo heifer suffering from severe papillomatosis with multiple papillomas, from 0.5 to 8 mm in diameter, disseminated on eye lids, ear, head, neck and shoulder was reported (Fig. 1A). The wart around eye lids had a cauliflower-like appearance, strongly attached to the dermis and physically obstructing normal vision of the animal. The diagnosis of bovine papillomatosis was arrived at on the basis of presented clinical signs, since the structure of the papillomas on the skin was easily observed and identified. However, a few papillomas around the eye lids of animal were surgically removed in order to confirm the diagnosis by histopathology, and for the preparation of an autogenous vaccine.

Hematology: Hematological parameters viz. Haemoglobin (Hb), packed cell volume (PCV), total erythrocyte count (TEC) and total leukocyte count (TLC) were estimated using

Hematological analyser (ADVIA 2120, SIEMENS Hematology Analyzer, USA.) in the diagnostic laboratory of department of teaching Veterinary clinical complex, GADVASU, Ludhiana.

Histopathology

After the surgical excision, the wart tissue samples were fixed in 10% neutral buffered formalin and processed for paraffin sectioning by dehydrating in ascending grades of alcohols and acetone and were cleared in benzene. After clearing samples were infiltrated and embedded in paraffin wax (Pathak and Bansal, 2012) [7]. Sections were cut at 4-5µm thickness and were subjected to hematoxylin and eosin staining for histomorphological details.

Preparation of autogenous vaccine and treatment of animal using immunomodulator

Sample from older growths were resected under aseptic conditions, minced, suspended in normal saline, filtered through muslin cloth and treated with formalin, to inactivate the virus. The suspension was kept overnight. Antibiotic (Strepto-Pencillin @ 2mg/ml) was also added. The animal was treated using autogenous vaccine administered @ 5ml subcutaneously and revaccinated after 7 days interval for four consecutive weeks. Prior to vaccination, as a paramunity inducer, on each occasion the immunomodulator (Lemasol®-75 (Levamisole), Zydus AH) was administered in doses of 5 ml I/M.

Results and Discussion

Diagnosis was based on visible clinical signs and histopathological findings. Grossly, tumour tissue was composed of hyperplastic epidermis supported by thin, inconspicuous dermal stalks. Histopathological examination of the tissues collected from the warts (n=03) showed the features of acanthomatous papilloma. It revealed moderate to extensive degree of cornification (hyperkeratosis) with wave like appearance (Figs. 2A-C). Similar observations were recorded by Kumar *et al.*, (2013) [8] in cows and buffaloes. There was extensive proliferation of stratum spinosum suggesting acanthomatous papilloma. In addition thickening of stratum corneum was also evident (Figs. 2C&D). At places degenerative changes of cells and marked cytoplasmic vacuolations were observed (Fig.2B&D). Histopathologically, the wart tissues of cattle have been reported earlier as fibro papilloma characterized by epidermal hyperplasia, acanthosis and hyperkeratosis (Singh *et al.*, 2009) [9]. Hematological analysis revealed mild anemia (Hb 8.5g/dl), leukocytosis (TLC 16,100) with 30 per cent neutrophils and absolute lymphocytosis (70%) indicative of active inflammation at

papilloma site. The animal was treated successfully by autogenous vaccine and an immunomodulator. Regression (Fig.1B&C) of papillomas occurred about 2 weeks after the beginning of treatment, and within 6 weeks all warts spontaneously disappeared and animal completely recovered. No recurrence of papillomas has been observed in treated buffalo. Bovine papillomatosis is a self-limiting disease in animals, but in our study the papillomas were long lasting without any sign of regression for at least 2 months before initiation of therapy. The diagnosis was confirmed by clinical signs and histopathology findings. The autogenous vaccine and a paramunity inducer (Lemasol®-75 (Levamisole), Zydus AH) were used for treatment of animal. Reports of bovine papillomatosis treatment with vaccine produced from formalinized suspension of wart tissue indicate variable results. Lesnik *et al.* (1999) [3] reported that treatment with vaccine showed 93.5 per cent efficiency with no difference in the used vaccine after 105 days of vaccination. Süveges and Schmidt (2003) [5] showed autogenous vaccination made from sterile homogenized tumour tissue prevented new cases and with sick animals recovering after vaccination. On the contrary, treatment with autogenous wart vaccine sometimes failed with no favorable outcomes (Smith, 1990) [10]. Commercial vaccines for cattle rarely seem to effectively promote regression of existing warts or to prevent malignant progression, although they may be capable of preventing the development of new lesions if the same strain is involved (Scott and Anderson, 1992) [11]. Our results showed the efficacy of bovine papillomatosis treatment with the autogenous vaccine and a paramunity inducer in the manner of earlier regression of papillomas with no relapse. Data reported previously based on the treatment only with autogenous vaccine showed a longer period necessary for animal recovery (Lesnik *et al* 1999; Scott and Anderson, 1992) [3, 11] then we obtained in present study. Levamisole is one of the ideal contenders to help in modifying immune response because of its immunomodulatory effect. Levamisole is mainly used as anthelmintic agent in Veterinary practice but in some countries its use is limited to immunomodulatory agent in humans in some cancers. Also, in humans, it has been extensively used in dermatology practice for the management of various dermatoses ranging from infections such as warts and leprosy to inflammatory dermatoses. The way levamisole might have exerted its immunomodulatory effect is by increasing phagocytosis by polymorphonuclear leukocytes and macrophages. Additionally, we recommend that our treatment protocol may also be effective in the developing stage of disease when surgical intervention is contraindicated due to the possibility of recurrence of papillomas and fears of uncontrolled bleeding.



Fig 1: Cauliflower like warts around eyelid.



Fig 2: Complete recovery of animal after treatment

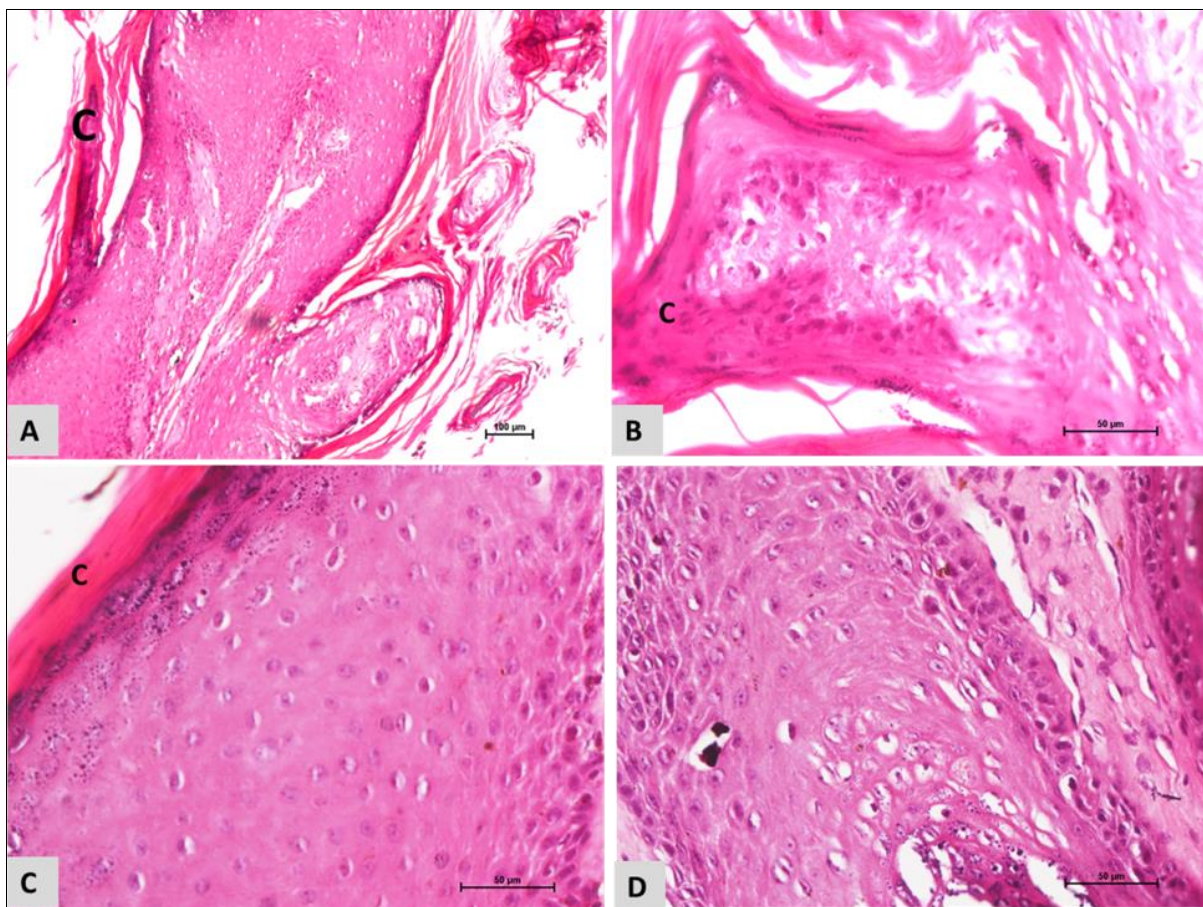


Fig 3: Cross section of buffalo cutaneous wart showing acanthomatous papilloma; A. Extensive cornification (C); B. Extensive cornification (C) and degenerative changes of cells and marked cytoplasmic vacuolations (V); C. Extensive cornification (C) and proliferation of stratum spinosum; D. proliferation of stratum spinosum and degenerative changes of cells and marked cytoplasmic vacuolations (V). H&E. X 400.

Conclusion

Although we used this treatment protocol (autogenous vaccine + parammunity inducer) in only one buffalo, we believe that a parammunity inducer also shows a beneficial effect in additional treatment of bovine papillomatosis leading to early recovery. However, our hypothesis is still in its infancy and needs to be further clarified and proved in future studies.

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