Original Research

Udder Papillomatosis Associated Interferences for Machine Milking In a Rural Dairy Farm

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Abstract

A rural dairy farm with 233 dairy animals was investigated for the complaint of recurrent cattle warts. 103 cows were screened as per owner's request and 3 were found to have varying degree of warts along with history of frequent recurrence. In severe cases, the warts interfered with machine milking and resulted in milking difficulties. Clinically it was diagnosed as Bovine papillomatosis and PCR testing confirmed the diagnosis. Autogenous vaccines helped in reducing of warts.

Key words: Bovine, Papillomatosis, PCR, Udder and Teat Warts

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Introduction

Papilomatosis is a neoplastic disease caused by papiloma virus. It occurs more frequently in bovines than other domestic animals (Smith and Jones, 1970). Bovine Papilloma Virus (BPV) is a group of DNA viruses of the family Papillomaviridae and is the common cause of papilloma and warts in cattle. In cattle, cutaneous papiloma can be encountered on almost any part of the body. Some papilomas are topographically specific and are caused by distinct virus having different antigenic reactions and DNA Composition. Although, cutaneous papilomas are usually benign those of the alimentary tract may become malignant (Canipo, 1980; Shrivastava and Sharma, 1991). The present report describes the presence of udder papillomatosis and its associated interference in machine milking in an organized dairy farm and its confirmatory diagnosis by PCR.

Materials and Methods

A referral clinical investigation was under taken in a rural dairy farm with 233 dairy animals during September 2017 in Thanjavur, Tamilnadu. The farm was reported to have a higher prevalence of warts in the past. Affected cows were found to have various forms of papillomatosis from rice grain like growth to cauliflower like lumpy masses on the teat and to some extent in the udder tissue. Recurrence of the same was reported even after the animals were treated by veterinarians with inj. Lithium Antimony Thiomalate - 15ml intramuscularly at weekly intervals. A total of 103 cross bred cows were examined as per owner's request. Out of which one Holstein Friesian cross bred cow had the presence of cauliflower like warts on teats and two Jersey cross breed cows had rice grain like warts lesion on teats. All the affected cows were reported to have drastic reductions in milk yield. For the severely affected three cows, the milk yield was reported to be reduced from 12 liters a day to 6 liters. Besides reduced yield, there was major difficulty in milking the cow as they refused to allow handling of the affected udder. These cows also refused for using milking machine on their udder. Wart tissue were collected from the teats outer surface by giving ring block using 2% lignocaine and stored in 10% formalin container for further processing and molecular testing. Blood and serum samples were also collected for clinical laboratory investigations, as per standard protocol (Radostits *et al.,* 2007). PCR was done using tissue sample as per Ogawa *et al.* (2004). Autogenous vaccines were prepared as per Sreeparvathy *et al.* (2011).

Results and Discussion

Clinically the cows were diagnosed to have bovine papillomatosis. However the recurrence of them warranted further testing and PCR testing helped to confirm the diagnosis. The hematology and biochemistry results and electrolyte analysis results were unremarkable (Table 1). The two animals were found to had hypoglycaemic and hypocalcaemic status, which are in their peak lactation stage. This also indicated the suboptimal metabolic health of these cows. Such cows easily may get afflicted by disease challenges. Any added stress, in this case the presence of warts, associated pain during milking could have triggered the drastic milk yield reduction. Bovine papillomaviruses (BPVs) are frequently associated with tumors of cutaneous or mucosal epithelia, known as papillomas or warts (Nasir and Campo, 2008). Papillomatosis appears in various sizes, shapes in cattle and in case of horses they affect any part of the body assuming the appearance of cauliflower (Radostits *et al.*, 2007). Teats were commonly affected in dairy cows. In a study, the teat skin lesions were found to / affect only one teat (68.89%) in cows, involvement of all four teats (17.78%) and two teats (11.11%) and three teats (2.22%) and lesions were lesser (Kavitha *et al.*, 2014).

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Table 1: Hematology, biochemistry and electrolyte analysis profile of cows with papillomatosis

Test results			
	HF Cross Bred Cow	**Jersey Cross Bred Cow**	**Jersey Cross Bred Cow**
Statge of Lactation	**Dry cow**	**2nd month**	**3rd month**
Parameters			
Hb- g/dl;	7.8	7.6	8.4
PCV – %;	29	27	31
RBC– mil/cmm;	4.96×10^6	4.28×10^6	5.28×10^6
WBC – cells	6.86×10^3	7.22×10^3	6.92×10^3
N-%,	30	36	36
L-%,	58	58	52
M-%,	6	3	5
E-%	6	3	6
B-%	-	-	1
Glucose - mg/dl	18	15	43
Total proteins-g/dl	9.2	8.6	7.5
Albumin-mg/dl	3.24	3.76	3.18
BUN-mg/dl	40	53	44
Creatinine- mg/dl	1.15	1.3	1.14
Calcium-mg/dl	8.6	8.4	9.6
Phosphorus-mg/dl	6.89	8.4	6.69
K- (mmol/L)	4.26	4.83	5.32
Na-(mmol/L)	125.3	124.9	126.3
Cl -(mmol/L)	97	96	95.8
iCa-(mmol/L)	0.86	0.56	0.93

In the present report Holstein Friesian cross bred cow had warts of variable sizes on teats causing unsightly appearance (Fig.1). Other two Jersey cross breeds had rice grain like growths on all the teats (Fig.2). Their presence over several months was considered to be worrisome by the owner.

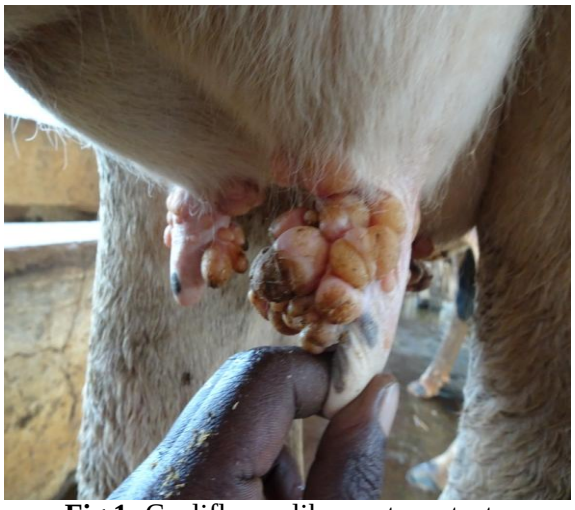

Fig.1: Cauliflower like warts on teats

Fig.2: Rice grain like wart lesions on teats

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Their presence also interfered with the machine milking of these cows. The bigger growths had interfered with attachment of milking machine to teats and animals refused for using machine milking. Many times severe kicking habits were observed. There were episodes of cows refusing even hand milking possibly due to the pain and fear factors. Such sustained interference to milking is another reason for loss of milk yield. Even when the owner tried to sell these cows they were not purchased citing the reason of udder warts. In addition, factors such as chances for spreading to other animals, causation of self limiting wounds, increase mastitis occurrences and associated treatment cost, loss of milk yield forces economic loss to the owners also warrant early veterinary interventions. Polymerase chain reaction (PCR) remains an important tool for diagnostic purposes, particularly in determining asymptomatic carriers within the population, and for clinical studies, and in field investigations involving viral infections (Ataseven *et al.*, 2016). In this study the PCR, was performed with slight modifications of a previously described protocol of Ogawa *et al.* (2004). PCR products were analyzed in 1.5% agarose gel electrophoresis stained with Ethidium Bromide (0.5 μg/mL) in TAE buffer and visualized under UV light (Fig. 3). PCR confirmed the diagnosis.

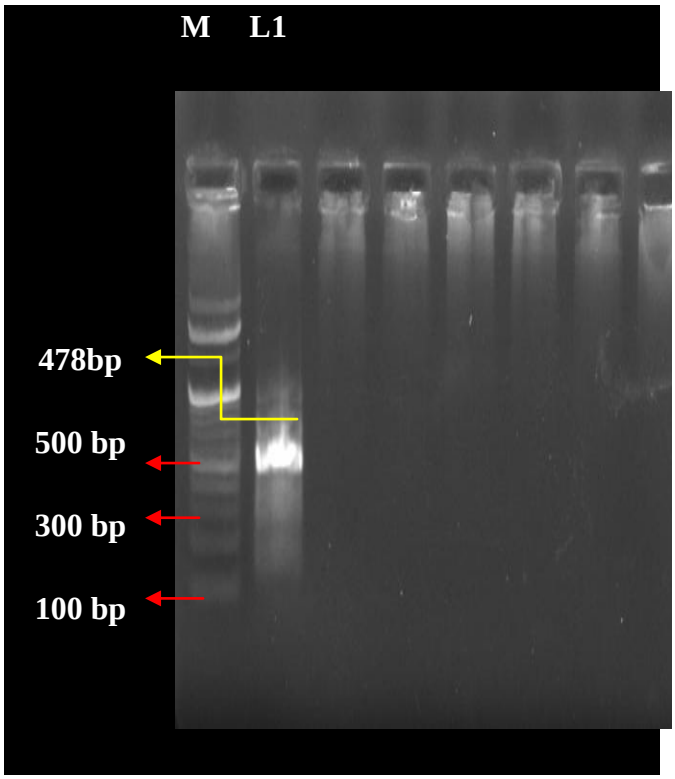

Fig. 3: 1.5% agarose gel electrophoresis of PCR products. **Lane 1:** Bovine Papilloma Virus (478 bp); **Lane M:** 100 bp ladder

As PCR testing confirmed the diagnosis, farm owners were advised on palliative care for warts and the need for better nutritional care and better herd immunity maintenance. Venugopalan (2000) and

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O'Connor (2001) have suggested remedial measures for removal of warts such as use of autogenous vaccine, wart ennucleation, burning with hot iron or eraser, ligation and surgical removal of wart (excision) with surgical knife, application of salicyclic acid ointment, dimethyl sulfoxide ointment and potential caustics etc. In the current study Autogenous vaccine was administered at the dose of 5 ml intramuscularly twice a week for four weeks to the affected animal. Animals were put on gentle hand milking for 2 months. Regression of wart lesions were observed after 45days (Fig. 4).

Fig. 4: Regression of warts lesions after 45th day of autogenous vaccine administration

Papillomatosis in cattle were considered to be connected with serious disorders of the metabolism, mainly mineral, energetic and components, and also with levels of heavy metals like arsenic, lead and cadmium. In the current study no such factors were reported. Presence of such skin and / or mucosal disorders in dairy cows may cause significant economic losses by means of reduced valuation of unsightly cattle, decrease in udder health due to teat warts and related secondary wounds and consequent infections, interference with machine milking and decrease in milk production. At times secondary wounds, erosions, fistulas and subsequent infections may also lead to milk flow disorders (Selvaraj *et al.*, 2016 and Venkatesan *et al.*, 2015) and pose greater clinical challenges. For these reasons dairy animal farmers wants wart free herds. Presence of severe udder warts also poses economic challenges, as it interferes with machine milk and hence for manual milking, an additional man power is required, until there is complete regression of warts and cows accepting machine milking. In an already labour constraint livestock farming, there is a huge burden, besides the loss of milk yield over few to many weeks; they are required for regression of warts. Further studies are needed to explore the factors responsible for recurrence of cattle warts.

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Conclusion

Three dairy cows were found to have varying degree of warts along with history of frequent recurrence. These growths were grayish-white or dark brown in colour and were diagnosed as Bovine papillomatosis based on clinical examination and PCR testing. Ineffective with treatment of lithium antimony thiomalate in theses cows, autogenous vaccines were helped in reducing of warts.

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