

# Histopathological Examination of Teat Obstruction in Cows

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**Abstract:** A total of 36 Jersey cross bred cows with teat obstruction aged between 2.6 years to 6.7 years and the body weight ranged from 374 kg to 409 kg were taken for the present study. The age at first calving of the cows ranged from 2.18 years to 2.4 years. Animals were presented between 1<sup>st</sup> and 4<sup>th</sup> lactation, all the cows were maintained with live calves at an age between 6 days to 245 days. Knukling method of milking was practiced in all the affected animals. After the ultrasonographical examination of the affected teat, under xylazine sedation, the obstructive mass was resected using theloresectoscope and suitable samples for histopathological examination were harvested from the affected teat and preserved in 10% neutral-buffered formalin for histopathological studies. Histopathological examination of the teat tip obstruction was showing excessive keratinization. Tissues collected at the mid teat level were showing fibrino necrotic debris with few inflammatory cells and area of calcification adjoining to lactiferous duct and excessive collagen deposit. In teat base obstruction area of calcification adjoining to lactiferous duct was noticed.

**Keywords:** Cow teat obstruction, Histopathology, Mid teat obstruction.

## INTRODUCTION

Milk flow disorders in cattle due to obstructive lesions are caused either by congenital deformities or acquired conditions as a result of trauma or unscientific milking patterns. Teat cistern obstruction interferes with effective milk delivery. Teat obstructions resulting in obstructed milk flow may be focal or diffuse.

Most teat cistern obstructions result from proliferative granulation tissue, mucosal injury or fibrosis, all secondary to previous trauma [1]. Knuckling is a method of conventional milking found to be practiced by most of the professional milkers [2, 3]. Aruljothi *et al.* [4] during one year period of study treated 22 cows for teat obstruction and reported the incidence of teat obstruction to be 5%. Jersey/Holstein Friesian cross bred cows were found to be more prone to this condition. The occurrence was highest in the age group of 5 years to 6 years (50%) followed by 2 to 4 years (35%) and 7 to 9 years (15%) and was common in cows having suckling calves with them during their third lactation. Maina and Mulei [5] in a study reported an incidence of 2.5% teat obstruction among 139 lactating cows. Nickerson *et al.* [6] studied histologic response of the bovine mammary gland to the presence of three intra-mammary device models (abraded, star, or grooved) in 12 lactating cows. The present paper discusses about the histopathological examination of the internal teat lesions like teat obstruction at the tip, mid teat cistern and at the teat base. Diffuse area of hyperkeratosis occurred as a

normal physiological response to chronic, excessive pressure or friction on the skin in 36 Jersey cross bred cows.

## MATERIALS AND METHODS

A total of 36 Jersey cross bred cows having teat obstruction, aged between 2.6 years to 6.7 years and the body weight ranging from 374 kg to 409 kg were taken for the present study. The age at first calving of the cows ranged from 2.18 years to 2.4 years. Animals were presented between 1<sup>st</sup> and 4<sup>th</sup> lactation, all the cows were maintained with live calves aged between 6 days to 245 days old. Knuckling method of milking was practiced in all the affected animals. Ultrasonographical examination of the affected teat was performed preoperatively by B-mode diagnostic ultrasound scanner using 7.5 MHz linear probe by using normal saline as contrast by water bath method. Under xylazine sedation telescopic examination of the teat cistern was performed by axial approach under aseptic precautions. A blunt trocar and canula of 4 mm size was inserted into the teat cistern upto the level of obstruction blindly through the streak canal in such a way to assess the level of obstruction. The trocar was replaced by the theloscope sleeve size of 1.9 x 2.1 mm along with the wire snare and assessed the type and extent of the lesion. The size, nature of the lesion and other pathological changes were evaluated. Obstructive mass was removed after assessing the type, location and extent of lesion by theloscopy, the lesion was well demarcated from the normal tissue. The teat cistern was filled with 3% solution of glycine and simultaneous cutting the obstructive lesion at its origin in the teat cistern at the temperature of (70-80 °C) and coagulation at 80-90°C was performed using a

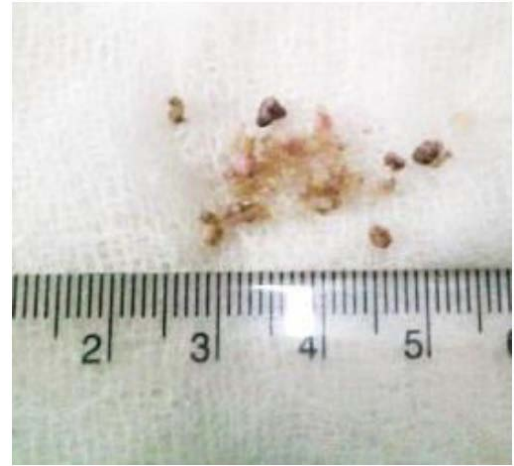
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wire snare connected to an underwater diathermy unit [7]. Samples suitable for histopathological examination were harvested from the affected teat and preserved in 10% neutral-buffered formalin for histopathological studies. Subsequently the samples were embedded in paraffin wax and cut into 5µm thick sections. They were mounted on glass slides and stained with standard hematoxylin and eosin staining examined under 10x, 40x and oil immersion microscope (100 x).

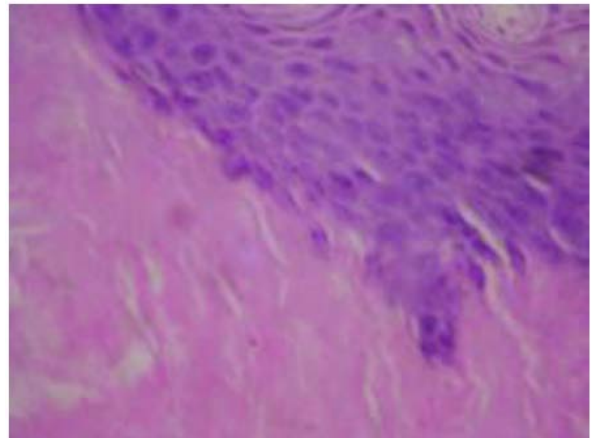
## RESULTS AND DISCUSSION

Milk flow disorders in cattle due to obstructive lesions are caused either by congenital deformities or acquired conditions as a result of trauma or unscientific milking patterns. Knuckling is a method of conventional milking found to be practiced by most of the professional milkers [2, 3]. Knuckling pattern of milking was practiced in all the 36 animals. It is performed by exerting undue pressure on the teat by dorsal aspect of the thumb flexed at inter-phalangeal joint and palmar surface of the fingers along its length to express the milk out which causes more trauma to the teat cistern and causes teat obstruction in milking cattle. Ultrasound scanning of the affected teats showed teat tip obstruction in 10 teats (28%), mid teat obstruction in 20 cases (55%) and teat base obstruction in 6 cases (17%). Theoscopic electroresection was a minimally invasive procedure, aided in restoring the esthetic appearance of the teat, anatomical and functional capacity, milk ability and quality of milk within a short period of time with minimum complications [8]. Samples harvested in the present study were found suitable for histopathological examination. The size of the each resected mass ranged from 1 mm to 3 mm (Figure 1) and multiple such masses were collected depending on the size of the obstruction. The color of the obstructive mass was pale pink in color. Histopathological examination of the teat tip obstruction was showing excessive keratinization (Figure 2). The extent of teat end hyperkeratosis is essentially determined by the forces the milking process exercises on the teat tissue. The longer the teat tissue is affected by mechanical forces, especially in periods with low milk flow, the higher the risk for the development of severe teat end hyperkeratosis [9]. Tissues collected at the mid teat level were showing fibrino necrotic debris with few inflammatory cells (Figure 3), and area of calcification adjoining to lactiferous duct and excessive collagen deposit in mid teat obstruction (Figures 4 and 5). In teat base obstruction, area of calcification adjoining to lactiferous duct was noticed (Figure 6). Malfunctioning machine milking, knuckling and

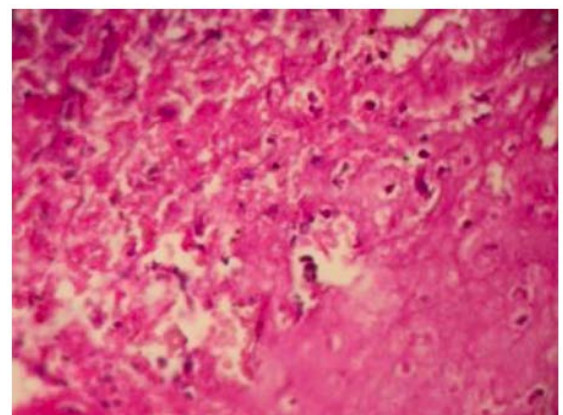
stripping method of milking can induce damage to the teat tissue increasing the risk for intra-mammary infections [10]. Knuckling induced damage to the teat mucosa could be the reason for fibrino necrotic debris



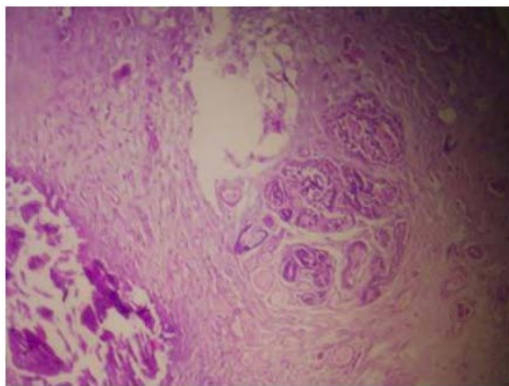
**Figure 1:** The obstructive masses were resected in pieces ranging in size from 1 mm to 3 mm.



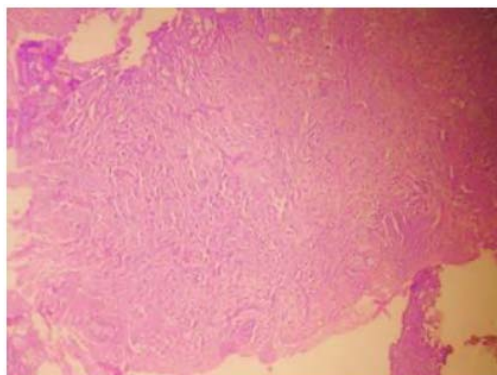
**Figure 2:** Teat tip obstruction showing excessive Keratinization (H&E 10 X).



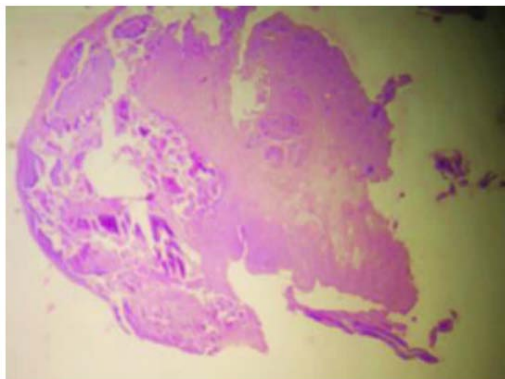
**Figure 3:** Fibrino necrotic debris with few inflammatory cells (H&E 10 X).



**Figure 4:** Aarea of calcification adjoining to lactiferous duct (H & E 10 X).



**Figure 5:** Excessive collagen deposit (H & E 10 X).



**Figure 6:** Area of calcification adjoining to lactiferous duct in teat base obstruction H& E 40 X.

with inflammatory cells and excessive collagen deposit in the mid teat obstructions and calcification adjoining to lactiferous duct, in both, mid and base obstructions. Full hand milking can be performed to protect the teat

from extensive damage that causes intraluminal lesions in teat.

## CONCLUSION

Knuckling pattern of milking was practiced in all the animals. The longer the teat tissue is affected by mechanical forces, especially in periods with low milk flow, the higher the risk for the development of severe teat end hyperkeratosis, fibrino necrotic debris and area of calcification adjoining to lactiferous duct in mid teat with excessive collagen deposit.

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