



Udder and teat disorders in cows: Clinical and ultrasound findings in Salem, Tamil Nadu

M VENKATESAN¹✉, S HAMSA YAMINI², A VIJAY³, E VENKATESAKUMAR¹, R RAJKUMAR¹,
 K K PONNUSWAMY⁴ and A ELANGO¹

Veterinary College and Research Institute (TANUVAS), Salem, Tamil Nadu 636 112 India

Received: 5 February 2024; Accepted: 9 October 2024

Keywords: Cow, Mastitis, Teat obstruction, Udder edema, Ultrasound

Maintenance of optimal udder and teat health is highly essential to produce both good quality as well as quantity of milk, thereby reducing the economic loss to the farmers. Poor quality milk and an increase in the cost of treatment for the udder and teat affections may even lead to culling of the animal (Blowey and Edmondson 2010). Farmers often complain that they find difficulty in milking due to milk flow disorders, leading to increased milking time and the need for veterinary interventions. In such situations, ultrasonographic assessment of the teat will help to locate the lesions in the teat in case of teat obstructions (acquired as well as congenital) and planning of treatment strategy (Venkatesan *et al.* 2018). To avoid a great loss to farmers, practicing veterinarians should have updated knowledge on udder and teat health. This study enlightens the various conditions of the udder and teat and also emphasizes its' ultrasonographic evaluation, especially for the udder abscess and teat obstructions.

Dairy animals from in and around Salem district of Tamil Nadu presented to the Veterinary Clinical Complex, Veterinary College and Research Institute, Salem were screened for udder and teat disorders/milk flow obstruction. Out of 126 milch animals, 67 were selected from July 2022 to January 2023 for this study.

In this study, 67 cows having various udder (39), and teat affection (28) were taken up for detailed evaluation. Physical examination and ultrasonography assessment of the udder and teat were conducted to identify the type of lesions, nature of the obstruction, and location of the lesions. Udder ultrasound was done by using a 2.5 to 5 MHz curvy linear probe; teat ultrasound was done by using a 7.5 to 12.5 MHz micro convex (Cartee *et al.* 1986, Franz *et al.* 2009). Plain radiography of the udder and teat was done

using Adoni's 100mA Machine (Tabatabaei and Gholami 1999). Milk samples were collected from all the affected quarters and were subjected to laboratory evaluations for mastitis.

Among the 67 cows, 58.20% incidence of udder affection were found and teat disorders were found to be 41.79%. Among the udder affections, clinical mastitis was recorded in a higher percentage followed by haemolactia, udder edema, udder abscess, and gangrenous mastitis (Table 1) (Supplementary Fig. 1). California Mastitis Test and Antibiotic Sensitivity test were also performed in the case of mastitis-affected milk samples. Nine mastitic milk samples showed *Staphylococcus spp.*; one sample showed mixed infection of *Staphylococcus spp.*, and *Streptococcus spp.*, and three milk samples showed negative culture. In this study, *Staphylococcus spp.* cultured from mastitic samples were sensitive to Enrofloxacin, Cefotaxime, Gentamicin and Cotrimoxazole.

Udder abscess recorded in the study was reported to be

Table 1. Udder and teat affections of the dairy cows

Udder affections	Number of udder affections (in percentage) (n=39)
Clinical Mastitis	9 (23.07%)
Gangrenous mastitis	4 (10.25%)
Haemolactia	8 (20.51%)
Udder edema	7 (17.94%)
Udder abscess	5 (12.82%)
Open wound	3 (7.69%)
Suspensory ligament rupture	3 (7.69%)
Teat disorders	Number of teat disorders (in percentage) (n=28)
Acquired teat obstruction (Covered teat injury)	11 (39.28%)
Papilloma	5 (17.85%)
Teat tip/ orifice injury	4 (14.28%)
Teat incised wound	3 (10.71%)
Congenital teat obstruction	2 (7.14%)
Teat lacerations	2 (7.14%)
Fused teat	1 (3.57%)

Present address: ¹Veterinary College and Research Institute, Salem, Tamil Nadu. ²Veterinary University Peripheral Hospital, Madhavaram Milk Colony, Chennai, Tamil Nadu. ³Madras Veterinary College, Vepery, Chennai, Tamil Nadu. ⁴Veterinary College and Research Institute, Namakkal, Tamil Nadu. ✉Corresponding author email: drvenksmvsc88@gmail.com

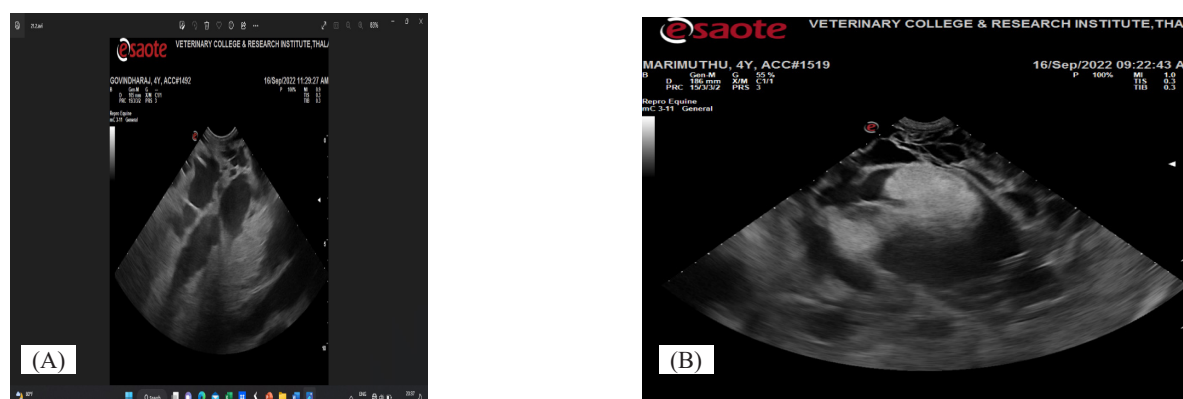


Fig. 1. Ultrasound of udder abscess: (A) Multiple Anechoic pockets; (B) Anechoic cavity with homogenous area.

swollen for more than 20 days. On aspiration, it revealed various pathological effusions, viz. clear yellowish, thick pus, and brownish transparent. Ultrasonography of the udder abscess revealed multiple anechoic pockets in three cows and an anechoic cavity with a homogenous area in two cows (Fig.1). Culture and antibiotic sensitivity testing of aspirated effusions from udder abscesses in two cows revealed the presence of *Staphylococcus spp.*, which was sensitive to Amoxicillin-clavulanate, Gentamicin, Cotrimoxazole, Enrofloxacin, Cefotaxime, and Ceftriaxone. While, no culture growth was observed in three cases. In a study by Venkatesan *et al.* (2020), udder abscesses were found in 2.28% of lactating cows. They also reported that cows with chronic mastitis could be effectively evaluated using ultrasonography to rule out udder abscesses.

Heamolactia (blood in milk) was recorded in 8 cows, out of which 4 cows had affection in all the quarters. Microbial examination revealed that these four cow's milk samples showed negative culture. The remaining four cows had one-quarter of affection. Giving integrative therapy with parenteral Calcium borogluconate, Tranexamic acid injections, and ayurvedic hemostatic bolus through enteral route for 7 days recovered all the quarters uneventfully.

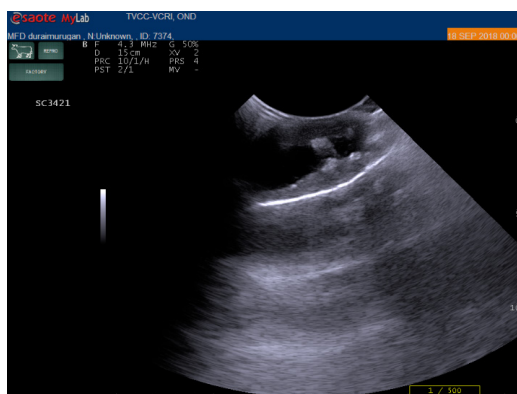
In the present study, udder open wound and suspensory ligament rupture were recorded at equal percentages. Suspensory ligament rupture udder quarter was pendulous, soft, and had swollen teat with hindrance in milk flow. Sayyed *et al.* (2020) reported that four calved buffalo had lost the medial suspensory ligaments support at the level of the udder hind quarter after 10 days of calving. The open wound on the udder tissue was sutured, the antiseptic ointment was applied and healing was observed 20 days after the intervention.

In this study, among the teat disorders observed, acquired teat obstruction had a higher percentage followed by Papilloma, Teat tip/ orifice injury, Teat incised wounds and Fused teat (Table 1). Congenital teat obstruction and Teat lacerations were equally observed. Ultrasonographic examination clarified the teat obstructions, viz. Acquired teat obstruction (Covered teat injury) (Fig. 2A and 2C) and Congenital teat obstruction (Fig.2B). Other teat affections

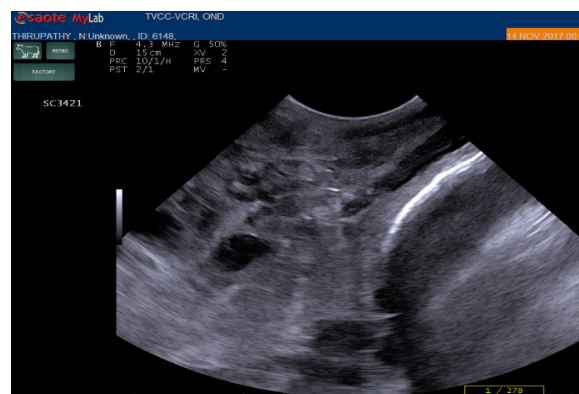
were diagnosed on physical examinations (Supplementary Fig. 2).

Cases with papillomas on the teat were also observed having rice-shaped warts invariably in all quarters (Supplementary Fig. 2C). The wart sample (5 g) was collected, minced and homogenized in normal saline solution using a mortar and pestle along with sterile sand. The mixture was centrifuged at 3500 rpm for 15 min and the supernatant solution was transferred to a sterile container, and 0.6% of the formaldehyde solution was mixed with the supernatant solution. The formaldehyde-added virus-containing supernatant solution was kept at 4°C overnight for virus inactivation and stored in the refrigerator until further use. After a sterility check, 10 mL of the prepared autogenous vaccine was given subcutaneously at weekly intervals for 3 weeks at room temperature (Sumitha and Sukumar 2021). Recovery was uneventful in these cases.

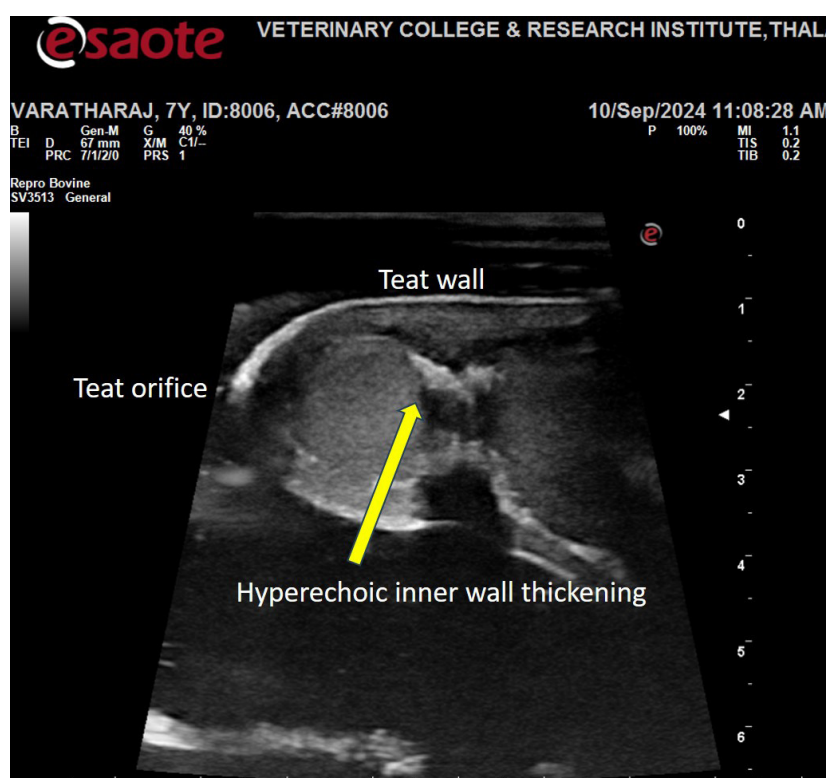
In this study, prevalence of Acquired and Congenital teat obstructions was recorded at 39.28% and 7.14%, respectively. Acquired teat obstructions were diagnosed physically by palpation revealing thickening at the mid-teat cistern, floating mass, and hardening of the teat canal, and the same was confirmed by ultrasonographical examination by using a 7.5 to 12.5 MHz micro-convex direct gel contact method and/or water bath technique. Ultrasonographical examination of congenital teat obstructions revealed hyperechoic tissue running from the grand cistern to the teat canal (Fig.2B). Ragab *et al.* (2017) recorded 3.01% of teat congenital anomalies and 2.02% of acquired teat affections in cows. Venkatesan *et al.* (2016) reported that ultrasonography of the teat was found to be a better diagnostic tool for the detection of milk flow disorder (64.28%), when compared to clinical detection (35.75%) as well as in the location of the lesion and in identifying the type of lesion. They also found that teat cistern mucosal growth type of milk flow disorder was encountered at a higher percentage (35.71%) followed by teat tip injury, covered teat injury (17.85%). Venkatesan *et al.* (2018) reported that teat ultrasonography is essential as it helps detect and assess lesions like the congenital membrane in the teat cistern of a 5-year-old Holstein Friesian crossbred



(A) Hyperechoic teat wall thickening at teat cistern (Acquired teat obstruction)



(B) Hyperechoic mass at gland cistern (Congenital Teat obstruction)



(C) Water trough method shows hyperechoic teat wall thickening at teat cistern

Fig. 2. Ultrasonogram of teat obstruction in cows (A, B, C).

cow. Ultrasonography proved to be an accurate diagnostic tool in the detection, localization, and assistance for the removal of foreign bodies which caused acquired teat obstruction in cows (Venkatesan *et al.* 2021).

Teat incised wounds and teat lacerations recorded were fresh cases and were managed by simple interrupted suturing, and application of antiseptic ointment for 7 days and recovery was uneventful (Supplementary Fig. 2). For fused teat, excision was done and recovery was uneventful after 5 days.

To identify and confirm the teat obstruction, one cow's teat was radiographically evaluated with 60 KW, 20 mAS, and 10-110 Film Focal Distance by using an Adoni's

100mA Machine. A plain radiographic survey revealed no clear view of obstruction even after the insertion of a metal teat cannula (Supplementary Fig. 3). Tabatabaei and Gholami (1999) reported double contrast radiography was particularly suitable to trace ruptured teat and inverted mucous membranes in the area of Furstenberg rosette.

The prevalence of udder affections was higher than the teat affections recorded in this study. Compared to physical and radiographic examinations, ultrasonographic evaluation of the teat helped to localize the lesion and to confirm the teat obstruction (Acquired and Congenital teat obstruction). All the conditions were managed with medical and/or surgical interventions and cows recovered

successfully, except in cases of congenital teat obstruction and suspensory ligament rupture in the udder.

REFERENCES

- Blowey R and Edmondson P. 2010. Disorders of udders and teats, pp. 220–238. *Mastitis Control in Dairy Herds*. 2nd Edition. CABI.
- Cartee R E, Ibrahim A K and Mcleary D. 1986. B-mode ultrasonography of the bovine udder and teat. *Journal of the American Veterinary Medical Association* **188**: 1284–87.
- Franz S, Flock M and Parisot M H. 2009. Ultrasonography of the bovine udder and teat. *Veterinary Clinics of North America: Food Animal Practice* **25**: 669–85.
- Ragab G H, Seif M M, Abdel-Rahman M A and Qutp M. 2017. Prevalence of udder and teat affections in large ruminant in Beni-Suef and El-Fayoum provinces. *Journal of Veterinary Medical Research* **24**(2): 211–21.
- Sumitha and Sukumar. 2021. Bovine papillomatosis: Occurrence and its control by autogenous vaccine. *Indian Journal of Animal Health* **60**(2): 274–77.
- SayyedA M, AkhtarR A, Abdul S, Iahtesham K, Adnan H T, Hafz I A, Farah I, Jalees A B, Muhammad A Q and Ali H S. 2020. A case of extensive rupture of udder suspensory ligaments (dropped udder) in a buffalo: Clinical observations and effect of palliative support. *Buffalo Bulletin* **39**(4): 553–55.
- Tabatabaei N A and Gholami A. 1999. Radiography of the bovine mammary gland. *Journal of Applied Animal Research* **15**(1): 53–56.
- Venkatesan M, Sumathi D, Selvaraj P, Vijayarani K and Nambi A P. 2016. Comparison of clinical and ultrasonographic diagnosis of milk flow disorders in hand milking dairy cows. *The Indian Veterinary Journal* **93**(08): 72–74.
- Venkatesan M, Selvaraj P, Sumathi D and Nambi A P. 2018. Congenital teat obstruction by intraluminal membrane. *The Indian Veterinary Journal* **95**(04): 55–57.
- Venkatesan M, Jayalakshmi K, Poovarajan B, Saravanan M, Yogeshpriya S and Selvaraj P. 2020. Ultrasound-guided percutaneous aspiration of udder abscess in dairy cows with chronic mastitis. *Indian Journal of Veterinary and Animal Sciences Research*, **49**(5): 53–57.
- Venkatesan M, Kumaresan A, Tamilmahan P, Senthilkumar S, Veeraselvam M and Premalatha N. 2021. Ultrasound aided retrieval of iatrogenic foreign body in teat obstruction in crossbred cows. *Haryana Veterinarian* **60**(SI): 132–33