

# Surgical and Ultrasound Guided Retrieval of Iatrogenic Foreign Body from Teat in Cows - A Clinical Study

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**Abstract:** Present study was carried out in four crossbred jersey cows aged between 4-6 years. These cows were presented to the Teaching Veterinary Clinical Complex, RIVER with a history of difficulty in milking, presence of palpable foreign body in the teat canal and pain on palpation of the affected teat. Ultrasound scanning using 7.5 MHz linear probe by water bath method confirmed the presence of foreign body in the teat canal. Under sedation and local analgesia, the foreign bodies were retrieved instrumentally under ultrasound guidance in case 1 and 2, through thelotomy in case 3 by making incision on the teat at the site of obstruction and by theloscopic electroresection and thelotomy in case 4 by theloresectoscope. Collagen based Silver sulfadiazine cream was applied over the thelotomy site. Systemic administration of Inj. Streptopenicillin and intramammary infusion through the prosthetic tube kept *in-situ* and systemic antibiotic were followed for 5 days in case 3 and 4. All the cows recovered uneventfully. Foreign bodies recovered in this study were teat siphon, AI sheath and AI straw.

**Keyword:** Teat, Foreign body, AI sheath.

## INTRODUCTION

Milk flow disorders in cows can either be congenital or acquired. Acquired lesions causing milk flow disorders can be due to external violence or internal injuries caused by trauma or unscientific milking pattern. Partial teat obstruction caused by local tissue reaction to iatrogenic foreign bodies accidentally inserted by farmers or milkman is reported to be uncommon.

Foreign bodies reported to be retrieved from teat canal were teat dilator and wax teat insert [9] quill [6] plastic tube [11] and broken bangle piece [1]. The entrance, migration and lodgment of foreign objects through the teat canal may lead to many complications like thickening of mucosa, fibrosis and stenosis that differ according to the nature of the foreign body and its location in the teat canal [6]. The location of the foreign body in teat can be confirmed by inspection, palpation, sondage of the teat, ultrasonography [6], Radiography [11] and teat endoscopy [9]. Thelotomy for removal of iatrogenic foreign body was recommended by Abu-Rafee and Pawde [1].

The objective of this study is to report clinical and ultrasonographical evaluation of teat showing milk flow disorders due to iatrogenic foreign body in cows, surgical and ultrasound guided retrieval of them and postoperative care to avoid complications.

## MATERIALS AND METHODS

Four cows presented to the Teaching Veterinary Clinical Complex, Rajiv Gandhi Institute of Veterinary Education and Research with a history of milk flow disorder due to retention of foreign bodies in teat *viz*; metallic teat siphon, artificial insemination straw and sheath used by farmers/milkman for relieving partial teat obstruction. In all the cases, several unsuccessful attempts were made by owner/milkman to retrieve the foreign bodies by milking the affected teat.

Animal particulars *viz*; age (years), breed, body weight (kg) and details on number and stage of lactation, affected teat, duration of clinical signs (days) and the type of foreign body entrapped in the teat were recorded.

Following clinical examination of the affected teat for external lesions/palpable internal lesion if any, ultrasonographical examination was performed by B-mode diagnostic ultrasound scanner using 7.5 MHz linear probe by water bath method [7] to confirm the location of the foreign body and morphometrical evaluation of the teat (Teat wall thickness and width of the sinus) and obstructive lesions if any.

## Treatment

The foreign body was retrieved under ultrasound guidance in case No. 1 and 2 and through thelotomy in case No.3. In case No.4, video-assisted theloscopic electroresection was employed to relieve teat obstruction at mid teat level which was confirmed by ultrasonography and axial theloscopy and the foreign body was removed by thelotomy.

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All the animals were sedated with Inj. Xylazine (Xylaxin injection, Indian Immunologicals Ltd) @ 0.1mg/kg body weight intravenously. A rubber tourniquet was then applied at the base of the teat and local anaesthetic, Inj. Lignocaine hydrochloride 2% solution (Tignocaine 2%, Tamman Titoe Pharma Pvt. Ltd) was administered into the tissues ventral to the tourniquet in a ring fashion and 3ml was infused through the teat sinus to provide analgesia of the mucosa [8]. A time gap of 15 minutes was given for the anaesthesia to set in. The animals were placed on lateral recumbancy and the affected teat was prepared aseptically.

In case No. 1 and 2, under ultrasound guidance, the foreign body was pushed down the teat canal and retrieved using a 3.5" long, straight mosquito forceps through the teat orifice. In case No. 3 and 4, since the foreign bodies had migrated and lodged at the base of the teat, ultrasound guided retrieval was not possible and so surgical correction was advised.

In case No. 3, Under aseptic precaution, around 3 inches long incision was made involving the skin, subcutaneous tissue and mucosa from mid to the base of the teat. After retrieving the foreign body by forceps, the surgical site was irrigated with normal saline and the patency of the teat canal was maintained by a teat siphon. The mucosal and muscularis layers were sutured using 3-0 polygalactin 910 in simple continuous suture pattern followed by subcutaneous sutures and the skin was apposed using black braided silk No. 0 in simple interrupted sutures.

The case No. 4 was presented 5 days after following entrapment of the foreign body and it was found lodged at the base of the teat and an obstructive lesion was also noticed at mid teat level by ultrasound scanning which was confirmed by axial theloscopy [10]. After axial theloscopy, the teat cistern was filled with 1.5% glycine solution and simultaneous cutting the obstructive lesion at its origin in the teat cistern at the temperature of 70-80°C and coagulating at 80-90°C

was performed using theloresectoscope (Karl Storz). The quarter was flushed with 0.9% normal saline to remove the blood clots/tissue remnants and milk [5]. The foreign body was retrieved following thelotomy as in case No. 3.

In case 3 and 4, a sterile prosthetic tube made up of modified polyvinyl chloride (Infant feeding tube No. 10-Romsons Scientific and Surgicals, India) was inserted into the teat lumen and fixed *in-situ* with a stay suture using black braided silk [2]. Collagen based silver sulphadiazine cream (Sore treat-Helix Pharma, Pondicherry, India) was applied over the wound and protected with an elastic adhesive bandage (Plate 4).

All the animals were administered with Inj. Streptopenicillin @ 10mg/kg IM for 7 consecutive days. Owners were advised not to milk the affected quarter for 5 days. Wound dressing was done and the tube was removed on 5<sup>th</sup> postoperative day. The skin sutures were removed on 10<sup>th</sup> postoperative day.

## RESULTS AND DISCUSSION

All the affected cows were cross bred jersey aged between 4-6 years and weighing around 335-415kg. Out of four, three were in 2<sup>nd</sup> lactation and one in 1<sup>st</sup> lactation. Out of four, two were in mid stage of lactation, one was in early stage of lactation and one was in late stage of lactation. Right hind teat was affected in two cows, right fore and left fore one each. Duration of clinical sign varied from 1-5 days (Table 1).

On clinical examination, no external skin lesions were noticed in all the affected teats except one (Case 4) in which superficial wound was observed on the teat. On palpation of the affected teat, pain was evinced in all the cows. A thin tube like structure was felt at the mid teat level in two cows (Case 1 & 2) and no palpable structure was noticed in other two animals (Case 3 & 4) however, hardness was noticed at the base of the teat. Complete absence of the milk flow was recorded in all the affected teats.

**Table 1: Signalment of the Affected Cows**

Case No.	Age (Years)	Body weight (kg)	No. of lactation	Stage of lactation	Affected teat	Duration of clinical signs (days)	Foreign body
1	4	335	1	Late	RHT	2	AI straw
2	5.5	370	2	Mid	RHT	1	AI straw
3	5	415	2	Mid	LFT	3	Broken teat siphon
4	6	360	2	Early	RFT	5	Broken AI sheath

**Table 2: Ultrasound Findings of the Affected Teat**

Case No.	Location of the foreign body	Morphometry of other internal structures (mm)	
		Teat wall thickness	Width of teat sinus
1	Entire length of the teat sinus	7.6	6.4
2	Entire length of the teat sinus	8.2	5.8
3	Base of the teat	8.6	8.4
4	Base of the teat	9.2	6.6

Ultrasonographical images of the teat revealed the presence of tubular, hyper-echoic, intra-luminal foreign bodies of different length and width (Table 2). Ultrasonography was considered an important effective, feasible diagnostic tool for diagnosing foreign body obstruction in the teat, to assess the location and size of the foreign body and to demarcate the extent of pathologic changes involving the teat structures due to presence of foreign body [13]. In case 1 and 2, the foreign body was occupying entire length of the teat canal and in case 3

(Plate 1) and case 4 the foreign body was located at the base (Plate 2). The teat wall thickness was found to be increased in all the cases. Case 4 showed hyper-echoic lesions at mid teat level causing complete obstruction of the teat (Plate 3).

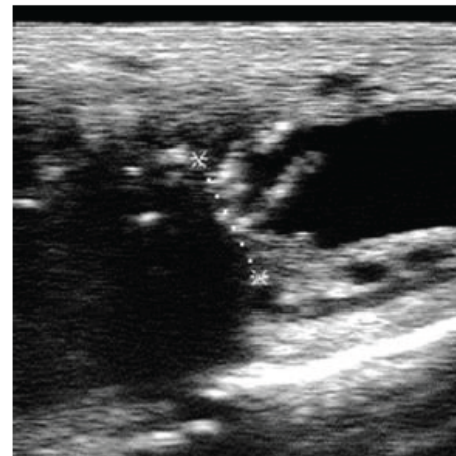


**Plate 1:** Ultrasonographic image of teat (Case No. 3) showing hyper-echoic foreign.

All straws of 9 and 8.5 cm were retrieved through the teat orifice in case 1 and 2 respectively. The straws were occupying the entire length of the teat canal. Since the AI straw was thin and not deeply embedded in case 1 and 2, ultrasound guided retrieval was successful and milk flow was apparently normal. However, surgical procedure was necessary in case 3 and 4 since the objects had migrated to the teat base. Unsuccessful attempts made by the milker might have led to upward migration of the foreign bodies.



**Plate 2:** Ultrasonographic image of teat (Case No. 4) showing hyper-echoic foreign body at the base of the teat and thickened teat wall.

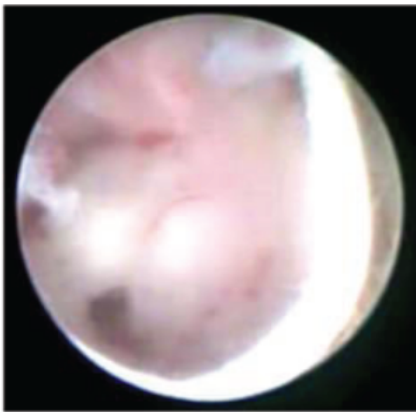


**Plate 3:** Ultrasonographic image of teat (Case No. 4) showing obstructive lesion at mid teat.

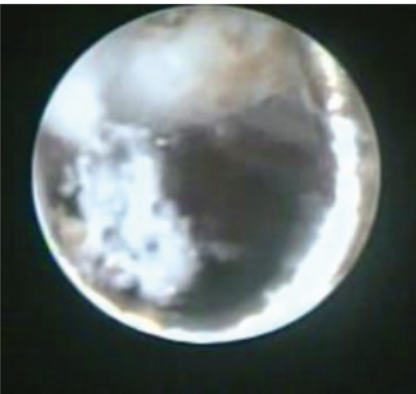
In case No. 3, A, 7 cm long metallic, rusted and broken teat siphon embedded at the base of the teat was retrieved through thelotomy using mosquito forceps (Plate 4). In case No.4, The hyperemic, proliferative lesion observed at the mid teat level through axial theloscopy (Plate 5) was resected by theloscopic electroresection and patency of the teat sinus was noticed (Plate 6). The obstructive lesion noticed in this case might have developed in response



**Plate 4:** Retrieval of broken teat siphon through thelotomy (Case No. 3).



**Plate 5:** Theloscopic view of the hyperemic obstructive lesion in Case No. 4.



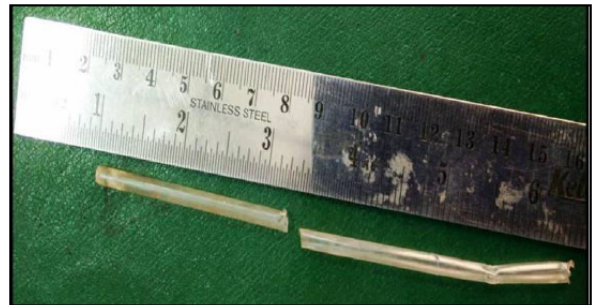
**Plate 6:** Patency of the teat sinus noticed after the theloscopic electro-resection.

to the constant irritation and injury caused by the foreign body during the unsuccessful attempts made by the milkman for retrieval of it as suggested by Eşki *et al.* [6]. Video-assisted theloscopic electro-resection was a promising, novel and minimally invasive technique for correction of the intraluminal obstructive lesions. It should be considered as an alternative to conventional

surgical methods in valuable dairy cows [4]. Through thelotomy, a 5cm long broken AI sheath embedded at the base of the teat was retrieved using mosquito forceps (Plate 7 and 8). Foreign bodies reported to be retrieved from teat canal were teat dilator and wax teat insert [9], quill [6] plastic tube [11] and broken bangle piece [1]. The type of foreign bodies recovered in the present study indicate that these materials were easily available and regularly used by the milkmen for correcting teat obstruction in cows.



**Plate 7:** Retrieval of broken AI sheath through thelotomy (Case No. 3).



**Plate 8:** Photograph showing broken AI sheath.



**Plate 9:** Suture site on 7<sup>th</sup> postoperative day (Case 3).



**Plate 10:** Suture site on 10<sup>th</sup> postoperative day (Case 4) showing complete healing.

Postoperatively, retention of a prosthetic tube for 5 days allowed milk flow to be restored with minimal manipulation of the teat prevented stenosis, milk leakage and fistula formation which is in accordance with that reported by Abu-Rafee and Pawde [1].

The application of Collagen based Silver sulfadiazine cream favoured wound healing as noticed on 10<sup>th</sup> postoperative day in case 3 and 4 (Plate 9 and 10). Milk and milk flow was apparently normal in all the cases. Collagen enhances the migration of fibroblasts, epithelial cells and synthesis of extracellular matrix in the wound healing process [12]. It may also attributed to the moist wound healing environment and sustained release of antibacterial provided by Collagen-silver sulfadiazine cream [3].

To conclude, educating the farmers and milkmen is very important to avoid use of inanimate objects to relieve teat obstruction.

## SUMMARY

Surgical and ultrasound guided retrieval of iatrogenic foreign body from the teat canal was performed and all the cows recovered uneventfully.

## ACKNOWLEDGEMENT

The authors are thankful to The Dean, Rajiv Gandhi College of Veterinary and Animal Sciences, Puducherry for the facilities provided to conduct this study.

## REFERENCES

- [1] Abu-Rafee M, Pawde AM. Iatrogenic foreign body in a previously blind teat: case report. *Int J Vet Health Sci & Res* 2015; 3(4): 58-59. <https://doi.org/10.19070/2332-2748-1500014>
- [2] Aruljothi N, Balagopalan TP, Alphonse RMD, Rameshkumar B, Kumar R. A clinical study on the use of prosthetic tubes for treatment of teat obstruction in cows. *Indian J Vet Surg* 2009; 30: 47-48.
- [3] Aruljothi N, Balagopalan TP, Thiruselvame P, Ramesh Kumar B, Thilagar S. Management of teat injuries using collagen based cream of silver sulfadiazine in cattle - A clinical study. *Indian Vet J* 2015; 92(10): 59-61.
- [4] Aruljothi N, Balagopalan TP, Thiruselvame P. Surgical management of four teat obstruction in a cow using theloresectoscope. *Eur J Biomed Pharm Sci* 2016; 3(10): 289-292.
- [5] Bleul UT, Schwantag SC, Bachofner C, Hasig MR, Kan WK. Milk flow and udder health in cows after treatment of covered teat injuries via theloresctoscopy: 52 cases (2000-2002). *J Am Vet Med Assoc* 2005; 226: 1119-1123. <https://doi.org/10.2460/javma.2005.226.1119>
- [6] Eski F, Şendag S, Çetin Y, Alan M. Total teat stenosis in a cow due to foreign body (quill). *Yüzüncüyıl Üniversitesi Veteriner Fakültesi Dergisi* 2007; 18(1): 101-104.
- [7] Fasulkov IR. Ultrasonography of the mammary gland in ruminants: a review. *Bulg J Vet Med* 2012; 15: 1-12.
- [8] Maria LM. Local anesthesia for husbandry procedures and experimental purposes in farm animals, A Bird's-Eye View of Veterinary Medicine, Dr. Carlos C. Perez-Marin (Ed.), In *Tech* 2012; 7: 233-254.
- [9] Querengasser K, Geishauser T, Querengasser J, Bruckmaier R, Fehlings K, Wolf W. Teat dilators as free foreign bodies in the bovine teat-two cases. *Bovine Practitioner* 2000; 34(1): 41-45.
- [10] Rathod SU, Khodwe PM, Raibole RD, Vyavahare SH. Theloscopy - the advancement in teat surgery and diagnosis. *Vet World* 2009; 2: 34-37.
- [11] Semieka MA. Radiography of unusual foreign body in ruminants. *Veterinary World* 2010; 3(10): 473-475.
- [12] Senthilkumar M, Sripriya R, Vijayaraghavan H, Sehgal PV. Wound healing potential of Cassia fistula on infected albino rat model. *J Surg Res* 2006; 131: 283-89. <https://doi.org/10.1016/j.jss.2005.08.025>
- [13] Shokry MM, Brebish EA. Case report: Thelotomy in a dairy buffalo after ultrasonographic diagnosis of teat stenosis. *J Buffalo Sci* 2012; 1: 110-112. <https://doi.org/10.6000/1927-520X.2012.01.01.19>