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Innovative technique using modified infusion set tubing for rectification of milk outflow disorders in cows

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Abstract

The present study was carried out in eight cross bred jersey cows irrespective of their age, breed, post calving period, pregnancy status and lactations number of the animals with the history of teat obstruction and leaking of milk from the affected teats. On physical examination, teat was found soft and major complication were leaking of milk from a teat sinus due to teat laceration and teat fistula in two animals each. In four cows an unusual ring like structure were felt near the base of affected teat due to some membranous or fibrous tissue blockage in the teat canal and case is diagnosed as teat spider. Surgical correction was advised in all the animals and the defect was surgically corrected. Milk flow patency was maintained by sterile modified infusion set tubing (polyvinyl chloride material) in situ. After suturing, N-butyl cyanoacrylate tissue adhesive was added over the sutured line to reinforce the suture line and tubing post operatively. Daily dressing with Povidone solution was done and siphoning the milk every now and then 2 days interval. Infusion set tubing and skin sutures were removed on 10th postoperative day. The modified infusion set tubing functional well 100 per cent without any complication for 10 days post-operatively. All the animals showed uneventful recovery. On the basis of present study, it is recommended that the infusion set tubing is the excellent method of treatment related with internal affections of the teat such as membranous obstruction, occlusion of teat, teat fistula and laceration of the teat. This is the non-invasive, easily available, cost-effective, animal friendly, radiation free and acted as ancillary and supportive treatment tool for the management of milk flow disorders in cows.

Keywords: Teat spider, laceration, fistula, infusion set tubing, cow

Introduction

Unscientific milking and management practices are the main cause for teat and udder affections and cause a great loss to the poor farmers. The farmers are less aware about clean milk production and teat or udder health. Further, they also do not pay enough attention on udder care and sometimes even mishandle the udder which always leads to teat and udder affections (Chakrabarti *et al.*, 2014) [1]. Udder and teat health are increasingly important for dairy producers and any disease condition involving udder or teat ultimately affects the productivity and the farmer's economy. The udder and teats are vulnerable to external trauma or injury because of their anatomical location, increase in size of udder and teats during lactation, faulty methods of milking, repeated trauma to the teat mucosa, injury by teeth of calves, accidentally stepped on teat, paralysis resulting from metabolic disturbances at parturition (Tiwary *et al.*, 2005) [2]. Such injuries do not necessary lead to visible changes in teat but often lead to outflow obstructions caused by proliferations of interstitial tissue and scar formation in the teat. After repeated milking, changes appear in teat end tissue, resulting in the development of a callous ring around the teat orifices. Other factors also leads to callous formation like teat end shape, teat position, teat length, milk production, lactation status and parity (John *et al.*, 1998) [3]. In teat laceration and fistulae condition is mostly observed in those animals that have long teats and pendulous udder (Tyagi and Singh, 2012; Kashyap *et al.*, 2014) [4, 5]. When animal tries to jump over the barbed wire or pass through the thorny bushes, their teat get teared due to laceration of skin and muscles. If this laceration is deeper, then even teat canal gets opened and milk will start flowing through the teared portion. This condition is called as teat fistula. The cases of teat fistula are considered as emergency because any delay in repair of such teat will cause development of mastitis or necrosis of the teat (Ansari, 2019) [6]. For repair of such teat, all aseptic precautions should be taken into considerations. Teat obstruction involves the intra-luminal lesions that partially or completely hinder the milk outflow. These lesions have been identified and classified in literatures (Ducharme *et al.*, 1987, Alacam *et al.*, 1990, Athar *et al.*, 1999) [7, 8, 9].

Teat spider condition is usually due to congenital absence of teat cistern or canal. Teat spider is met with in buffaloes and cows as a congenital as well as acquired anomaly (Alacam *et al.*, 1990, Singh *et al.*, 1993) [8, 10]. Teat and udder surgery is certainly one of the major areas of soft tissue surgery. In recent years, there have been great advances in what can be accomplished with teat and udder surgery (Bruce, 1995) [11]. In affections such as teat fibrosis, membranous obstruction, occlusion of teat and inflammation of the teat all these said normal structure of the teat get altered. Teat affections always lead to economic loss due to loss of milk yield, antibiotics-treated milk and loss of quarter (Awad *et al.*, 2008) [12]. The disease conditions of teats and udder not only cause discomfort to the animals with painful milking but also make teats and udder prone to mastitis. Milk flow disorders are a central problem in the field of udder health. Teats of milked farm animals are parts of the udder, serving the role of both a valve regulating milk outflow as well as that of a natural barrier for exogenous infections, affecting the quality traits of milk. It give rise to different kinds of mastitis, which consequently leads to a loss in milk production, detrimental changes to the milk components and raw milk quality, increased costs for the treatment of the animal, early culling, and, hence, a negative economic impact. Major problem associated with teat injuries and stenosis are compromised milk flow, poor milk ability, abnormal milk, presence of pathogens and greater risk for mastitis in affected quarters (Querergasser *et al.*, 2002) [13]. Inadequate information is available in the literature on the use of infusion set tubing for rectification of milk flow disorders. Therefore, the purpose of this communication is to put on record these findings in cows,

using an unconventional type of tubing material.

2. Materials and Methods

The present study was carried out in eight cross bred jersey cows irrespective of their age, breed, post calving period, pregnancy status and lactations number of the animals with the history of teat obstruction and leaking of milk from the affected teats. Confirmation of milk flow disorders, the owner was advised not to milk the cow. Animals were subjected to through clinical examination so as to assess their status of affection of teat. The animals were otherwise apparently healthy and appetite were normal. The clinical examination of the teat was done by visual inspection, careful palpation of teat and udder, probing of the teat canal with the help of sterile teat siphon to detect any abnormality or affections. On physical examination, teat was found soft and major complication were leaking of milk from a teat sinus due to teat laceration and teat fistula in two animals each. In four cows an unusual ring like structure were felt near the base of affected teat following a sinus like structure and an invagination were also found on exertion of upward pressure with finger. The condition may be due to some membranous or fibrous tissue blockage in the teat canal and case is diagnosed as teat spider. Surgical correction was advised in all the animals and the defect was surgically corrected. Repair of teat affections were carried out with various instruments of teat surgery such as teat bistoury, teat slitter were used for correction of milk flow disorders. Milk flow patency was maintained by sterile modified infusion set tubing (polyvinyl chloride material) in situ (Fig 1). Skin sutures were removed on 10th postoperative day.

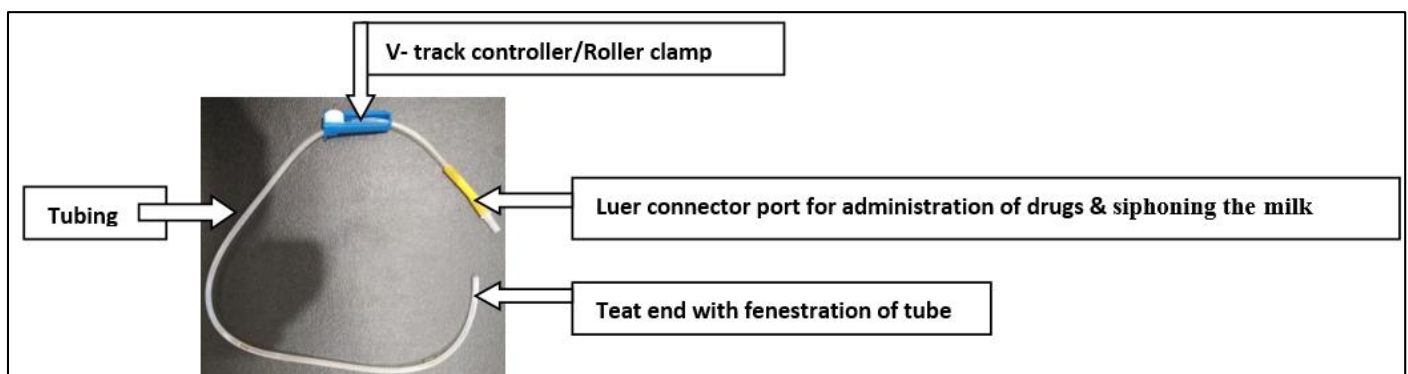


Fig. 1. Showing anatomy of modified Infusion (drip) set

2.1 Anesthesia and control

Pre-operatively after withholding feed and water for 24 hours (Coutre and Mulon, 2005) [14]. The affected animal was restrained either in standing position/lateral recumbency. All the animals were sedated by using Inj. Xylazine (Xylaxin®-Indian Immunologicals, Hyderabad) @ 0.1 mg/kg body weight intravenously. Desensitization was achieved by ring block anaesthesia was done using Injection 2% Lignocaine hydrochloride (Xylocaine®-Astra IDL, Bangalore).

2.2 Surgical Procedure

The animals was positioned in a lateral recumbency and secured all the legs tied together using a rope. The teat and udder were cleaned using chlorhexidine (Savlon®) antiseptic and surgical spirit applied. A rubber tourniquet was then applied at the base of the base of the teat to provide hemostasis during surgery. In teat laceration (Fig 2), the margin of the laceration were debrided using a scalpel blade

to remove the scar tissue that had already formed around it. In teat fistula cases (Fig 3) the wound margins were debrided and lavaged with normal saline solution. The suturing of the fistular and other layers performed by three-layer closure technique. The mucosal and muscular layers were sutured with polyglactin 910 of size 3/0 (Vicryl Plus– a product of Johnson and Johnson, Mumbai) in simple continuous pattern. Skin apposition was done with braided silk of size 2/0 in cross mattress. In teat spider cases (Fig 4), teat slitter as well as teat bistoury was introduced for clearing those membranous or fibrous tissue blockage. After that, drop by drop milk coming out through the teat canal. In all the cases a sterile modified infusion (drip) set tubing (polyvinyl chloride material) was placed in the teat to maintain the patency (Fig 5). After suturing, N-butyl cyanoacrylate tissue adhesive was added over the sutured line to reinforce the suture line and tubing post operatively. Infusion of intramammary antibiotic (Mamoprotec® -a product of Virbac Animal Health India Pvt

Ltd, subsidiary of group Virbac SA) 10 ml for 5 days, Injection Penzidyme® (a product of Sarabhai Zydus Animal Health, Mumbai) @ 8 ml single intramuscular on alternate day, Bolus Serakind plus (a product of Mankind Pharma Vet, HBL) @ 1 bolus BID orally for 3 days. Daily dressing with Povidone solution was done and siphoning the milk every now and then 2 days interval. In all the animals the infusion set tubing was kept in situ for 10 days, till the flow of the milk became normal. Owners were instructed to watch for the milk flow from the tubing after releasing the V-track controller/ Roller clamp of the set and owners were advised to remove the tubing by gently pulling it out. The owners were directed to wash and disinfect the exposed tubing regularly until its removal. Skin sutures were removed on 10th postoperative day.

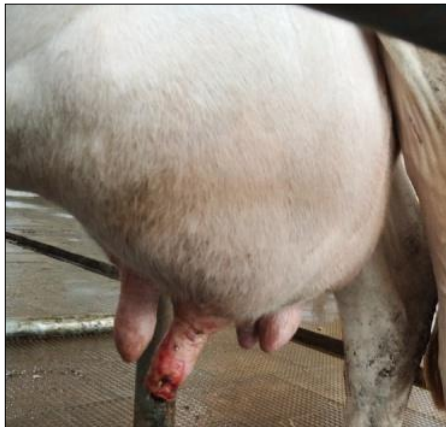


Fig 2: Teat laceration in a cow



Fig 3: Teat fistula in a cow



Fig 4. Cow suffering from teat spider



Fig 5: Placement of modified infusion (drip) set in affected teat in a cow

3. Results and Discussion

The modified infusion set tubing functional well 100 per cent without any complication for 10 days post-operatively. All the animals showed uneventful recovery. Early diagnosis and treatment of such problems is very crucial for maintenance of their health vis-à-vis milk production (Singh, 2014) [15]. The physical examination was corroborated with the findings of Ather *et al.* (1999) [9] and confirmed as teat spider. No pain sensation was found during entire surgical process as local anaesthetic technique facilitated surgical repair of the teat and udder (Steiner and Rotz, 2003) [16]. After 10 days, animal was totally cured showing normal mammary gland activity and milk ejection. The clinical success from udder and teat surgery depends mostly upon aseptic measures, proper restraint of animal as well as adequate postoperative care (Arnold, 1960) [17]. The anesthetic protocol employed in the present study was found satisfactory with reference to Nichols (2009) [18]; Balagopalan and Aruljothi, (2016) [19]. The suturing of mucosal and muscular layers with polyglactin 910 of size 3/0 (Vicryl Plus – Johnson and Johnson, Mumbai) in simple continuous pattern was followed in the present study as explained by Nichols and Anderson (2007) [20]. Skin apposition was done with braided silk of size 2/0 in cross mattress (Nichols, 2009) [18]. Probing the teat with sterile modified infusion (drip) set tubing was done in the present study and was found to be helpful in maintaining the patency and also for the drug delivery (Aruljothi *et al.*, 2012) [21]. Infusion set tubing is made up of virgin grade, satisfactory tensile and functional strength, non-capillary, uniform thickness, smooth surface, available in sterilized form, non-absorbable and wide diameter continued retentions without tearing the tissues, non-reactive, non-toxic, non-irritant and made up of polyvinyl chloride material for the choice of the treatment protocol. Teat tubing with infusion set which is economical and field applicable than other type of commercial available catheters viz. Foley's catheter, for the management of milk flow disorders. On the basis of present study, it is recommended that the infusion set tubing is the excellent method of treatment related with internal affections of the teat such as membranous obstruction, occlusion of teat, teat fistula and laceration of the teat. This is the non-invasive, easily available, cost-effective, animal friendly, radiation free and acted as ancillary and supportive treatment tool for the management of milk flow disorders in cows.

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6. Conflict of Interest: None declared

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