



Radical Unilateral Mastectomy As A Salvage Procedure In Fibrosed Gangrenous Udder In A Lactating Goat

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ABSTRACT

A 4 year old freshly lactating goat presented with swollen, cold, hard, dried, fibrosed, right quarter of the udder since 15 – 20 days was subjected to radical unilateral mastectomy as a salvage procedure under Xylazine sedation and local infiltration using Lignocaine HCl. The skin was sutured with Nylon no-2 using vertical mattress technique (Quill sutures). The goat recovered uneventfully and the other mammary gland continued to lactate normally.

KEYWORDS – *Fibrosed udder, gangrene, Goat mammeotomy, hemi mastectomy, Quill suture technique.*

I. INTRODUCTION

Caprine mastitis is a very serious problem leading to a decline in the overall health of the animal. It is more frequent in goats raised under intensive and semi intensive managerial practices. Mastitis reflects the inflammation of the mammary gland, which may occur due to any bacterial infection secondary to teat injury or poor management as reported by [1 and 2] reported that although various pathogens (virus, bacteria or fungi and their toxins) may lead to the onset of this condition, the predisposing factors like poor management and hygiene, faulty or irregular milking of the animals leading to teat injuries caused by the bruising of mammary tissue or teats from trauma, and narrowing of teat canal by injury contribute for mastitis.

Umadevi *et al.*, (2015) [3] opined that, mastitis when uninterrupted either consecutive abscess formation or spontaneous recovery occurs. Early recognition and prompt treatment are important for limiting tissue damage and production losses. Practically, most of the mastitis cases are well treated with antibiotic injections as well as antibiotic teat infusions. Due to the lack of early diagnosis or farmer's ignorance, the approximately curable mastitis may progress to fibrosis, leading to gangrenous ones as opined by [4]. Nieberle *et al.*, (1996) [5] opined that mastitis when not treated successfully or left uncared will progress to fibrosis. Teat fibrosis, a common sequel of mastitis develops so gradually that it may escape observation until most of the secretory tissues are destroyed. Chronic mastitis develops from an untreated case of acute mastitis which is manifested as formation of abscess within the mammary parenchyma [6]. Development and growth of such abscesses with proliferation of surrounding fibrous tissue leads to gross enlargement of the udder which is very painful and presents a welfare concern to the animal as opined by [2]. Fibrosis may be diffused, involving whole quarter or local varying in size from pea like lesion to bigger masses near the base or tip of the teat [7]. Fibrous tissues proliferate and occupy the place of infected and damaged soft mammary tissues. Formation of fibrous tissue and encircling of the pathogen is a defensive mechanism from preventing the spread of pathogen.

Singh *et al.*, (2008) [8] opined that gangrenous mastitis is one of the most severe and dangerous form of mastitis. Development of gangrene may be due to long term accumulation of inflammatory

exudates either due to allergic or infectious origin. Gangrenous mastitis may probably occur due to thrombosis of the vein and infection of the udder causing local edema. Blood supply to the necrotic part of the udder is reduced, resulting in putrefaction. The affected part becomes blue or black. Serosanguinous fluid may leak out drop by drop and the skin sloughs off and the entire affected part may slough off bit by bit, thus extensively indurating the udder and teat cistern. Progressive discolouration from the tip to the top with sloughing off of necrotic parts is a common sequel of gangrenous mastitis. Bradford (1990) [9] reported that the primary etiological agents found in fibrosed and gangrenous udders were *E.coli*, Staphylococcus, Streptococcus and Clostridium. In mastitis, caused by Staphylococcus, necrosis occurs either due to toxins or due to thrombosis of the mammary vessels. Subsequent infection by saprophytes results in gangrene as reported by [10].

Mastectomy is performed in ruminants either as radical mastectomy or hemi-mastectomy [11]. Radical mastectomy (unilateral or bilateral) is recommended as a pain relieving salvage procedure in cases where medicinal treatment is obsolete, in extensive lesions involving udder, in cases of chronic suppurative mastitis, in fibrosis and gangrenous mastitis and in neoplastic or hyperplastic conditions of the udder where medical treatment is of limited value as reported by [12, 13 and 26]. Goat mastectomy is occasionally employed in ruminants to treat conditions involving the mammary gland and associated structures. Radical mastectomy could be a safe and effective procedure for small ruminants with udder disease, with few complications. The present report describes radical unilateral mastectomy as salvage procedure for fibrotic and gangrenous udder in a freshly lactating goat as a treatment option for unilaterally fibrosed udder, while allowing the other mammary gland to continue lactation, in accordance with several other case reports [14 and 16]. Decision for surgical amputation of the affected udder, in the present study, was taken keeping in mind the extensiveness of the lesion and to relieve the discomfort to the goat while walking as opined by [15].

II. HISTORY AND OBSERVATION

A four year old goat was presented to Department of Veterinary Surgery and Radiology, Bidar, 17 days after parturition with a chief complaint of hard, dried and swollen udder with no let down of milk since 2-3 weeks in the right (affected) quarter while left quarter was apparently healthy with normal milk production. The animal was apparently healthy. Clinical examination revealed respiration rate, heart rate and rectal temperature were within normal physiological range. However, the overgrown udder was causing problem to the goat during walking. Palpation of the right quarter of the udder revealed it to be swollen, hard, and cold to touch with dried skin, which appeared to be peeling off indicating gangrene (Fig 1a and Fig 1b). Palpation revealed hard nodular consistency of the affected gland with no milk flow. On survey radiography, the right quarter appeared as a radio opaque mass (Fig 2). Ultrasonographic examination revealed hyper echoic calcified areas (Fig 3a and Fig 3b). On the basis of history, clinical examination, survey radiography and ultrasonographic findings the case was diagnosed as gangrenous mastitis. As the quarter was not functional, it was decided to radically ablate the quarter.

Prophylactically, the animal was administered inj. Enrofloxacin @ 5mg/kg b.wt i/v, inj. Meloxicam @ 0.2mg/kg b.wt i/m, inj. Adrenochrome @ 2 ml i/m TD and inj. DNS @ 20 ml/kg b.wt i/v. The animal was restrained in left lateral recumbency with upper right hind limb made slight dorsal and the site was prepared surgically. Inj. Xylazine @ 0.1 mg/kg b.wt i/m was administered (diluted 1:10 with distilled water) in order to provide deep sedation and analgesia. Field block analgesia was achieved using local infiltration with 1% inj. Lignocaine HCl. An incision was given at the base of the gland at superior-lateral aspect of the mammary gland (Fig 4) and careful dissection of subcutaneous tissue was carried out without damaging the septa of the adjacent quarter in order to undermine the skin and separate the tissues properly. The external pudic artery and vein, perineal artery and large subcutaneous

vein were isolated and ligated with chromic catgut (1–0) to avoid hemorrhage. The entire affected right mammary gland was carefully separated from the healthy udder and abdominal wall with blunt dissection and was removed (Fig 5). The site was adequately lavaged with normal saline solution. Excess skin flaps were trimmed to avoid dead space and incisional wound was sutured together with Nylon no-2, using Quill suture technique (Fig 6). The excised gland weighed 2.6 kg (Fig 7) and measured 35 cm in length and 15 cm in breadth.

Post operatively, the incisional wound was dressed with Povidone Iodine ointment until healing. Inj. Enrofloxacin @ 5mg/kg b.wt i/m was administered for 5 postoperative days along with inj. Meloxicam @ 0.2 mg/kg b.wt i/m for 3 days. The skin sutures were removed on 16th post operative day after the animal recovered uneventfully (Fig 8).

III. RESULTS AND DISCUSSION

Gangrene of mammary gland following acute mastitis in a pregnant goat was reported by [16]. The unilateral or bilateral fibrosis of udder leading to gangrenous mastitis has been frequently encountered especially in goats as reported by [17] leading to amputation of affected quarter. According to [18] the highest prevalence (40%) of mastitis was observed in goats in-between 1–6 years of age. The goat in present report was 4 years old and in line with the mentioned average age. The course of this condition is 1-2 weeks as reported by [19]. In present case, the history revealed similar duration of 2 – 3 weeks since onset of the disease.

Nigam and Tyagi (1974) [20] achieved good results in negative contrast radiography; because of the clear contrast that it can offer in demonstrating soft tissues and their abnormalities has more advantage over a positive contrast medium. However in present case, on plain radiography a radio opaque mass was noticed in the affected udder indicating possible fibrosis and calcification.

Rambabu *et al.*, (2009) [21] observed that on ultrasound examination of bovine udder with mastitis, there was increased echogenicity of this structure. The worsening of symptoms coincided with increasing difficulty to delimit alveoli at ultrasound examination. Reduction of the gland cistern area according to the evolution of the disease may be explained by the thickening of the parenchyma. Ashwani *et al.*, (2012) [15] performed transcutaneous ultrasonographic examination of the affected udder using 7.0 MHz linear transducer, which revealed multiple round to oval capsulated cavities filled with echogenic contents. In the present case ultrasonographic examination of the udder was carried out using 5.0 MHz curvilinear transducer. The findings revealed the udder showing hyper echoic masses and mixed echogenicity of the udder parenchyma indicating fibrosis and calcification.

In gangrenous mastitis the affected quarter should be treated as an open wound with broad spectrum antibiotics as opined by [19]. Pal *et al.*, (2011) [14] observed that the organisms were sensitive to amoxicillin, cloxacilin, gentamycin and chlortetracycline but resistant to penicillin and streptomycin. Singh *et al.*, (2008) [8] reported a case of successful therapeutic management of gangrenous mastitis in a goat with gentamycin. Umadevi *et al.*, (2015) [3] reported that udder fibrosed cows were treated effectively with intramammary infusion of Pendistrin S H and topical mammary application of Mastilep gel. Bezek and Hull (1995) [22] recommended a specific antitoxin therapy with enterotoxin-secreting *S. aureus* rather than antibiotic therapy. However, efficacy of this therapy could not be confirmed in the mentioned study due to death of the goat. Debasis and Mousumi (2002) [23] opined the possible cause of death could be due to persistent anorexia, necrotizing udder tissue and above all the toxemia resulting from the release of bacterial toxins. Death of an animal due to toxemia after gangrenous mastitis was reported by [24]. Therefore in the present case, the decision was made not to risk the goat's life and instead, a radical unilateral mastectomy was performed on affected gland as a salvage procedure to excise the fibrosed quarter.

Cable *et al.*, (2004) [26] reviewed 20 cases of ruminants with severe but localized disease of udder that were subjected to radical mastectomy and reported that the surgical procedure was safe, made the animals more comfortable and helped to prolong their disease free survival. El-Maghraby (2001) [13] reported that bilateral radical mastectomy was technically easier to perform than unilateral mastectomy, since between the two halves of the udder; there are several interconnecting blood vessels that need to be ligated during unilateral mastectomy. In the present case, since only the right udder was affected, a unilateral mastectomy was performed.

Bardhan *et al.*, (2002) [25] reported that partial mammectomy of affected quarter was performed under Triflupromazine HCl sedation and epidural anaesthesia using Lignocaine HCl. Dhar *et al.*, (2015) [27] performed unilateral mastectomy under mild sedation using diazepam and local infiltration with 2% lignocaine HCl. Ashwani *et al.*, (2014) [15] performed unilateral mastectomy in a goat under general anesthesia using diazepam and ketamine combination. Monsang *et al.*, (2014) [2] performed bilateral mastectomy in a doe under general anesthesia using triflupromazine, diazepam and ketamine combination. Ahmet *et al.*, (2015) [29] performed unilateral mastectomy in a goat under general anesthesia using xylazine, ketamine and isoflurane combination. In the present case deep sedation with Xylazine and infiltration of local anesthesia as field block was found to be adequate to perform unilateral ablation of the gland.

Monsang *et al.*, (2014) [2] fixed a fenestrated catheter at the ventral skin suture in order to drain any fluid accumulation or seroma formation beneath the sutures. However, Ahmet *et al.*, (2015) [29] did not place any catheter as the subcutaneous tissue was tightly sutured, bleeding was avoided by ligation during surgery, and no discomfort was observed related to fluid accumulation. In the current case, no catheter was placed, as the dead space was eliminated by trimming the excess skin flaps after suturing the incision with Quill sutures (vertical mattress). Ashwani *et al.*, (2012) [15] reported that on the 4th post-operative day seroma formation was noticed at the surgery site in which case the most ventral skin suture was opened in order to allow drainage of the accumulated seroma. However, in present case no such postoperative complications were observed and the animal recovered uneventfully and the other quarter continued lactating normally. Knight, (1987) [28] reported that hemi- mastectomised goats in early stages of lactation will develop compensatory hypertrophy of the remaining mammary gland with up to 50% increase in milk production.

Bardhan *et al.*, (2002) [25] performed mammectomy in goat as salvage treatment for mammary cystadenoma and the exteriorized mass weighed 7.5kg with 29 cm in length and 15 cm in breadth. In the present case the unilaterally excised gland weighed 2.6 kg and measured 35 cm in length and 15 cm in breadth.

The prognosis of fibrosed udder in goats is not favorable as gangrene may develop. Similar observations were made in the present case. For goats with fibrosed udder, unilateral mastectomy can be an option as a salvage procedure as it will allow the other mammary gland to continue lactation and function normally. The surgical procedure was safe without complications and may be recommended for localized diseases of udder. Similar conclusions were made by [15, 27 and 29]. From the present study it is concluded that radical unilateral mastectomy as a salvage procedure can be a viable alternative to save the life of the goats in the treatment of goats with fibrosed and gangrened udder and the retain lactation in the normal unaffected udder.

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Fig 1a: Fibrosed right quarter of udder due to gangrenous mastitis



Fig 1b: Fibrosed right quarter of udder due to gangrenous mastitis

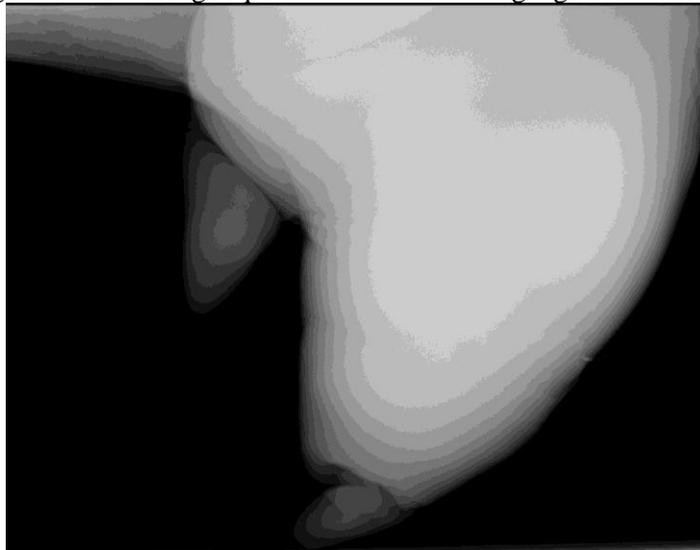


Fig 2: Radiographic image of the fibrosed udder.



Fig 3a: Ultrasound image of normal and fibrosed part of the udder.

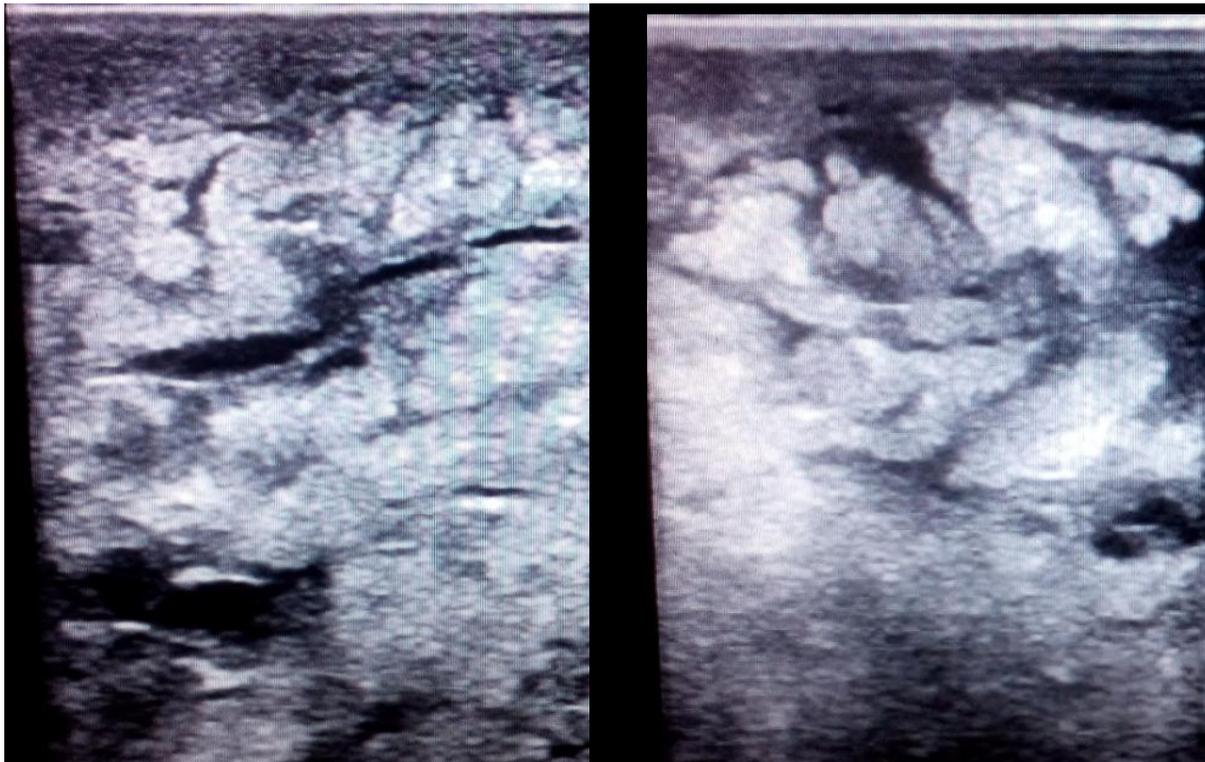


Fig 3b: Ultrasound image of fibrosed part of the udder



Fig 4: Elliptical incision at the site.

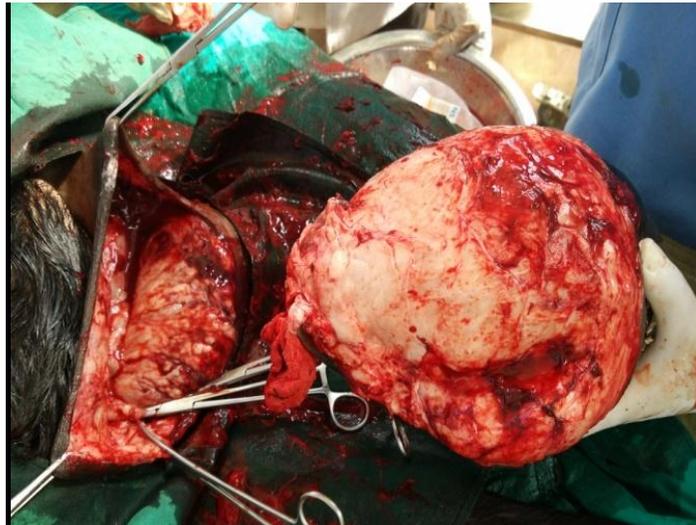


Fig 5: Radical excision of the affected quarter



Fig 6: Quill suture technique to appose the skin edges.

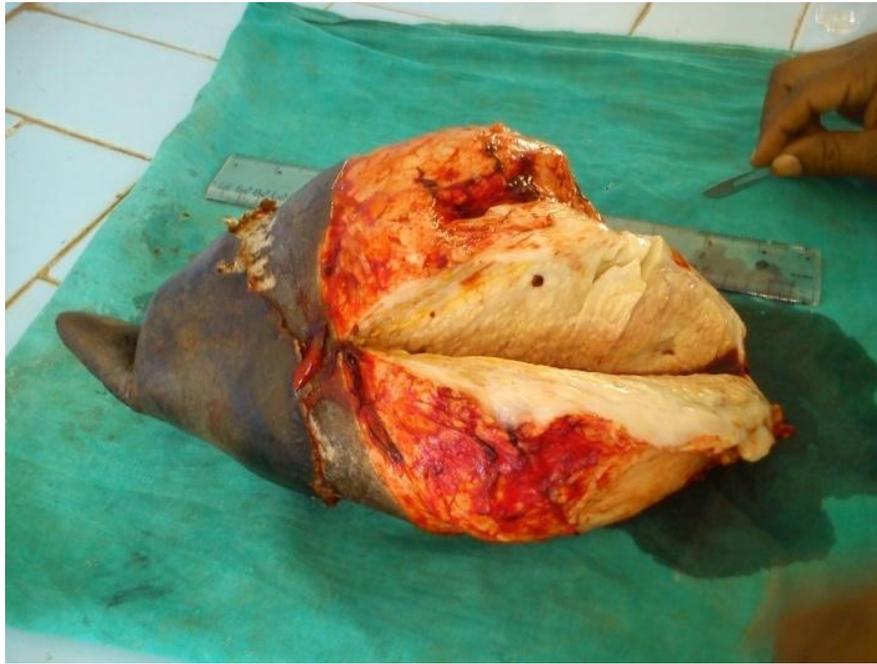


Fig 7: Radically excised fibrosed mass.



Fig 8: Uneventful recovery post operatively after suture removal