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Conservative Management of Unilateral Focal Gangrenous Mastitis in a 1½ Year-Old Lactating Red Sokoto Doe

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ABSTRACT

Red Sokoto goats are well known for their susceptibility to mastitis, but the economic role they play in the provision of regular income and outstanding high-quality hide and skin make it very important to care for their healthy well-being to ensure continuous production. Gangrenous mastitis is the form where the udder undergoes necrosis as a result of the effects of the toxin produced by the virulent microorganisms causing the condition and death can ensue from resulting toxemia. Total or unilateral mastectomy is the best management of gangrenous mastitis, especially where the teats are also affected. We present here a report of a conservative approach to management of a craniolateral focal gangrenous mastitis in a 1½-year old lactating doe by debulking of the gangrenous tissue, debriding, antibiosis and management as an open wound. The outcome was good and resulted in a spared teat with possibility of lactation in subsequent kidding.

Key words: Conservative management, Gangrenous mastitis, Goat, Mastectomy.

INTRODUCTION

Red Sokoto Goat (RSG) like any other breed of goat plays an important role in the food production system in Nigeria and it's neighboring countries (Shittu et al. 2008; Garba et al. 2019). They contribute to the economy of the poor people by providing regular source of income and have the most outstanding characteristic of high-quality hide and skin (Dewangan et al. 2020). Its high prolificacy and short gestation period make them suitable for production among poor and landless livestock farmers (Dewangan et al. 2020). Hence the need to ensure maximum production and guarding all that concern its healthy wellbeing, especially mastitis which RSG are characteristically known for causing the udder to undergo both physical and pathological changes (Pilau et al. 2011; Jibril et al. 2020), causing a major concern in both economy and animal welfare (Al Salihi 2018; Garba et al. 2019).

Mastitis is the inflammation of the mammary gland tissue, affecting one or multiple glands and usually occurs at the postpartum period preceding lactation (Radostits et al. 2007; Al Salihi 2018; Kumar et al. 2019). Depending on the cause, clinical presentation and observations, mastitis could be subclinical, acute, chronic or gangrenous. All cardinal signs of inflammation are present on the affected udder with or without systemic infection depending on the state of infection (Al Salihi 2018). Many agents which include bacteria (Tariq 2014), mycoplasma (Egwu et al. 2001), yeast and other fungal agents cause mastitis but factors like poor management, injuries to teat and udders, poor hygiene and faulty milking machines prone the udder to the invasion of the aetiologic agents (Zenebe et al. 2014). Fever, depression, lethargy and death in severe cases may be seen in mastitis with systemic involvement and hence, the need for immediate therapy once presented (Jibril et al. 2020).

Gangrenous mastitis, also known as "blue bag", is a per acute form of mastitis where the affected quarter undergoes necrosis and is the most challenging form to be managed (Tufani et al. 2010; Abubakar et al. 2020). It is

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termed “blue bag” because as the skin of the udder turns bluish within few hours which is an indication of ischaemia organisms in acutely infected mammary gland (Abubakar et al. 2020). The gangrene occurs due to thrombosis caused by the effect of virulent microorganism’s alpha toxin on the mammary vessels endothelium and could lead to toxaemia and subsequent death of the animal (Pilau et al. 2011). Usually, the clinical sign of inflamed udder is seen in the first weeks of lactation with or without systemic signs of pyrexia, anorexia, dyspnoea and signs of toxaemia (Al Salihi 2018).

A blue-blackish or blue-greenish discolouration of the skin of the udder, coldness to touch, demarcation line of the affected tissue, development of abscess and draining pus are pathognomonic of gangrenous mastitis on the clinic floor. In an advanced stage of the condition, pneumonia and clinical signs of septicaemia or toxaemia are observed (Abubakar et al. 2020). Radical approach is usually given to gangrenous mastitis through radical or partial mastectomy (Al Salihi 2018) due to the possible fatality effect of toxaemia that can develop. However, combination of therapies including specific antitoxin therapy (AL Salihi 2018), antibiotics, fluid administration, anti-inflammatory and debriding in case of focal gangrenous area have been reported in the successful management with preservation and restoration of the integrity and milk production in the udder in subsequent kidding post management (Pilau et al. 2011; Tariq 2014). We therefore present a case of gangrenous mastitis successfully managed as an open wound after mechanical debridement of the focal gangrenous area.

Case History

A 1½ year-old lactating Red Sokoto doe weighing 25kg was presented at the Usmanu Danfodiyo University Veterinary Teaching Hospital with chief complaint of wound on the left half of the udder which was also swollen. The client added that the doe had reduced appetite. The condition of the udder was said to be noticed two weeks after kidding and was presented at the hospital a week after noticing it. On physical examination, the temperature was 39.4°C while the pulse and respiratory rates were 80 beats/minute and 40 cycles/minute respectively. The capillary refill time was less than 2 seconds.

The patient was alert and apparently healthy (Fig. 1A). Examination of the udder revealed an intact right half and a focal area of abscessed wound and swelling of the craniolateral aspect of the left half (Fig 1B). The patient resented to palpation of the affected half. Blood sample was taken through jugular venepuncture into and EDTA bottle (JRZ Plastilab, Beirut, Lebanon) for haematological and blood parasite analysis. Faecal and wound swab samples were taken for parasitic and bacterial culture and sensitivity tests, respectively.

Management

The patient was restrained on right lateral recumbency and the left hindlimb was raised to have access to the affected left half. The area of the wound was locally infiltrated with 2% lignocaine (Swiss Parenterals PVT. Ltd., India), the gangrenous tissue was debulked (Fig. 1C) and mechanical debridement was carried out after which the biopsy sample was taken for histopathology. The (Al Salihi 2018). Warmth and high moisture are conditions favouring fast multiplication of pyogenic and saprophytic wound was thoroughly lavaged with a hydropressure from a 20mL syringe using 0.04% diluted chlorhexidine gluconate (Purit®, Saro Lifecare Ltd., Lagos, Nigeria). The wound was dried with sterile gauze afterwards (Fig. 2A) and oxytetracycline spray (Limoxin-25 spray, Interchemiewerken "De Adelaar" BV, Venray, The Netherlands) was applied. The wound was left to heal through secondary intention while been packed with gauze (Fig. 2B).

Fig. 1: Showing the patient on presentation (A), the craniolateral focal gangrenous mastitis (B) and the debulking of the focal gangrene (C).

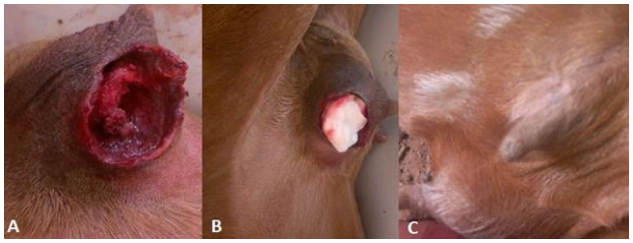

Fig. 2: Showing the image of the affected site after debriding and saline lavage (A), packing of the wound with gauze (B) and the condition of the udder 38 days after treatment (C).

Penicillin-Streptomycin (Hebei Hope Harmony Pharmaceutical Co. Ltd., China) was administered intramuscularly at 20,000 IU/kg bwt (body weight) and 20mg/kg bwt, respectively for 5 days. Multivitamin (Kepro B.V. Holland) was also given intramuscularly at 25mg/kg bwt for 5 days while 2.5% diclofenac sodium (Yanzhou Xier Kangtai Pharmaceutical Co., Ltd., China) was given intramuscularly at 2mg/kg bwt for 3 days.

RESULTS

The haematology revealed marked neutrophilic leucocytosis and wound swab culture yielded the growth of Staphylococcus aureus after 24 hours of aerobic incubation

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at 37°C. The microorganism was sensitive to streptomycin, chloramphenicol, erythromycin, gentamicin and tetracycline while it was resistant to cloxacillin, cotrimoxazole and augmentin. The parasitology results reported scanty Eimeria oocyst and no parasite in the blood samples. The histopathology revealed a severe intralobular and interlobular necrosis with multiple foci of gram-positive cocci colony (Fig. 3). The case was followed for 38 days with daily dressing before the healing could complete (Fig. 2C).

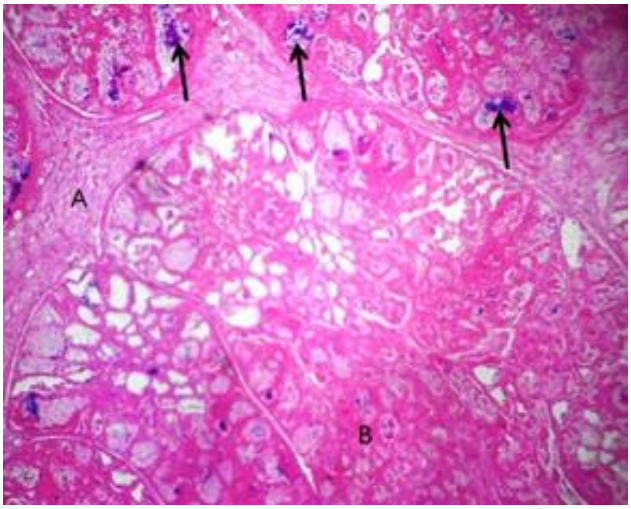

Fig. 3: Photomicrograph of section of mammary gland showing area of severe interlobular (A) and intralobular (B) necrosis with focal areas of colony of cocci Gram's positive bacteria (black arrows) (H&E stained, X 40).

DISCUSSION

The client reported to have noticed the swollen left half of the udder of the lactating doe two weeks after kidding with reduced appetite. This report was consistent with earlier reports that mastitis develops acutely in lactating dams postpartum (Tufani et al. 2010; Pilau et al. 2011; Abubakar et al. 2020) with the associated chief complaint of loss or reduced appetite (Al Salihi, 2018). Though the respiratory and pulse rates were within the physiological limit for RSG, the temperature was at the upper limit, and it could be said that there was slight pyrexia which may be indicative of systemic involvement as previously reported (Tariq 2014).

As mastitis could affect the two halves, one half or focal area of the udder (Al Salihi 2018), in the present case, only a lateral focal portion of the udder was affected while the teat was intact. This determined the therapeutic approach used. Unlike the usual mastectomy management of gangrenous mastitis where the whole or large portion of the udder is affected including the teat (Jibril et al. 2020), the case at hand was managed as open wound following mechanical debridement, thorough lavaging with hydropressure, systemic antibiosis, daily dressing and application of oxytetracycline spray. This therapy was adopted as opposed to unilateral mastectomy since only a focal area was affected while the teat was intact, and thought could still be productive in subsequent lactation. The condition resolved completely after 38 days of consistent follow-up of daily dressing while the teat was spared. Similar successful conservative management has been reported using the same approach of debriding and systemic and topical antibiosis in Beetal goat (Tariq 2014) and RSG (Pilau et al. 2011).

Many microorganisms have been isolated from mastitic udder, the most prominent and constantly isolated bacteria in cases of small ruminants is *S. aureus* (Abubakar et al. 2020) and was the same isolated from the current case. Streptomycin and oxytetracycline were among the antibiotics the isolated *S. aureus* were susceptible to, hence the reason why the antibiotics were not changed after the result of the microbial culture and sensitivity was received. Inability to carry out Mycoplasma and fungal isolations is a limitation of this report as we could not ascertain whether the S. aureus isolated was either the primary or secondary aetiologic agent. However, the daily progress in the wound healing showed that the antibiosis was effective and causative agents other than bacteria were not likely involved.

In ruminants, the predominant circulating white blood cells are lymphocytes (Alimi et al. 2020), but in the presence of infection, either local or systemic like mastitis, there is neutrophilic leucocytosis as previously reported (Abubakar et al. 2020) and was observed in this case. Furthermore, the severe intralobular and interlobular necrosis with multiple foci of gram-positive cocci observed in this case is the usual histopathologic feature of acute gangrenous mastitis that has been previously reported (Garba et al. 2019). In the management, we did not institute any therapy against the scanty Eimeria oocyst reported from the parasitology report because this level is required to confer constant immunity against coccidiosis (Chartier and Paraud 2012).

Conclusion

This approach of management was successful for the case handled and can be adopted subsequently for similar cases where only a portion of the udder half is affected, and the teat is intact. The outcome of this management has a better advantage over mastectomy approach as it will not greatly affect the market value post-management if the farmer considers culling the doe.

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Conflict of Interest

The authors do not have any conflict of interest.

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Authors Contribution

AAA, AOA and ASY, managed the case at the clinic. SB and FML collected and process the laboratory samples taken for confirmatory diagnosis. MSA conducted the

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histopathology and interpretation of the slides. ZSA, AA, EIO an, SOA produced the initial manuscript draft. All authors revised and granted approval for the final draft submission to the journal.

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