



Case Report

Unilateral mastectomy as an alternative treatment for gangrenous mastitis in a Saanen goat



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Abstract A four-year-old Saanen goat, weighing 52 kg, was referred to the Department of Obstetrics and Gynaecology clinic with black discoloration of the left mammary gland. The goat's general condition was not good upon initial examination. The goat was anorexic, lethargic, and febrile (rectal temperature of 40 °C) with a palpably cold left mammary gland on which there was an accumulation of pus. Somatic cell count (SCC) was measured as 820,000/ml in the milk sample collected from the infected gland, and *Staphylococcus aureus* was isolated. Gangrenous mastitis was diagnosed on the left mammary gland of the goat based on the clinical findings. To treat the condition, a unilateral mastectomy was performed successfully. The goat was fully recovered a week after surgery. This case aimed to establish a surgical approach of unilateral mastectomy as a treatment option for goats with gangrenous mastitis while allowing the other mammary gland to continue lactation. Thus, it can be concluded that unilateral mastectomy is a viable alternative treatment of goats with gangrenous mastitis.

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1. Introduction

Caprine mastitis is a very serious and important problem in goat breeding which may lead to a decline in the overall health [1,2]. Although various pathogens may lead to the onset of this disease, predisposing factors may also play a major role. Predisposing factors include poor management and hygiene,

including conditions related to mountainous environment as well as faulty or irregular milking of the animals leading to teat injuries, and the narrowing of the teat canal and teat [1–5]. Gangrene of a mammary gland was observed following acute mastitis in a previous report [6]. One of the most important causative agents in subclinical, chronic, and acute caprine mastitis is *Staphylococcus aureus*. However, a combined infection of *S. aureus*, *Clostridium perfringens*, and *Escherichia coli* in a Boer goat with gangrenous mastitis has been reported [7]. Additionally, *Corynebacterium* sp., *coagulase-negative Staphylococcus*, *Enterococcus faecalis*, and *Staphylococcus* sp. were also reported to be isolated from goats with gangrenous

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mastitis [8], but *S. aureus* is responsible for a more severe form of the disease [9]. This case aimed to establish the surgical approach of unilateral mastectomy as a treatment option for goats with gangrenous mastitis, while allowing the other mammary gland to continue lactation.

1.1. Case history and clinical findings

A four-year-old Saanen goat, weighing 52 kg, was referred to the Department of Obstetrics and Gynaecology clinic with 1-month complaint of black discoloration of the left mammary gland. The goat had undergone parturition 40 days prior to presentation. Physical examination revealed an elevated rectal temperature, anorexia, dyspnea, and reluctance to walk. The left mammary gland was black with a purulent lesion and was cold on palpation (Fig. 1). Also, a hemorrhagic purulent discharge was present during milking.

2. California mastitis test evaluation and scoring

California mastitis test (CMT) solution (DeLaval, Cardiff, UK), consisting of 3% sodium lauryl sulfate and bromocresol, was mixed in equal amounts with the collected milk sample. CMTs were scored as follows: 0 = no reaction, (+) = weak positive, (++) = distinct positive, and (+++) = strong positive.

2.1. Somatic cell count

SCC was measured using a Fossomatic 90 instrument (Foss Electric, Hillerod, Denmark) following a 40 °C heat treatment for 15 min [10].

2.2. Microbiological examination

A milk sample collected from the infected gland was sent to the microbiology department for examination and antimicrobial



Fig. 1 Gangrenous mastitis in the left mammary gland of a Saanen goat.

agent selection. Microorganisms were isolated and identified based on macroscopic and microscopic morphology determined by Gram staining, culture characteristics, and biochemical features [11]. *In vitro* susceptibility tests, were performed on the isolate, according to the guidelines from the Clinical and Laboratory Standards Institute (CLSI), in order to select the most effective antimicrobial agent. Bacterial resistance was determined by the measurement of inhibition of growth around the antimicrobial disks according to the zone diameter interpretative standards of the CLSI [12]. Antibiotic susceptibility test results are shown in Table 1.

3. Pre-treatment and surgical excision

The goat had not received any medication previously. Milk samples were collected immediately from both mammary glands for CMT and SCC evaluation. The left mammary gland's CMT score was recorded as (+++); the right mammary gland's score was 0 (no reaction) and was designated as healthy. The SCC was found to be 820,000/ml in the sample collected from the left mammary gland, and < 250,000/ml in the sample from the healthy gland. All milk samples were aseptically collected and sent to the microbiology department for microbial examination. The isolate from the infected mammary gland's milk sample was identified as *S. aureus* based on observations of its cultural and biochemical properties, including coagulase activity [11]. No bacteria were isolated from the other mammary gland, classifying it as healthy. Gangrenous mastitis was diagnosed on the left mammary gland according to the clinical symptoms, increased SCC, and bacterial culture results. Initially, the goat's general condition was restored by administration of non-steroidal anti-inflammatory drugs (NSAIDs), an antibiotic, vitamins (vitamin B and vitamin C combination), and Lactated Ringer's solution for one week. Antibiotic teat infusions were also used but proved ineffective. A decision was made to perform a unilateral mastectomy of the infected mammary gland. Food and water were withheld from the animal for 12 h prior to surgery. Fifty µg/kg xylazine hydrochloride (Rompun, Bayer, Turkey) intramuscularly for sedation and 5 mg/kg ketamine hydrochloride (Ketalar, Abbott Laboratuvarı A.Ş., Turkey) was administered intravenously for general anesthesia. Subsequently the

Table 1 Antibiotic selection and susceptibility test results.

Antibiotic selection	S/R*
Cefoperazone	S
Cephalothin	R
Ampicillin/sulbactam	R
Ampicillin	R
Amoxicillin/clavulanic acid	S
Amoxicillin	R
Trimethoprim/sulfamethoxazole	R
Penicillin G	R
Neomycin	R
Enrofloxacin	R
Erythromycin	R
Ceftiofur	R
Tetracycline	R
Oxacillin	S

* S = susceptible; R = resistant.

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