Mastitis in Goats – Diagnosis and Management

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ABSTRACT
The present study was carried out in 32 goats over a period of 10 months that were presented with the history and signs related to abnormalities of udder, milk composition and other general signs and milk samples were collected from each affected udder lobe in a sterile container and subjected to cultural and antibiogram studies. Samples were revealed that Staphylococcus, E. coli, and Pseudomonas were the common bacterial organisms responsible for Caprine Clinical Mastitis and Amoxycillin- Clavulanic Acid was highly effective antibiotic in treating such cases.

Key words: Goats, Milk, Staphylococcus, E. coli, and Pseudomonas, Amoxycillin.

INTRODUCTION
Mastitis refers to inflammation of the mammary glands, regardless of the cause, which is accompanied by abnormal alterations in physical, chemical and bacteriological composition of milk or clots, flakes, or watery milk. It is a multiple etiological disease complex, being most prevalent in high yielding dairy cattle, buffaloes, goats and sheep throughout the world. Mastitis in goats is mainly of sub-clinical type which causes reduced milk yield, kid mortality and is responsible for major economic losses caused by a wide range of microorganisms, but most cases are reported to be due to staphylococci infection. Further, goat rearing mostly local breed is a common livelihood for most of the poor in Hyderabad, even though, the prestigious breed Jamunapari is also been reared as a status symbol by the other group. Though sufficient work was done on mastitis in cattle, published reports on caprine mastitis is dearth in India. Hence, the present study was designed to investigate the isolation of major bacterial pathogens responsible for Clinical Caprine Mastitis and their sensitivity to different antibiotics.

MATERIALS AND METHODS
The present study was carried out in 32 goats over a period of 10 months that were presented with the history and signs related to abnormalities of udder, milk composition and other general signs like reduced appetite, generalized weakness to Veterinary Hospital Mailardevpally, College of Veterinary Science, Hyderabad.

A minimum of 5 ml milk sample was collected from each affected udder lobe in a sterile container, after cleaning the teat with denatured 90% ethanol and discarding the first few milk drops.
Samples were subjected to cultural and antibiogram studies to identify the possible etiology and affective antimicrobial agent.

**Cultural Assay:**
Within 24 hrs of collection, the samples were plated onto the nutrient agar, MacConkey agar and Eosin Methylene Blue agar (Hi-Media, Mumbai, India) and incubated aerobically at 37°C for 24 h. The isolated colonies were again plated on to nutrient agar plates as pure culture and subjected to standard morphological, biochemical tests as described by Cowan and Steel⁴ to ascertain their identity and to observe the colony morphology (shape, size, surface texture, edge and elevation, colour, opacity etc). The organisms showing characteristic colony morphology were repeatedly sub cultured onto selective media until the pure culture with homogenous colonies were obtained. Selective media like EMB agar, Mac Conkey agar and Mannitol salt agar (HiMedia, India) were used for isolation of different organisms on the said media. The culture was subjected for invitro antibiotic sensitivity test by disc diffusion technique as described by Bauer et al.⁴. However, the affected goats were treated with Amoxicillin and Dicloxacillin @ 20 mg/kg, Meloxicam and other supportive drugs for 5-7 days to avoid further deterioration of the udder.

**RESULTS AND DISCUSSION**
In the present study almost all the goats revealed similar manifestations viz., moderate to severe swelling of udder/quarter, with abnormal consistency of milk. Affected goats were exhibiting pain on palpation of affected quarter. Further, palpation of quarters also revealed hot, hard fibrotic mass and few were soft and friable in consistency (fig. 1). Whereas, few of the affected quarters were cold to touch with bluish discoloration of skin (fig. 2) with necrotized lesions at the tip of the teats. Watery milk with or without clots and flakey/occasional pus (fig. 3) and blood tinged (fig. 4) were the common abnormalities noticed with milk from the affected goats. Microbiological assay of the affected milk samples revealed *Staphylococcal* isolates on MSA (fig. 5), *Escherichia coli* colonies on Mac Conkey agar (fig. 6) and metallic sheen on EMB agar (fig. 7). Microorganisms isolated were identified based on macroscopic morphology on selective media. The in vitro antibiogram of milk samples revealed susceptibility to Amoxicillin-Clavulanic acid (+++), Amoxicillin (++), Ceftriaxone (+++) and Amikacin (+), Enrofloxacin (++), Gentamicin (+), Kanamycin (+) and Tetracycline (+). Out of 32 samples collected from affected goats, 12 (37.5 %) were found positive for *Staphylococcus* sps., 07 (22%) for *Escherichia coli*, 06 (19%) for *Pseudomonas* sps and the rest for mixed bacterial infection. Şükür and Bergonier and Berthelot⁴ documented that *Staphylococci* as the common pathogens that were isolated from collected milk samples and whereas, Tufani *et al.*¹³ reported that *Staphylococcus aureus*, *Escherichia coli* and *Streptococcus* spp were the microorganisms isolated from the affected milk samples of the caprine mastitis. Olechnowicz and Jaśkowski⁹, recorded that *Staphylococcus aureus* is considered as the most common causal agent of goat mastitis, which is followed by a minor occurrence of mastitis by *Pasteurella haemolytica*, *Escherichia coli*, *Clostridium perfringens*, *Streptococcus*, *Pseudomonas* and *Nocardia* genera. Ajuwape *et al.*¹ documented that the coagulase-negative *Staphylococci* (*Staphylococcus epidermidis*) was the most common pathogen with an incidence of 50.9%; followed by *Escherichia coli* (15.1%). The findings of the present study are in agreement with the above authors. Further, Najeeb *et al.*¹⁰ reported highest percent of *Staphylococcus aureus* (61.64%) followed by *E. coli* (10.96%). Similarly, *Staphylococcus aureus* had been reported most frequent etiological agent (45.34%) in cases of dairy goat mastitis⁷.

In the present study all the affected goats were treated parenterally with Amoxicillin and Dicloxicillin 20 mg/kg, isoflud 2-3 ml, Tribivet, 2-3 ml and Mastilep topical for 3-5 days. Following therapy the clinical improvement *viz.,* reduced
inflammatory signs and flakes/clots in milk were recorded among 18/32 cases. The animals started to take feed and water and started to walk few steps following therapy. As the remaining 14/32 cases that were refractory for the above antibiotic, were managed with respective antibiotic based on invitro antibiogram results for 3 days. However, 5/32 goats that were showing the signs of cold, friable udder tissue did not show any improvement and the affected quarters became completely gangrenous. These teats gradually sloughed off. The present findings are in accordance with Radostits et al., who opined that the exhaustive therapeutic measure alone is not effective for treatment of gangrenous mastitis unless early surgical removal of the affected quarter is undertaken, which is the only standard treatment for gangrenous mastitis in ewes. Olechnowicz and Jaśkowski concluded that the prognosis of gangrenous mastitis in goat is not favorable. Surgery may be the alternative option to save the animal, but milk production might be lost partially or completely.

CONCLUSION
From the present study it may be concluded that Staphylococcus, E. coli, and Pseudomonas were the common bacterial organisms responsible for Caprine Clinical Mastitis and Amoxycillin- Clavulanic Acid was highly effective antibiotic in treating such cases.

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