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Isolation and identification of bacterial flora and their antibiogram from Mastitic milk of goats

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Abstract

The objective of the present study was to isolate bacteria from clinical mastitic milk of goats and their antibiogram. A total of 18 milk samples from eleven goats having clinical mastitis were collected and on cultural examination 25 bacterial pathogens were isolated viz. 13/18 *Staphylococcus aureus* (72.22%) was predominant followed by 7/18 *Escherichia coli* (38.88%) and 5/18 *Klebsiella spp.* (27.77%), respectively and their antibiogram revealed 94.44 per cent sensitivity to ceftriaxone + tazobactam followed by amoxicillin + clavulanic acid (88.88%), gentamicin (61.11%), ampicillin (55.55%), enrofloxacin (44.44%) and penicillin G (33.33%), respectively.

Keywords: Mastitis, antibiogram, ceftriaxone/tazobactam.

1. Introduction

Mastitis is the major problem in dairy industry which is associated with inflammation of the mammary gland and is characterized by changes in the physical characteristics of the udder or milk (Nazifi *et al.*, 2011) [8]. Major bacteria involved in clinical and subclinical mastitis of dairy goat includes *Staphylococcus aureus*, *Escherichia coli*, *Streptococcus*, *Klebsiella* species, of which *Staphylococcus aureus* is the major pathogen (Najeeb *et al.*, 2013) [7]. However, prevalence and relative importance of different etiological agents of mastitis may differ in different geographical regions (Contreras *et al.*, 2007) [4]. Determination of drug efficacy by *in vitro* drug sensitivity testing is the vital factor for the strategic use of antimicrobial agents against mastitis pathogens to control intra-mammary infection (Andrew, 2001) [3].

2. Materials and Methods

The present investigation was carried out among eleven mastitic goats which were presented to the Veterinary Clinical Complex, College of Veterinary and Animal Science, Bikaner with the history and signs of mastitis viz. swelling on udder and abnormal milk having flakes. Clinical mastitis was assessed based on palpation of udder for severity of inflammation and milk secretions for gross abnormalities. Milk samples were collected aseptically from the affected quarters for cultural isolation and antibiogram. The antibiotic sensitivity of the whole milk sample cultures was done *in vitro* by disc diffusion method on Muller Hinton agar plates for the antibiotics discs ceftriaxone/tazobactam (CIT, 30 mcg), Amoxycillin/Clavulanic acid (AMC, 20/10 mcg), gentamicin (G 15 mcg), enrofloxacin (E 5 mcg), ampicillin (AMP 10 mcg) and penicillin G (10units).

3. Results and Discussion

The bacterial pathogens isolated from eighteen quarters of clinical mastitis in the present study were 13/18 *Staphylococcus aureus* (72.22%) was predominant followed by 7/18 *Escherichia coli* (38.88%) and 5/18 *Klebsiella spp.* (27.77%), respectively. The present results are in close association with the findings of Sharma *et al.* (1999) [11] who reported that *Staphylococcus aureus* (coagulase positive) was the predominant organism isolated from mastitis milk samples followed by *E. coli*, *Streptococcus spp.*, *Bacillus spp.*, *Corynebacterium spp.* and *Pseudomonas spp.* Whereas, Ajuwape *et al.* (2005) [11] isolated coagulase-negative *Staphylococcus* (50.9%) as predominant organism followed by *Escherichia coli* (15.1%), *Streptococcus spp.* (9.4%), *Bacillus cereus* (7.5%), *Mannheimia haemolytica* (5.7%), *Corynebacterium spp.* (5.7%) and *Klebsiella pneumoniae* (5.7%). Pal *et al.* (2011) isolated *E. coli* alone and mixed infection with *Staphylococcus aureus* and *E. coli* from per-acute and

acute gangrenous mastitis in goats. Islam *et al.* (2011) [6] isolated *Staphylococcus aureus* (36.36%) as major pathogen followed by coagulase negative *Staphylococcus* spp. (27.27%), *E. coli* (18.18%), *Streptococcus* spp. (9.09%) and unidentified gram negative bacteria (9.09%) from clinical mastitis in goats.

The another major isolate in our study was *E. coli* (38.88%). Higher prevalence of *E. coli* (30%) was reported by Ameh and Tari (2000) [2]. The higher prevalence of coliforms might be due to the unclean environment in which the goats are maintained. Quite a large number of bacterial agents are present in environment, surrounding the sheds, beddings, contaminating the fodder and water where the animals are kept. Animals contract the infection of udder from unhealthy surroundings. The environmental pathogens most commonly found are the *Streptococcus uberis*, *Streptococcus dysgalactiae*, *Streptococcus bovis*, *E. coli*, *Klebsiella* spp., *Citrobacter* spp., *Enterobacter* spp., *Pseudomonas* spp., *Serratia* spp., *Proteus* spp. (Radostitis *et al.*, 2009). Analysis of the isolation pattern during the present study revealed that the predominant organism was *Staphylococcus* spp. followed by *Escherichia coli* and *Klebsiella* spp. The fact that the variation in the isolation of organisms causing mastitis may be a result of differences existing in the agro-climatic zones favouring the endemicity of a particular bacterial agent in a particular area supported by the local husbandry practices and the kind of mastitis treatment practices prevailing in that particular area. The etiological agents that cause mastitis vary widely within the population depending on the managemental practices and geographical area. In the present study, out of 18 quarter milk samples, seven were *E. coli* and five were *Klebsiella* isolates which were found to be the environmental pathogens. Out of seven *E. coli*, five were found in goats which were during their early stage of lactation. Similarly, three out of five *Klebsiella* isolates were found in goats during their early stage of lactation. Most new infections occur during the early part of the dry period and in the first two months of lactation, especially with the environmental pathogens (Radostitis *et al.*, 2009). The antibiogram of 18 whole milk cultures revealed 94.44 per cent sensitivity to ceftriaxone/tazobactam followed by amoxicillin/clavulanic acid (88.88%), gentamicin (61.11%), ampicillin (55.55%), enrofloxacin (44.44%) and penicillin G (33.33%), respectively.

The sensitivity pattern recorded in the present study is in close accordance with Sreeja *et al.* (2013) [12] who recorded overall sensitivity of isolated microbes from mastitic milk was 97% to ceftriaxone/tazobactam. The higher sensitivity to ceftriaxone/tazobactam and amoxicillin/clavulanic acid in the present study could be due to very rare use of these antibiotics in the treatment of mastitis (Ghose and Sharda, 2003). The difference in sensitivity patterns of microbes to various antimicrobials observed could be ascribed to ecological reasons, seasonal variations, unidentical microbial pattern, multiple drug resistance and area specificity.

4. Conclusion

In the present study total of 25 bacteria were isolated from 18 milk samples that were collected aseptically from the affected quarters of which 13/18 *Staphylococcus aureus* (72.22%) was predominant followed by 7/18 *Escherichia coli* (38.88%) and 5/18 *Klebsiella* spp. (27.77%) and the isolates showed highest sensitivity of 94.44 per cent to ceftriaxone/ tazobactam.

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