SHORT COMMUNICATION

Studies on Antibiotic Sensitivity Pattern of Bacterial Isolates from Subclinical Mastitis of Sirohi Goats

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Abstract

Milk samples of 100 udder halves from 50 apparently healthy Sirohi goats were collected aseptically and subjected to bacteriological culture examination to determine the prevalence of subclinical mastitis, type of bacterial isolates and their antibiotic sensitivity pattern. The prevalence of subclinical mastitis was found to be 34 % by cultural examination of milk samples. In subclinical mastitic milk samples, Staphylococci was found most prevalent organism (37.50 %) followed by Streptococci (28.12 %), *E. coli* (18.75 %), Bacilli (9.37 %) and *Corynebacterium* Spp. (6.25 %). The antibiotic sensitivity pattern showed that the isolated bacteria were highly sensitive to amoxycillin-sulbactam, cefuroxime, chloramphenicol, and ciprofloxacin.

Keywords: Antibiotic sensitivity pattern, Culture examination, Sirohi goats, Subclinical mastitis.

Ind J Vet Sci and Biotech (2020): 10.21887/ijvsbt.16.(2,3,&4).22

Introduction

Sirohi is one of the important goat breeds and is mostly distributed in southern part of Rajasthan, *i.e.,* outline areas of Arawali hills in Rajasthan. Sirohi is a compact to medium sized, dual purpose goat breed. Demand for Sirohi goats all over the country is increasing due to good production performance, hardiness and disease resistance (Sharma *et al*., 2019). It has ability to withstand harsh climatic conditions and adapting tendency to various climatic conditions.

Diseases of the mammary glands have always proved a bottle neck in dairy goat rearing (Gebrewahid *et al*., 2012). Subclinical mastitis denotes absence of apparent gross abnormalities in the mammary gland but presence of chemical and bacteriological changes in the milk (Sharma *et al*., 2004). Goat has chances of high bacterial infection rate in mammary gland due to its pendulous udder. Antibiotic sensitivity pattern of bacterial isolates pave the way in suggesting the treatment and the control of subclinical mastitis. It aids the physician to go for a direct approach of treatment with drug to which bacteria are highly susceptible (Sharma *et al*., 2005). Thus, looking to the importance of subclinical mastitis, the present investigation was undertaken to determine the prevalence of subclinical mastitis in Sirohi goats, and the antibiotic sensitivity pattern of bacterial isolates.

Materials and Methods

In the present investigation, total 100 milk samples from 50 apparently healthy Sirohi goats were collected aseptically. The milk samples were subjected to cultural examination and antibiotic sensitivity of the bacterial isolates. Each milk sample was screened for the presence of aerobic bacteria by cultivation, isolation and identification using standard procedures as described by Cowan and Steel (1975).

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How to cite this article: Sharma, S.K., Meena, H.K., Joshi, M. (2020). Studies on Antibiotic Sensitivity Pattern of Bacterial Isolates from Subclinical Mastitis of Sirohi Goats. Ind J Vet Sci and Biotech, 16(2,3,&4): 95-97.

Source of support: Nil

Conflict of interest: None.

Submitted: 21/07/2020 **Accepted:** 12/11/2020 **Published:** 25/12/2020

Antibiotic sensitivity pattern of the bacterial isolates was determined as described by Bauer *et al.* (1966) using disc diffusion method. Total eight automatic dispensing antibiotic discs were used for determination of antibiogram of the bacterial isolates, *viz.,* Amoxycillin-sulbactam (10 µg), Ceftriaxone (30 µg), Gentamicin (10 µg), Cefuroxime (30 µg), Chloramphenicol (30 µg) Ciprofloxacin (5 µg), Cefoperazone (75 µg) and Tetracycline (30 µg). The data was analysed using statistical method described by Snedecor and Cochran (1994).

Results and Discussion

The prevalence of subclinical mastitis was found to be 34 % (34/100 quarters) by bacterial cultural examination. In subclinical mastitic milk samples, Staphylococci was found

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most prevalent organism (37.50 %) followed by Streptococci (28.12 %), *E. coli* (18.75 %), Bacilli (9.37 %) and *Corynebacterium* Spp. (6.25 %).

Results of *in vitro* antibiotic sensitivity of different bacterial isolates from subclinical mastitic milk samples in Sirohi goats have been presented in Table 1 and 2.

Among total 12 staphylococci isolates tested, all the isolates (100 %) were found sensitive to cefuroxime, chloramphenicol and cefoperazone, followed by 91.66, 83.33, 66.66, 58.33 and 58.33 % sensitivity to amoxycillin-sulbactam, ciprofloxacin, ceftriaxone, gentamicin and tetracycline, respectively. Resistance response of staphylococci to antibiotics was observed as 41.66, 41.66 and 8.33 % for tetracycline, gentamicin and ceftriaxone, respectively.

Nine isolates of streptococci were 100 % sensitive to amoxycillin-sulbactam, cefuroxime and cefoperazone followed by chloramphenicol (77.77 %), ciprofloxacin (77.77 %), gentamicin (66.66 %), ceftriaxone (66.66 %) and tetracycline (33.33 %). Resistance effect of streptococci on antibiotics was observed as 44.44 % to tetracycline and 11.11 % for ciprofloxacin and gentamicin each (Table 1).

All six isolates of *E. coli* were 100 % sensitive to amoxycillin-sulbactam, cefuroxime, chloramphenicol, cefoperazone, ciprofloxacin, gentamicin followed by ceftriaxone and tetracycline (66.66 % each). Resistance effect of *E. coli* on antibiotics was observed as 33.33 % each to tetracycline and ceftriaxone.

Three isolates of bacilli were 100 % sensitive to amoxycillin-sulbactam, cefuroxime and cefoperazone followed by chloramphenicol (66.66 %), ciprofloxacin (66.66 %), gentamicin (33.33 %), ceftriaxone (66.66 %) and tetracycline (33.33 %). Resistance effect of bacilli on antibiotics was observed as 66.66 and 33.33 % to tetracycline and gentamicin, respectively.

Two isolates of *Corynebacterium* spp. were 100 % sensitive to amoxycillin-sulbactam, chloramphenicol, cefoperazone and ciprofloxacin followed by cefuroxime, gentamicin, ceftriaxone and tetracycline (50.00 % each). Resistance effect of *Corynebacterium* spp. was observed as 50 % each to tetracycline and gentamicin.

In the present study overall highest sensitivity of bacterial isolates was for cefoperazone (100 %) followed by amoxycillin-sulbactam and cefuroxime (96.87 % each), chloramphenicol

Table 1: Antibiotic sensitivity of microorganisms isolated from subclinical mastitic milk samples from Sirohi goats

Sr. No.	*Antibiotic*	*Response of antibiotic*	*Staphylococci (12)*	*Streptococci (9)*	*E. coli (6)*	*Bacillus (3)*	*Corynebacterium (2)*
1.	Amoxycillin-sulbactam	Sensitive	11 (91.66)	9 (100)	6 (100)	3 (100)	2 (100)
		Intermediate	1 (8.33)	-	-	-	-
		Resistant	-	-	-	-	-
2.	Cefuroxime	Sensitive	12 (100)	9 (100)	6 (100)	3 (100)	1 (50.00)
		Intermediate	-	-	-	-	1 (50.00)
		Resistant	-	-	-	-	-
3.	Chloramphenicol	Sensitive	12 (100)	7 (77.77)	6 (100)	2 (66.66)	2 (100)
		Intermediate	-	1 (11.11)	-	1 (33.33)	-
		Resistant	-	-	-	-	-
4.	Cefoperazone	Sensitive	12 (100)	9 (100)	6 (100)	3 (100)	2 (100)
		Intermediate	-	-	-	-	-
		Resistant	-	-	-	-	-
5.	Ciprofloxacin	Sensitive	10 (83.33)	7 (77.77)	6 (100)	2 (66.66)	2 (100)
		Intermediate	1 (8.33)	-	-	1 (33.33)	-
		Resistant	1 (8.33)	1 (11.11)	-	-	-
6.	Gentamicin	Sensitive	7 (58.33)	6 (66.66)	6 (100)	1 (33.33)	1 (50.00)
		Intermediate	-	1 (11.11)	-	1 (33.33)	-
		Resistant	5 (41.66)	1 (11.11)	-	1 (33.33)	1 (50.00)
7.	Ceftriaxone	Sensitive	8 (66.66)	6 (66.66)	4 (66.66)	2 (66.66)	1 (50.00)
		Intermediate-	3 (25.00)	2 (22.22)	-	1 (33.33)	1 (50.00)
		Resistant	1 (8.33)	-	2 (33.33)	-	-
8.	Tetracycline	Sensitive	7 (58.33)	3 (33.33)	4 (66.66)	1 (33.33)	1 (50.00)
		Intermediate	-	1 (11.11)	-	-	-
		Resistant	5 (41.66)	4 (44.44)	2 (33.33)	2 (66.66)	1 (50.00)

Table 2: Overall sensitivity of different antibiotics in the isolated bacteria

S. No.	*Antibiotic*	*Sensitivity (%)*
1.	Amoxicillin-Sulbactam	96.87
2.	Cefuroxime	96.87
3.	Chloramphenicol	90.62
4.	Cefoperazone	100.00
5.	Ciprofloxacin	84.37
6.	Gentamicin	65.62
7.	Ceftriaxone	65.62
8.	Tetracycline	50.00

(90.62 %), ciprofloxacin (84.37 %), ceftriaxone and gentamicin (65.62 % each) and tetracycline (50 %) (Table 2). Similar findings were reported by Chahar *et al*. (2001) and Mishra *et al*. (2018). The refractoriness of certain bacterial isolates to a particular antibiotic may be due to indiscriminate use of antibiotic therapy and involvement of large number of pathogenic bacteria.

Acknowledgement

We thank the Dean, Veterinary College, Navania, Udaipur and RAJUVAS, Bikaner authorities for support and facilities provided.

References

Bauer, A.W., Kirby, W.M.M., Sherris, J.C., & Turek (1996). Antibiotics susceptibility testing by a standardised single disc method. *American Journal Clinical Pathology,* 45, 493-496.

Chahar, A., Gahlot, A.K., & Tanwar, R.K. (2001). Microbial and drug sensitivity pattern in clinical cases of mastitis in cattle. *Veterinary Practitioner,* 3, 29-32.

Cowan, S.T., & Steel, K.J. (1975). Manual for the Identification of Medical Bacteria. Cambridge University Press, Cambridge.

Gebrewahid, T.T., Abera, B.H., & Menghistu, H.T. (2012). Prevalence and etiology of subclinical mastitis in small ruminants of Tigray Regional State, North Ethiopia*, Veterinary World,* 5(2), 103-109.

Mishra, A.K., Sharma, N., Singh, D.D., & Gururaj, K. (2018). Prevalence and bacterial etiology of subclinical mastitis in goats reared in organized farms. *Veterinary World*, 11(1), 20.

Sharma, S.K., Tanwar, R.K., Gahlot, A.K., & Joshi Monika (2004). Diagnosis of subclinical mastitis in goats. *Veterinary Practitioner*, **5**(2), 107-108.

Sharma, S.K., Tanwar, R.K., Gahlot, A.K., & Joshi Monika (2005). *In vitro* antibiotic sensitivity of bacterial isolates from caprine subclinical mastitis. *Veterinary Practitioner,* 6(2), 129-130.

Sharma SK, Meena Hitesh K, Joshi Monika (2019) Studies on Subclinical Mastitis in Sirohi Goats in Southern Rajasthan with Reference to Prevalence and Diagnostic Aspects. Ind.J.Vety. Sci.& Biotech 14(4), 56 -58

Snedecor, G.W., & Cochran, W.C. (1994). Statistical Methods. 8th ed. Oxford and IBH Publishing Co. New Delhi, India.