Pak. j. life soc. sci. (2004), 2(1): 73-75

Pakistan Journal of
Life and Social Sciences

Prevalence of Mastitis in Buffaloes and Antibiotics Sensitivity Profiles of Isolates

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Abstract

The present study was designed to determine the prevalence of mastitis in buffaloes and antibiotics sensitivity profiles of isolates. Milk samples collected from 50 dairy buffaloes were tested for subclinical mastitis using Surf Field Mastitis Test (SFMT) and all milk samples were processed for isolation and identification of pathogens. Antibiotics sensitivity profiles of isolates was determined by the disc diffusion method on Mueller-Hinton agar. The over all percent prevalence of sub clinical mastitis were 54/172 (27%), clinical mastitis 8/172 (4%) and blind quarters 20/172 (10%) in buffaloes recorded. Incidence was higher in hindquarters. The percentage of incidence was maximum (39.8%) in animals with the involvement of single quarter. Among the isolates, *Staphylococcus aureus* had the highest (48%) frequency. Antibiogram analysis of gentamycin, ciprofloxacin, chloramphenicol, cephalothin, sulfa-trimethoprim, amoxycilline, lincomycin, and oxytetracycline showed that each was responsive 90% to isolates. Novobiocin, erythromycin showed sensitivity between 80 to 90%. The sensitivity values for ampiclox and penicillin G were less than 80 %.

Key words: Mastitis, Antibiotics, Sensitivity

Introduction

Mastitis (the inflammation of the mammary gland) is known to be a complex and costly disease of both dairy cattle and ewes (Blosser, 1979; Radostits *et al.*, 1994). Buffaloes are the major dairy animals of Pakistan and additionally provide beef, traction and tilling power.

Total population of buffalo is 23.3 million, producing about 26284 million tons of milk and 1010 million tons of the beef annually (Anonymous, 2001). This disease is associated with a decrease in milk production, deterioration of milk quality and increased labour costs and culling (Dobbins, 1977; Blosser, 1979; Fthenakis, 1994).

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According to Ratafia (1987), annual losses caused by this disease were nearly 35 billion dollars cosmo-politically. In Pakistan, statistics of current losses due to this disease are not available, although it was estimated that in Punjab province alone, total loss of Rs 240 million per annum has been estimated to be caused by the clinical form of this disease (Chaudhry and Khan, 1978). Subclinical mastitis is 3 to 40 times more common than the clinical mastitis and causes great losses in the dairy herds (Jasper et at., 1982). It is one of the most important reasons for termination of lactation and involuntary culling of dairy buffaloes (McDowell et al., 1995). The proposed study was, planned to: (a) study the prevalence of mastitis in buffaloes, and (b) the Antibiotic susceptibility profiles of isolated bacteria.

Materials and Methods

Milk samples of 50 buffaloes were aseptically collected from Livestock Experimental station, Department of livestock Management (16) and field (34) at random (Ayub Agriculture Research Institute and NIAB). The prevalence of mastitis in subclinically infected buffaloes was diagnosed by using SFMT as described by Muhammad *et al.* (1995), Rehman, (1995) and by bacteriological examination of milk samples while milk samples from clinically infected quarters were directly processed for bacterial isolation as described by National Mastitis Council Inc., (1987).

Antimicrobial Susceptibility Testing of Bacterial Isolates:

The procedure adopted was as described by National Mastitis Council Inc., (1987). The susceptibility of 62 bacterial isolates from buffaloes milk samples were tested to 12 different antibiotics by a disc diffusion method on Mueller-Hinton medium, according to the guidelines of National Committee for Clinical Laboratory Standards (1990). For *Streptococci* the medium used was enriched with 5 percent sheep blood. The plates were incubated at 37°C for 24 hours and the inhibition zones were measured with Anti-bacterial zone gauge. Prevalence of mastitis in buffaloes on the basis of Surf Field Mastitis Test and microbiological examination of milk samples were tabulated.

Results and Discussion

In the present study, total number of quarters affected with sub clinical mastitis were 54 (out of 200) as shown in table 1, out of 54, 8 (14.8%) in right fore, 16 (29.6%) in right hind, 10 (18.5%) in left fore and 20 (37%) in left hind were recorded as reported by Saini *et al.,* (1994). So there was higher incidence in hindquarters than forequarters and among hindquarters, left hindquarters were found to be more susceptible as also reported by Saini *et al.,* (1994).

The higher incidence of clinical mastitis in hindquarters was also recorded. The total number of quarters affected with clinical mastitis were 8 as shown in table 1, out of these 1 (12.5%) in right fore, 2 (25%)in right hind, 1 (12.5%) in left fore and 4 (50%) in left hind quarters were recorded as also reported by Didonet et al., (1986).

The incidence of blind quarters was more in hindquarters than fore quarters. Total number of blind quarters were 20 as shown in table 1, out of these 1 (5%) in right fore, 9 (45%) in right hind, 3 (15%) in left fore and 7 (35%) in left hind quarters were recorded as also described by Langoni and Domingues (1998).

The major pathogens isolated from milk samples were *Staphylococcus aureus* 28 (45%), *Streptococcus spp*. 14 (23%), *Escherichia coli* 11 (18%) and *Bacillus spp*. 9 (14%) shown in table 2. as found by Rehman (1995).

Antibiogram profile using 12 different antibiotics showed that, gentamycin (100%), ciprofloxacin (97.1%), chloramphenicol (91.3%), cephalothin (95.7%), sulfa-trimethoprim (94.4%), amoxycilline (88.4%), lincomycin (94.2%), oxytetracycline (88.4%), novobiocin (86%), erythromycin (93%), ampiclox (49.2%), penicillin G (45%) sensitivity for *Staphylococcus aureus* as shown in table 3 which is closely related to as reported *by* Chanda *et al*., (1989).

Sensitivity of *Streptococcus spp*. to gentamycin (100%), ciprofloxacin (100%), chloramphenicol (100%), cephalothin (97.4%), sulfa-trimethoprim (95%),amoxycilline (89.7%), lincomycin (95%), oxytetracycline (97.4%), novobiocin (92.3%), erythromycin (92.3%), ampiclox (95%), penicillin G (95%) as shown in table 3. Rehman (1995) also observed a similar pattern of sensitivity.

E.coli were sensitive to gentamycin (100%), ciprofloxacin (93.3%), chloramphenicol (100%), cephalothin (95.5%), sulfa-trimethoprim (100%), amoxycilline (100%), lincomycin (91%), oxytetracycline (95.4%), novobiocin (73%), erythromycin (45.4%), ampiclox (86.3%). All isolates of this species were resistant to penicillin G as shown in Table 3. Rehman; 1995 also observed same sensitivity of E.coli.

Bacillus species were invariably sensitive to penicillin G, erythromycin, oxytetracycline, chloramphenicol, cephalothin, novobiocin, lincomycin, ceprofloxacin and gentamycin. These organisms showed less sensitivity to amoxycilline (93.3%), ampiclox (80%), sulfa-trimethoprim (80%) as shown in table 3. Rehman (1995) also found that *Bacillus spp*. were invariably sensitive to these antibiotics.

It was concluded from present study that incidence of clinical and subclinical mastitis was higher in hindquarters than forequarters and among hindquarters, left hindquarters were more susceptible. In case of antibiotic sensitivity the possible best antibiotics were gentamycin, cephalothin, and ciprofloxacin *In vitro*. From the future study point of view it is recommended that the regular testing for subclinical mastitis should be performed to reduce the economical losses and above tested antibiotics can be evaluated in vivo.

Table 1: Percentage of different Quarters affected with Mastitis

Quarters Studied	Type of Mastitis	Total affected Quarters	Involvement of the Quarters							
			Right Fore		Right Hind		Left Fore		Left Hind	
			No.	%	No.	%	No.	%		%
200	Sub clinical	54	8	14.8	16	29.6	10	18.5	20	37
	Clinical	8	1	12.5	2	25	1	12.5	4	50
	Blind Quarters	20	1	5	9	45	3	15	7	35

Table 2: Quarter wise (n=200) prevalence of different microorganism in (buffaloes) milk samples

Organisms	Right Hind	Left Hind	Right Fore	Left Fore	Total	% age
Staphylococcus aureus	9	13	4	2	28	45
Streptococcus spp.	5	5	2	2	14	23
E. coli	3	5	2	1	11	18
Bacillus spp.	3	4	1	1	9	14
Total	20	27	9	6	62	100

Table 3: *In vitro* sensitivity of different microorganisms to different antibiotics

Antibiotics	*Staphylococcus aureus*	Streptococcus spp.	*E. coli*	Bacillus spp.
Gentamycin	100	100	100	100
Ceprofloxacin	97.1	100	100	93.3
Chloramphenicol	91.3	100	100	100
Cephalothin	95.7	97.4	95.5	100
Sulph-trim.	94.4	95	100	80
Amoxycillin	88.4	89.7	100	93.3
Lincomycin	94.2	95	91	73.3
Oxytetracycline	88.4	97.4	95.4	93.3
Novobiocin	86	92.3	73	93.3
Erythromycin	93	92.3	45.4	67
Ampiclox	49.2	95	86.3	80
Pencillin G	45	95		93.3

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