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BACTERIAL CAUSES AND ANTIBIOGRAM OF MASTITIS IN DAIRY FRIESIAN COWS AT ASSIUT GOVERNORATE

(With 2 Tables and One Figure)

By

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الأسباب البكتريه وحساسيتها للمضادات الحيويه لحالات التهابات الضرع فى الأبقارالفريزيان الحلابه بمحافظة أسيوط

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إشتملت هذه الدراسه على ٣٦ بقره فريزيان حلابه تعانى من حالات التهابات شديده بالضرع وقد لوحظ أن الميكروب القولونى والمكور السبحى اوبرز والكيبسيلا والكورينى بكتريم بوفيز من الأسباب الرئيسيه للإصابه الكليه وأن نسب عزلهم تراوحت بين ٦ر٤١٪ ،٢ر٢٢٪ ، ٢ر٢٢٪ ، ٩ر١٣٪ على التوالى. كما وجد أن أعلى نسبة إصابه بالميكروبين القولونى والمكور السبحى اوبرز تكون خلال الشهر الأول من موسم الحليب بينما تزايدت نسبة الاصابه بكل من الكليبسيلا والكورينى بكتريم بوفيز خلال الفترات من شهر إلى ثلاثة شهور وأكثر من ثلاثة شهور على التوالى. كما أوضحت الدراسه ان أعلى نسبة إصابه تكون خلال موسم الصيف وفى الفتره الأولى من الحليب. ومن خلال إجراء إختبار حساسية الميكروبات المعزوله للمضادات الحيويه المختلفه وجد أن الجينتاميسين والكناميسين هما أكثر المضادات الحيويه تأثيراً على الميكروب القولونى والمكور السبحى اوبرز والكليبسيلا والكورينى بكتريم بوفيز.

SUMMARY

This study was carried out on 36 dairy friesian cows suffered from mastitis at Assiut Governorate. E.coli, Streptococcal uberis, Kelbsiella pneumoniae and C.bovis formed the main bacterial causes of mastitis. They were isolated and identified from 41.6%, 22.2, 22.2% and 13.9% of the total infections respectively. E.coli (54.5%) and Streptococcal uberis (27.2%) were the most prevalent pathogens during the first month of lactation, while kellbsiella pneumoniae (62.5%), and Corybnebacterium bovis (66.6%) were the predominant causes from the period of 31-90 days and more than 90 days respectively, The largest percentage of intramammary infection (IMI) were

detected during the summer season (83.3%), and early stage of lactation (61.1%). Antibiogram study revealed that gentamycin, and kanamycin had highly inhibitory effect on isolated strains of E.coli, Streptococcal uberis, Kelbsiella and pneumoniae C.bovis.

Keywords: *Bacteria - mastitis - Friesian cows.*

INTRODUCTION

Bovine mastitis is considered to be one of the most important destructive disease producing abnormal milk and monetary losses to dairy industry *(SCHALM et al, 1971)*. Many genera and species of pathogenic bacteria were incriminated as causal agents of severe mastitis in dairy friesian cows. Teat dipping and dry cow therapy have reduced the mastitis caused by *Staphalococcus aureus* and *Streptococcus aglactiae*, but have failed to prevent the mastitis caused by many other types of bacteria *(OZ, et al 1985)*.

E.coli, *Streptococcous uberis*, *Klebsiella pneumonia*, *Proteus*, *Pseudomonads* and *Corynebacterium bovis* are considered the main causes of bovine mastitis. Each of these bacteria, either alone or in association with others can produce severe cases of mastitis *(SMITH et al, 1985; WILESMITH, et al, 1986; SEINHORST, et al, 1991, ZAITOUN and MANNA, 1992 and MASALMEH et al, 1994)*.

Therefore, the aim of this study was of two folds:(a) isolation and identification of caustive bacterial agent(s) of mastitis at different stages of lactation in dairy friesian cows at Assiut Governorate, (b) Antibiogram for isolated strians to reach a valuble and specific treatment.

MATERIAL and METHODS

A- Animals:

This study was carried out on 36 dairy friesian mastitic cows belonging to Animal Production Development Project at Assiut Governorate. Their age ranged from 4-6 years. The clinical signs were recorded. Cows were housed in a close barn and the major componant of their bedding was saw dust. Most cases of mastitis (30 case) were appeared during summer season (from May to September). According to stage of lactation, the mastitic cows were classed into three groups: - the 1st group (22 cows) from the first day to 30 days, the 2nd group (8 cows) from 31 to 90 days and the 3 rd group (6 cows) more than 90 days.

B- Samples:

After disinfecting the teat orifice with 70% of ethyl alcohol, one milk sample was collected from each infected quarter in sterile vial with a septic precautions, and before adminstration of any treatment.

C- Bacteriological examination:

All samples were examined microbiologically by streaking a loopful of centrifuged sediment from each milk sample onto surface of MacConkey ager and blood agar containing 7.5% sheep blood and 0.1% aesculin (1g/Liter). Nutrient agar was used for antibiotic sensitivity test. All plates were observed, any growth was recorded after 24 and 48h. of incubation at 37 °C. The isolates were identified according to colony morphology and appearance, growth characteristics, hemolytic patterns, aesculin hydrolysis, lactose ferementation, microscopically by Gram stain and biochemically according to *QUINN, et al, (1994).*

Antibiotic seneitivity tests for isolates were done by using antibiotic discs (Biomerieux) of amoxicilline (25mg) ampicillin (10mg) chloramphenicol (30mg) colistine (10mg) erthromycin (15mg) garamycin (30mg) gentamycin (10mg), kanamycin (30mg). tetracycline (30mg) and tobramycine (30mg).

RESULTS

The main clinical signs were swelling, firmness of infected quarters and clots in the milk. In some cases milk became viscous, serous fluid with little or no casein or fat. Pyrexia, anorexia and diarroea appeared in 5 cases and the main cause was E.coli. In two cases milk secretions contained pus and the main isolates were Corynebacterium bovis. These signs appeared more severe in the 1st group than in 2nd and 3rd groups.

Number and percentage of different bacterial isolates in relation to the stage of lactation and antibiogram study were demonstrated in table 1 fig. 1 and tables 2 respectively.

DISCUSSION

From the results recorded in table (1) it is evident that E.coli, Streptococcus uberis, Klebsiella pneumoniae and C. bovis were the main bacterial causes of mastitis. They were isolated and identified from 41.6%, 22.2%, 22.2% and 13.9% of the total infection respectively (Table 1 and fig.1). This result agrees with that previously reported by *SMITH et al 1985 and ZAITOUN and MANAA, 1992.* These isolated strains were present in high levels in the housed cow's environment (environmental Pathogens), espicially in bedding

material. Sow dust which form the mjor componant of cow bedding in this stduy acts as primary resvior for these enviromental pathogens *(OZ, et al, 1985).*

Exposure of teat ends to environmental pathogens occurs between milkings and is not limited to milking process. Thus, Postmilking disinfection of teat ends is either less effective or inefective at reducing rate of new infection by these pathogens *(EBERHAT, et al, 1983).*

E.coli (54.5%) and Strep. uberis (27.2%) were the most prevalent pathogens in the 1st group of mastitic cows, While Klebsiella pneumoniae (62.6%) and Corynebacterium bovis (66.6%) were the main causative agents in the 2nd and 3rd groups respectively table 1 and fig.1. *DEBORAH, et al, (1991)* found that more than 75% of E.coli IMI were associated with calving and immediate post partum period. In contrast more than half of the kelbsiella IMI origenated after 60 days of lactation. Reasons for decreasing the rate of both coliform and streptococcal IMI as lactation advanced were not readily apparent, but could relate to ease of penetrability of streak canals *(MCDONALD, 1975),* changes of antibacterial factors in mammary secretions *(PAAPE et al 1981),* or quarters infected with coagulase negative staphylococci or C. bovis increasing with advancing lactation and thus reducing rate of IMI by coliform and streptococcal bacteria *(BRAMLEY, 1978).*

In this investigation it was observed that the most clinical mastitic cases were associated with summer and early stage of lactation. Similar observations were recorded by *OZ, et al, 1985 and SMITH et al 1985.* The combination of high temperature and humidity which occure during summer were likly influencing growth of coliform bacteria in bedding. However the resulting stress of this combination of temperature and humidity on high-producing dairy cows espically in early stage of lactation could have increased susceptibility to infection *(SMITH, et al, 1985).*

Results of antibiogram indicates that gentamycin and kanamycine had high inhibtory effect on E.coli, Strp. uberis, Kelbsiella pneumoniae, and Corynebacterium bovis, also Strp. uberis was highly sensitve for ampicillin and erythromycin (table 2). *MASALMEH, et al, (1994),* reported that 45% of isolated E.coli strains from mastitis herd problem were resistant ampicillin, 15% to tetracycline, 3% to kanamycin, but no one to gentamycin, also *ZAITOUN and MANAA (1992)* found that Kelbsiella pneumoniae was sensitive to cefoperazone and gentamycine. None of the isolated Streptococcal strains (Strep. uberis, Strep. agalactiae and Strep. dysagalactiae) from mastitic milk were resistant only to kanamycin or

gentamycin or both, but multiple resistance occured in combination with Streptomycin *(JAYARAO and OLIVER, 1992).*

In conclusion E.coli, Strep. uberis. and kelbsiella were the main environmental pathogens which causes severe mastitis in dairy friesian cows. So an effective control system must be applied to prevent or minimize the exposure of teat ends to these pathogens, and this occure via:- rapid and continuous removal of manure and urine from cow's enviroment. Maximizing air movement over the surface of bedding materials, floors and walking ways. Moisture in any form (urine, humidity, udder wash water) should be avoided. Change the bedding from saw dust to sand reduce the level of coliform mastitis *(OZ, et al, 1985).* A teat dip containing linear dodecyl benzen sulfuonate was more effective than any iodophor dip in reducing coliform mastitis *(BENNTT, 1982).* Lastly dairy cattle diet may alter resistance of cows to IMI. Cows with lower Vit. A had increased mastitis and cows whose diets were supplemented with vitamine E and selenium had reduced incidince of mastitis caused by environmental pathogens *(SMITH 1984).*

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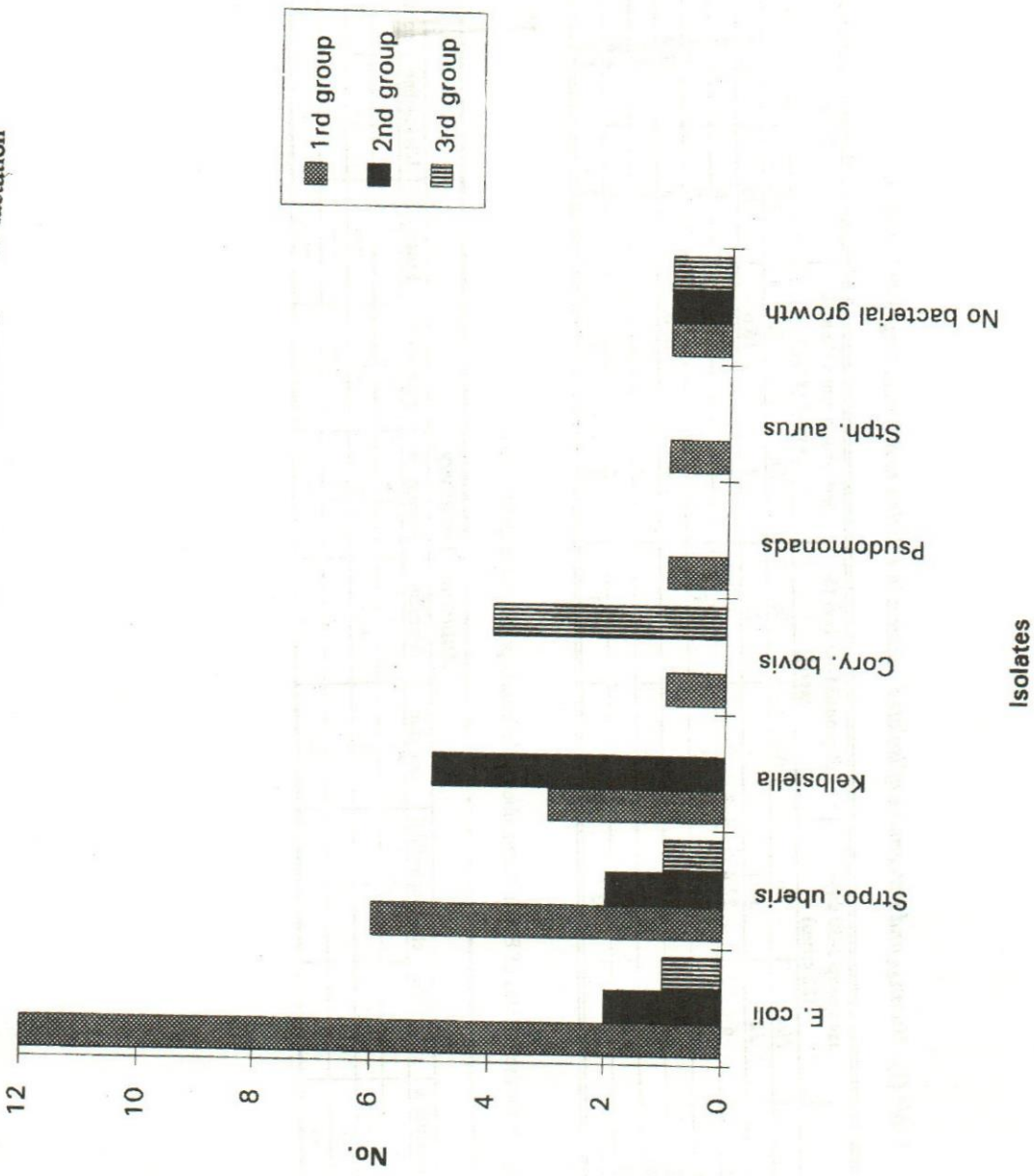

Fig(1) Number of isolated bacteria in relation to different stages of lactation

Table (1): Number and Percentage of isolated bacteria in relation to different stages of lactation.

Isolates	1st group 1-30 days (22 cases)		2nd group31-60 days (8 cases)		3rd group more than 90 days (6 cases)		Total	
	No.	%	No.	%	No.	%	No.	%
E. coli.	12	54.5	2	25	1	16.6	15	41.5
Strp. uberis.	6	27.2	2	25	1	16.6	8	22.2
Kelbsiella.	3	13.6	5	62.5	-	-	8	22.2
Cory. bovis	1	4.5	-	-	4	66.6	5	13.9
Psudomonads	1	4.5	-	-	-	-	1	2.8
Stph. aurus	1	4.5	-	-	-	-	1	2.8
No bacteial growth	1	4.5	1	12.5	1	16.6	3	8.3

Table (2) Anibiogram for the isolates of E.coli, Strep. uberis, Kelbsiella pneumoniae and C. bovis.

Isolates	Antibiotic Sensitivity									
	amoxicilline	ampicilline	choramphenicol	colistine	erthrocin	geramycin	gentamycin	kanamyci	tetracycline	tobramycin
E. Coli	-	+	++	-	+	++	+++	+++	+	++
Strep.uberis	++	+++	+	+	+++	++	+++	+++	++	++
Klebsiella pn.	-	-	++	-	-	++	+++	+++	+	++
C. bovis	++	++	-	++	+	++	+++	+++	+	++