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STUDY THE EFFECT OF CLINICAL MASTITIS CAUSED BY *staphylcoccus aureus* ON BLOOD PARAMETER OF BUFFALO IN NORTHERN OF BASRA

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ABSTRACT

Mastitis is affects the mammary gland tissue and is accompanied by chemical, physical and bacterial changes in milk. There are several bacterial pathogens that cause mastitis which differs in its effect on the glandular tissue of the udder. The current study was conducted at the Faculty of Veterinary Medicine, University of Basrah, in order to determine the effect of mastitis caused by *Staphylococcus aureus* and the extent of the disease importance events to determine the blood parameters, including the total number of red blood cells, the total number of white blood cells, hemoglobin level, and packed cell volume in infected with buffalo Mastitis in comparison to non-infected animals, which were considered a control group. A total of (75) milk samples from mastitis infected buffalo were collected from different site of northern of Basra, only twenty five isolates (33.3%) characterized as *Staphylococcus aureus* by conventional biochemical tests. The study showed a significant increase in white blood cells, and liver enzymes (AST&ALT), while significant decrease in red blood cell count as well as total cholesterol and differences were observed in total protein when compared with non-infected animals group.

Introduction

Mastitis is adiseas that effect the mammary gland tissue and is accompanied by chemical ,physical and bacterology changes in milk .companiedwithappearance of symptoms of pain, redness, heat and swelling of the as well as changes in the color and consistency of milk as well as the presence of clots (1).

There are several bacterial pathogens that cause mastitis which differs in its effect on the glandular tissue of the udder. This difference is due to the severity of the virulence of the bacteria and its secretion to many toxins. These bacteria are *Staphylococcus aureus*, *streptococcus*, and a group of Gram negative bacteria such as *Salmonella, Klepsella,* and *E. coli* (2). Mastitis is great economic importance disease because it

causes economic losses due to the sharp decrease in milk production which affects the quantity and quality of milk. In addition, the deaths of a number of calves dute feeding infected milk(3) milk losses by costs of treatment ,in addition of its effects on human health as result of drinking the infected milk and dairy products from infected animals as most of the causes of bacterial whichpathogenic to humans as well as changes in quality ((4). Mastitis of occur in several forms including severe form which was characterized by the presence of heat, , a significant decrease in milk production, in addition to an increase in somatic cells in milk and without any abnormal effects on milk or the udder itself, loss of appetite and weight loss may develop into a situation bacteremia and thus lead to the death of the animal (5).

due importance of *S. aureus* as one of the causes of milk production decrease, so our study tried to sheds light on these bacteria and the extent of the disease importance events and determine the standards blood titrations.

MATERIALS AND METHODS

Experimental design

A total of 75 milk and blood samples were collected from healthy and buffalo infected with mastitis from different area (Shafi, Qurna, Alshnana, Alnashwa, and AlSharush) in Basra city during September 2016 to march 2017.

Milk samples

To collect milk for diagnosis, the udder and teat was thoroughly washed using sterile water. After discarding first drops,(15 milk samples) were collected in plastic sterile tubes for identification of *Staph. aureus* as described reference From each milk sample, 0.1 ml spread onto plate containing Mannitol Salt Agar (MSA) and incubated for 48 h at 37°C. After presumptive identification based on colony morphology, S. aureus colonies were then taken for confirmatory testing, catalase, coagulase, and oxidase tests.

Blood samples

The blood samples (10 ml) were collected from the jugular vein of healthy and infected buffalo with anticoagulant (EDTA) were collected for red blood cells count (RBC), white blood cell count(WBC), hemoglobin level(HB%), and packet cell volume (PCV) within 5 to 10 h of collection as described by Jain (1986). Whileother blood samples without anticoagulant (EDTA) were collected for total cholesterol, liver enzymes (AST&ALT), and total plasma protein.

RESULTS

Isolation and diagnosis:

The results showed that out of 45 milk samples collected indicative of clinical mastitis only twenty five *Staphylococcus aureus* isolates (33.3%) were found. The chemical tests performed were positive for the test of the RNA enzyme (DNase) and Coagulase test while negative for catalase and oxidase testas shows in (Table 1).

Table(1) show results of diagnosis of staphylococcus aureus

Name of test	Dnase	Coagulase	Oxidase	Catalase	%
Result	+	+	-	-	33.3

Biochemical parameter:-

The table (2) showed a significant decrease in the total number of red blood cells (RBC) when compared with control group. As for the white blood cells (WBC) there is a significant increase in white blood cells when compared with the control group at P≤O. 5. The level of hemoglobin(Hb) in blood showed a significant decrease in animals infected with mastitis when compared with the control group. Also for packet cell volume (PCV %) decreased significantly compared to non-infected animals control group as show in figure 1.

Table(2) The effect of mastitis on blood parameters.

Parameter / groups	R.B.Cx10^6	W.B.Cx10^3	PCV%	Hb gm100/ml
Control	8.368 a 0.416±	4.640 b 0.648±	52.272 a 2.430±	8.276 a 0.377±
Mastitis	6.010 0.320± b	5.060 0.325± a	50.449 b 1.233±	7.275 1.366± a
LSD	1.120	1.25	3.823	0.013

The vertically different letters mean significant different at level 5%

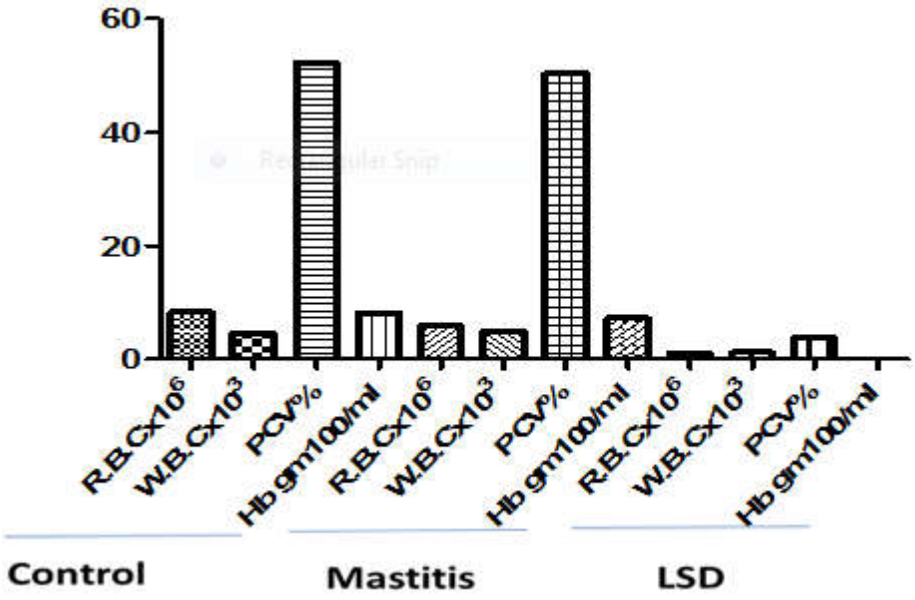

Figure1: Blood parameter variation in mastitis

table 3 showed total cholesterol level of animals infected with mastitis has decreased significantly compared with the control group. Liver enzymes (AST&ALT) have a significant increase in comparison with control groups. We note a decrease in the total protein values significant decrease and no significant differences compared with control group as show in figure 2

Table (3) The effect of mastitis on chemical parameters.

Parameter / groups	Cholesterol dL/mg	AST Iu/L	ALT Iu/L	Total protein dL/mg
Controls	57.600 a 2.014±	8.920 b 2.214±	6.860 b 0.779±	5.500 a 0.748±
Mastitis	46.800 b 3.733±	103.940 a 7.130±	15.640 a	7.200 a 0.821±
LSD	10.800	25.068	4.560	1.900

The vertically different letters mean significant different at level 5%

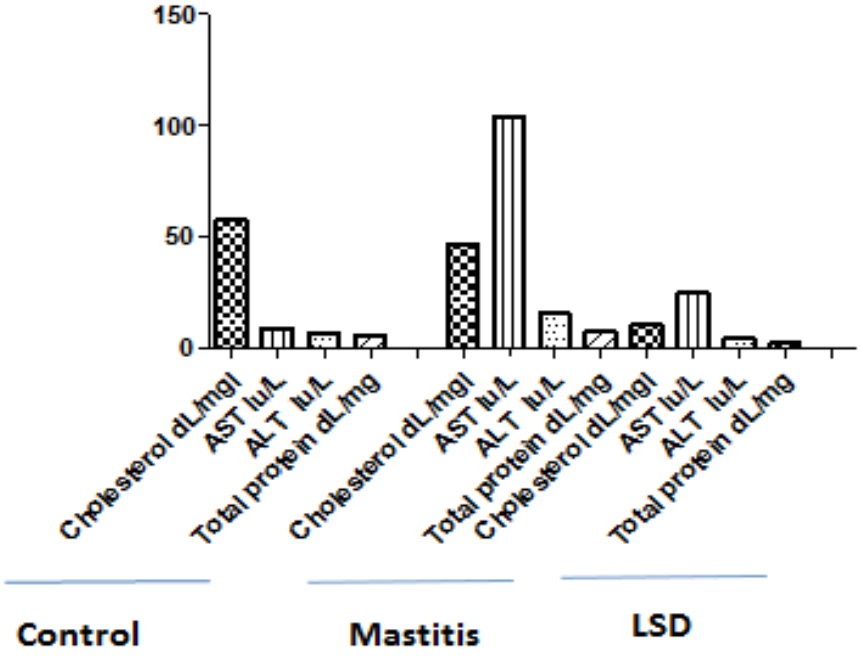

Figure2: The effect of mastitis on biochemical parameter

DISCUSSION

The results of isolation and identification the *Staphylococcus aureus* from milk of clinical mastitis found that the bacterial isolation rate of these isolates was(33.3%). The cause of the clinical mastitis was due to the weakness of the body's defence means the severity of the bacterial disease as well as the effects of the environment and stress (7), Causing the emergence of symptoms of acute disease, and the bacteria *Staphylococcus aureus* of the most prominent bacterial causes of clinical mastitis in cattle and this confirms that these bacteria are endemic in most areas of Basra and the reason for the presence of these bacteria, both in clinical inflammation or sub clinical is the presence of these bacteria in the skin of the teats or in the external aperture that is vulnerable to the outer environment, especially during the animal before or after the birth of the infection of the epilepsy. The high incidence of these bacteria is widespread in the vicinity of the animal and different seasons of the year, especially in the winter because of the presence of humidity (8, 9). Our study approved some studies of mastitis (10, 11) where *staphylococcus aureus* caused a high incidence of mastitis, due to environmental conditions and poor handling of the animal. For the errors of the collection of milk and lack of adequate care is one of the main reasons for the incidence of mastitis (12) and in a study conducted by (Zora 1979) found that

staphylococcus aureus is the most proportion of (12.9%) (13). The differences between our study and other studies explain that the bacterial causes of mastitis vary from one country to another due to differences in temperature , humidity and genetic variations of countries (14).

On the other hand, study the changes in some standard blood parameter titration in buffaloes infected with mastitis, as show in table (2)was significant differences in the level of probability of $p \leq 0.05$, as the number of red blood cells (RBC) of buffalo infected with clinical mastitis decreased when compared with control group. This decrease was due to inflammation of the lupus gland leading to the release of large amounts of Oxidative factors that cause the cracking and destruction of the plasma membrane of red blood cells and also in the breakdown of hemoglobin(HB), resulting in the total number of red blood cells, where the red blood cell is one of the target cells, which are damaged by the effect of oxidizing factors and the amount of damage to the amount of leprosy And the length of the period of inflammation (15) also may be the cause of low numbers of red blood cells due to lack of production of hormone erthrpoiten, which is excreted from the kidney tissue and a small amount of tissue liver due to exposure of these tissues to the causes of mastitis and the effect of bacteria on it to the level of proportion Hemoglobin(Hb) decreased significantly and its decrease is scientifically reasonable as it is one of the basic components of the red blood cells. The lack of normal blood corpuscles results in a decrease in the hemoglobin level as well as in the size of the blood cells (16). The hemoglobin to iron deficiency in the liver hemosiderin due to liver breakdown due to the stress caused by mastitis, which leads to the consumption of iron stocks in the liver and thus decrease the level of hemoglobin (17). Added, in table (2), we notice significant differences in the number of white blood cells of infected animals when compared to healthy animals, the sage increased significantly at $p \leq 0.05$. The reason is that white blood cells are the body's first line of defense against the inflammatory processes that occur in the body because mastitis affects the lactic glands(18), The results of this study are agreement with (19) and (20), we notice a significant increase in animals infected with mastitis at the level of $p \leq 0.05$ when compared to infected animals with healthy animals (Figure1) and is believed to cause the incidence of total cholesterol level *Staphylococcus aureus* leads to the destruction of liver tissue and lactation tissue, which leads to damage done in liver and high levels of total cholesterol because the

liver is responsible for the regulation of the secretion of cholesterol (21). As for the effect of mastitis on the enzymes (AST and ALT), there is a significant increase at the level of p≤0.o5 when comparing infected animals with mastitis healthy animals and the reason for the rise Levels of (AST and ALT) Staphylococcus aureus will be transmitted to the body tissues, which will cause increased levels of liver enzymes due to cellular damage and degeneration, which leads to the release of enzymes into the bloodstream causing a rise in the level of blood serum (22). The effect mastitis on the total protein , we note no significant differences when comparing animals infected with mastitis and control group .

دراسة تأثير التهاب الضرع الناجم عن المكورات العنقودية الذهبية ومدى أهمية الأحداث المرضية لتحديد معايير الدم في الجاموس في شمال البصره

الخلاصة

أجريت الدراسة الحالية في كلية الطب البيطري ، جامعة البصرة ، لدراسة تأثير التهاب الضرع الناجم عن المكورات العنقودية الذهبية ومدى أهمية الأحداث المرضية لتحديد معايير الدم ، بما في ذلك العد الإجمالي لكريات الدم الحمراء، العد الكلي لخلايا الدم البيضاء ،مستوى الهيموغلوبين وحجم كريات الدم المضغوطة المصاحبة لالتهاب الضرع في الجاموس مقارنة بالحيوانات غير المصابة والتي تعتبر كمجموعة سيطرة. جمعت (75) عينة من حليب الجاموس المحلي السليمة والمصابة بالتهاب الضرع السريري من مختلف مناطق شمال مدينة البصرة حيث كان مجموع العينات السليمة (٣٠) عينة اعتبرت كمجموعة سيطرة في حين ان مجموع الاصابة بالتهاب الضرع السريري كانت (٤٥)عينة شخصت (٢٥) عينة باختبارات كيميائية حيوية تقليدية م على انها حالات التهاب الضرع السريري نتيجة الاصابة بالمكورات العنقودية الذهبيةوبنسبة (٣٣.٣%)علما ان هناك العديد من مسببات الأمراض البكتيرية التي تسبب التهاب الضرع الذي يختلف في تأثيره على النسيج الغدي من الضرع. من جهة اخرى شملت الدراسة تاثير التهاب الضرع على المعايير الكيميائية والتي تضمنت قياس مستوى الكوليسترول الكلي وانزيمات الكبد والبروتين الكلي . لقد أظهرت الدراسة زيادة معنوية في كريات الدم البيضاء ، وإنزيمات الكبد (AST & ALT) ، بينما لوحظ انخفاض معنوي في عدد كريات الدم الحمراء ومستوى الهيموغلوبين وحجم كريات الدم المضغوطة وكذلك الكوليسترول الكلي والاختلافات في البروتين الكلي مقارنة مع مجموعة الحيوانات غير المصابة.

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