Clinical, Bacteriological And Biochemical Studies On Mastitis In dairy cattle

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ABSTRACT

In the present study 210 lactating cows from different farms located in Behera, Alexandria, El-kalupia and Assiute governorates were investigated for mastitis by california mastitis test. The results of bacteriological examination of milk samples showed that 39.10% of cows were positive. The bacteriological examination revealed that the most predominant microorganisms isolated from cows were *Coagulase negative Staphylococci +E.coli + Streptococci spp.*. Milk scans results of mastitic cows showed increase in total somatic cell count and milk urea, and decrease in milk fat and protein. The leukogram in mastitic cows showed significant increase in total leukocytic count accompanied with neutrophilia with shift left. The biochemical analysis of serum of mastitic cattle cows showed increase in blood urea, creatinine, calcium, prolactin and globulin while a decrease was noticed in serum potassium, chloride, phosphorous, estradiol, total protein and albumin

INTRODUCTION

Mastitis is defined as inflammation of the mammary gland can have an infectious or non infectious etiology ***(1)***. Infectious mastitis results from the introduction and multiplication of pathogenic microorganisms in the mammary gland and this lead to reduction in synthetic activity, changes in the milk constituents and elevated milk total cell count (TCC) ***(2)***. The main bacterial causes of bovine mastitis are species of *Staphylococci* and *Streptococci*. However it may be caused by *Escherichia coli*, *Pseudomonas, Proteus* or *fungi* ***(3)***.The mastitic milk has many physical changes as color and consistency ***(4)***. There are also chemical changes in mastitic milk such as elevated sodium and chloride content and decrease in calcium, phosphorus, magnesium and potassium levels. Protein changes are represented by decrease in lactoalbumin and increase lactoglobulin in whey of mastitic milk ***(5)***.There are also several alterations in the blood picture (leukocytosis and neutrophilia) ***(6)***. Serum biochemistry (urea and createnine) ***(7)*** and some hormonal changes (increase prolactin) ***(8, 9)***.

MATERIAL AND METHODS

Material

Animals

Two hundred and ten lactating cows were investigated in this study. The animals were belonged to different farms located at Behera, Alexandria, kalupia and Assiute Governorates. The age of these animals ranged from 2-9 years, their weight from 300 – 450 kg and their milk yield from 17 – 28 kg / day.

The total number of the examined animals included 116 apparently healthy cows, clinical signs of mastitis were marked on 33 cows, while 61 cows did not show the apparent clinical signs of mastitis but suffered from sudden drop in milk yield.

Milk examination

Sampling

Quarter milk samples (840) were collected from each animal into clean and sterile bottles. These samples were collected after washing the udder, teat and teat orifice with water and dried well then the teat orifice

was disinfected by ethyl alcohol 70%. Each sample was divided into three portions; the first portion was used for bacteriological examination, the second portion was used for estimation of total cell count and other milk parameters (fat, protein, total solid, solid not fat and lactose) using Bentley 150 milk scan. The third portion was used for separation of whey according to the technique of ***(10)*** for estimation of minerals, electrolytes.

Methods of examination of milk

California mastitis test *(CMT)* ***(2)***.

Total somatic cell count and milk constituents estimation ***(11)***.

Bacteriological examination: Milk samples for bacteriological examination were firstly incubated for 18 hours at 37ºC then, a loopful was taken and inoculated into the following media:- Manitol salt agar media, Edward's media, MacConkey agar media, Blood agar media, Nutrient agar media. The inoculated plates were incubated at 37ºC for 24 hours. Suspected colonies were examined by making smear from the isolates and stained by Gram's stain and examined microscopically. The biochemical tests for identification of the isolates were applied according to ***(12)***.

Estimation of electrolytes and minerals in milk whey: Separation of whey was carried out and then diluted 1:4 for estimation of electrolytes and minerals by chemical analysis according to the techniques of ***(10)***.

Blood examination

Sampling

Blood sample was collected from Jugular vein of each animal. The sample was divided into two portions; the first portion of blood sample was collected into clean and dry tube with rubber stopper containing Disodium Ethyline Diamine Tetra Acetic Acid (EDTA) as anticoagulant and was used for routine hemogram.

The second portion of blood sample was taken in vacutainer tube without anticoagulant and allowed to stand for 30 minutes at room temperature. The samples were centrifuged at 1500 r.p.m. for 20 minutes. The clear supernatant plasma or serum was decanted into clean and dry tube and was used for biochemical and hormonal analysis.

Hematological examination: Standard hemogram was adopted using standard the technique described by ***(13)***.

Serum biochemical and hormonal analysis

Estimation of urea: was carried out according the method of ***(14)***.

Estimation of creatinine: was carried out according to the method described by ***(15)***.

Estimation of total protein: was carried out by the method of ***(16)***.

Estimation of albumin: was carried out by the method of ***(17)*** Estimation of globulin= (Total protein - Albumin = globulin)

Estimation of A/G ratio= (Albumin / globulin).

Estimation of calcium: was carried out according to the method of ***(18)***

Estimation of phosphorus: was determined according to the method of***(19)***.

Estimation of magnesium was carried out using the method of ***(19)***.

Estimation of chloride was carried out using the method of ***(20)***.

Sodium and potassium: Was measured using flame photometer by using calibrating standard curve of sodium and potassium.

Estimation of estradiol was carried out using the method of ***(21)***.

Estimation of prolactin was carried out using the method of ***(22)***.

Statistical analysis: Collected data from hemogram, serum biochemistry and milk analysis were analyzed for the mean and standard error of mean. Significance of the results was evaluated by F-test (analysis of variance (ANOVA)) and the least significant difference (LSD) according to ***(23)***.

RESULTS

Table 1.Results of examined cow by C. M. T

Animals	Number	Percent
Healthy cows	116	55.2%
Subclinical mastitic cows	61	29.1%
Clinical mastitic cows	33	15.7%
Total	210	

Table 2. Result of bacteriological examination of milk samples

Isolated microorganisms	No of examined animals	Percent
E.coli	3	3.4%
S.aureus+other strept	21	26.2%
S.aureus + E.coli	15	18.6%
C.N.S +E.coli	26	32.2%
C.N.S + St.agalactiae	5	5.2%
C.N.S + other strept	12	14.4%
	82	100%

C.N.S: Coagulase Negative Staphylococci

Table 3. Result of examination of milk scan

	Urea mg/dl	Fat %	Protein g/dl	Total solids g/dl	Solid not fat g/dl	Lactose g/dl	SCC $\times 10^6$/ml
Healthy cows	17.86 ±1.37	3.53 ±0.17	4.05 ±0.07	10.45 ±0.38	7.09 ±0.14	3.69 ±0.16	0. 245±0.00
Subclinical mastitic cows	34.6 ±2.67	2.54 ±0.25	2.98 ±0.21	9.48 ±0.49	6.84 ±0.25	2.81 ±0.14	o.810± 0
Clinically mastitic cows	50.9 ±1.42	1.92 ±0.64	2.77 ±0.53	9.52 ±0.56	7.57 ±0.81	3.3 ±0.053	2.530± 0.5

Table 4.Erythrogram of healthy, Subclinical and clinically mastitic cows

Parameter	Healthy cows	Subclinical mastitic cows	Clinical mastitic cows
RBCs (1000000/µl)	5.25±0.047	5.21±0.12	4.97±0.13
Hb (gm/dl)	9.56±0.17	9.43±0.33	8.19±0.6
Hb (%)	59.7±1.28	58.8±2.15	51.1±3.74
PCV (%)	29±0.36	28.75±0.45	25.15±1.42
MCV (fl)	55.28±0.88	55±1.48	50.6±2.47
MCH (Pg)	18.13±0.40	18.2±0.42	16.53±1.15
MCHC (gm/dl)	32.64±0.65	32±0.88	32.6±2.36

Table 5. Leukogram of healthy, Subclinical and clinically mastitic cows

Parameter		Healthy cows	Subclinical mastitic cows	Clinically mastitic cows
WBCs (1000/µl)		7.91±0.97	11.43±1.56	15.22±1.8
Nutrophil	Absolute (1000/µl)	3.95±0.12	6.87±0.18	9.66±0.17
	Staph (1000/µl)	0.03±0.02	0.11±0.06	0.37±0.13
Lymphocyte (1000/µl)		3.82±0.11	4.00±0.14	4.72±0.11
Monocyte (1000/µl)		0.04±0.02	0.02±0.01	0.15±0.01
Eosinophil (1000/µl)		0.01±0.002	0.01±0.01	0.30±0.01
Basophil (1000/µl)		0	0	0

Table 6. Kidney and Liver function tests in cows suffered from mastitis

Parameter		Healthy cows	Subclinical mastitic cows	Clinical mastitic cows
Blood urea	mg/dl	19.2±0.91	33.25±1.04	37.9±0.76
Createnine	mg/dl	0.72±0.025	0.99±0.09	1.12±0.08
ALT	µ /L	13.3±0.69	16.56± 1.67	15.45± 0.32
AST	µ /L	45.7± 1.03	44.5± 1.76	40.1± 0.87

Table 7. Values of minerals and electrolytes in serum of cows suffered from mastitis

Parameter	Healthy cows	Subclinical mastitic cows	Clinical mastitic cows
Sodium (mEq/L)	148.77±0.92	149.71±1.77	148.69±1.14
Potassium (mEq/L)	5.01±0.05	5.22±0.09	4.87±0.05
Chloride (mEq/L)	100.5±1.61	98.00±2.05	96.6±1.18
Calcium (mg/dL)	8.33±1.67	9.20±0.34	9.99±0.134
Phosphorus (mg/dL)	4.85±0.104	4.18±0.09	3.78±0.089
Magnesium (mg/dL)	3.15±0.21	2.73±0.22	2.65±0.105

Table 8. Values of minerals and electrolytes in whey of cows suffered from mastitis

Parameter	Healthy cows	Subclinical mastitic cows	Clinical mastitic cows
Eq/L)	36.99 ±0.85	45.57 ±1.76	54.9 ±1.05
(mEq/L)	149.19 ±1.12	136.82 ±2.46	122.16 ±1.47
(mEq/L)	104.5 ±3.12	117.00 ±1.88	139.39 ±1.14
um (mg/dL)	45.9 ±1.60	40.12 ±1.43	38.76 ±1.00
osphorus(mg/dL)	38.31 ±1.64	36.1 ±1.41	32.57 ±0.67
Magnesium (mg/dL)	8.18 ±0.15	8.12 ±0.32	6.97 ±0.11

Table 9. Values of Prolactin and Estradiol in cows suffered from clinical and Subclinical mastitis

Parameter		Healthy cows	Subclinical mastitic cows	Clinical mastitic cows
Prolactin	Pg/ml	7.08±0.58	11.56±2.02	17.80±2.86
Estradiol	Pg/ml	18.68±2.68	14.02±1.85	13.13±2.56

Table 10. Values of serum Total protein, Albumin, Globulin and A/G ratio in cows suffered from Subclinical and clinical mastitis

Parameter	Healthy cows	Subclinical mastitic cows	Clinical mastitic cows
Total protein (gm/dl)	7.96±0.063	7.87±0.021	7.65±0.17
Albumin (gm/dl)	3.32±0.047	2.83±0.06	2.3±0.09
Globulin (gm/dl)	4.73±0.12	5.05±0.08	5.23±0.24
A/G ratio	0.77±0.01	0.56±0.023	0.46±0.05

Table 11. Values of whey total protein and it's in milk of cows suffered from subclinical and clinical mastitis

Fraction	Healthy cows	Subclinical mastitic cows	Clinical mastitic cows
Total protein (gm/dl)	2.6± 0.08	2.86± 0.1	3.00±0.03
γ globulin (gm/dl)	0.31± 0.02	0.68± 0.04	0.77± 0.03
β globulin (gm/dl)	0.58± 0.04	0.57± 0.02	0.50± 0.02
α globulin (gm/dl)	0.64± 0.05	0.60± 0.02	0.51± 0.02
Albumin (gm/dl)	0.96± 0.08	1.04± 0.1	1.17± 0.05

DISCUSSION

Mastitis is recognized as a world wide disease causing high economic losses in the dairy industry. It is considered to be one of the most important destructive diseases ***(24)***.

On the trial to estimate the prevalence of different forms of mastitis in 210 examined cows, results indicated that out of these cows, 61 (29.04%) were suffering from subclinical mastitis while clinical mastitis was detected in 33 (15.73%) cows.

Detection of mastitis in the present study depends on field and laboratory examination. The California mastitis test (CMT) revealed that out of 840 cows quarter milk samples, 444 (52.88%) were negative for mastitis, 20 quarter milk samples(2.25%) were (+),72 quarter milk samples (8.56%) were (++), while 304 quarter milk samples (36.31%) were (+++).

These results were proved when these samples were examined for total somatic cell count which recorded highly significant increase in both subclinically and clinically mastitic cows. These results were in accordance with ***(25)***. As the principle of this test depend on the reaction between CMT reagent and the DNA of the cells. That when the cell number increases the positivety of the reaction increase and vise verse.

In this study bacteriological examination of milk samples revealed that 128 samples were bacteriologicaly negative (60.90%), while 82 samples were bacteriologicaly positive (39.10%). Out of these 82 animals, 50 were suffered from subclinical mastitis and the rest 32 were suffered from clinical mastitis. The difference between the result of C.M.T. and bacteriological examination was due to the difference causes of mastitis (Bacterial- Fungal – viral – troumatic .....etc). The main bacteria which isolated from milk samples were Coagulase negative Staphylococci mixed with *E.coli* (31.70%), *Staphylococcus aureus mixed with other Strept.* (25.61%), *Staphylococcus aureous mixed with E.coli* (18.29%), *Coagulase negative Staphylococci mixed with other Strept.* (13.42%), *Coagulase negative Staphylococci mixed with Streptococcus agalactiae* (7.32%) and *E.coli* as a single isolate (3.66%).

These results disagree with those reported by ***(26)*** who recorded that the most isolated microorganisms from mastitic cows was E.coli.

Total cell count was elevated in both subclinically and clinically mastitic cows compared with control group. This elevation was more obvious in groups affected with clinical mastitis. Correlation between total cell count and bacterial isolates in cows revealed that the total cell count was higher in (Coagulase negative staphylococci + Streptococcus agalactiae) in subclinically mastitic cows and (E.coli) in clinically mastitic cattle cows these results were in agreement with ***(5,27)***. Who suggested that the significant increase in total cell count may be due to influx of leukocyte from circulation and increase the detached epithelium due to inflamation.

In the present study, the effect of mastitis on milk parameters of cattle cows suffered from subclinical and clinical mastitis showed significant increase in milk urea and decrease in milk fat and protein. The decrease in protein may be due to damage of the mammary secretory tissue and destruction of blood milk permeability barrier which decrease the transfer of protein from interstitial tissue into milk. These results agree with those reported by ***(28)***.

The effect of mastitis on erythrogram of cows suffered from subclinical and clinical mastitis showed no significant changes comparing with control group. These results agree with those reported by ***(29-31)***.

The leukogram of cattle cows suffered from subclinical and clinical mastitis showed leukocytosis. The observed leukocytosis was manifested by significant neutrophilia with shift left specially in clinically mastitic cows. These results are similar to ***(29)***. On the other hand, ***(32)*** recorded no change in leukogram of mastitic cows. This result might be due to release of mediators (cytokines, growth factors) which are involved in the proliferation, maturation, bone marrowrelease into blood and tissue migration of neutrophils. This accompanied with shift left due to increase

demand for neutrophils which depletes the storage pool of segmenters, bands and potentially earlier forms are released *(13)*.

Assessment of serum biochemical changes in dairy cows revealed that blood urea and creatinine were significantly elevated in mastitic cows compared with control group. This elevation was markedly seen in blood urea of cows affected with (Staphylococcus aureus + E. coli) in both subclinically and clinically mastitic cows, These results were agreed with those reported by *(7,23,30)*. The increase of urea and creatinine may be due to decrease renal perfusion (reduced glomerular filtration) which can cause azotemia, in which the tubular flow rate is lower and urea reabsorbtion is greater this alteration in kidney may be due to the toxins that produced from the pathogenic bacteria *(34)*.

A Danish study of acute coliform mastitis in nine cows with matched controls revealed that blood urea and creatinine levels might be a useful prognostic indicator in such cases *(35)*.

There was no change in serum ALT and AST in subclinically and clinically mastitic cows compared with control groups.

Serum total protein of cows suffered from subclinical and clinical mastitis showed significant decrease, These results agree with *(36)* and disagree with *(31,37)* who recorded slight increase in serum total protein of mastitic cows. In this study the decrease in total protein was accompanied with significant decrease in serum albumin and elevation in serum globulin associated with different bacterial isolates. The increase of globulin was due to increase gamma globulin due to inflammatory reaction. While the decrease in albumin may be due to kidney affection *(34)*.

In the present work evaluation of hormonal changes associated with mastitis in dairy cows revealed that serum prolactin was elevated markedly in clinically mastitic cows .This elevation was more obvious in different bacterial isolates. On the other hand, serum estradiol was decreased in subclinically and clinically mastitic cows. This decrease was more obvious in group affected with (Coagulase negative Staphylococci + other strept.) in clinically mastitic cows. These results agree with result recorded by *(9)* but not agree with result recorded by *(38,39)*.

In the present study assessment of serum electrolytes in cows showed limited changes in values of sodium, potassium and chloride in subclinically and clinically mastitic animals compared to control group. Similar pattern of changes were observed in serum minerals except mild hypercalcemia and hypomagnesaemia in mastitic animals of both groups. The above mentioned results behaved rather similar in correlation with different bacterial isolates.

Regarding mineral changes in milk whey associated with mastitis in dairy herds, values of sodium and chloride recorded significant elevation in mastitic animals, more obviously noticed in clinically mastitic ones. On the other hand, levels of potassium, calcium and phosphorous in milk whey showed marked drop especially in clinically mastitic cows. Hypomagnesaemia was noticed however, in clinically mastitic animal only. Similar pattern of changes regarding, different bacterial isolates were noticed in mastitic animals.

The correlation between serum and milk electrolytes was studied by *(40)* who recorded similar increase in serum calcium and decrease in serum phosphorous and potassium, while in milk they recorded an increase in sodium and chloride and decrease in milk calcium, phosphorous and potassium. These changes in milk electrolytes might be due to weakness in selective ability of udder epithelium to concentrate ions and increase in passive permeability which leads to imbalance in salt concentrations between blood and milk *(41)*.

REFERENCES

1. ***Bradly A (2002):***Bovine mastitis: an evolving disease. Vet. J. 164:116-128.
2. ***Harmon R. J. (1994):*** Physiology of mastitis and factors affecting somatic cell counts. J. Dairy Sci. 77 2103-2112.
3. ***Pautrel B L (1983):*** Comparative evaluation of commercial latex agglutination and coagulation reagents for B C and D mastitis streptococci.
4. ***Blood DC and Radostitis OM (1989):*** "Veterinary Medicine" 7th ed. Philadelphia London 501-504.
5. ***Sheldrake R F , McGregor G D and Hoare R J T (1983):*** Somatic cell count electrical conducting and serum albumin concentration for detecting bovine mastitis. J. Dairy Sci. 66: 548-555.
6. ***Amira HM (1979):*** Clinicopathological and pathological studies on mastitis in cattle and buffaloes.
7. ***Menzies FD , McBride SH , McDowell S WJ and Maccoy MH (2000):*** Clinical and laboratory finding in cases of toxic mastitis in Northern Ireland. Vet. Rec. July 147: 123-128.
8. ***Koprowski JA and Tucker HA (1973):*** Serum prolactin during various physiological states and its relationship to milk production in the bovine. J. Endocrin. 92: 1460-1480.
9. ***Lupoli B, Johnsson B, Moberg K and Svennersten (2001):*** Effect of suckling on the release of oxytocin prolactin cortisol gastrin colycystokinin somatostatin and insulin in dairy cows and their calves. J. Dairy Res. 68: 175-187.
10. ***Kostyra E. (1990):*** Changes in protein fractions of milk obtained from cows with mastitis caused by *Staphylococcous aureus*. Rocz. Panstu. Zakl. Hig. 41 (5-6): 263-268.
11. ***Zecconi A, Casirani G , Binda E, and Piccininni R (2002):*** The importance to asses the effects of voluntary milking system on teat tissue intramammary infection and somatic cell count. Dept. Anim. Path. Infect. Dis. Lab. University of Milan. Inaugal symposium May 15-16.
12. ***Quinn PJ , Carter ME , Markey BK and Carter GR (1994):*** Clinical Veterinary icrobiology.4thed. Wolf Published Mosby Rearbook.
13. ***Feildman BF, Zink LJG and Jain NC (2000):***Text book of veterinary hematology. 5th d. Schalm's Vet. Hematology.
14. ***Batton CJ and Crouch SR (1979):*** Estimation of Urea .Anal. Chem. 1977 49:464-469.
15. ***Bowers LD and Wong ET (1980):*** Kinetic serum creatinine assays. II. A critical evaluation and review. Clin. Chem. 26:555.
16. ***Henry RJ, Cannon D C and Winkelman J W (1974):*** Clinical Chemistry Principles and Techniques. 2nd Ed. Harper & Row
17. ***Grant GH, Silverman LM and Christenson RH (1987):*** Amino acids and proteins in Fundamentals of Clinical Chemistry. 3rd ed. Tietz NW Philadelphia: WB Saunders :291-345
18. ***Gindler E (1972):*** Colorimetric method for determination of calcium. Amer. Clin. J. 58: 376.
19. ***Klinik and Labor (1997):*** Klinik and Labor. 2nd Vienna/ New York, springer Verlag
20. ***Feldkamp CS (1974):*** Colorimetric determination of chloride. Z. Klin. Chem. Biochem. 12:146.
21. ***Xing S, Cekan SZ and Diezfalung V (1983):*** Validation of radio immunity for estradiol-17β by isotopes dilution mass spectrometry and by a test of radiochemical purity. Clin. Chem. Acta 135: 189-201.
22. ***Sinha YN (1995):*** Structural varieties of prolactin: occurrence and physiological significance. J. Endocrin. 16:354-365.
23. ***Petrie A and Watson P (1999):*** "Statistics for Veterinary and Animal Science" 1st ed. the Black Well Science LTD United Kingdom 90-99.

24.Dobbine CN (1977): Mastitis losses.J. Amer. Vet. Med. Assoc. 170: 1129-1132.

25.Wageh MAE (1994): Effect of some drugs on mastitis in cows. M. V. Sc. Thesis Pharmacology Fac. Vet. Med. Zagazig Univ.

*26.Ahmed NS, El-Rashidy AA , Metias K A, El-Garhy MA and Tawfik MS (1988):*Outbreak of bovine mastitis in large dairy herds in Egypt. J. Egypt. Vet. Med. Ass. 48 (2): 197-210.

27.Holdaway R J , Holmes C W and Steffert IJ(1996): A comparison of indirect methods for diagnosis of subclinical intramammary infection in lactating dairy cows Part 1:- the effect of bacterial infection stage of lactation and age of cow on eight parameters in foremilk from individual quarters with an initial study of difference between milk fraction. Aust. J. Dairy Technol. (51):64-71.

28.Hortet P and Seegers H , (1998): Loss in milk yield and related composition changes resulting from clinical mastitis in dairy cows. Preventive Veterinary Medicine 37 (1-4) 1-20.

29.Son G , Heo JH , Lee K JH and Kimj S (1985): Study on haemodynamic in cows with mastitis. Korean J. Vet. Res. 35 (3): 595-601.

30.Atroshi F , Parantainen J , Sankari S , Jarvinen M, Lindberg LA and Saloniemi H (1996): Changes in inflammation – related blood constituents of mastitis cows. Vet. Res. (2): 125-132.

31.Heba EEH (2003): Clinicopathological and pathological studies on mastitis in cows and buffaloes at El-Kalupia province. Ph.D.Thesis Fac. of Vet. Med. Zagazig Univ. Benha branch. (Moshtohor).

32.Ghodsian I, Sanadieh B , Keyvanfar H and Machsoodlou H (1977): Blood picture in bovine mastitis. J. Vet. Med. Tehran Univ. 33 (114) : 53-61.

33.Smith GW , Constable PD and Marvin DE (2001): Ability of hematological and serum biochemical variable to differentiate gram negative and gram positive mastitis in dairy cows. J. Vet. Intern. Med. Jul-Aug 15(4): 394-400.

34.Duncan J R , Keith W P and Edward A M (1999): Veterinary Laboratory Medicine. 5th Ed. Saunders Company Philadelphia.

35.Kathlom J and Haubro Anderson PH (1992): Acute coliform mastitis in dairy cows: endotoxin and biochemical changes in plasma and colony forming units in milk. Vet. Rec. 131: 513-514.

36.Rawdat AM and Omaima MM (1999): Some biochemical changes in milk and serum of mastitic Egyptian buffaloes. Zag. Vet. J., 27, (2): 30-44.

*37.Bertoni G , Tervisi E , Capelli FP and Cappa V(1994):*Variation in blood parameters with mastitis of different severity in dairy cows. Bologna, Italy Societailaia di Buiatria, 2:1427-1430.

38.Schuster DI , Harmon RJ , Jackson JA and Henken RW (1991): Suppression of milk production during endotoxin induced mastitis. J. Dairy Sci., Nov., 74 (11):3763-74.

39.Hockett ME , Hopkins FM, Lewis MJ, Saxton AM , Dowlen HH , Oliver SP and Schrick FN (2000): Endocrine profile of dairy cows following experimentally induced clinically mastitis during early lactation. Anim. Reprod. Sci., 15, (58): 241-251.

40.Rashed MA , Magda KM and Koritum Kh M (2002): Biochemical changes in blood and milk of mastitic cows. Egypt. Comp. Pathol. and Clinicalpathol., 15 (1): 74-84.

41.Webb J and Alford M (1983): Fundamental of Dairy Chemistry. 2nd ed., Philadelphia. USA.

الملخص العربى

دراسات اكلينيكيه و بكتيريولوجية و بيوكيميائية على مرض التهاب الضرع فى الابقار الحلابه

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*قسم بحوث أمراض الضرع و النتاج- معهد بحوث التناسليات الحيوانيه

**قسم الباثولوجيا الاكلينيكيه –كليه الطب البيطرى –جامعه القاهرة

يعتبر التهاب الضرع من أكثر الأمراض المسببة لخسائر إقتصادية فى مزارع الألبان و ذلك لأن الحيوان المصاب بالتهاب الضرع ينخفض إنتاجه من اللبن بنسبة كبيرة بجانب ان اللبن المنتج يكون قليل الجودة.

شملت هذه الدراسة عدد ٢١٠ من الأبقار جمعت من محافظات (البحيرة، الاسكندرية، القليوبية و اسيوط).

تم جمع عينات لبن و دم بعد إجراء الفحص الإكلينيكى الظاهرى و عمل إختبار الكاليفورنيا على عينات اللبن ثم تم إجراء الفحوصات المعملية على عينات اللبن و الدم شملت إجراء العزل البكتيريولوجى، فحص مكونات اللبن، عد خلايا اللبن، فحص مكونات الدم، التحاليل الكيميائية للدم و اللبن وتحليل الهرمونات بالدم.

سجلت نتائج الفحص البكتيريولوجى أن الميكروبات المعزولة من الأبقار هى (الميكروب العنقودى + الميكروب القولونى) بنسبة ٣١,٧٠% ، (الميكروب العنقودى الذهبى + الميكروب السبحى) بنسبة ٢٥,٦١% ، (الميكروب العنقودى الذهبى + الميكروب القولونى) بنسبة ١٨,٢٩% ، (الميكروب العنقودى + الميكروب السبحى) بنسبة ١٣,٤٢% ، (الميكروب العنقودى + الميكروب السبحى أجالاكتيا) بنسبة ٧,٣٢% و (الميكروب القولونى) بنسبة ٣,٦٦%.

أظهرت نتائج فحص مكونات اللبن في الأبقار المصابة بالتهاب الضرع الإكلينيكى و تحت الإكلينيكى زيادة فى عدد الخلايا الكلى واليوريا. كما أظهرت نقص فى نسبة الدهن و البروتين و اللاكتوز.

أثبت فحص صورة الدم فى الأبقار المصابة بالتهاب الضرع انه وجد أن هناك زيادة فى كرات الدم البيضاء فى حالات الأبقار المصابة بالتهاب الضرع مصحوبا بزيادة فى خلايا النيتروفيل.

تم اجراء التحاليل الكيميائية الحيوية على مصل الدم فى الأبقار المصاب بالتهاب الضرع و وجد زيادة فى البولينا، الكرياتينين، الكالسيوم، الماغنسيوم و الجلوبيولين. بينما كان هناك انخفاض فى البوتاسيوم، الكلوريد، الفوسفور، البروتين و الألبيومين

هذه التغيرات الكيميائية الحيوية فى الدم صاحبها تغيرات كيميائية فى البان الأبقار المصاب بالتهاب الضرع تمثلت فى زيادة فى الصوديوم و الكلوريد. و نقص فى البوتاسيوم، الكالسيوم، الفوسفور و الماغنسيوم.

أظهرمستوى هرمون البرولاكتين بالدم زيادة فى الأبقار المصابة بالتهاب الضرع الإكلينيكى أما بالنسبة لهرمون الإستراديول فقد إنخفض فى الأبقار المصابة بالتهاب الضرع

و ينصح لتقليل الإصابات الإكلينيكية باتباع الكشف الدورى على الحيوانات بإختبارالكاليفورنيا لتحديد الحيوانات المصابة بالتهاب الضرع الغير ظاهرى (تحت الإكلينيكى) و محاولة علاجها و كذلك إستخدام العادات الصحية السليمة فى التعامل مع الحيوانات الحلابة.