Bacterial , Cytological and Biochemical study of Arthritis in sheep and goats .

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Summary

Bacteriological , cytological, and biochemical testing were performed on synovial fluid of 160 sheep's and goats at Basrah slaughter house , 115 sheep (74 females, 41 males) , 45 goats (34 females , 11 males). The incidence of bacterial isolation from infected sheeps was 40.05 %. in females , 48.78 % . in males ,while in goats it was 54.54%. in males 14.7%. in females. Bacterial isolates were *staphalococcus aureus, pseudomonas spp*, and *Hemophilus spp*. *Staph –aureus* was senstive to impeneam and amikacin *Hemophilus spp*. was sensitive to cephalexin and Ampicillin , all *Pseudomonas spp*. isolates were sensitive to penicillin and amikacin. Mucin clot test varied from fair to poor clotting, the total protein of infected animals was significantly higher than that of control group. The total leucocytic count was significantly higher ($p<0.01$) than that of the control group, with high perecntage of Neutrophils.

دراسة جرثومية ,خلوية,كيمياحيوية لالتهاب المفاصل في الاغنام والماعز

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الخلاصة

اجريت الاختبارات الجرثومية ,الخلوية ,الكيمياحيوية على عينات السائل الزلالي لـ١٦٠ راسا من الاغنام والماعز في مجزرة البصرة وتضمنت ١١٥ اغنام (٧٤ اناث ,٤١ ذكور) ,٤٥ ماعز (٣٢ اناث ,١١ ذكور). كانت نسبة التهاب المفاصل الجرثومي في الاغنام ٥٤.٠٥٪ في الاناث و٤٨.٧٨٪ في الذكور , وفي الماعز ٥٤.٥٤٪في الذكور و ١٩.٧٪في الاناث. تم عزل كل من المكورات العنقودية الذهبية والهيموفلس والسيدا موناس. اظهرت جرثومة المكورات العنقودية الذهبية حساسية لكل من الامبنييم و الامكسين وكانت جرثومة الهيموفلس حساسة لكل من السيفالكسين و الامبسلين وجرثومة السيدا موناس حساسة لكل من البنسلين والامكسين. تراوحت نتائج تخثر المخاطين بين ضعيف الى عديم التخثر , وكان معدل مستوى البروتين الكلي اعلى بشكل مهم عن مجموعتي السيطرة وكان حساب العد الكلي لكريات الدم البيض اعلى بشكل مهم عن مجموعتي السيطرة مع ارتفاع عالي في نسبة الخلايا العدلة .

Introduction

Arthritis in sheep and goat causes great economic loss specially in it is chronic from which result in sever loss of production , affected animals are usually culled from the flock ,or their carcasses are condemend at the slaughter hours (1) . Arthritis may result from a variety of bacteria , mycoplasma , and viruses , bacterial causes including *Pasteuralla , Streptococci , Corynebacteria , Staphylococci , Histophilus , E-coli* (2).

Examination and analysis of synovial fluid which includes mucin clot test , total protein estimation , total and differential leucocytic count are of value as diagnotic tests in arthritis (3) .

This study were carried out to determine some bacterial causes of arthritis in sheep and goat at Basrah slaughter house , and determination of mucin clot test , estimation of total protein , and total & differential leucocytic count of synovial fluid .

Materials and Methods

1- **Animals** : This study was carried in Basrah slaughter house, and includes 160 animals 115 sheep (74 females, 41 males), 45 goats (34 females ,11 males) , their age between 2-2.5 year , the control group includes 20 animals (10 sheeps , 10 goats).

2- **Collection of samples** : The synovial fluid was collected under aseptic conditions from the knee joint (4) ,the physical characteristics of the synovial fluid were noted immediately after collection .The animals were examined clinically before slaughter to detect arthritis and this study was carried from September 2004 to Febraury 2005

3- **Bacterial isolation** and identification with antibiotic sensitivity test according to Collee, *et al* (5).

4- **Mucin clot test**:- the test was performed according to Cohen *et al* (7) by mixing one part of synovial fluid with four parts of glacial acetic acid in glass beaker with a glass stirring rod. A clot forms immediately as a result of the precipitation of the hyauronate and the synovial fluid protein by the acid. The quality of the clot formed reflects the degree of hyaluronic acid polymerization

5- **Estimation of total protein** , the total protein measured using proteinease-kit (Biomerieux) .

6- **Esimation of total & differential leucocytic** count of the synovial fluid (8) .

Results

The highest rate of bacterial isolates was found in female sheep 54.05 % against . 48.78 % .in male sheep , while in goat the highest rate of bacterial isolate was found in male 54.54% , and 48.78 %.in female (Table 1) .

The bacterial isolates were *Staph-aureus*, *Hemophilus spp*., and *Pseudomonas spp*. (Table 2) .

Staph aureus was sensitive to Impeneum and Amikaicin and resistant to Cloxacillin, Tetracycline, Cephalexin and Cephazolin, and Penicillin(Table 3).

Hemophilus spp were sensitive to Cephalexin , Ampicillin ,and Cefazolin. All *Pseudomonas spp*. isolates were sensitive to Penicillin and Amikacin & resistant to other antibiotics .

The volume of the synovial fluid was 1-2 ml, and appeared turbid ,with varied coloration ,had low viscosity and clotted when kept without anticoagnlant . The degree of polymerization of synovial fluid by hyaluronate (Table 4) was varied from fair to poor .

The rate of poor mucin clot was 92.5% in female sheep & 100 %.in male goats ,while the fair mucin clot was observed only in sheep . In control group the degree of mucin clot test was good (firm tight mass forms in a clear solution) .

The total protein of infected sheep and goats were significantly higher at $p < 0.1$ than that of the control group (Table 5). There were significant difference at $p < 0.01$ between the total leucocytic count of infected and control groups (Table 6) . Also there were significant difference at $p < 0.01$ in the differential leucocytic count between infected & control groups (Table 7) , with high percentage of neutrophils in the synovial fluid of both sheep and goats .

Table 1 : Numbers and percentage of infected sheep and goats

Animal	cases	Female	Bacterial isolates	Male	Bacterial isolates
sheep	115	74	40 (54.05 %)	41	20 (48.78 %)
goats	45	34	5 (14.7 %)	11	6 (54.54 %)
total	160	108	45 (41.6 %)	52	26 (50 %)

Table 2 : Numbers of bacterial sp. Isolated from sheep and goats

Bacterial isolate	sheep		goat	
	Female	Male	Female	Male
Staph.aureus	40	14	-	-
Hemophilus spp.	-	6	-	-
Pseudomonas spp.	-	-	5	6
Total	40	20	5	6

Table 3 : Antibiotic sensitivity of the isolated bacteria from sheep and goats

Antibiotic	*Staph aureus* 54 isolates		*Hemophilus spp.* 6 isolates		*Pseudomonas spp.* 11 isolates	
	sensitive	resistant	sensitive	resistant	Sensitive	Resistant
Penicillin	10	44	--	6	11	--
Amikacin	47	7	--	6	11	--
Cloxacillin	--	54	--	6	--	11
Impeneam	54	--	--	6	--	11
Nitrofuratin	25	29	--	6	--	11
Ampicillin	--	54	5	1	--	11
Cefazolin	35	19	3	3	--	11
Amoxicillin +clavulan-Icacid	28	26	--	6	--	11
Tetracycline	--	54	--	6	--	11
Cephalexin	--	54	--	6	--	11

Table 4 : Mucin clot test of infected sheep and goats

Degree mucin test	Sheep		Goat	
	Female	Male	Female	Male
Poor	37(92.3%)	15(75%)	5(63.3%)	5
Fair	3(15 %)	3(7.5%)	--	--

poor : clot is friable , easily broken-up by shaking and surrouded by cloudy fluid.

fair : less compact mass with shreds in turbid solution .

Table 5 : Measurment of the total protein from infected and control sheep and goats.

Animal group	sex	gm / dl
Sheep / control group	Female	1.02 + - 0.48
	Male	1 + - 0.37
Goat / control group	Female	1.26 + - 0.39
	Male	1.14 + - 0.42
Sheep / infected group	Female	5.7 + - 0.2
	Male	5.3 + - 1.9
Goat / infected group	Female	5.6 + - 1.7
	Male	5.7 + - 1.3

Table 6 : Total leucocytic count of the synovial fluid .from infected and control sheep and goats

Animal	Sex	No. of animals	WBCs count /ml
Sheep /control group	Female	5	104 + - 76.353
	Male	5	108 + - 76.938
Goat / control group	Female	5	96 + - 63.104
	Male	5	106 + - 70.104
Sheep / infected group	Female	40	4976 + - 3742
	Male	20	5295.7 + - 3164
Goat / infected group	Female	5	5370 + - 3046
	Male	6	4673 + - 3921

Table 7 : The differential leacocytic count of synovial fluid of infected & control sheep and goats.

Cell	Animal spp.	Control group	Infected group
Neutrophils	Sheep	5 %	95 %
	Goat	7 %	97 %
Lymphocytes	Sheep	40 %	2 %
	Goat	48 %	3 %
Monocytes	Sheep	50 %	0
	Goat	55 %	1 %

Discussion

The incidence of bacterial arthritis was 52.2 % in sheep , and 24.4 % in goat ,the bacterial isolate were *Staph . aureus, Hemophilus spp*. , and *Pseudomona*s *spp*. these results in line with (9).

Staph .aureus was sensitive to Impeneum , Amikacin ,and Cefazolin, and were resistant to cloxacillin , tetracycline , cephalexin ,and penicillin , Lowy reported that 90% of the *Staph . aureus* isolates produce B-lactam and leads to resistant against penicillin and cloxacillin. *Hemophilus spp* were sensitive to cephalexin, ampicillin ,and cefazolin.

Whereas Compus had showed that *Hemophilus spp*. was sensitive to ampicillin. *Pseudomonas spp*. was sensitive to penicillin and amikacin and resistant to other antibiotics , this finding in line with (12) as they reported that *pseudomonas spp*. was sensitive to penicillin and amikacin.

The synovial fluid of low viscosity is usually an indicative of inflammation (3). The mucin clot test is aqualitative assessment of the degree of polymerization of synovial fluid by hyaluronate,and in this study the rate of positive mucin clot tes was 96 % and 25 % in infected sheep and goat respectively , the more inflammed joint the poorer result (13) ,while in the control group the degree of mucin clot test was good .

The concentration of synovial fluid protein are known to vary with the degree of joint inflammation (7) . The synovial fluid total protein in infected sheep & goat were 5.6 + - 1.98 , 5.7 + - 1.4 gm /dl respectively , while in the control group of sheep & goat were 1.01 + - 0.4 , 1.2 + - 0.39 gm /dl with significant difference at $p < 0.1$ between the infected & control groups.

The total leucouytic count of the synovial fluid of the infected groups were significantly differ from that of the control groups, Nayk and Bhowmick reported amarked increase in total leucocytic count of infected sheep .

There was amarked increase in neutrophils of the synovial fluid , with amarked decrease in lymphocytes and monocytes , Where as Singh reported a increased percentage of neutrophils in synovial fluid of bacterial arthritis.

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