

بعض الدراسات على الاصابة التنفسية للحملان

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الملخص

فحص بكتريولوجيا عينات مأخوذة من الجهاز التنفسى لعدد ٢٥ حمل سليم ظاهرية وقد ثبت أن ١١ عينة خالية تماما من البكتريا . واحتوت العينات الباقية على البكتريا الآتية :
المنقودي الجلدى . العصى الفطرى . وبكتريا القولون والمنقودي الأبيض والبستريلا
مانوسيدا النوع الثانى .

وقد أخذت عينات أخرى للفحص البكتريولوجى من عدد ١٥٧ حمل مصاب باصابات مختلفة فى الجهاز التنفسى ومقسمة الى مجموعات حسب طريقة العلاج . وقد وجدت أن أغلب الميكروبات المزالة قبل العلاج هى :

السبحى الصديدى ، السبحى الدموى التحلى ، الكورينى الصديدى ، والكورينى غير المصنف ، والبوزودومونص ابروجينوزا وبكتريا القولون والفطريات والخمائر بترتليبه وجودهم .

وقد بحث استجابة الحملان المصابة للعلاج ووجد أن السلفوناميد مع البروكسين جنسيتين والداى هيدرو استربتومايسن تعطى أحسن نتائج عن الطرق العلاجية الأخرى .

بسم الله الرحمن الرحيم

الحمد لله رب العالمين

والصلاة والسلام

على سيدنا محمد وآله الطيبين الطاهرين
الذين هم خاتم النبيين وأجمع الصلوات
عليهم في كل يوم مائة مرة

اللهم صل على محمد وآل محمد
صلواتك عليهم في كل وقت
وكل حين

اللهم صل على محمد وآل محمد
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اللهم صل على محمد وآل محمد
صلواتك عليهم في كل وقت
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SOME STUDIES ON THE RESPIRATORY AFFECTIONS OF LAMBS

(with 5 tables)

By

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SUMMARY

Specimens for bacterial findings ; of 35 apparently healthy lambs taken from the respiratory tract were examined. Out of the total samples, 11 (31.43%) proved to be bacteriologically sterile. The flora of the normal samples included ; *Staph. epidermidis*, *B. mycoides*, *E. coli*, *Staph. aureus* and *Pasterurella multocida* type 11.

Samples from 157 diseased lambs were classified according to the way of treatment. The most frequent micro-organisms isolated before treatment were *Str. pyogenes*, *Str. alphahaemolytic*, *C. pyogenes*, unclassified corynebacteria, *Pseudomonas aeruginosa*, *E. coli*, yeasts and moulds in their order of frequency.

The respond of the sick lambs to treatment was investigated. Sulphadimidine in combination with penicillin procaine — G — and dihydrostreptomycin gave a better result than other methods of treatment.

INTRODUCTION

Respiratory affections in its various forms affect sheep of all ages and in all climates especially in norther regions in Egypt. Cold, dampness, increased humidity and rain lower the resistant of animals particularly the newly born lambs and predisposes for pneumonia (MIHAJLOVIC and BUT-OZAN, 1958). There are several types of pneumonia recognized in sheep. The most common is the acute condition, of world wide distribution occurring most often in lambs (GHARIB, 1962). Pneumona was designated as

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the cause of death among lambs all over the world (SAFFORD and HOVERSLAND, 1960 ; VELTER, NORTON, and GORRIGUS, 1960, and SHREVE, BIBERSTEIN and THOMPSON 1972). *Pasteurella* species have long been known to be associated with respiratory disease in sheep and was considered to be the secondary lung pathogens (HAMDY, 1958 ; PANDE, SEKARIAH, SHUKLA and BAXI, 1961 ; RATALICS and SZABO, 1964 ; BIBERSTEIN NISBET, and THOMPSON, 1967 ; HOSNY and FARRAG 1967 ; MISRA, MULLICK, RAO and KHERA 1970 ; and STAMATIN 1970). Respiratory diseases in lambs ; caused by *Str. pneumoniae* have been described by some authors, amongst them (DHANDA and CHANDRA 1958 and MISRA *et al.*, 1970). *C. pyogenes*, *Str. faecalis*, Staphylococci, haemophilus, coliforms and *Pseudomonas aeruginosa* have been isolated from the respiratory tract of diseased sheep (CHEEMA, KAZIMI and MAJEED, 1965 ; RAMACHANDRAN and SHARMA, 1969 and MISRA *et al.*, 1970). Pneumonia in sheep caused by pleuro-like virus (PLO) group has been described in Bulgaria by OGNJANOV, 1962 and in Hungary by ROMVARY, 1962. Yet viral pneumonia in Egyptian sheep is not uncommon (MOUSTAFA and BAHGAT, 1963).

The present work was initiated to carry out some studies on the causes of respiratory affections in sheep, especially on the bacteriological side and to test the efficiency of various antibiotics and other bacteriostatic drugs.

MATERIALS AND METHODS

Hundred and fifty seven Rhmany lambs were presented for the Veterinary Clinic at Saadeyeen, Zagazig province, Egypt within a period between March 1973 and February 1974. These lambs belonged to different farmers living in the same region and ranged from 4 to 6 weeks of age. The general health condition of these animals was subjected to careful examination. The clinical symptoms revealed respiratory disorders in the early stage with dry painful cough and nasal discharge. The temperature reached 40.8 to 41.6°C. There were rapid shallow respirations with exaggerated harsh sound. The pulse rate was high with a general depression and loss of appetite.

The diseased lambs were divided into the following four identical categories according to their treatment, in addition, to the control group which consisted of thirty five normal lambs aged between four to six weeks and examined for the bacterial flora in their respiratory tract. Faecal examination of all lambs for parasitic helminths was also carried out.

Group I : Consisted of 27 diseased lambs which received injection of a broad spectrum antibiotic *i.e.* oxytetracycline hydrochloride (Pan Terramycin Pfizer). Each ml. contain 30 mg. active terramycin. A dose of 0.3 ml./kg body weight was injected intra-mascularly daily.

Group II : Consisted of 35 diseased lambs showing the clinical signs of respiratory affection and treated with penicillin procaine - G- 5000 I.U. and dihydrostreptomycin sulphate in a dose of 20 mg/kg. body weight daily.

Group III : This group comprised 35 diseased lambs which received treatment with long acting sulphonamide (20% solution of 2-sulphanilamide-5 - methoxy - pyrimidine "Bayrena" - Bayer preparation) in a dose of 0.2 ml. as initial dose, followed by 0.1 ml. kg. body weight as maintainance dose daily.

Group IV : Consisted of 60 cases which were treated with penicillin procaine - G - and dihydrostreptomycin sulphate in doses mentioned before, dissolved in 2 ml. of 0.25% novocaine solution daily. These cases were given subsequently sulphadimidine solution in a dose of 0.2 g. per kg. body weight followed by 0.1 g. per kg. body weight as maintainance dose daily.

All groups received 15 ml. of cod liver oil per os and injection of 0.1% atropine sulphate in a dose of 0.5 mg./kg. body weight every other day.

Bacteriological Examination

Samples were collected by using sterile swabs from alive lambs and from the trachea and lungs of dead animals. Blood smears were made from each lamb and stained with leishman's to detect bipolar organisms. Samples were inoculated into the following media : nutrient agar, blood agar containing 5% defibrinated sheep blood, chocolate agar and Mac Conkey's agar media. The inoculated plates were incubated at 37°C for 24 -48 hrs. Sabouraud's blucose agar was also used for the isolation of fungi and yeasts. The inoculated plates were incubated at 25°C for 5 days and examined at intervals. The isolates obtained were identified morphologically, culturally, biochemically and serologically in accordance with those described by BAILEY and SCOTT (1962), EDWARDS and EWING (1964), CRUICHSANK (1968) and MERCHANT and PACKER (1969).

Indentification of Pasteurella species was done biochemically and the pathogenicity by inoculation of mice subcutaneously with 1 ml. of 24 hours broth culture. The characteristic bipolarity in stained blood smears from heart

blood of dead mice (4-8 hrs. after inoculation) was revealed. Type identification of *pasteurella* species by passive mouse protection tests (ROBERTS, 1947) was done by using specific type sera I, II, III, IV and V of *pasteurella multocida* 24 hrs. before challenge.

RESULTS

Out of 35 apparently normal lambs examined bacteriologically, 24 (68.57%) proved to harbour micro-organisms and the remainder samples (31.43%) proved to be sterile. From the results tabulated in (Table 1), it can be concluded that 35 different types of micro-organisms were isolated.

TABLE 1: Incidence and frequency of bacterial flora isolated from apparently normal lambs

Organisms	No. of strains	Incidence
Staph. aureus	3	8.57
Staph. epidermidis	8	22.86
Sarcina lutea	2	5.72
B. mycoides	4	11.42
B. subtilis	1	2.87
E. coli	5	14.28
Haemolytic <i>Bordetella bronchiseptica</i>	3	8.57
<i>Pasteurella multocida</i> type II	2	5.72
Yeasts	4	11.42
Staph. aureus + yeasts	3	8.57
Total	35	100%

From (Table 2), one can conclude that out of 157 diseased lambs with respiratory affections examined bacteriologically, 135 animals (86%) proved to be bacteriologically positive and contain specific micro-organisms. In the remaining 22 lambs (14%) the disease was due to non-specific bacterial causes. It will be seen from (Table 3) that a total of 258 bacterial isolates were investigated. The results of typing of microorganisms both morphologically, biochemically and serologically in case of *pasteurella species* was registered in the same table.

TABLE 2 : Results of the bacteriological examination from lambs suffering from respiratory affection

Group	Total Number of cases	Bacteriological Findings			
		Specific bacterial		Non Specific	
		No.	%	No.	%
I	27	20	12.74	7	4.46
II	35	31	19.75	4	2.54
III	35	33	21.02	2	1.27
IV	60	51	32.49	9	5.73
Total . .	157	135	86.00	22	14.00

Regarding to the response of the affected lambs to different types of medication it was found that ; in the first group, out of the diseased 27 lambs treated with Pan-teramycin, 20 of them cured within 7-10 days. 2 lambs passed to the chronic form and five died.

Thirty lambs out of 35 of the second group ; treated with penicillin and streptomycin ; had been completely cured within 4-7 days. Two lambs passed to the chronic form and 3 died.

In the third group ; treated with Bayrena ; 33 lambs out of 35 recovered within 4-6 days. One lamb passed to the chronic form and one died.

In the fourth group ; the response to penicillin and streptomycin injection and sulphadimidine (orally) was better and the percentage of recovery was 95% within 3-4 days (Table 4).

Bacteriological examination of the lungs and trachea of diseased lambs which succumbed during the course of treatment revealed different types of micro organisms (table 5).

TABLE 3: Organisms isolated from diseased lambs showing respiratory affections

Micro-organisms	Group I		Group II		Group III		Group IV		Total	
	No. of strains	Incidence %	No. of strains	Incidence %	No. of strains	Incidence %	No. of strains	Incidence %	No. of strains	Incidence %
I. <i>Micro-coccus species</i>										
Staph. aureus	6	2.32	7	2.70	10	3.86	15	5.79	38	14.66
Staph. epidermidis	3	1.16	2	0.77	6	2.32	5	1.93	16	6.18
Sarcina lutea	1	0.39	—	—	4	1.54	7	2.70	12	4.63
Gaffky tetragona	—	—	1	0.39	—	—	3	1.16	4	1.54
M. flava	2	0.77	2	0.77	—	—	—	—	4	1.54
—	—	—	2	0.77	—	—	—	—	2	0.77
II. <i>Streptococcus species</i>										
Str. pyogenes	7	2.70	14	5.41	15	5.79	17	6.55	53	20.46
Str. alpha-haemolytic.	4	1.54	6	2.32	5	1.93	4	1.54	19	7.33
Str. unclassified	2	0.77	5	1.93	6	2.32	9	3.47	22	8.49
—	1	0.39	3	1.16	4	1.54	4	1.54	12	4.63
III. <i>Gram positive bacilli</i>										
Erysipelothrix insidiososa	25	9.65	13	5.02	20	7.72	19	7.35	77	29.74
C. pyogenes	2	0.77	—	—	—	—	1	0.39	3	1.16
C. ovis	6	2.32	4	1.54	5	1.93	3	1.16	18	6.95
C. bovis	3	1.16	1	0.39	2	0.77	5	1.93	11	4.25
C. unclassified	4	1.54	1	0.39	2	0.77	1	0.39	8	3.09
B. mycoidis	2	0.77	4	1.54	4	1.54	6	2.32	16	6.17
B. cereus	5	1.93	3	1.16	6	2.32	2	0.77	16	6.17
—	3	1.16	—	—	1	0.39	1	0.39	5	1.94
IV. <i>Gram negative bacilli</i>										
Pasteurella multocida type II	15	5.78	9	3.48	20	7.73	29	11.21	73	28.20
Pasteurella multocida type IV	3	1.16	1	0.39	2	0.77	4	1.54	10	3.85
Klebsiella pneumoniae	1	0.39	—	—	—	—	1	0.39	2	0.78
Pseudomonas aeruginosa	4	1.54	—	—	3	1.16	4	1.54	11	4.21
E. coli	3	1.16	2	0.77	6	2.32	8	3.10	19	7.35
—	4	1.54	6	2.32	9	3.48	12	4.64	31	11.98
V. Yeasts and Moulds										
—	3	1.16	5	1.93	4	1.54	5	1.93	17	6.56
Total	56	21.61	48	18.54	69	26.64	85	32.83	258	99.62

TABLE 4 : Correlation between the various phases of treatment and response to medi

Number of group	Total Number of treated lambs	Results after medication					
		Cured		Failed			
		No.	%	Survival		Dead	
				No.	%	No.	%
I	27	20	74.0	2	3.4	5	18.6
II	35	30	85.7	2	5.7	3	8.6
III	35	33	94.3	1	2.8	1	2.8
IV	60	57	95.0	2	3.7	1	1.7

DISCUSSION

Very little is known about the bacterial flora of the respiratory tract in apparently normal and diseased lambs.

Investigation of the normal flora in contrast with that of diseased is very important for evaluation of the role played by different micro-organisms on the respiratory tract of sheep.

Samples were collected from thirty five apparently normal sheep for bacteriological examination, 24 samples harboured different micro-organisms and the remaining eleven samples proved to be sterile. The most predominant bacteria isolated were *Staph. epidermidis*, *E. coli*, yeasts, *B. mycoides* and *Pasteurella multocida* type II. These findings nearly coincide with the observations obtained by BIBERSTEIN and KENNEDY (1959) and HAMDY *et al.* (1959) who isolated *Pasteurella multocida* from the throat of 28 of 41 apparently healthy lambs and 23 of their 36 dams. To the best of our knowledge, this is the first time that *Pasteurella multocida* type II could be isolated from normal sheep in Egypt.

TABLE 5: Isolated organisms from pneumonic lungs and trachea of 11 dead lambs

Group	Number of carcasses examined	Bacteriological Findings												Total							
		Microcococcus species				Streptococcus species		C. pyogenes	pasteurella multocidis		Gram negative Rods		Total								
		staph. sures		staph. epider midis		sarcina lutea		str. pyogenes	Dipl pneumoniae		No.	%	No.	%	No.	%	No.	%			
I	5	2	9.52	—	—	—	—	—	—	1	4.76	2	9.52	—	—	3	14.29	1	4.76	10	47.61
II	3	1	4.76	1	4.76	2	9.5	—	—	—	—	—	—	—	—	—	—	2	9.52	6	28.56
III	1	—	—	1	4.76	—	—	—	—	—	—	—	—	1	4.76	1	4.76	—	—	3	14.28
IV	2	1	4.76	—	—	—	—	1	4.76	—	—	—	—	—	—	—	—	—	—	2	9.52
Total	11	4	19.04	2	9.52	2	9.52	1	4.76	1	4.76	2	9.52	1	4.76	4	19.05	3	14.28	21	99.97

Bacteria isolated from 157 specimens of respiratory affections included : *E. coli* (11.98% of 258 isolates) ; *Pseudomonas aeruginosa* (7.35%), *Pasteurella multocida* type II (3.85%), *Pasteurella multocida* type IV (0.87%), *C. pyogenes* (6.95%), *Staph. aureus* (6.18%), alpha. haemolytic streptococci (8.49%), unclassified corynebacteria (6.17%) and a few strains of other microorganisms. Nearly similar micro-organisms were also reported by RAMACHANDRAN and SHARMA (1969) and MISRA *et al.* (1970) who isolated *Pasteurella multocida* (6.8%), *E. coli* (15.5%), *C. pyogenes* (9.5%), *Pseudomonas aeruginosa* (5.5%) and a few strains of salmonella, staph., streptococci, neisseria and proteus from sheep with respiratory affections.

Regarding the response of the affected lambs to treatment in accordance to the different methods of medication, it was observed that the third and the fourth group responded mostly to medication and were better than in the first and second group.

The use of broad spectrum antibiotic (oxytetracycline hydrochloride) in the treatment of respiratory affections in new born lambs failed to give the desired results with a relatively high mortality rate (18.6%). Also the cured animals showed a rather fairly good healthy condition in comparison with the other groups used in this work. This may be due to the fact that this type of antibiotic have a toxic effect on the bone marrow especially in young animals, and may result in aplastic anaemia, leucopenia, thrombocytopenic purpura, granulocytopenia and pancytopenia with high mortality (SOLIMAN and ABD EL-MOTY, 1973). Therefore, its use should be restricted especially in new born animals.

A combination of penicillin and streptomycin was found to be less toxic and rather more effective when dissolved in a solution of 0.25% novocaine. From a previous study (EL-SHERIF and FAHMY, 1974) found that novocaine seems to provide a long acting bacteriostatic blood level, preventing bacterial accommodation and lessening the side effects of these antibiotics.

Long acting sulphonamide was proved to be more effective with a rather short course of treatment. These results were better when sulphadimidine was given orally in combination with injection of antibiotics as it appears to affect both Gram positive and Gram negative micro-organisms, *i.e.* of broad spectrum effect.

The use of an accessory supply of vitamin A, proved to be very important during the course of treatment to protect the epithelial covering of the respiratory system from the inflammatory damage. Also atropine sulphate was of value in preventing bronchospasm, collapse and keeping the respiratory passage opened. It could be concluded from this work that the best method of treating respiratory diseases in lambs was by using long acting and synergistic antibiotics and sulphonamides against both Gram positive and Gram negative bacteria.

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THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

REPORT OF THE

COMMISSION ON THE

STATUS OF THE

PHYSICS DEPARTMENT

FOR THE YEAR

1954-1955

BY

THE COMMISSIONERS

AND

THE DEPARTMENT

CHAIRMAN

AND

MEMBERS

OF THE

COMMISSION

ON

THE

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