Clinical and Etiological study on respiratory affections of sheep

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Abstract

The results of this study illustrate that the respiratory affections of sheep occure in two froms the first one was sever with acute signs while the other mild with prolonged cough and loss of body condition. The bacteria associated with such affections were isolated in single and mixed form. The most prevalent isolated bacteria was Mannheimia haemolytica that also associated with sever and acute signs. E.coli, Pasteurella multocida, Staphylococcus aureus, Klebsiella pneumoniae , Pseudomonas aeroginosa, Streptococcus pneumoniae and Salmonella were isolated at variable percentages. The antibiogram and treatment trials revealed that the most effective antimicrobial agents againts these bacteria were flurophenicole and enrofloxacin but oxytetracyline shown reduced activity in both antibiogram and treatment trials.

Key words Sheep, Respiratory affection, Mannheimia haemolytica, Treatment.

Introduction:

Respiratory affections occur frequently in sheep. In many countries respiratory diseases represent the most serious sheep problem and can be an important cause of death and reduced productivity (Martin, 1996). Respiratory disorder appears to be a complex disease. Many infectious agents synchronized with stress and/or environmental factors responsible for such disease causing a considerable level of economic losses of the infected flocks (Alley, 1975; Al-darraji et al., 1982 and Sharma and Woldehiwet, 1991). The infectious agents associated with respiratory affections of sheep include viral agents such as PI3 virus, Reo virus, Respiratory syncytial virus and Ovine adenovirus type 6 (Sharp and Nettleton, 2000). Mycoplasma ovipneumoniae and Mycoplasma argini also incriminated as cause of respiratory disease condition in sheep. The viral and mycoplasmal agents causing low grade respiratory disease with mild signs after extended period of infection (Martin, 1996). Those which cause mortalities and obvious acute clinical signs are associated with bacterial agents particularly Mannheimia haemolytica (Donachie, 2000).

The fundamental goal of the present work carried out to:

1-Clinical description of the respiratory disorder manifestation in sheep.

2-Isolation and identification of the possible causative bacterial pathogens from diseased animals.

3- Antibiogram of the isolated bacterial agents, and treatment trials of some forms of the disease with different drugs to reaching the most suitable one.

Materials and Methods:

Animal and history:

542 Living sheep of different ages, sexes and breeds were examined clinically in the field for investigation of the animals suffered from signs of respiratory problems [nasal discharge (serous – mucoid - mucopurulent), lacrimation, and

coughing and abnormal lung sound by auscultation]. Those animals w reared in private farms at desert road and Sadat City. Others were rea mobile flocks at Kafer Dawood village, Wadeielantron village and Etral village).

Sheep reared in the private farms were reared in properly ventilate night and during the day they kept in wide yard with hygienic conc good plane of nutrition in which the sheep fed daily on 1.5 kg concent hay or green bressem also they were administrated broad spect parasitic drug at regular interval as well as they vaccinated against diseases. But those of mobile flocks were reared in bad hygienic c poor nutrition. As they graze along the day on any area contain any h at night they kept with other flocks in narrow and poorly ventilated moisten earthy ground. Dead sheep at farms and slaughtered abattoirs subjected for postmortem examination, for collection of p lungs showing different degree of pneumonia (congestion, consolid hepatization).

13 Swiss mice about 18-22 gram weight were used for determinati virulence of the isolated Pasteurella multocida. These mice were obta the laboratory animal house at the Faculty of Veterinary Medicine S Menoufia University.

Collection of samples and laboratory procedures:

Nasal swabs:

Sterile cotton swabs were used for collecting nasal swab samp diseased (135) and apparently healthy sheep (50). (William et al., 199

Lung tissues:

105 lungs with various degree of pneumonia collected from freshly sla animal at El-Bassatin, El-Moonib abattoirs and from died cases in the 20 normal lungs had been collected separately in sterile plastic b transported to laboratory on an ice tank within two hours of collection.

Bacteriological examination:

Primary isolation and purification:

Nasal swabs were incubated at 37°c for about 4 hours aerobically th from the broth of the swab subcultured on blood agar, DAS medi barker media and MacConkey's agar. As well as the surface of pneum tissues were sterilized using hot spatula and incision made using steri then loopful of internal tissue were inoculated on the above mentione (Nadra, 1998).

Identification of the isolated strains:

Pure colony from each isolate was identified morphologically accordir staining reaction, shape, size and arrangement. Merchant and Packe Blobel and Schliesser (1981) and Fingegold and Martin (1982)

The various members of family Enterbactericeae were typed bioc according to Krieg and Holt (1984). Pseudomonas typed biochen described by Quinn et al., (1994). Gram positive cocci included me genera Streptococcus and Staphylococcus. were identified bioc according to Queen et al., (1994).

The suspected isolates of P.haemolytica were typed biochemically into T and A types according to Buchanan and Gibbons (1974) and the pathogenicity test of Pasteurella multocida isolates were carried out according to (Amany, 1998).

Antibiotic sensitivity test of the isolates:-

This test performed by the disc diffusion method according to (Amany, 1998). The antibiotic discs were obtained from Oxoid were Amoxycillin 25µg, Erythomycin 10µg, Gentamycin 30µg, Peicillin G 10 units, Oxytetracyclin 100µg, Lincomycin 10µg, Enrofloxacin 10µg and Florofenicol 10µg.

Treatment trials:

Four protocols of treatment were performed:

The first protocol:

10% Enrofloxacin (Medtryl® Arabcomed) intramuscular injection 5mg / kg B.wt, for 5 days with 2.5% Diclofenac sodium (Diccloflam® Unipharma).1mg / kg. B.wt intramuscular injection for 2 days and AD3E+C (Advit C® Adwia) 2ml per animal injected intramuscularly for 5 days. This protocol applied upon 15 animals.

The second protocol:

Florfenicol (Nuflor® Schering-Pough) intramuscular injection 20mg / kg B.wt in two doses 48hrs apart with injection of Diclofenac sodium for 2 days and AD3E+C injected intramuscularly for 5 days. This protocol applied upon 15 animals.

The third protocol:

Oxytetracycline long acting (Terramycin L.A® Pfizer) 20mg / kg. B.wt. intramuscular injection in two doses 48hrs apart with Diclofenac sodium intramuscular injection for 2 days and AD3E+C injected intramuscularly for 5 days. This protocol applied upon 15 animals.

The forth protocol:

Only two injection of Amoxycillin long acting (Trioxyl® Univet) 15mg / kg. B.wt. at 48 hrs intervals by intramuscular route with Diclofenac sodium intramuscular injection for 2 days and AD3E+C injected intramuscularly for 5 days. This protocol applied upon 15 animals.

Results

Description of the clinical signs and postmortem finding associated with respiratory affections of sheep in relation to bacterial isolate:

135 animals from 542 sheep showed various signs of respiratory disorder. From those 83 sheep showing sever respiratory signs and 52 sheep with mild signs.

Table (1) illustrates the clinical signs and postmortem examination in re to main bacterial isolated from cases.

Main bacterial isolates	Clinical signs	Postmortem examina
Pasteurella haemolytica (alone or in combination with other bacteria)	Sever respiratory signs that include fever (ranged from 40°C to 42°C) with anorexia, depression. All these sheep showed bilateral mucopurulent nasal discharges and crusting around the nostrils and lacrymation fig. (1). Mouth breathing in most cases as well as cough was prominent and frequent and usually associated with expulsion of nasal discharges after coughing. Chest auscultations revealed exaggerated vesicular sound in some cases. In other cases moist rales with gargling sound was presented. In other cases no lung sound can be heard over the lung area.	Sever congestion all the lung with b purplish solid areas. the lung was he edematous with pete hemorrhage over lung, in the trachea ar the heart Figure Other cases sho sever congestion hepatization of the ve part of diaphragn lobe. Figure (4). C cases showed s hyperemia and edem the l
Pasteurella multocida	Similar to the signs associated with pasteurella haemolytica	Congestion with pete hemorrhages and ma emphyse
Other bacterial agents : (Staph., Strept., Ecoli., Klebsiella., pseudomonas and salmonella) In single or mixed form.	Thick mucopurulent nasal discharges and seromucoid nasal discharges fig (2) with intermittent cough. The body temperature about 39.5°C, but chest auscultation in most of cases was dry rales and frictional sound.	Various degree congestion and gra discoloration of the with ecchym

Bacteriological findings:

Identification of bacterial isolates revealed the recovering of single and mix isolates from the nasal swabs of diseased and lung tissues of slaughtered animals and from apparently healthy animal.

The following bacteria had been isolated from the respiratory tract of disea and apparently healthy sheep (Pasteurella haemolytica, Pasteurella multo

E.coli, Klebsiella pneumoniae, Salmonella, Pseudomonas aeroginosa, Staphylococcus aureus and Streptococcus pneumoniae).

The percentage of infection and bacterial isolates were illustrated in table (2)and (3). respectively.

All the isolates of Pasteurella haemolytica belonged to Pasteurella haemolytica biotype A (recently called Mannheimia haemolytica) fig (5). All the isolates of Pasteurella multocida were pathogenic strain killed all inoculated mice with within 24 hours after inoculation .Fig (6) showed pasteurella bipolarity in stained blood smear of inoculayed mice.

Table (2): The percentage of bacteria isolated from respiratory tract of apparently healthy and diseased sheep.

	Apparently healthy animals			Diseased animals		
	Number examined	+ ve for isolation No	%	Number examined	+ ve for isolation No	%
Nasal swab	50	35	70%	135	113	83.7%
Lung tissue	20	6	30%	105	75	71.42%
Total	70	41	58.57%	240	188	78.33%

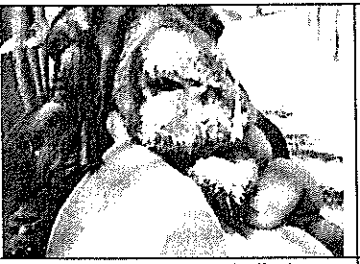

Fig (1): Bilateral mucopurulent nasal discharge with crusting.

Fig (2):Thick mucopurulent nasal discharge

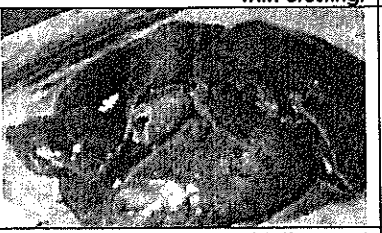

Fig (3):Lung congested with consolidation and pericarditis

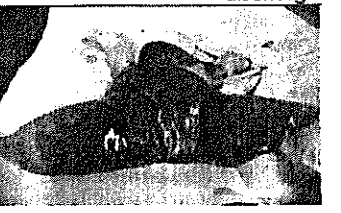

Fig (4):Lung enlarged congested with emphysema and petechial haemorrhage

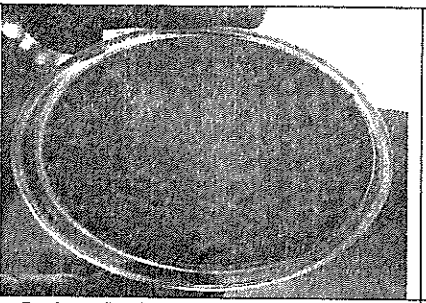

Fig (5): Pasteurella haemolytica on 7% sheep blood agar with β haemolysis

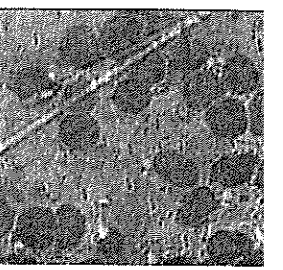

Fig (6): Blood smear of mice pasteurella multocida b

Discussion

In many countries respiratory diseases were the most serious sheep probl and an important cause of death and reduced productivity (Martin, 1996).
Clinical examination revealed that the affected sheep suffering from fe (temperature above 40°c) with mucoid to mucopurulent nasal discharges a crusting around the nostrils with depression in some cases. Chest auscultat was the presence of abnormal lung sounds as moist rals, exaggera vesicular sounds as well as bubbling sound also were heard in some cases. other cases no lung sound could be detected over the lung area but the he sound is clear from the right chest side. From these signs the affected she suspected to be suffered from bronchopneumonia. These signs were recorc by Yousif, 1981; Elyas, 1993; Sadiek et al., 1993; Abdel-Salam and Abd 1994; Mary and David, 1994; Martin, 1996 and Zaitoun, 2001, they describ the clinical findings in sheep suffering from acute bacterial pneumonia.

The results of clinical examination are also supported by the records Donachie, 2000; Radostitis, et al., 2000 and Mona et al., 2005 as th described mild clinical disease with seromucoid and thick tenacious na discharges and intermittent cough. Chest auscultation reveals the presence dry rales and friction sound.

Table (2) illustrated The incidence of bacterial isolation from nasal swab w 70% and 30% from apparently normal lung. These figures were nearly simi to that obtained by Faten, 2001 but less than that obtained by Nadra, 1998.T bacterial isolates recovered from apparently healthy sheep were Pasteure haemolytica, E.Coli, pseudomonas aerginosa, Staphylococcus aureus a Staphylococcus epidermidis. Mixed isolates of Pasteurella haemolytica w E.Coli and E.Coli with Staphylococcus aureus and with Staphylococc epidermidis were also recovered. This result agreed with the finding of El-She and Abd-El-Ghani, 1974 and Nadra, 1998. On the other hand Faten, 200 Isolated Pasteurella multocida and Corynbacterium pseudotuberculosis fr apparently healthy sheep. The recovery of the different bacterial isolates fr the nasal swabs of apparently healthy sheep refered to the presence of t carrier animals within the herd representing a source of infection to other she in the herd. While the isolation of bacterial agents from apparently normal lu

may be indicating subclinical infection or from contamination of lung tissue during the bad handling of carcass in the abattoirs. It well known that about 40% of healthy animals carry Pasteurella species in the upper respiratory tract that under the stress factors causing respiratory disease (Radostitis, 2000 and The Merck Veterinary Manual, 2006)

Bacteriological examination of the nasal swabs of diseased sheep as well as pneumonic lung tissues revealed the presence of many bacterial species as a single isolates or in mixed forms. This agree with many authors as Alley and Clark, 1980; Nadra, 1998; Faten, 2001; Zaitoun, 2001 and Mona et al., 2005. The following bacterial isolates had been isolated from nasal swabs of diseased sheep and pneumonic lung tissue; Pasteurella haemolytica, Pasteurella multocida, E.coli, Klebsiella pneumonia, Salmonella, Pseudomonas aeroginosa, Staphylococcus aureus and Streptococcus pneumoniae. These bacterial isolates also isolated by Sambyal et al., 1980; Baysal and Guler, 1992; Queen et al., 1994; Nadra, 1998 and Mona et al., 2005. The percentage of bacterial isolation from the diseased animals was 78.33% which includes 113 isolates out of 135 examined nasal swab of diseased sheep (83.7%) and 75 out of 105 pneumonic lung tissue examined (71.42%). This was similar to the incidence of bacterial isolation by Kaya and Erganis, 1991 and Mona et al., 2005. But less than the incidence of bacterial isolation by Elsherif and Abdel-Ghani 1974, Nadra, 1998, and Faten, 2001.
Pasteurella haemolytica was the more commonly isolated bacteria from diseased sheep either from nasal swabs or pneumonic lung tissues. Table (3) presented the percent of isolation of Pasteurella haemolytica were 26.54% and 26.66% from the nasal swabs or pneumonic lung tissues, respectively. On the other hand Pasteurella multocida was unusually isolated from the diseased sheep. Only the percent of its isolation were 3.54% and 12% from nasal swabs and pneumonic lung tissues, respectively. These result were in accordance with Elsherif and Abdel-Ghani, 1974; Davis, 1985; Younan et al., 1988; Kaya and Erganis, 1991; Baysal and Gular, 1992; Queen et al., 1994; Bouljihad and Leipold, 1995; Mohamed, 1996; Nadra, 1998; Faten, 2001; Gelagay et al., 2004 and Mona et al., 2005. Hancock et al., 1991 recorded that Pasteurella multocida was the common isolated bacteria from pneumonic sheep.

Pasteurella haemolytica isolated in combination with E.coli at percent of 9.04% which includes 10 isolates from nasal swab (8.85%) and 7 isolates from pneumonic lung tissues (9.33%). This agreed with Nadra, 1998. Mona et al., 2005 isolated also Pasteurella multocida in combination with E.coli from nasal swab and lung tissues of diseased sheep.Pasteurella haemolytica was also isolated in combination with gram positive bacteria mainly Staphylococcus aureus (5.31%) which includes 7 isolates from nasal swab (6.19%) and 3 isolates from pneumonic lung tissues (4%). Nadra, 1998 isolated Pasteurella haemolytica in combination with gram positive bacteria which in his case was Streptococcus pneumoniae from the nasal swabs at percent of 9%. Biotyping of Pasteurella haemolytica isolates in this study revealed that 100% of the isolates belong to Pasteurella haemolytica biotype A (Mannheimia haemolytica). This agreed with the result obtained by Blanco-viera, et al., 1995. The results obtained by Guler et al., 1996 and Mohamed, 1996 indicated the

isolation of both biotype A and T with also untypable strains. Dunbar e 1990 isolated both biotypes from tonsillar biopsies rather than from the swabs.Pathogenicity test of Pasteurella multocida revealed that all Paste multocida isolates were pathogenic to the mice. These results we accordance with that recorded by Amany, 1998. on the other hand Zincir, illustrated that only 86.7% of the isolated Pasteurella multocida from s suffering from respiratory disease were positive in mice pathogenically test.

Table (3) illustrated the percent of isolation of different member Enterobacteriace. E.coli was the common members of this family frequ isolated from both nasal swab as well as from pneumonic lung tissues. total percent of isolation was 12.23% that include 17 isolates from nasal s (15.04%) and 6 isolates from pneumonic lung tissues (8%). These r agreed with El-sherif and Abdel-Ghani, 1974; Faten, 2001 and with Mona e 2005. Sambyal et al., 1980 recorded a percentage of its isolation of 27.7% Elyas, 1993; Nadra, 1998 and Zincir, 2004 recorded a percentage o isolation of 3%, 7.7% and 2.8% , respectively. The differences betwee records were mainly due to the geographical distribution at which investigator was adopted. E.coli isolated in combination with Staphyloco aureus from both nasal swabs and pneumonic lung tissues at percent of and 8% respectively. These results agreed with Zincir, 2004 and Mona e 2005.Klebsiella pneumonia isolated from diseased sheep at percent of 7. which includes 9 isolates from nasal swabs (7.96%) and 6 isolates pneumonic lung tissues (8%). This agreed with Ikede 1978; Kaya Erganis, 1991; Gameel et al., 1991; Elyas 1993; Queen et al., 1994; N 1998; Faten, 2001 and Mona, et al., 2005. Sambyal et al., 1980 record percentage of its isolation of (17%). Klebsiella pneumoniae had been iso in combination with pseudomonas aeroginosa from nasal discharge of case Salmonella had been isolated from the nasal swabs of diseased she percent of 3.54%. These result agreed with that obtained by Mona e 2005.Table (3) presented the isolation of Pseudomonas aeroginosa from nasal swabs and pneumonic lung tissues. The total percentage of its isol was 5.85% that include 8 isolates from nasal swabs (7.079%) and 3 cases pneumonic lung tissues (4%). These result agreed with that obtained b sherif and Abdel-Ghani, 1974; Nadra, 1998 and Mona et al., 2005. On the hand Sambyal et al., 1980; Baysal and Guler, 1992 and Zincir, 2004., rec lower percentage of isolation of Pseudomonas aeroginosa.

Staphylococcus aureus had been isolated at percent of 10.63% that incl include 12 isolates from nasal swabs (10.61%) and 8 isolates from pneum lung tissues (10.66%). That result agreed with Baysal and Gular, 1992 Sukhon, 1995; Nadra, 1998 and Mona et al., 2005. On the other hand Sherif and Abdel-Ghani, 1974; Sambyal et al., 1980 and Elyas, 1993. rec a percentage of isolation of 6.2%, 3.1% and 6%, respectively. Zincir, recorded a percentage of isolation of 17.7%.Streptococcus pneumoniae isolated at percent of 6.38% that include 5 isolates from nasal swabs (4. and 7 isolates from pneumonic lung tissues (9.33%). These result agreed El-sherif and Abdel-Ghani, 1974; Sambyal et al., 1980, Elyas, 1993; N 1998 and Mona et al., 2005. On the other hand Zincir, 2004., recorded a

percentage of isolationThe antibiogram of isolated bacteria shown that most isolates were sensitive to Flurofenicole, Enrofloxacin, Amoxycillin and Gentamycin. While moderate sensitivity showed against Oxytetracycline, Penicillin and Erythomycin. But most of them were resistant to Lincomycin. This was similar to the antibiogram result of Zaitoun, 2001 and Mona et al., 2005. While it differed with Faten, 2001 who reported that most bacterial isolates recovered from pneumonic sheep are highly sensitive to Oxytetracycline and Erythromycin but she did not test these bacteria against Enrofloxacin, Amoxycillin.

The different treatment trials applied on the diseased animals using different antibacterial agent indicating that the rapid and complete recovery result was from florofenicol administration. The use of enrofloxacin also showed good result that agreed with Zaitoun, 2001, and similar to the findings obtained by Cusack et al., 2003. Who found that flurofenicol was used to effectively reducing replase and case fatality rates. Also he found that enrofloxacin had been used to effectively respiratory diseases in USA. and Europe. Also agreed with Ronald et al., 2004 who advise the use of aggressive antimicrobial therapy using one or combination of tilmicosin, florofenicol, cetiofur or enrofloxacin. Long acting amoxycillin had been given good results in treatment of infected cases. The unstasfactory results were by using of oxytetracycline this might be due to development of bacterial resistance against /the oxytetracycline. Which disagreed with Nadra, 1998; Donachie, 2000; Faten, 2001. They recorded that the Oxytetracycline gives good result in treatment of pneumonic cases.

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الملخص العربي

من خلال هذة الدراسة تبين أن الأصابات التنفسية في الأغنام توجد في صورتين . الأولـــي تكون في صورة شديدة مع أعراض حادة و الأخرة في صورة مزمنة وأقل حدة مع كحـــة مستمرة و ضعف عام. كما تم عزل البكتريا المسببة للإصابة في صورة منفردة ومختلطـــة. مثل البستريلا هيموليتكا والبستريلا ملتوسيدا و ايشيريشيا القولـــون و الكلبســـيلا الألتهـــاب الرئوي و السلمونيلا و بكتريا الصديد الأخضر وبكتريا العنقود الذهبي وبكتريا المكيـــروب السبحي الرئوي كم تم ربط التغيرات الباثولوجية مع البكتريا المعزولة.اوضحت نتيجة أختبار الحساسية للبكتريا المعزولة أن كل البكتريـــا المعزولـــة حساســـة لعقـــار الفلورفينيكـــول و الأنروفلوكساسين وأقل حساسية لكل من الجنتاميسين والأموكســـللين و مقاومـــة لكـــل مـــن اللنكوميسين والأوكسي تتراسيكلين والبنسلين. ومن خلال تجارب العـــلاج كـــان كـــل مـــن الفلورفينكول و والأنروفلوكساسين هما الأكثر سرعة في معدل الشفاء وتحسن الحالات.

Antibiogram of the isolated bacteria:

The antibiogram of isolated bacteria shown that most isolates were sensitive to Flurofenicole, Enrofloxacin, Amoxycillin and Gentamycin.as shown in table (4).

Table (4) showed the result of antibiogram test.

	Enrofloxacin	Amoxycillin	Erythromycin	Gentamycin	Pencillin-G	Oxytetracyclin	Florofenicole	Lincomycin
1-Pasteurella haemolytica	+++	++	+	++	+	++	+++	+++
2-Pasteurella multocida	+++	++	-	++	+	+	+++	+++
3-E.Coli	+++	++	-	+	-	+++	+++	+
4-Klebsiella pneumoniae	++	-	-	++	-	+	++	-
5-Salmonella	++	+	+	++	-	++	++	-
6-pseudomonas aerginosa	+++	+	+	++	-	-	++	-
7-Staphylococcus aureus	++	+++	+	-	++	+	+	-
8-Streptococcus pneumoniae	++	++	+	++	+	-	+	-

Treatment trials:

Treatment protocol	Cases progress
First	10 cases completely recovered after 3 days. 5 cases recovered after 5th day of treatment
Second	All 15 cases completely recovered after 1st dose.
Third	6 cases recovered completely after 3rd day. 9 cases recovered after 5th day of treatment
fourth	12 cases recovered after second dose. 3 cases recovered after 5th day of treatment

Table (3): The percentage of each bacterial isolate isolated from respiratory tract of apparently healthy and diseased sheep

Bacterial isolates	Apparently healthy						diseased					
	Total		Nasal swab		Lung tissue		Total		Nasal swab		Lung tissue	
	No	%	No	%	No	%	No	%	No	%	No	%
A- Single isolates:												
1-Pasteurella haemolytica	5	12.2%	5	14.3 %	-	-	50	26.59%	30	26.54%	20	26.66%
2-Pasteurella multocida	-	-	-	-	-	-	13	6.91%	4	3.54%	9	12.00%
3-E.Coli	6	14.6%	4	11.4 3%	2	33.33%	23	12.23%	17	15.04%	6	8.00 %
4-Klebsiella pneumoniae	-	-	-	-	-	-	15	7.97%	9	7.96%	6	8.00 %
5-Salmonella	-	-	-	-	-	-	4	2.13%	4	3.54%	-	-
6-pseudomonas aerginosa	2	5 %	2	5.7 %	-	-	11	5.85%	8	7.079%	3	4.00 %
7-Staphylococcus aureus	7	17.1%	6	17.4 %	1	16.60%	20	10.63%	12	10.61%	8	10.66%
8-Streptococcus pneumoniae	-	-	-	-	-	-	12	6.38%	5	4.42%	7	9.33 %
7-Staphylococcus epidermidis.	10	24.4%	8	23%	2	33.33%	-	-	-	-	-	-
B-Mixed isolates:												
1-P.haemolytica+ E.Coli	2	5 %	2	5.7 %	-	-	17	9.04%	10	8.85%	7	9.33 %
2- P.haemolytica+Staph.aureus	-	-	-	-	-	-	10	5.31%	7	6.19%	3	4.00 %
3- E.Coli+Staph.aureus	2	5 %	2	5.7 %	-	-	12	6.38%	6	5.4%	6	8.00 %
4-Klebsiella pneumoniae+Pseudomonas aeroginosa	-	-	-	-	-	-	1	0.53%	1	0.88%	-	-