Bacterial Nasal Carriage in Cattle in Jordan

Haydar, Kh. AL –Maliky

Thi-Qar University, Medicine College, Microbiology Dept.

Abstract

Bovine respiratory diseases causes serious economic losses due to high mortality rate, decrease in production, treatment cost and decrease in growth rate of animals. In this study, 50 nasal swabs from apparently healthy living cattle were collected from October 1998 through December 1998, for detection of nasal bacterial carriage in Jordan.

There are several important bacterial isolates such as Corynebacterium *spp*, *Pasteurella haemolytica*, *Streptococcus spp*, *Staphylococcus aureus*, *Escherichia coli*, *Proteus spp* and *Pseudomonas spp*, were isolated from nasal carriage of apparently healthy animals in 17.07%, 8.53%, 7.31%, 6.09%, 6.09%, 2.43%, 2.43% respectively. Besides, *Micrococcus spp* were isolated in 24.39% and *Staphylococcus saprophyticus* were isolated in 25.09% . It is predicted that some of nasal carriage might be play an important role in cattle pneumonia especially when animal was suffered from stress or suppressed immunity.

الخلاصة

إن إصابة الجهاز التنفسي في الأبقار تسبب خسائر اقتصادية كبيرة وهذه الخسائر متمثلة بارتفاع نسبة الوفيات في الحيوانات وكلفة العلاجات وقلة أو نقصان في الإنتاج علاوة على انخفاض في نمو الحيوانات المصابة.

في هذه الدراسة تم جمع 50 مسحة أنفية من أبقار سليمة صحياً من الناحية الخارجية في الفترة المحصورة من October 1998 وخلال December 1998 لغرض تحديد وعزل البكتريا الموجودة في المجاري العليا التنفسية (المنخرين) للأبقار وأجريت الدراسة في الأردن.

لقد أوضحت النتائج أن هناك عدد لا بأس فيه من العزولات الجرثومية مثل جراثيم *Pasteurella haemolytica* و *Staphylococcus aureus* و *Streptococcus spp* و *E.coli* و *Corynebacterium spp* و *Proteus spp* و *Pseudomonas spp* علاوة على جراثيم *Micrococcus spp* وجراثيم *Staphylococcus saprophyticus* وبالنسب الآتية 53،8%و 6،09 %و 7،31%و 6،09%و 31،17%و 43،2%و 43،2% على التوالي.

من هذه النتائج نستدل على أن هذه العزولات الأنفية تلعب دوراً مهماً في حدوث التهاب الرئة في الأبقار خصوصاً عندما تعاني هذه الحيوانات من عوامل الكرب (Stress) أو نقصان في المناعة.

Introduction

In Jordan, there is no previous study was carried out to determine the bacterial nasal carriage in cattle, therefore the aim of study was detected the important commensally nasal isolates in cattle. Pneumonia in cattle occurs through out the year. However, the seasonal predomination, according to the etiology, such as in the summer or fall is not uncommon[1].

The causes of cattle pneumonia represent different complexes and various ranges which might be viral, bacterial, Parasitic and fungal agents. These agents together or with other non biological agents known as stress factors such as transportation, bad management, environmental and nutritional ones play important role in decreasing the immune response of animals and enhance the rapid growth of inhabiting bacteria which then become more virulent[2]. The common and important pneumonia causing bacteria are the *Pasteurella* (p) species especially the *Pasteurella multocida*, *P. haemolytica*, *Haemophilus spp*, *Mycoplasma* (M) *dispar*, *M. bovirhinis*, *Ureaplasma spp*, certain *Salmonella spp* and others, either alone as primary causative agent or accompanied with some viral infections[3].

In the USA, pneumonia in cattle, sheep and goats is caused by *p. haemolytica* and costs the producers a loss of about one billion dollars annually (4). Since *P.haemolytica* inhabits the nasal passages of these animals, Pneumonia most probably, develops when the animals suffer a variety of stresses [5].

Materials and Methods

50 nasal swabs from apparently healthy living cattle were collected from October 1998 through December 1998, each swab was immersed in Nutrient broth and transported, promptly in a pre-cooled box, to the Microbiology Research Laboratory, Dept. of Basic Vet. Med. Sci. Faculty of Veterinary Medicine, Jordan university of scince and technology, Irbid. Swabs were incubated aerobically at 37 °C for 24 hours.

For further identification of the bacterial isolates different biochemical activities criteria cited in Diagnostic Microbiology[6], Essential of Microbiology and Mycology[7] were carefully followed. The different cumulated strains were preliminary belonging to the following bacteria genera *Staphylococcus*, *Corynebacterium*, *Escherichia* and *Pasteurella*. Their staining reaction was determined by Gram Stain[6], Albert Stain (Albert Laybourn method) and Methylene blue[8].

Results

As shown in table 1, nine different bacterial species were obtained from bacterial examination of (50) apparently healthy living cattle, represented by 82 isolates. *Staphylococcus saprophyticus* was the common isolated microorganism (25.09%), followed by *Micrococcus spp.* (24.39%), while only 2 isolates (2.43%) for each *Proteus spp.* And *Pseudomonas spp.* were obtained.

Table 1: shows important bacterial nasal carriage isolates in bovin

Number of isolates (%)*	Bacterial isolates
14 17.07	*Corynebacterium spp.*
7 8.53	*Pasteurella haemolytica*
6 7.31	*Strepticoccus spp.*
5 6.09	*Staphylococcus aureus*
5 6.09	*E. coli*
2 2.43	*Proteus spp.*
2 2.43	*Pseudomonas spp.*
20 24.39	*Micrococcus spp.*
21 25.09	*Staphylococcus saprophyticus*

%* : percentage

Discussion

Respiratory system is an important and vital system. Its efficacy depends on mainly upon its ability to supply the blood with oxygen and remove carbon dioxide from it. Any change or defect in the function of this system will be reflected badly on the health and production[9].

Respiratory disorders are reflected, economically, on the animal production. Pneumonia is one form of respiratory system diseases which occurs in all domestic animals and human, it develops by multiple etiology and as a result of complex interactions between three main factors, namely, the pathogens, the environment and intrinsic host factors[10].

The microorganisms were isolated from the nasal passages of cattle, *Corynebacterium spp* was isolated in 17.07%, *P.haemolytica* was isolated in 8.53%, *Streptococcus spp.* in 7.31%, *S.aureus* in 6.09%, *E.coli* in 6.09%, each of *Proteus spp.* and *Pseudomonas spp.* in 2.43%. Accordingly, they may be of remarkable consideration in the development of pneumonia among cattle, especially if the animals suffer from some defect in their immune status and/or when they are under stress[5], Rafael *et.al* ; 1995 obtained similar results especially for the *P.haemolytica* .

They explained that the bacteria inhabiting the nasal passages can cause pneumonia when the animal suffered a variety of stresses [4]. Similar conclusion was achieved by Zinsser, 1992. These bacteria especially Pasteurella haemolytica , Staphylococcus aureus and Corynebacterium spp. have important role in an incidence of cattle pneumonia in Jordan(11) and many scientists conducted the role of bacterial causes in cattle pneumonia, most of sudden death cases in cattle are due to infectious pneumonia (12)

References

1- Kamp, E.M.; ter laak, E. M.; dejong, M. F. "A typical *Pasteurella* strains producing a toxin similar to the dermonecrotoxic toxin of *pasteurella multocida* subspecies *multocida* " Vet Res.126 (17), (1990), PP: 434-437.

2- Omar, A. R. "The aetiology of Pneumonia in calves". Vet. Bull. 36, (1966), PP:259-273.

3- Bryson, D.G.; "Calf Pneumonia"; Vet. Clin. North.

Am. Food. Anim. Pract. 1, (1985), PP: 237-257.

4- Rafael, R.R.; Kim, A. B.; Randall, C.C. "The influence of immunization on the Pulmonary inflammatory response of rabbits induced by *Pasteurella haemolytica* A1 Lipopolysaccharide" Infect. Immun. 36(10), (1995), PP: 9-12.

5- Robert, E.B.; Glynn, F.H.; Emilies, S.Z. "Development and testing of a selectable challenge of *Paseurella haemolytica* for Studies of upper-respiratory colonization of cattle" Infect. Immun. 5(4), (1997), PP: 5-6.

6- Baron, J. E.; Finegold, M.S. " Diagnostic Microbiology" Williams and Wilkins, London, 4th edition, (1990), PP: 210-250.

7- Carter, G.R.; Chengappa, M. M.; William, G.; Rikihi, Siay. "Essential of Microbiology and Mycology"; Lea and Febiger, 4th edition, (1991), PP: 212-220.

8- Collins, C.H.; Patricia, M.L. "Microbiology Methods" Butter and Tanner LTD from and London 5th edition (1985), PP: 98-99.

9- Ganong, W.F. "Review of Medical Physiology" Librairie Du liban, Lebanon, 11th edition, (1983), PP: 165-170.

10- Aiello, E.S.; AsaMays " The Merk Veterinary Manual" Merk and co.Inc. N.J. USA eight edition, (1998).

11- Haider ,Kh. Sh. " Studies on the Bacterial isolates and Pathology of Bovine pneumonia in Jordan , M.Sc. degree (2001) , pp: 60-61.

12- Pierson , R. E. ; Jensen, R.; Lauermann, L.H.; Sari, D.A.; Braddy, P.M.; McChesney, A.E.; Horton, D.P. " Sudden death in yearling feedlot cattle" J. Am. Vet. Med. Assoc. 169, (1976)