

قسم : الميكروبيولوجى - معهد صحة الحيوان - الدقى - الجيزة

دراسات على ميكروب المكور السبحى الرئوى المسبب للالتهاب السحائى  
فى عجيلات الجاموس

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- ١- ظهرت فى مزرعة المرج للتسمين حالات عصبية بين العجول الجاموس فى سن ٦ - ٨ شهور
- ٢- الأعراض المرضية عبارة عن تصلب القوائم والرأس تميل الى الخلفاً ويقظه شدة بدون ارتفاع فى درجة الحرارة والنفوق فى ظرف من ٢ - ٤ يوم من ظهور الأعراض رغم اجراء المسلاج الدوائى .
- ٣- الآفات التشريحية معدومة الامن احتقان خفيف فى المخ والتهاب خفيف فى المصارين .
- ٤- لم يعزل من الآفات التشريحية الا ميكروب بكتيرى صنف على أنه من نوع السبجات المتكورة .
- ٥- تلاحظ وجود مستشفى للأمراض الصدرية قريبة من تلك المحطة مما يجيز على أن تكون العدوى قد أنتقلت من طريقها الى المحطة . .

\* قسم : الأمراض الباطنة والمعدية - كلية الطب البيطرى - جامعة الزقازيق .

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## STUDIES ON STREPTOCOCCUS PNEUMONIAE AS A CAUSE OF FATAL MENINGITIS IN BUFFALO CALVES

(with One Table)

By

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### SUMMARY

In a calf rearing unit (El-Marg) near Cairo, ten buffalo weaned calves died with nervous symptoms. No constant similar P.M. lesions were observed. Symptomatic treatment as well as antibiotic therapy were tried.

Extensive laboratory examination were carried on the dead carcasses. A bacteriological agent was only isolated in pure culture from the brain of 3 calves, this agent was identified and classified as *Streptococcus pneumoniae* synonym *Diplococcus pneumoniae*.

### INTRODUCTION

In a calf rearing farm (El-Marg); ten weaned buffalo calves of 6-8 months old revealed nervous manifestations. The symptoms were continuous extreme extension of the limbs with the head retracted backward while the animal was recumbant on one side. The animals were hypersensitive, showing rigidity of muscles, agitation and retraction of the eye balls. If the head was forced to its normal position, it quickly returned to its previous attitude. The body temperature of the affected animals was around 39.5°C. Administration of magnesium sulphate solution (10%) subcutaneously, penicillin, streptomycin therapy was also tried parentally for 5 successive days to all affected animals. All animals that revealed nervous symptoms died after 2 to 4 days without response to treatment.

The aim of this study is to emphasize the role of *Streptococcus pneumoniae* as a cause of fatal meningitis in calves.

### MATERIAL and METHODS

#### Laboratory work:

- Autopsy: P.M. examination was performed on dead animals.
- Examination for internal and blood parasites was carried out (SOLUSBY, 1968).
- Trials to isolate viral agent from blood and internal organs (MERCHANT & PACKER, 1967).
- Serum magnesium ratio were estimated (GINDLER & KING, 1972; FISKE & SUBBARO, 1925 and DENNIS, 1922 respectively).
- Bacteriological investigation on blood and internal organs were performed (CRUCKSHANKS, 1973).

### RESULTS

No constant similar lesions were observed on post-mortem examination of the dead carcasses.

The main macroscopical lesions were congestion of the cerebrum and signs of enteritis. Histopathological examination revealed lymphocytic infiltration around the blood vessels and fatty degeneration in the liver cells.

Results of parasitic investigations were negative as well as trials of isolating a viral agent.

Serum magnesium together with the ratio between calcium, phosphorous and magnesium were found within the normal levels.

A bacterial agent was isolated in pure culture from the brains of 3 dead calves. Characterisation, identification and typing were done as follows:

Culture character:

On blood agar, colonies were circular, low convex, 0.5-1 mm. with alpha haemolysis. On chocolate agar, luxuriant growth was obtained after 24 hours incubation at 37°C, while no growth was recorded on MacConkey media.

The organism grew anaerobically and proved to be non-toxic. The isolates proved to be Gram-positive coccobacilli, 0.6-0.8  $\mu$  x 1.0-1.5  $\mu$  in size, arranged in pairs, lanculated and was non-motile.

Biochemical reactions: See Table (1).

Animal inoculation:

Inoculation of the isolate into rabbits S/C caused death in 48 hours without any growth lesions. The organism could be re-isolated from the blood and all internal organs and bone-marrow. By instillation into the eye, it caused also death in 4-5 days with re-isolation of the organism. On S/C inoculation of guinea pigs, it proved to be virulent and caused death and the organism could be re-isolated from heart and brain. Mice and pigeon were resistant.

For final identification, the isolate was sent to the Central Veterinary Laboratory, New Haw, Weybridge, Surrey, England. It showed fermentation in Hush and Leifson media, growth in glucose broth was poor, optochin sensitivity was positive, growth was improved in CO<sub>2</sub>. Its behaviour in sugars was the same as in Table (1). The organism was identified as *Streptococcus pneumoniae* synonym *Diplococcus pneumoniae*. The report added that the organism behaved atypically in some important characterization test (SHREEVE, 1975).

## DISCUSSION

Although FINLAND (1942) stated that *Diplococcus pneumoniae* have not considered to be an important cause of diseases in animals, yet DONALD and MANN (1950), JENSEN and VAN DORSEN (1951), DHANDA and SEKARIAH (1958), MACLACHLAN *et al.* (1958) and OTTOSEN (1959) described fatal diseases in different animal species with nervous manifestation. The symptoms showed by diseased calves without response to treatment and death was in conformatory with the findings reported by RUEGSEGGER (1949); ALEXANDER *et al.* (1953) and SPINK (1960). The isolate was identical with the characteristics of *Streptococcus pneumoniae* in most aspects both biochemically and culturally. It proved to be harmless in mice and pathogenic to rabbit and guinea pigs, findings which were not identical with its characteristics concerning the resistance of mice (MERCHANT and PACKER, 1967; BURROW, 1968). In the meantime, CRUCKSHANK (1973) stated that non-capsulated forms of pneumococci lack the resistance to phagocytosis and are entirely non-virulent for laboratory animals like mouse and rabbit. MACLOED and KRAUSS (1950) stated that the virulence of pneumococci was associated with the amount of the capsular polysaccharide formed in vitro though, according to MORCH (1934) the virulence for mice is not a reliable guide to virulence for man.

The isolation of identical strains of the organism from the lungs of calves dying of pneumonia and from the throat of their human attendants suggested by ROMER (1960) that the interspecies transmission may occur. The human importance as a source of infection for calves and in order to emphasize the interspecies transmission could be accepted if we knew that the farm under question was in close and very near to a human-beings chest impatient hospital and this was in conformatory with the results obtained by ROMER (1960).

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Table (1)  
Biochemical reactions of the isolated organism

Sugar	Reaction	
	Acid	Gas
Glucose	+	-
Lactose	+	-
Maltose	+	-
Sucrose	+	-
Raffinose	+	-
Salicin	+	-
Dulcitol	-	-
Mannitol	-	-
Catalase test	-	-
Coagulase test	-	-
Indole	-	-
Solubility in 10% bile media-		

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