Neonatal Colibacillosis in Calves

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ABSTRACT

The cause of diarrhoeal disease in calves was investigated in 40 Holstien Fiensian calves in Sidi El-Misri Cattle Raising Station, Tripoli, Libyan Jamahiriya. Five Hundred and Forty Six rectal swabs were collected from these animals for bacteriological examination. Escherichia coli was found to be the main cause of diarrhoea and was isolated from 42.12% of the collected swabs. Klebsiella organisms were also isolated at a rate of 2.19%. 10% of calves died from diarrhoea.

INTRODUCTION

The term diarrheal disease or scours generally refers to the clinical signs of profuse, watery diarrhea, with fatal dehydration. A variety of bacteria and viruses have been incriminated as causes of diarrhea in newly born calves as recorded by Acres *et al.* (1). But the association of Escherichia coli with calf diarrhea is now well known as indicated by Farid *et al.* (4), Wray and Thomlinson (19), Farid *et al.* (3), Raskova *et al.* (13), Tsaregradskaya (16), and Acres *et al.* (1). Klebsiella organisms in presence of *Escherichia coli* may cause deaths in calves as stated by Glantz and Jacks (5).

Although diarrheal disease is considered to be a major problem in newly born calves in many farms in the Libyan Jamahiriya, and as from the available literature, no research has so far been done to investigate the problem. The present paper is first attempt to investigate the problem of calf diarrhea under Libyan conditions.

MATERIAL AND METHODS

Animals: Investigations were carried out on 40 Holstein Friesian calves that were born in Sidi El-Misri Cattle Roising Station during May and June 1977. After birth these calves were individually penned in the weaning shed. Many of them developed spon-

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taneous diarrhea during their first two weeks of life. Four of the diarrheatic calves died from anorexia and dehydration.

Microbiological investigations: Rectal Swabs were taken from calves either once or twice daily from immediately after birth until 30 days of age.

The rectal swabs from each calf were inoculated into a tube of selenite broth and incubated at 37°C for 16–18 hours. A loopful from each incubated tube was streaked on MacConkey agar and EMB agar. Colonies suspected to be lactose fermenters were picked, purified and examined biochemically.

Organisms biochemically suspected to be *E. Coli* were serologically identified against the only available G *E. coli* antisera.

RESULTS AND DISCUSSION

A total of 546 rectal swabs were collected from the 40 claves, out of these 230 *E. coli* (42.12%) and 12 Klebsiella (2.19%) isolates were obtained as shown in Table 1. Out of 230 *E. coli* isolates, 166 (30.40%) were typed and 64 (11.72%) could not be typed by the available antisera. Triple or quadruple infection was encountered in most of the infected fecal samples. Ten per cent of calves died during the experiment from diarrheatic illness.

The investigation showed that *E. coli* was likely the cause of diarrhea in the calves as it had been found in 42.12% of the total swabs collected. Diarrhea occurred in most of the calves soon after birth. This may be due to the fact that they lacked immunity to *E. coli* infection as stated by Loosmore (7). The immune status of the calves in the experiment was unknown. However, Smith and Little (15) stated that colostrum has a protective effect.

E. coli has been isolated from calves with diarrhea in several parts of the world by Verma and Adlakha (18), Farid *et al.* (4), Chepurov *et al.* (2), Salajka *et al.* (14) Farid *et al.* (3) and Acres *et al.* (1). Seven serotypes out of nine, (Table 2) that were isolated in this investigation had previously been isolated by Farid *et al.* (3) in Egypt from dead calves with enteritis, namely, 0111, 055, 026, 0119, 086, 0125 and 0126. The 0 group 128 was also isolated by Farid *et al.* (4) in Egypt from dead calves with enterities. Chepurov *et al.* (2) in U.S.S.R., also isolated 5 serotypes; 086, 0111, 0119, 026 and 0128. These serotypes were also isolated during this study.

Table 1 Isolated bacteria from 546 rectal swabs collected from 40 newly born calves.

Isolates	Number	Percent
E. coli type	166	30.40
E. coli untyped	64	11.72
Klebsiella	12	2.19
Total:	242	44.31

Table 2 Percentage of typeable and untypeable *E. coli* isolated from feces of calves.

Serogroup	Strains number	Positive %	% of typeable *E. coli*
0111:B_4	19	8.26	11.44
055:B_5	20	8.09	12.05
026:B_6	18	7.83	10.84
0119:B_{14}	26	11.30	15.66
986:B_7	19	8.26	11.44
0127:B_8	14	6.09	8.34
0125:B_{15}	18	7.83	10.84
0126:B_{16}	19	8.26	11.44
0128:B_{12}	13	5.65	7.83
Untypeable	64	27.83	—
Total:	230	100.00	100.00

The serotypes of *E. coli* isolated in the present investigation were similar to those isolated by Farid *et al.* (4) and Farid *et al.* (3) in Egypt. Although these findings indicate a great similarity between the *E. coli* serotypes causing calf diarrhea in these 2 neighbouring countries, yet some reports in other countries, Gossling *et al.* (6) have shown some geographical differences as regards the distribution of predominent serotypes. This was confirmed by the present investation, showing that serogroup 0119 B_{14} isolated by Farid *et al.* (3) may be an important factor in calf diarrhea in the Jamahiriya as shown by its repeated isolation; Table 2. Other groups were isolated in a descending percentage. Also Polyakova (11) in U.S.S.R., isolated 22 O serogroup of *E. coli* from calves with diarrhea with the predominance of 0119(18%). This rate is higher than that given in this work (15.66%) but this may indicate that some serogroup always shows predominance in calve diarrhea.

The Rate of *E. coli* isolated during this study (42.12%) was lower than that found by Farid *et al.* (4) and Farid *et al.* (3); 85% and 80.7% respectively.

The percent of typeable and untypeable *E. coli* presented in Table 1 are much lower than those given by Farid *et al.* (3) who isolated 951 coli strain representing a percentage of 80.7 from 1178 fecal samples. Out of this percentage 79.5 strains were types, 4.8% were rough, and 15.7 untypeable.

It should be mentioned that some of the isolated *E. coli* serotypes, e.g., 026 B_6, 0127 B_8 and 0128 B_{12}, as shown in Table 2, are pathogenic to human-beings. This was stated by Polyskova (11). This indicate that infection from such investigated calves constitute a hazard to their human attendant.

The Genus Klebsiella have been found in a percentage of 2.19, Table 1. Klebsiella occurs naturally in calves and together with *E. coli* may result in some mortality as stated by Clantz and Jacks (5). This could not be confirmed by this work as Klebsiella species could not be isolated from none of the 4 deaths occurred.

The mortality rate due to diarrhea in this investigation was 10%. This is greater than that found by Farid *et al.* (3) in Egypt (2.7%) but similar to that reported by Mayer *et al.* (8) in West Germany. It is less than those reported by Van Pell *et al.* (17) in U.S.A. (43.6%), by Pignattelli *et al.* (10) in Italy (20–30%), by Ragab and Askar (11) in Egypt (16–30%) and by Raskova *et al.* (13) in Czechoslovakia (30%).

Oxendar *et al.* (9) mentioned that neonatal diarrhea of calves is a major cause of economic loss in rearing young calves. This work throws light on one cause of diarrhea in calves born under Libyan conditions. Further work needs to be carried out to discover other causes of diarrhea in calves and trials to produce local vaccine from *E. coli* strains to protect the newly born calves.

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الاسهال فى العجول حديثة الولادة

ع٠ حامد ـ ب٠م٠ القصبى ـ أ٠م٠ نـور

المستخلـــص

أجرى هذا البحث على أربعون عجلا من نوع الهولستيان فريزيان حديثـــة الولادة بمشروع تنمية الابقار ـ مزرعة سيدى المصرى ـ طرابلس ـ الجماهيريـــة العربية الليبية الشعبية الاشتراكية ، وذلك لدراسة سبب اصابة العجول بمـــرض الاسهال ، وذلك بفحص عينات من براز هذه العجول سكتريولوجيا وسريولوجيا ٠

وأظهرت النتائج أن الميكروب القولونى هو المسبب الرئيسى لمرض الاسهال حيث تم عزل هذا الميكروب بنسبة ١٢ر٤٢ ٪ من مجموع العينات التى أخذت من هذه العجول كذلك أمكن عزل ميكروب الكلبسيلا بنسبة ١٩ر٢ ٪ ٠

هذا وقد حدثت حالات نفوق لبعض العجول موضوع البحث مثلت نسبة ١٠ ٪ من مجموع هذه العجول ٠

وقد تمت مناقشة النتائج الخاصة بهذا البحث ، واقترح الباحثون اجراء بحوث أخرى مكملة لمعرفة المسببات الأخرى لمرض الاسهال فى العجول بالجماهيرية العربيـــة الليبية الشعبية الاشتراكية ، ومحاولة انتاج أمصال أو لقاحات لوقاية العجول الحديثة الولادة من أخطار هذا المرض ٠