ENTEROBACTERIACEAE AND ITS ROLE IN DIARRHEA OF NEWLY BORN FRIESIAN CALVES IN QUENA GOVERNORATE, EGYPT
(With 2 Tables)

By
S. Z. MAHMOUD
(Received at 8/3/2007)

SUMMARY

This study was carried out on 80 faecal samples collected from Friesian calves (one day to three months old) at Quena Governorate. Twenty calves were clinically healthy and 60 calves showed sever diarrhoea, with offensive odour and fever. Bacteriological examinations revealed that 64 out of 80 faecal samples (80%) were positive to Enterobacteriaeae. Bacterial isolates of the diseased calves were identified biochemically as; 37 (61.6%) strains of E. coli, 18 (30%) strains of Salmonella spp., 3(5%) strains of Pseudomonas spp., 2(3.3%)
strains of *Shigella* spp. and from the clinically healthy calves 2 (10%), 1 (5%), 1 (5%), 0% respectively. Sensitivity tests for the bacterial isolates revealed that the tested strains were sensitive to ciprofloxacin, lincospectin, gentamycin, and stertptomycin.

**Key words:** Enterobacteriaceae, diarrhea, newly born calves

**INTRODUCTION**

Diarrhoea is one of the most principle causes of calves mortalities (El-Ged *et al.*, 1994). Diarrhoea in young pre-weaned calves causes remarkable disturbances in clinical signs and blood parameters (Blood *et al.*, 1983 and Hassaan *et al.*, 1985). The most serious enteric infection usually attack calves during the first ten-weeks of life (Smith *et al.*, 1980 and Hoiseth and Stocker, 1981). The infectious agents capable of causing diarrhoea in newlyborn calves are numerous and the most important enteropathogens are *E. coli* and *Salmonella* species. Newly born calves could be infected with *Salmonella* at time of parturition or sooner after birth (Jones *et al.*, 1983 and Peel *et al.*, 1990). Colibacillosis is the most common disease of calves during the first days of their life and manifested clinically by sever diarrhoea followed by rapid death (Blood *et al.*, 1983). The immune system of animals at young age is not well developed and the maternal immunity would not withstand variable infections (Holland, 1990; and Mahmoud, 1993). The results of many investigations showed that the greatest losses among animals occurs in the neonatal period (Snodgrass and Angus, 1983). Colibacillosis appear to be the most important disease of calves during the frist few days of their life.

The present work was carried out to clear up the role of bacteria belong to family Enterobacteriaceae in diarrhoea of neonatal calves at Quena Governorate

**MATERIALS and METHODS**

**Materials:**

1-**Animals:**

A total number of 80 Friesian calves aged from 1 day to three months old were monitored. Of these calves, 60 were suffered from profuse watery diarrhoea with offensive odour, fever, dryness and anorexia, and the remaindes were clinically healthy (control group).
2- Samples:

Faecal samples were collected in sterile labeled plastic bags from the rectum of diarrhoeic and healthy calves

Methods:

The collected samples were inoculated directly into nutrient broth and into selenite F broth and they were incubated for 18 hours at 37°C. A loopful from the incubated broth was streaked onto MacConkey agar and Salmonella Shigella agar plates, and incubated at 37°C for 24-48 hours (Pelton et al., 1994). The suspected colonies were picked up, purified and biochemically identified as Cruickshank et al. (1975), Collee et al. (1996). Antibiogram for bacterial isolates were carried out on 22 isolates using the disc susceptibility test by diffusion methods according to Quinn et al. (1994). The antibacterial discs supplied by Oxoid with different concentrations included ciprofloxacin (30µg), rifampicillin (5µg), doxycyclin (30µg), ampicillin (10µg), chloramphenicol (30µg), lincomecitin (15+200µg), stertptomycin (10µg), colistin sulphat (10µg), gentamycin (10µg), and flamaquin (10µg) were used. The media used in sensetitivity tests was nutrient agar (Oxoid) (CM0003) Lot/ 345492.

RESULTS

Isolation and identification of isolated organisms:-

The bacteriological examinations of the faecal samples collected from diarrheic and clinically healthy calves revealed the presence of Escherichia coli, Salmonella Pseudomonas and Shigella organisms. These microorganisms were isolated from the examined calves in a variable rate as shown in Table (1).

Furthermore, the sensitivity of the recovered microorganisms to some antimicrobial agents is recorded in Table 2.

Table 1: Bacteriological examinations of the examined calves.

<table>
<thead>
<tr>
<th>The examined calves</th>
<th>Number of the positive cases to Enterobacteriaceae</th>
<th>Number of the positive cases to E.coli</th>
<th>Number of the positive cases to Salmonella spp.</th>
<th>Number of the positive cases to Pseudomonas spp.</th>
<th>Number of the positive cases to Shigella spp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhoeic calves (n=60)</td>
<td>No. 60</td>
<td>% 100</td>
<td>No. 37</td>
<td>% 61.6</td>
<td>No. 18</td>
</tr>
<tr>
<td>Clinically Healthy calves (n=20)</td>
<td>4</td>
<td>% 20</td>
<td>2</td>
<td>% 10</td>
<td>1</td>
</tr>
<tr>
<td>Total n=80</td>
<td>64</td>
<td>% 80</td>
<td>39</td>
<td>% 48.75</td>
<td>19</td>
</tr>
</tbody>
</table>

224
Table 2: Antibacterial sensitivity tests of some isolates (n=22 Strains)

<table>
<thead>
<tr>
<th></th>
<th>Ceprol oxacin 30µg</th>
<th>Lincomycin 15-200µg</th>
<th>Streptomycin 10µg</th>
<th>Gentamicin 10µg</th>
<th>Ampicillin 10µg</th>
<th>Colistin sulphate 15µg</th>
<th>Flamquin 10µg</th>
<th>Chloramphenicol 30µg</th>
<th>Doxy cilllin 30µg</th>
<th>Rifampicin 5µg</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.coli n=12</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Salmonella n=7</td>
<td>+++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Pseudomonas n=2</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Shigella n=1</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

+++ = Sensitive, ++ = Intermediate, - = Resistant.

DISCUSSION

Enterobacteriaceae play an important role as a cause of diarrhoea in neonates. Several studies were carried out and showed that the most important bacterial infection are E. coli and Salmonella spp. (Mottelib 1972). Amer et al. (1985) and Hassaan et al. (1985) reported that E. coli was the main cause in the pathogenesis of enteritis in calves at Upper Egypt. The bacteriological examinations of the present study revealed that the isolation rate of E. coli and Salmonella was (48.75%) and (23.75%) from diarrheic and healthy calves respectively. These results agreed with those mentioned by Abd El - Salam et al. (1998), Asma et al. (1996), Farid et al. (1992) and Mousa et al. (2001). They elucidated that the isolation rates of Salmonella organisms from diarrheic and healthy calves were 43.53%, and 27.69% respectively. The isolated E. coli and Salmonella spp. from the diarrheic calves were 61.6% and 30%, respectively while from healthy calves were 10% and 5% respectively. These results agreed with those reported by El-Ged et al. (1994) and Aisha (2001). The obtained results indicated that E. coli was the main bacterial cause of enteric infection in newly born calves while Salmonella organisms formed the second cause of enteritis in calves. Pseudomonas spp. and Shigella spp. were isolated from the diarrheic and the healthy calves with a rate of 5% and 2.5% respectively and from diarrheic calves the isolation rate was 5%, 3.3%, respectively. From healthy calves the isolation rate of Pseudomonas spp. was 5%. These results agreed with that reported by Mottelib (1972), Amer et al. (1985), and Snodgrass et al. (1986). Hala (2002) mentioned that Pseudomonas spp. is an opportunistic pathogen of medical and veterinary importance due to its capability of infecting human, animals and poultry. The infection with this organism has been regarded as one
of the serious economic losses and considered as one of the most
dangerous disease which affects animals (Hick et al. 1991). Shigella and
Pseudomonas organisms recorded the lowest incidence in diarrhoeic
calves and they were found in form of mixed infection either with E. coli
or Salmonella (Abd El-Salam et al., 1998). The results of sensitivity
tests using different antibacterial discs revealed that the tested isolated
strains (22 isolates) were sensitive to cefoproxacin, lincopectin,
gentamycin and streptomycin but resistance to colistin, flamaquin,
ampacillin and doxycillin. These resistance of bacteria to antibiotic may
be due to wide use of antibiotic (El-Ged et al., 1994).

REFERENCES

investigation on some trace elements, vitamins and
biochemical value in buffalo with diarrhoea in Assiut

Aisha, R. Ali (2001): Comparative studies on diarrhoea caused by E. coli
in farm animals. J. Egypt Vet. Med. Assoc. 61 No. 6C: 39--49.

Amer, A.A.; Hassaan, N.K.; El-Sebaie, A.; Bayoumi, A.H. and Ibrahim,
Holstein Friesian calves in the newvally. Egypt: 1-clinical,
heamatological aetiological and pathological alteration. Assiut

Asma, O. Aly; Zamzam, H. Abd El-Wahed; Kohilo, Kh. and El-Sheikh,
A.R. (1996): Some studies on clinical, hematological and
biochemical changes in diarrhoeic neonatal buffalo calves with
reference to hygienic conditions. Assiut Vet. Med. J. 35,
69: 91-104.

Medicine. A textbook of the disease of cattle, sheep, pigs, goats

Collee, J.G.; Marmion, B.P.; Fraser, A.G. and Simmons, A. (1996):
Mackey and MacCartney Practical Medical Microbiology,

Cruickshank, R.; Dugid, J.R.; Marmion, B.P. and Swain, R.H.A. (1975):
Medical Microbiology: The practice of medical microbiology


