PRELIMINARY OBSERVATIONS ON ESCHERICHIA COLI INFECTION IN NEONATAL CALVES IN EASTERN PROVINCE OF SAUDI AROBIA

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ABSTRACT

Five neonatal calves with diarrhoea were presented to the Veterinary Teaching Hospital for treatment. Main clinical signs and results of faecal examination were reported. E. coli was isolated from all calves. Mixed isolates of E. coli and Proteus spp. were found in 3 calves. No mortality was observed among examined calves. The E. coli isolated was subjected to antibiotic sensitivity test against six antibiotics. Various aspects concerning diarrhoea in neonatal calves are discussed.

Keywords: Neonatal calves, E. coli infection, Saudi Arabia

INTRODUCTION

Diarrhoea in neonatal ruminants is a syndrome of great etiological complexity and is a common problem affecting animals in their first few weeks of life. Diarrhoea occurs despite of partial immunity which might be gained by neonates from their dams. The disease causes loss of animal health and death may occur due to enterotoxicity of causative agents. Many agents have been incriminated as a causative agent of diarrhoea especially E. coli, Salmonella spp; viruses and Cryptosporidium (Khan and Khan, 1991; Snodgrass, 1995).

Isolation of E. coli as a main cause of diarrhoea in calves was reported from Pakistan (Hafiz and Khan, 1993; Khan and Khan, 1997), Egypt (El-Ged et al., 1994) and Britain (Daniel et al., 1998). Also, presence of E. coli in livestock cattle in Japan was also recorded (Sekiya, 1997).

An outbreak of neonatal calf diarrhoea was reported in a dairy farm of Saudi Arabia and E. coli was recovered from the faecal samples, a total 480 (73%) calves out of 662 were affected (Hafiz et al., 1987). Neonatal calves (n=120) with diarrhoea were presented to the Veterinary Teaching Hospital, King Faisal University during the last ten years (Anonymous 1989-98).

This study was meant to provide preliminary clinical observations on neonatal diarrhoea in five calves examined at the Veterinary Teaching Hospital, King Faisal University. Also to determine the suitable different types of antibiotics under local conditions for such calves.

MATERIALS AND METHODS

Study was undertaken in five calves which were presented to the medical clinic in ill condition with profuse diarrhoea. Those calves were subjected to details clinical examinations (Table 1). Faecal sample were collected under strict aseptic conditions for bacteriological examination. These samples were streaked immediately onto plates of MacConkey's agar and incubated aerobically at 37°C for 24-48 hours. Isolated colonies were detected and picked up and transferred to slope of nutrient agar, and further incubated at 37°C for 24 hours. The organisms were identified by using API 20E system (Bio Merieux sa, France). The disc agar diffusion method was used to test the isolated bacteria against six different antibiotics, according to the method of Koneman et al. (1992). Screening parasitological tests were also undertaken.

RESULTS AND DISCUSSION

Data of clinical examination of the five neonatal calves and macroscopical features of the faeces is presented in Table 1. The antibiotic sensitivity test of E. coli isolates against six antibiotics is recorded in Table 2.

In this investigation non of the five calves examined died, although calves No. 4 and 5 were brought in severely ill condition. The clinical signs recorded varied from animal to animal. It can be summarized that all animals showed typical clinical picture of diarrhoea. Pale mucus membranes, weakness, dullness, loss of weight, inability to stand to complete recumbency, sunken eyes and increased skin elasticity were observed.
Hind quarters and tail were stained with yellowish or greenish faecal material. Similar clinical findings were stated by Radostits et al. (1994). Although E. coli is a normal flora of calf intestines, the infection is uncommon by enterogenic E. coli. It was found that calves were three time more likely to shed E. coli after weaning than before weaning (Garber et al., 1995). In studies of 100 healthy and 100 diarrheic calves, the incidence of recovery of enteric bacteria from calves with diarrhoea was 96% and from normal calves was 43% (El-Ged et al., 1994). The same authors found that Enterobacteriaceae were isolated more frequently in the Winter and Clostridium in the Autumn.

In this investigated cases, E. coli was isolated from all calves (100%), and proteus sp. from three calves as a mixed isolates with E. coli. Report on isolation of Proteus mirabilis from enteritis of captive herbivorous animals was stated by Chakraborty et al. (1997). Parasitological examinations revealed negative findings in all calves studied. and adult cattle showed that after inoculation 25 out of 29 animals remained healthy and 4 out of 17 had transient diarrhoea (Cray and Moon, 1995). Exposure to infected livestock caused severe and intermittent bloody diarrhoea in human (Rice et al., 1996).

In the present work non of the calves died although severe clinical signs were associated with diarrhoea and treatment of examined calves were done by suitable antibiotics, for several days, combined with fluid replacement and resulted in improvement of conditions. Treatment of diarrhoea by danofloxacin resulted in a significantly improved clinical condition, increased weight gains and few mortalities (Holack et al., 1994).

E. coli was isolated from the nose of healthy camels (Alhendi, 1999) and from the nasopharyngeal swabs of healthy cattle (Alhendi, 1989), which indicates that E. coli may be found in the nose of animal as normal inhabitant and/or commensal.

Table 1: Clinical data of 5 neonatal calves with diarrhoea (E. coli infection).

<table>
<thead>
<tr>
<th>Calf No.</th>
<th>Age (days)</th>
<th>Weight (kg)</th>
<th>Temp. (°C)</th>
<th>Heart rate/min.</th>
<th>Respiratory rate/min.</th>
<th>Clinical signs</th>
<th>Faecal characters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>20</td>
<td>39.1</td>
<td>100</td>
<td>45</td>
<td>Pale m.m., anorexic, weak, dull, slight dehydration</td>
<td>Yellowish, watery,</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>25</td>
<td>37.0</td>
<td>70</td>
<td>25</td>
<td>Normal m.m., reduced appetite, slight dehydration</td>
<td>Profuse, yellowish, watery</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
<td>30</td>
<td>39</td>
<td>66</td>
<td>40</td>
<td>Normal m.m., Anorexic, slight, loose skin elasticity</td>
<td>Soft, yellow-greenish</td>
</tr>
<tr>
<td>4</td>
<td>35</td>
<td>40</td>
<td>40</td>
<td>84</td>
<td>20</td>
<td>Pale m.m., reduced appetite, sunken eyes, recumbent, weak</td>
<td>Mucus with faeces, greenish, bad odour</td>
</tr>
<tr>
<td>5</td>
<td>40</td>
<td>35</td>
<td>38.5</td>
<td>65</td>
<td>35</td>
<td>Pale m.m., anorexic, depressed unable to stand, emaciated, weak</td>
<td>Profuse watery, brownish, very few blood stained colour</td>
</tr>
</tbody>
</table>

mm = mucus membrane

Table 2: In vitro antibiotic sensitive of E. coli isolated from 5 diarrhoeic calves.

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>Dose/disc (μg)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kanamycin</td>
<td>10</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>R</td>
<td>+</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>10</td>
<td>++</td>
<td>R</td>
<td>+++</td>
<td>R</td>
<td>++</td>
</tr>
<tr>
<td>Streptomycin</td>
<td>10</td>
<td>R</td>
<td>R</td>
<td>+</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Oxytetracycin</td>
<td>30</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>15</td>
<td>++</td>
<td>+++</td>
<td>R</td>
<td>+</td>
<td>R</td>
</tr>
<tr>
<td>Neomycin</td>
<td>10</td>
<td>R</td>
<td>+</td>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
</tbody>
</table>

+ = Narrow zone inhibition; ++ = Intermediate zone inhibition; +++ = Large zone inhibition; R = Resistant

There are several sources of E. coli where it can be isolated. A survey in the USA, revealed that E. coli was isolated from bovine faecal samples on 12 farms with a herd prevalence of 1.1 to 6.1%, and was found in 1 out of 90 (1.1%) equine faecal samples, 2 out of 65 (3.1%) canine faecal samples, 1 out of 200 pooled bird samples (0.5%), 2 out of 65 pooled fly samples (3.3%) and 10 out of 320 (3.1%) water samples (Hancock et al., 1998). Experimental infection of E. coli in calves

The E. coli isolates from five calves were subjected to six antibiotics sensitivity test. Kanamycin, Gentamicin and Erythromycin were not more effective than Streptomycin, Oxytetracyline and Neomycin (Table 2). The antibiotics susceptibility of E. coli strains was investigated by a number of workers, among these are Holack et al. (1994) and Mellata et al. (1998). Their results indicated variability in susceptibility of different E. coli strains to different antibiotics.
It is important to emphasize that antibiotics susceptibility tests are tended to be a guide to the clinician, not a guarantee that antimicrobial agent will be effective in the vivo therapy (Koneman et al., 1992).

The diarrhoeal disease can not be eliminated from neonatal calves as many causes other than E. coli are involved. The control and subsequent prevention of disease should be based on those factors like, reducing pathogen challenge and increasing the resistance of the calf. Attempt should be made to increase the amounts of colostral immunoglobulins absorbed by calf. Good management should be at maximum level during first few weeks of neonatal life (Radostits et al., 1994).

REFERENCES


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