SHORT COMMUNICATION

FIRST RECORD OF CRYPTOSPORIDIUM SP. IN CALVES IN CZECHOSLOVAKIA

I. PAVLÁSEK

Institute of Parasitology, Czechoslovak Academy of Sciences, Prague

Abstract. Cryptosporidium sp. was recorded for the first time in Czechoslovakia (South Bohemia) from two 14-day-old calves after a forced slaughter at the abattoir in České Budějovice. Histological examination of ileum revealed cryptosporidial infection and very strong atrophy of villi in both animals.

The occurrence of coccidia in calves under conditions of large-scale breeding farms of various types has been studied since 1974. According to the results obtained, 100% of calves at the age of 2—3 months are infected by several coccidium species. The infection is related with the type of the used breeding technology. Examinations of dry faeces on hoofs, hair etc. showed that the calves carry the oocysts of coccidia from their mother farms. The milk cows in the nurseries were mostly found to be heavily infected with several species of coccidia, particularly Eimeria bovis (Züblin, 1908), E. zuernii (Rivolta, 1878), E. ellipsoidalis Becker et Frye, 1929 and E. auburnensis Christensen et Porter, 1939. This indicates that the calves can be infected by several coccidium species already shortly after the birth. At the age of 15—20 days the calves are transferred from different farms to large-scale breeding farms. It is known that on days 4—5 after the transfer they suffer from diarrhea which is supposed to be of viral, bacterial, dietetic or parasitary origin. During our long-term studies it was observed that coccidia of the genus Eimeria start to appear on days 14—25 after the transfer to large-scale breeding farms, in relation to the mode of stabiling (individual or in groups). Since the diarrhea occurred very frequently in calves under conditions of large-scale breeding, we wanted to ascertain whether some developmental stages of coccidia, particularly schizonts, which might cause the diasease, were present in the intestinal mucosa of the slaughtered calves.

During these studies, an infection induced by a member of Cryptosporidium was recorded for the first time in Czechoslovakia.

MATERIAL AND METHODS

Four randomly chosen calves were examined for the presence of coccidia after a forced slaughter at the abattoir in České Budějovice. Some data concerning the animals are given in Table 1.

Shortly after the slaughter, about 1.5 cm samples at about 20 cm long distance were taken from duodenum, jejunum, ileum and colon for histological examination. The tissues were fixed in AAF (10 ml of 40% formal, 50 ml of glacial acetic acid and 850 ml of absolute alcohol), embedded in paraffin, and 3—6 μm thick sections were stained with haematoxylin-eosin (HE) and Giemsa.
Table 1. Basic data on slaughtered calves

<table>
<thead>
<tr>
<th>Calf No.</th>
<th>Sex</th>
<th>Age (days)</th>
<th>Farm</th>
<th>Diagnosis before slaughter</th>
<th>Post-mortem diagnosis</th>
<th>Cryptosporidium sp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>615</td>
<td>♂</td>
<td>14</td>
<td>Čakov</td>
<td>gastroenteritis acuta</td>
<td>gastroenteritis acuta</td>
<td>+</td>
</tr>
<tr>
<td>616</td>
<td>♂</td>
<td>14</td>
<td>Čakov</td>
<td>gastroenteritis acuta</td>
<td>gastroenteritis acuta</td>
<td>-</td>
</tr>
<tr>
<td>618</td>
<td>♂</td>
<td>10</td>
<td>Hluboká n. Vltavou</td>
<td>gastroenteritis acuta</td>
<td>gastroenteritis acuta</td>
<td>-</td>
</tr>
<tr>
<td>without number</td>
<td>not determined</td>
<td>14</td>
<td>Ševětín</td>
<td>pneumonia, enteritis acuta</td>
<td>pneumonia, cirrhosis hepatitis, icterus</td>
<td>+</td>
</tr>
</tbody>
</table>

RESULTS AND DISCUSSION

No developmental stages of *Eimeria* were found in the examined animals. However, a large number of cryptosporidia (Fig. 1), spherical to egg-shaped protozoans measuring 1.5—4.0 μm, were present in histological sections through ileum of two calves with a strong atrophy of villi. The systematical position of the parasites is as follows: class Sporozoasida, subclass Coccidiasina, order Eucoccidiorida, suborder Eimeriorina, family Cryptosporidiidae.

*Cryptosporidium* infection in cattle (8-month-old heifer) was first reported by Panciera et al. (1971) in the USA. The clinical picture of this infection was diarrhea and general weakening of organism. Barker and Carbonell (1974) found cryptosporidia in 3- and 2-week-old calves (*Bos taurus*) with a heavy diarrhea and supposed the parasites to be host specific. The organisms recovered from the small intestine of calves were named *Cryptosporidium bovis*. If the authors' assumption on the host specificity of *Cryptosporidium* is confirmed, then the cryptosporidial infection recorded by us in two calves might be caused by *Cryptosporidium bovis*. However, many experimental cross infections with cryptosporidia in different host species are necessary to confirm their specificity.

Coccidia of the genus *Cryptosporidium* were also found by Meuten et al. (1974) at post-mortem examination of a 14-day-old calf suffering from diarrhea. Schmitz

Fig. 1. *Cryptosporidium* sp. (arrows) in small intestine (ileum) of calf No. 615. Giemsa stain. (×480).
and Smith (1975) registered cryptosporidium infection in a 5-day-old bull with intestinal disorder. The authors state that these infections are widely spread, but their role in intestinal diseases could not be ascertained. The first case of cryptosporidiosis in Great Britain was recorded by Pearson and Logan (1978) in a 7-day-old bull.
Pohlenz et al. (1978a) observed by means of transmission and scanning electron microscopy Cryptosporidium sp. freely moving in the lumen and attached to the epithelium in the mucosa of ileum of 12 calves. The authors assume that cryptosporidia are extracellular parasites and cause changes in the epithelium of ileum probably inducing digestive disorders in form of diarrhea. According to Pohlenz et al. (1978b), enteric infections by cryptosporidia are common in the USA and Canada in new-born calves suffering from diarrhea and the authors consider them pathogenic for calves. Nagy et al. (1979) detected cryptosporidiosis in two of three dead calves at the age of 13—14 days in Hungary. The cause of their death was diarrhea, and catarrh of small intestine was disclosed at the dissection. The authors suppose that cryptosporidia play an important role in diarrhea of calves.

Our results indicate that Cryptosporidium sp. is probably a widely spread parasite in Czechoslovakia. If it is proved that cryptosporidial infections are directly related with the deaths and forced slaughters of calves at an early age as a cause of diarrhea, it will be necessary to pay more attention to their occurrence also from the economical viewpoint.

ПЕРВАЯ НАХОДКА CRYPTOSPORIDIUM SP.
У ТЕЛЯТ В ЧЕХОСЛОВАКИИ

И. Павлесек

Резюме. Cryptosporidium sp. найдены в первый раз в Чехословакии (Южная Чехия) у вынужденно убитых телят в возрасте 14 дней в скотобойне в г. Ческе Будеевице. При гистологическом исследовании подвздошной кишки обнаружено заражение криптоспоридиями и очень сильная атрофия ворсинок у обоих животных.

REFERENCES

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I. P., Parasitologický ústav ČSAV,
Flemingovo n. 2, 166 32 Praha 6,
ČSSR