FIRST RECORD OF DEVELOPMENTAL STAGES OF CRYPTOSPORIDIUM SP. IN VARIOUS ORGANS OF EXPERIMENTALLY INFECTED MICE AND SPONTANEOUSLY INFECTED CALVES

Coenidia of the genus Cryptosporidium parasitize in the digestive tract of many animal species and they occur also in man. They were found for the first time by Tyzzer (Proc. Soc. Exp. Biol. Med. 5: 12—15, 1907) in the gastric glands of laboratory mice. In 1910, they were determined by the same author (J. Med. Res. 23: 394—418, 1910) as a type species of a new genus Cryptosporidium — C. muia. Later Tyzzer (Arch. Protistenk. 26: 394—418, 1912) reported C. parvum from domestic mice, in which the coenidia were localized in the whole small intestine, i.e., from duodenum up to ileocecal valve. No developmental stages were found in the large intestine or cecum.

As it is known from the literature, Cryptosporidium sp. may be localized also in other organs. Kovatch and White (Vet. Path. 9: 426—440, 1972) found in the small intestine of a gall-bladder, gall ducts and pancreas of two juvenile Rhinos mesalea, Proctor and Kemp (J. Protozool. 21: 654—666, 1974) described C. muris from the large intestine of A. muscor L. Fletcher et al. (Avian Dis. 19: 630 to 639, 1975) found parasites of the family Cryptosporididae in the bone marrow of house sparrows. Hoerl et al. (J. Am. Vet. Med. Assoc. 173: 1591—1593, 1978) recorded Cryptosporidium sp. in the respiratory tract, epithelium of trachea and bronchi of turkeys. Also Ranck Jr. (Proc. 2nd Western Poultry Dis. Conference and 14th Poultry Health Symposium, March 19—22, pp. 49—51, 1979) described Cryptosporidia from respiratory tracts of 13 turkeys. Proctor and Mahaflay (Avian Dis. 22: 854—867, 1978) described respiratory cryptosporidia in 2-week-old chickens. Dhifflon et al. (Avian Dis. 23: 745—751, 1979) detected Cryptosporidium sp. in epithelial tracheal mucus in a flock of 7-week-old broilers. According to some authors cryptosporidia occur also in calves and laboratory mice, not only in the small intestine, but also in large intestine and cecum.

We have found developmental stages of Cryptosporidium sp. in the stomachs of experimentally infected laboratory mice and in dead or killed calves.

Coenidia of Cryptosporidium sp. isolated from faeces (using saturated sugar solution) from faeces of spontaneously infected 10-day-old calves were fed to 30 laboratory mice. Cryptosporidial infection in calves was diagnosed on the basis of the presence of coenidial in faeces isolated by floatation method after Breen. The samples were taken from rectum of dead animals or immediately before killing (Pavlinský L. Vet. Med., Praha 27: 729—740, 1982). The developmental stages were found in mice and calves in faeces or imprints of mucosa from individual parts of the digestive tract and body organs stained by Giemsa method.

Four laboratory mice experimentally infected with coenidia of Cryptosporidium sp. died, mostly on days 4—6 p.i. During a complex pathological examination of these mice (in 1982), we found not only in the gastrointestinal tract, but also in faeces of liver, lungs and heart (Figs. 1—3). Samples from brain, spleen and kidneys were negative. The experiments were repeated several times. In some cases, our original finding was confirmed. In others, the developmental stages of Cryptosporidium sp. were found only in the intestines, but not in other organs of the examined mice.

Various developmental stages of this protozoan were found in the liver of calves, heart and lungs of 3 spontaneously infected calves which died or were killed at the age of 6—8 days (Figs. 4—6). Coenidia of cryptosporidia were found in faeces already at the age of 4—5 days, which indicates that the animals were infected immediately after birth. The calves were very weak and suffered from severe diarrhea which dehydrated the organism. Serositis and mesenteritis or bronchopneumonia were diagnosed at post-mortem examination. A strong cryptosporidial infection was detected in the faeces of intestinal mucosa from the whole digestive tract, as well as at histological examination. Developmental stages of Cryptosporidium sp. were found also in blood smear (Fig. 7) from another two spontaneously infected 10-day-old calves. The blood was taken from veins jugularis. These are the first records of various developmental stages of Cryptosporidium sp. in calves and experimentally infected mice outside the digestive tract. For the time being it is not possible to ascertain whether the stages of this protozoan found in the liver, lungs, heart and blood are part of the life cycle of Cryptosporidium sp., or whether they were passively transported to these host organs with the blood during the endogenous development in microvilli of intestinal mucosa, particularly in case of very strong cryptosporidial infections.

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