

Cryptosporidial Infection of Pigs at The Intensive Breeding

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ABSTRACT

The sporozoan parasites *Cryptosporidium* spp. are recognized as significant pathogens of vertebrates (mammals, birds, reptiles and fishes). Most infections have been associated with acute transient disease, mainly in neonates, like piglets. Most case of the porcine cryptosporidiosis are nonhemorrhagic diarrhea. In our examination cryptosporidia organisms were detected in the microvillus brush of 11.25% (37/329) of pigs from 11-12 weeks old. Organisms were found in the jejunum and ileum. All of cryptosporidia infected pigs had diarrhea but at 32% of these had other primary diarrheagenic agents or lesion capable of causing their diarrhea.

INTRODUCTION

Cryptosporidiosis caused by the protozoan parasite *Cryptosporidium parvum* has been reported worldwide in humans and other mammals. It is highly prevalent and contributes to both, morbidity and mortality of the domestic livestock and humans (Fayer 1994). Like closely related parasites in the genus *Eimeria*, *Cryptosporidium parvum* passes through a series of asexual and sexual development stages in the gut and is transmitted in the oocyst stage via fecal contamination of the environment (Upton and Current 1985; Moon and Woodmansee 1986; Fayer 1994; Pavlovic et al. 1995). The usual routes of the transmission are ingestion of the contaminated water, food and close physical contact with infected animals or humans (Villocarta et al. 1991; O'Donoghue 1994; Fayer 1994).

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The prevalence of cryptosporidial infection in pigs is little known. Most case of piglet cryptosporidiosis are asymptomatic and infection with this parasites does not appear to be major production problem (Kennedy et al. 1977; Links 1982; Sanford 1987; Nagy 1995). If clinical signs are present they consist of nonhemorrhagic diarrhea (Sanford 1987; Lindsay et al. 1992; Pavlovic et al. 1995). Cryptosporidial infection are found at adult and young pigs, but usually at pigs from 6-12 weeks of age (Villocarta et al. 1990; Sanford 1987). Most case of clinical signs (diarrhea) are seen in pigs from 6-12 weeks old (Sanford 1987; Lindsay et al. 1992; Pavlovic et al. 1995). Organisms were found in the jejunum, ileum, rarely in colon, but primarily in microvilli of dome epithelium in the ileum (Tzipori 1982; Sanford 1987). The goal of our work was to research the prevalence of cryptosporidial infection in pigs and asses its clinical importance in conventional farm-raised pigs.

MATERIALS AND METHODS

During 1994 a total of 320 pigs, 4-16 weeks old, were examined in the laboratory of Scientific Veterinary Institute of Serbia. To all of examined pigs were signs of diarrhea. After routine necropsy, parasitological and viral evaluations were performed, as required to establish the cause of disease in each pig. To parasitological examination we used faecal swab, gut contents and mucosus scrape of gut which we examined with Sheathers sugar flotation and in direct smears stained with Giemsa strain and Ziehl-Neelsen stain and examined by use of light microscopy. In addition to section of jejunum, ileum and spiral colon from each pig were fixed in natural buffered 10% formalin, embedded in paraffin, sectioned at 6 μ m, stained with hematoxylin and eosin and examined by use of the light microscopy.

RESULTS AND DISCUSSION

During our examination cryptosporidial organisms were detected in the microvillus brush border in the intestine of 37 of the 329 (11.25%) pigs examined. Small numbers of organisms were in 24, moderate number at 7 and large number in 6 pigs. Infected pigs ranged from 7 to 12 weeks old but 78% (29 pigs) were 11-12 weeks old. Parasites were located primarily in the brush border of the ileum and especially in the dome epithelium covering the Payer's patches. When only a few organisms were detected, they consistently could be found in dome epithelium. In the jejunum parasites always were located on the villus epithelium. In three pigs cryptosporidia were found in the ileum, jejunum and colon. At histological intestine section, when lesion are present, they consist of mild to moderate villus atrophy, especially over ileal domes, and invasion of the

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lemna propria by large numbers of the mononuclear inflammatory cells and fewer eosinophils. All of cryptosporidia infected pigs had diarrhea but at 12 (32%) of these had other agents or lesions capable of causing their diarrhea (like colibacillosis or adenovirus infection). The examination of prevalence of cryptosporidia infection in pigs confirmed by Sanford (1987) suggested that 60% of infected pigs were 5-12 weeks old. The results of our investigation show that out of 78% infected pigs were 11-12 weeks old which suggested that infection apparently diminishes in pigs older than 12 weeks. Cryptosporidia were seen much less frequently in pigs outside of this age range (7 to 11 weeks) and not found in pigs less than 7 weeks old. This is in contrast with findings in experimental infected pigs which were, however, nearly always inoculated as neonatans (Moon et al. 1981; Tzipori et al. 1981; 1982). It is possible that in the field-factors including maternally derived the lactogenic immunity may operate to reduce the infection in piglets.

Comparing the obtain results of primary location of parasites with results of similar examination performed by other authors (Kennedy et al. 1977; Tzipori et al. 1982; Moon et al. 1982; Sanford 1987). We concluded that the cryptosporidia were in the ileum, jejunum and rarely in colon but primarily in the brush border in ileum. In study of naturally infected pigs, given by Links (1982) and Kennedy et al (1977) and with results of our examination we concluded that the colon is a minor site for attachment. During our examination *Cryptosporidium parvum* was not determined to be the only cause of diarrhea in examined pigs. Experimental infection indicate a primary etiologic role for cryptosporidia in the neonatal diarrhea of pigs, but diarrhea in farm animals frequently is a multifactoral problem, especially to young pigs and cryptosporidia may not in concert with other primary diarrheagenic agents or lesions capable of causing their diarrhea.

In our examination cryptosporidia organisms were detected in the 11.25% (37/329) of examined pigs. Organisms were found in the microvillus brush in the ileum, jejunum, rarely in colon. The fact that 78% of those infected were 11-12 weeks old, would suggested that there is a strong possibility of subclinical infection in the weaned pig. All of cryptosporidia infected pigs had diarrheagenic agents suggested that diarrhea in farm animals is a multifactoral problem and especially in the young pigs, cryptosporidia may act in connect with other agents to induce or exacerbate the clinical disease.

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