

BRIEF COMMUNICATION

SIZE OF *CRYPTOSPORIDIUM* OOCYSTS EXCRETED BY SYMPTOMATIC CHILDREN OF SANTIAGO, CHILE

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Various authors have contributed to the taxonomic classification of the *Coccidia* assigned to the genus *Cryptosporidium*. The valid species actually accepted are: *C. muris* and *C. parvum* (that infect mammals); *C. meleagridis* and *C. bayleyi* (infecting birds); *C. serpentis* (infecting reptiles) and *C. nasorum* (infecting fishes)^{3,5,10}.

UPTON & CURRENT reported that neonatal bovine with cryptosporidiosis shed two types of oocysts with different size. They made redescriptions of the two different species, those with oocysts of the small type was considered as *C. parvum* Tyzzer, 1912 and those larger as *C. muris* Tyzzer, 1907¹⁶. Amongst synanthropic and domestic mammals *C. parvum* was described infecting mouse, rat, cat, and cattle, besides dog, goat, sheep, pig, and horse. Studies of transmission of oocysts of *Cryptosporidium* recovered from human feces reported infections in the above mentioned recipients species, except in pig and horse^{1,5,9,12,14}.

About the human infections, it was considered that *C. parvum* appears to be the infectious species^{2,3,5}.

In this study, using an epidemiological approach to determine the size of *Cryptosporidium* oocysts excreted by infected children we contribute to investigate the *Cryptosporidium* species which are infecting humans beings in Chile.

Between July 1989 and June 1990 fecal samples from 1,418 children (aged < 24 months) were parasitologically studied. A stool examination for intestinal para-

sites was solicited to each children attended in public outpatient clinics or hospitalized in the Roberto del Rio Hospital from the north section of Santiago, Chile. Most children presented gastrointestinal symptoms, specially acute or persistent diarrhea and abdominal discomfort.

The stool samples were collected in small plastic vials containing a formol-saline solution (formaldehyde 50 ml, NaCl 5 g, distilled water 950 ml).

Each samples was processed by the formol-ether technique⁴ and the modified Ziehl-Neelsen staining⁶. In a next step, *Cryptosporidium* oocysts were isolated using two discontinuous sucrose gradients^{7,11}.

Using a calibrated ocular micrometer and a brightfield or phase contrast microscopy, fifty oocysts of *Cryptosporidium* were measured as described previously by UPTON & CURRENT¹⁶.

To eliminate any effect of the formol-ether technique on the size of the oocysts, parasites recovered from stool samples mixed either with formol-saline solution or with NaCl 0.85% from one hospitalized patient were previously examined. No difference was observed on the size of the fifty oocysts of *Cryptosporidium* processed with or without formol-saline solution.

Out of the 1,418 of the studied individuals, in 69 (4.9%) oocysts of *Cryptosporidium* by the modified Ziehl Neelsen staining were detected. After the treatment with

the two discontinuous sucrose gradient only 18 fecal samples contained the required number of parasites (50 oocysts) to measure and determine the average of their size.

A total of 900 oocysts of *Cryptosporidium* were observed and measured.

Most isolated oocysts were lightly ovoid and colorless. Some internal structures, as well as sporozoites and internal residual granules at brightfield or phase contrast microscopy were outlined.

All the isolated oocysts from the 18 fecal samples contained oocysts of *Cryptosporidium* whose average size with one standard deviation were $5.0 \pm 0.25 \times 4.5 \pm 0.26$ microns (range of major diameter between 3.8 and 6.0 microns; range of minor diameter between 3.0 and 5.3 microns), the variation coefficient was 5.0% and 5.7% for major and minor diameter respectively. The shape index was 1.1 (average of major diameter divided by minor diameter).

UPTON & CURRENT made redescrptions of the morphological aspects of the oocysts of *C. muris* and of *C. parvum* studying parasites isolated from bovine fecal material. *C. muris* oocysts measured 7.6×5.6 microns and *C. parvum* oocysts 5.0×4.5 microns. The shape index was 1.3 for *C. muris* and 1.1 for *C. parvum*¹⁶.

According to Tyzzer the oocysts of *C. muris* and *C. parvum* measured 7.0×5.6 and of $4.0-4.5 \times 3.0-3.3$ microns respectively¹⁶.

In rodents and ruminants, *C. muris* had a strict location in the stomach. On the contrary, *C. parvum* colonized the intestinal tract. Different clinical features were observed in the bovine *C. muris* and *C. parvum* infections^{1,12}.

In few studies it was measured the size of the oocysts isolated from humans fecal samples, reporting that oocysts ranged between 4.5 microns in diameter and in another paper 5.0×4.5 microns^{3,13}.

In our study we measured for the first time, in a systematic form, the size of *Cryptosporidium* oocysts excreted by determinate group of children. We observed that children infected with *Cryptosporidium* eliminated oocysts measuring 5.0×4.5 microns, corresponding to *C. parvum* reported by UPTON & CURRENT¹⁶. This results agrees with those published by other authors, in parasites isolated from humans and other mammals^{3,8,13,15}.

Even though in the present study, 69 cases of cryptosporidiosis were detected in the children, only in 18 (26.1%) patients it was technically possible to recover

the minimal suitable number of oocysts to calculate their average diameter. Using this parameter, we detected only infections by *C. parvum*.

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