In recent years there has been increasing attention to microsporidial infection in humans. Microsporidia are obligate intracellular protozoa parasites that infect a wide variety of lower animals. Four genera (*Enterocytozoon*, *Encephalitozoon*, *Pleistophora* and *Nosema*) have been identified in human microsporidiosis. Most symptomatic infections are found in immunocompromised patients. This concerns mainly HIV-infected persons, in whom microsporidia are a frequent cause of diarrhea, biliary illness and occasionally systemic infection.

Various studies have been carried out in Africa investigating intestinal microsporidial infection in children. In a group of 106 children in Harare (Zimbabwe) with symptoms of persistent diarrhea, of whom 18 were confirmed to be HIV-seropositive, *Enterocytozoon bieneusi* infection could not be detected in any of the fecal samples. A study in Niger showed 8 of 990 children to have intestinal *E. bieneusi* infection, from which 6 were reported to have diarrhea. A study in Kilifi (Kenya) showed no intestinal microsporidial infection in a group of 16 marasmic children and 32 children with kwashiko ror; a total of 5 children in this study were HIV-seropositive (RW Sauerwein, unpublished results).

In immunocompetent persons microsporidiosis is limited to case reports and includes four patients with cornal stroma infection, of which two were caused by *Nosema* and two were of undetermined *Microsporidium* species. *E. bieneusi* infection in an immunocompetent adult has been reported by Sandfort et al., this was an HIV-seronegative adult with acute, self-limited traveller's diarrhea, whose CD4+ cell count and plasma immunoglobulin values were normal. A case of self-limited traveller's diarrhea in an immunocompetent HIV-seronegative child with intestinal infection with *E. bieneusi* and *Cryptosporidium parvum* was recently presented by Sobottka et al. We report a case of asymptomatic intestinal *E. bieneusi* infection in a HIV-seronegative, immunocompetent Zambian child.

**Methods and case report.** In a population-based survey conducted in Samfya District, Zambia, in 1994, we examined stool samples from 176 rural children for microsporidia. Before entrance in the study informed consent was obtained from the parents or guardians of these children. Single fresh stool samples were collected and stored for 1 to 8 weeks at 4°C with 100 μl of 0.01% azide, before examination. The samples were examined for spores of microsporidia using the Uvitex 2B® fluorescence method. Serum samples were collected to examine serologic HIV status.

One of 176 stool samples contained spores of *E. bieneusi*, as confirmed by electron microscopy. The child was a 7-month-old 8.0-kg boy in good nutritional status. The mother reported that the boy had no history of diarrhea in the previous 2 weeks. At the Tropical Diseases Research Centre in Ndola-Zambia, three more stool samples were routinely examined for ova and cysts, including *Ziehl-Neelsen* stain for oocysts of *Cryptosporidium*, all with negative results. Laboratory investigations showed normal results, with a hemoglobin of 8.5 g/dl and serum concentrations of albumin and C-reactive protein of 44 g/l and 5 mg/l, respectively. The child was HIV-seronegative (HIV1/HIV2 Cambridge Biotech Recombigen ELISA® and HIV1/HIV2 IMX® test from Abbott), and serum immunoglobulin concentrations (IgG 11.32 g/l, IgM 2.06 g/l and IgA 0.46 g/l) showed no indication of immunodeficiency. In the total study group of 176 children, only 1 subject was HIV-positive.

Nine months later another stool sample was obtained from this child that was negative for spores of microsporidia. By that time the boy was 16 months old and still in a good nutritional status (body weight, 9.7 kg). The mother gave no history of frequent or longstanding diarrhea in her child since the previous visit. Recently when the child reached the age of 2 years and 4 months, plasma was collected and again found to be HIV-negative (HIV1/HIV2 Cambridge Biotech Recombigen ELISA®).

**Discussion.** Based on its relatively high prevalence in HIV-positive persons, it has been suggested that *E. bieneusi*...
may be a natural parasite of humans that is missed in routine stool examination, and clinically manifest only in severely immunocompromised people. However, in one study the prevalence of intestinal microsporidia was not significantly different between HIV-infected persons with or without diarrhea. We report intestinal E. bieneusi infection in the absence of clinical symptoms in an HIV-seronegative, immunocompetent child. Thus carriage of E. bieneusi has been demonstrated to occur in HIV-infected individuals, but importantly our study shows that carriage of E. bieneusi can also occur in asymptomatic immunocompetent individuals.

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