RESEARCH NOTE

ENTEROBIASIS: A NEGLECTED INFECTION IN ADULTS

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Abstract. In this study, adult patients were treated with praziquantel to expel intestinal flukes. Unexpectedly, dozens of adult *Enterobius vermicularis* worms with disfigured morphology, which had not been detected on fecal examination using Kat's modified thick-smear technique, were expelled from 6 of 33 patients.

INTRODUCTION

Intestinal infection due to pinworm (*Enterobius vermicularis*) is widespread worldwide (Neva and Brown, 1994). School or pre-school children are most often affected when living in crowded-conditions, such as nurseries or orphanages (Bogitsh *et al*, 2005). Worm transmission by fecal-oral route and self-reinfection is common when the hand touches the perianal area and carries the infection to the mouth (Yoon *et al*, 2000). The disease is highly correlated with a lack of hygiene, contaminated bed linen and clothes may also play a role in transmission.

Patients are often asymptomatic; however, when female worms deposit large numbers of eggs in the perianal region, pruritus is a typical symptom, especially at night. Serious complications, such as extra-intestinal infections, may occur but are uncommon (Djakovic *et al*, 2006).

The cellulose-tape technique (Scotch-tape technique) has proven to be an effective diagnostic technique. Fecal-smear examination is not generally used for *E. vermicularis* detection since female worms lay eggs in the perianal region, outside the host body, so eggs are rarely found in fecal samples. Albendazole, mebendazole or pyrantel pamoate are effective drugs for the treatment of *E. vermicularis* (Horton, 2000). Praziquantel is not commonly used, but is the drug of choice for treating flatworms and flukes.

MATERIALS AND METHODS

Mass fecal examinations to recover liver flukes (*Opisthorchis viverrini*), and intestinal flukes (*Haplorchis* spp) were conducted by Kat's modified thick smear technique (Katz *et al*, 1972), in Nan Province, northern Thailand (Fig 1) during 10-15 September 2006. The study cohort consisted of 479 participants with an age range of 20-95 years. Treatment was with praziquantel.

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RESULTS

The infection rate for *Haplorchis* spp eggs was about 70% by thick smear technique. After treatment, 33 participants were randomly chosen and whole fecal samples were collected for recovery of adult worms. Most of the expelled worms in the fecal samples were *Haplorchis taichui*, however, 6 of 33 (18.2%) participants were co-infected with *E. vermicularis*. After praziquantel treatment, *E. vermicularis* were expelled in feces and recovered; they were damaged morphologically (Fig 2). The worms were 10-11 mm in length. The typical cephalic array was observed clearly. In the abdominal section, the internal organs were disrupted and protruded outside the body. The tail was folded, however, the distinctive pointed tail was still recognizable. These morphological changes may have been caused by the praziquantel treatment. Therefore, praziquantel may be effective in treating both flukes and *E. vermicularis* worms.

Fig 1–Map of Thailand showing Nan Province.

DISCUSSION

In our study, nematodes were not expected, since praziquantel is normally indicated for flatworms and flukes. The effectiveness of praziquantel against *E. vermicularis* was reported in a study evaluating praziquantel treatment of *O. viverrini* and intestinal fluke infections (Pungpak *et al*, 1998). *E. vermicularis* egg was not deteced by Kat's modified thick smear technique in our study since it was not a standard technique for this infection. However, *E. vermicularis* adult worms were expelled in stools after praziquantel treatment for flukes and flatworms. Generally, when field studies of enterobiasis are conducted, the major target becomes children, since childhood behavior is more conducive to developing infection than adult behavior. In Thailand, the prevalence of *E. vermicularis* among pre-school children is high (45.4%) in a study of hill-tribe villages in Mae Chaem District, Chiang Mai, northern Thailand (Tukaew *et al*, 2002). In Bang Khun Thian District, Bangkok, a high rate of enterobiasis (21.6%) was reported among children (Changsap *et al*,

Fig 2–*Enterobius vermicularis* worm with disfigured morphology.

2002). At the same site as the current study, Nan Province, the infection rate with *E. vermicularis* among schoolchildren was 0.9%, however, this result was derived from stools prepared by the formalin-ethanol sedimentation technique (Waikagul *et al*, 2002). In another study, the prevalence of *E. vermicularis* was estimated at 9.2% among Malaysian adults (Oothuman *et al*, 1992). The current study indicates the need to focus research on *E. vermicularis* infection in adults as well as in children. *E. vermicularis* co-infection with HIV/AIDS (Adams *et al*, 2005) should be highlighted, because of self-infection and its global incidence in both developed and developing countries. Where a high prevalence is found, mass treatment may be required, including treatment of the whole population in endemic areas. Mass treatment of affected groups reduces symptoms rapidly, progressively, and cost-effectively (Lohiya *et al,* 2000).

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