Pelvic inflammatory disease associated with *Enterobius vermicularis*

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A case of pelvic inflammatory disease in a sexually non-active 13 year old girl is described, with evidence of pinworms as the cause. Albendazole treatment cleared the infestation but the patient suffered subsequent bouts of lower abdominal pain. The literature is reviewed regarding abdominal pathology associated with ectopic migration of pinworms.

Pelvic inflammatory disease involves inflammation of the endometrium, fallopian tubes, pelvic peritoneum, and contiguous structures caused by ascent of organisms to the normally sterile upper genital tract. A majority of cases are caused by *Chlamydia trachomatis*, but many other organisms have been implicated. We describe a case of an adolescent girl with pelvic inflammatory disease caused by *Enterobius vermicularis* and discuss the diagnosis, management, and implications of this infection.

**CASE REPORT**

A 13 year old girl presented to the emergency room with a five day history of vomiting, diarrhoea, fever, and abdominal pain. She was not sexually active and had a normal menstrual cycle (menarche 11 years). She had suffered in the past from migraine and recurrent Bell’s palsy but had been well before onset of this illness. Her spare time was spent figure skating and she earned money as a babysitter for 6–12 year old children.

At presentation, the girl was afebrile but appeared pale and unwell. Physical examination revealed notable tenderness in the right lower quadrant, guarding, and rebound tenderness. White blood cell count was 11.7 × 10^9/l; the differential count showed an eosinophilia of 0.82 × 10^9/l rising to 2.2 × 10^9/l over the next four days.

A right ovarian cyst and pelvic free fluid were seen on ultrasound examination, prompting gynaecological investigation. At laparoscopy a 2–3 cm right ovarian functional cyst was seen; there were signs of chronic inflammation with a yellow-green exudate in the pelvic peritoneum. Uterus and fallopian tubes appeared normal. Histological examination of the inflamed pelvic peritoneum showed an eosinophilic infiltrate and pinworm ova (see fig 1). Coagulate negative staphylococci were isolated from the pelvic fluid and cloxacillin commenced following antibiotic sensitivity testing. These organisms were thought to have been carried to the peritoneum by the worms. The patient was treated with two 400 mg doses of albendazole administered one week apart. The family contacts also received a dose of mebendazole.

The postoperative course was complicated by an *E coli* urinary tract infection which responded to cephalexin treatment. The abdominal pain rapidly improved with use of non-steroidal anti-inflammatory drugs (diclofenac sodium) and the girl was discharged home. On review six months later, she had undergone three further laparoscopies for recurrent right lower quadrant abdominal pain, but there was no evidence of persistent *Enterobius* infection or pelvic inflammation. Uterus, ovaries, and fallopian tubes were reported as normal, with no obvious scarring or adhesions.

**DISCUSSION**

*Enterobius vermicularis* (pinworm or threadworm) is a common intestinal parasite, perhaps affecting 10% of North Americans per year. Pinworm infections predominantly occur in young children (5–10 years), who present with perianal and perineal pruritus, but adults may also be affected. Despite this high prevalence, enterobiasis is not usually considered to be a serious disease, although ectopic infections, seen most commonly in females, can cause significant morbidity. It is likely that the enterobius infection in our patient was an occupational hazard of working as a babysitter, and that she acquired infection either from direct contact with the children or via contaminated fomites.

The 2–4 week life cycle of *E vermicularis* occurs normally in the lumen of the human gastrointestinal tract. Transmission is faecal–oral as a result of self contamination of hands, or ingestion of contaminated fomites. The outer proteinaceous layer of the egg dissolves on exposure to digestive secretions, releasing larvae into the duodenum; the adult worms inhabit the distal small and proximal large bowel, where mating occurs. At night, the gravid female migrates to the anal verge to deposit as many as 10 000 eggs. The eggs embryonate within hours and remain viable for 20 days. These eggs may then infect the same or a new susceptible host through anal–oral transmission, or via “reinfection”. In the latter instance, the larvae migrate from the anal verge back into the gastrointestinal tract where they mature, mate, and continue their life cycle.

![Figure 1](http://adc.bmj.com/content/86/6/439/f1)

**Figure 1** The hard shelled egg of *E vermicularis* is prominent centrally, surrounded by inflammatory cells including eosinophils (biopsy specimen of the pelvic peritoneum; haematoxylin and eosin stain, 400×).
The chief symptom of classical pinworm infection is pruritis ani, caused by mechanical irritation and allergic reaction, and is often manifest as irritability, insomnia, and enuresis. These features were not present in our patient. Ectopic infections result from spread of larvae from the anal margin to a wide variety of ectopic sites. The local inflammatory response or secondary bacterial infection cause symptoms and clinical presentation. Direct inoculation of larvae may result in infection of distant sites such as the external auditory meatus or conjunctiva, but occasionally the parasites reach internal ectopic sites. Ascent of larvae from the perineum into the female genital tract is the most common, and was the probable route of entry into the peritoneum of our case. Such ascending genital tract infection in the presence of postmenopausal bleeding. Another possible means of ectopic spread into the peritoneum is perforation of the intestine or appendix, allowing penetration of the pinworms through the damaged intestinal wall into the peritoneal cavity. This secondary route of parasite migration helps to account for the reported cases of tinal wall into the peritoneal cavity. This secondary route of parasite migration helps to account for the reported cases of 

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infection have an increased incidence of urinary tract infection, probably because of 

migration of worms into the urethera and bladder, and this may have accounted for the urinary tract infection in our patient. Transfer of enteric or cutaneous organisms to these normally sterile sites along with the pinworms has been documented previously, and may be the explanation for the isolation of bacteria from the peritoneum of our patient.

Our patient has suffered with chronic abdominal pain since the initial presentation, prompting multiple surgical interventions and may be at risk of future problems with infertility, ectopic pregnancy, and continuing abdominal-pelvic pain. Although most pinworm infections are minor, ectopic infections in the female genital tract can be a diagnostic challenge and may have long term implications for reproductive health.

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