CASE SERIES

Cutaneous larva migrans in infants in the Adelaide Hills

Michael D Black,1 David I Grove,2 Andrew R Butcher3 and Lachlan J Warren1

1Department of Dermatology, The Women’s & Children’s Hospital, North Adelaide, South Australia, 2Clinical Microbiology & Infectious Diseases, The Queen Elizabeth Hospital, Woodville, South Australia, 3Microbiology & Infectious Diseases, SA Pathology, Adelaide, South Australia, Australia

ABSTRACT

Four infants aged between 8 and 15 months presented between November 2002 and May 2006 with dermatitis of the lower abdomen, perineum or buttocks. All lived in semi-rural properties in the Adelaide Hills and had not travelled outside South Australia. Wandering thread-like serpiginous tracks were evident on examination, consistent with a diagnosis of cutaneous larva migrans. No abnormalities were detected on full blood examination, Strongyloides stercoralis serology or faecal analysis. Treatment with oral albendazole resulted in rapid resolution of symptoms. An epidemiological survey was undertaken which suggested possums or millipedes may have been the source of nematode larvae, the precise nature of which is unclear but could include Parastrongyloides trichosuri and Rhabditis necromena.

Keywords: creeping eruption, cutaneous larva migrans, millipede, possum, South Australia.

INTRODUCTION

CLM is a parasitic skin infection typically caused by penetration of the epidermis by helminth larvae. It occurs predominantly in tropical and subtropical climates, and therefore occurrence in temperate climates is most common in returning travellers. Sporadic cases of locally acquired CLM in temperate climates such as New Zealand1 have been reported, but never in Australia. We describe four cases of locally acquired CLM occurring in infants in the Adelaide Hills between November 2002 and May 2006.

CASE SERIES & QUESTIONNAIRE

Case 1

An 11-month-old girl presented in November 2002 with a 2 week history of a pruritic lesion on the buttocks migrating at a rate of 5–5 cm per day. Examination revealed a slightly raised erythematous and vesicular lesion on the buttocks and sacral skin (Fig. 1). Peripheral blood examination was normal with no eosinophilia, serology for Strongyloides stercoralis was negative and faecal analysis was negative for parasites. She was treated with albendazole 200 mg daily for 5 days, with rapid resolution of the rash noted following the first dose.

Case 2

A 12-month-old girl presented in July 2005 with a 2 week history of a pruritic lesion on the inguinal and vulval skin migrating at a rate of 1 cm per day. Examination revealed a raised erythematous serpentine lesion on the lower abdomen and inguinal region (Fig. 2). Faecal analysis was negative for parasites. She was treated with oral albendazole 200 mg daily for 5 days, with rapid resolution of the rash.

Case 3

A 13-month-old boy, the brother of Case 1, presented in March 2006 with a 4 week history of a pruritic vesicular lesion on the scrotum which subsequently migrated to the left inguinal fold at a rate of 5–5 cm per day. Examination revealed a raised erythematous serpentine lesion on the scrotum and inguinal skin (Fig. 3). Serology for S. stercoralis was negative and faecal analysis was negative for parasites. Possum faeces from the family property were also submitted for analysis. Nematode eggs and rhabditiform larvae were identified in small numbers although further identification was not possible. The boy was treated with...
albendazole 200 mg daily for 3 days resulting in resolution of the eruption. However, the eruption recurred 3 weeks later, necessitating a further 3 day course of oral albendazole. The eruption resolved but then recurred again 2 weeks later. Topical thiabendazole 15% ointment was applied twice daily for 5 days, resulting in complete resolution with no further recurrences.

Case 4
An 8-month-old girl presented in May 2006 with a 2 week history of a pruritic lesion on the inguinal and vulval skin migrating at a rate of 2 cm per day. Examination revealed a raised erythematous serpentine lesion on the lower abdomen and inguinal region (Fig. 4). Serology for *S. stercoralis* was negative and faecal analysis was negative for parasites. She was treated with albendazole 200 mg daily for 5 days resulting in complete resolution of the rash. However 3 months later she developed a similar lesion in the natal cleft. Treatment with albendazole 200 mg daily for 5 days was repeated with rapid resolution of the rash and no further recurrences.

**Questionnaire**
A questionnaire was sent to the parents of all the patients. The results are summarised in Table 1. All patients were infants living in semi-rural environments in the Adelaide Hills region and had not travelled outside SA, indicating the infection was locally acquired. No seasonal predilection was observed. Three out of four of the households had vegetable gardens, a compost pile and used animal manure on the garden, all of which may provide favourable conditions for nematode larvae contaminating vegetables. The children lived with a variety of domestic animals and wildlife. Three of the four children had been observed to ingest the Portuguese millipede, *Ommatoiulus moreleti*, and three children had spent time sitting on the ground outdoors without a nappy.

**DISCUSSION**
CLM is caused by filariform larvae of nematodes, which normally infect animals, migrating to human skin. Since
Table 1  Key features of the questionnaire sent to parents of the patients

<table>
<thead>
<tr>
<th></th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Female</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Age (months)</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td>Environment</td>
<td>Semi-rural</td>
<td>Semi-rural</td>
<td>Semi-rural</td>
<td>Semi-rural</td>
</tr>
<tr>
<td>Garden</td>
<td>Vegetables, compost, manure</td>
<td>Vegetables, compost, manure</td>
<td>ND</td>
<td>Vegetables, compost, manure</td>
</tr>
<tr>
<td>Water supply</td>
<td>Rain, mains</td>
<td>Rain, bore</td>
<td>Rain, mains</td>
<td>Rain</td>
</tr>
<tr>
<td>Seasonal onset</td>
<td>Summer</td>
<td>Winter</td>
<td>Autumn</td>
<td>Autumn/Winter</td>
</tr>
<tr>
<td>Travel outside SA</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Animal contacts (domestic)</td>
<td>Cat, goat, ducks, horse</td>
<td>Dog, cattle</td>
<td>Horse</td>
<td>Horse, chickens</td>
</tr>
<tr>
<td>Animal contacts (wildlife/vermin)</td>
<td>Possums, mice, fox, millipedes, earwigs</td>
<td>Possums, mice, fox, millipedes, earwigs</td>
<td>Possums, mice, fox, millipedes, earwigs</td>
<td>Mice, fox, millipedes, earwigs</td>
</tr>
<tr>
<td>Ingestion of non-food objects</td>
<td>Yes (millipedes)</td>
<td>No</td>
<td>Yes (millipedes, rabbit faeces)</td>
<td>Yes (millipedes)</td>
</tr>
<tr>
<td>Nappy-free time outside</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

ND, no data.

humans have a degree of innate immunity to these animal parasites, the worms are unable to follow their normal patterns of migration and maturation into adult worms in the bowel. Although a number of nematodes have been reported to cause CLM, by far the most common is the dog and cat hookworm, *Ancylostoma braziliense.* However, this parasite was not found in a recent, large Australia-wide survey of cats and dogs and this no doubt accounts for the absence of reports of autochthonous CLM in this country. A. caninum is endemic in Australia but this usually causes ground itch or eosinophilic enteritis rather than CLM. *Uncinia stenocephala* is also widespread in Australia but this is not thought to be a major cause of CLM.

There are a number of features of this small series that are unexpected. First is the geographical distribution of patients in the Adelaide Hills. This could reflect selection bias as it is the area of practice of author LJW, but this seems unlikely as when these patients were reported at the Australasian College of Dermatologists Annual Scientific Meeting in 2007, a straw poll of dermatologists practising throughout Australia indicated that none present had seen any similar patients. Second, all the patients were young children whereas CLM caused by *A. braziliense* affects people of all ages. Third, the distribution of the rash was in the nappy area. Infection in adults is almost exclusively on the feet and legs but children have been infected on the buttocks, genitals and hands, reflecting the habits of children sitting and crawling on ground contaminated with *A. braziliense* larvae. However, in this small series, there is a suggestion of a slightly different anatomical distribution. The rashes shown in the photographs of the four patients involve the skin above the buttocks, the natal cleft, the lower abdomen and inguinal region, and the perineum. These features may be relevant when considering the parasite involved and the mode of acquisition of infection.

In CLM due to *A. braziliense,* the region of skin infected is that which comes into contact with infective larvae lying in wait on the ground. That is certainly possible in our series, given that three of the children were allowed to sit outside without a nappy, and the fourth may have done so without her parents’ knowledge. In this case, the worms must have been parasites of domestic animals or wildlife, particularly possums, which may have defaecated on the ground on which the children played. Two species of possums are common in the Adelaide Hills, the ringtail possum (*Pseudocheirus peregrinus*) and the brushtail possum (*Trichosurus vulpecula*). The latter can be infected with *Parastrongyloides trichosuri* which has a life cycle similar to *Strongyloides stercoralis* (which causes larva currens in humans) with both parasitic and free-living cycles.

The restriction of the rashes to the nappy area and the observation that three of the four children had been observed to ingest Portuguese millipedes (the fourth may well have done so unseen) suggests an alternative possibility. It is somewhat reminiscent of a recently described trematode, *Brachylaima cribbi,* which has been found to infect the gut of children who ingested infected snails commonly found in rural parts of South Australia.

The Portuguese millipede, *Ommatoiulus moreleti,* was accidentally introduced into Port Lincoln in South Australia in 1953 and has since spread into other parts of South Australia, Victoria, Tasmania, southern NSW and around Perth. It was then found that a nematode indigenous to South Australia, *Rhabditis necromena,* parasitises these millipedes. *Rhabditis necromena* is largely a free-living species that feeds on bacteria in the soil. Fertilised female worms release eggs, each of which hatches a larva which molts twice to become a third-stage larva known as a dauer juvenile. Dauer juveniles enter the haemocoel of millipedes, are transported around, and are then released from dead and disintegrating millipedes, to moult two more times to once again become adult worms.

Our series of patients raises the intriguing possibility that millipedes which are ingested act as a vector for the larvae of *R. necromena* which are then passed in the faeces. If stool is trapped in a nappy for a number of minutes or hours, this could provide an opportunity for these larvae to penetrate the relatively fine skin of infants. We have no definitive
evidence to support this hypothesis but the related worm *Pelodera (Rhabditis) strongyloides*, a free-living nematode, can penetrate skin and cause dermatitis. We hypothesize could be a subject of further research, for example by exposing the skin of infant mice or nude (hypothymic) mice to *R. necromena* dauer juveniles.

We cannot know what was the actual cause of CLM in these patients, but we hope our report will alert other practitioners to look for similar cases. CLM manifests as a pruritic eruption characterised by wandering, erythematous, serpiginous tracks. Diagnosis is usually by history and clinical appearance, as there are no reliable laboratory investigations and isolation of larvae by skin biopsy is difficult and their identification problematic.

**ACKNOWLEDGEMENTS**

The authors would like to thank Drs Allison Ramsey, Veronica Paull and Paul Dilena for referring these fascinating cases to LJW.

**REFERENCES**