Larva Migrans

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Importance

The larva migrans syndromes are clinical syndromes that can be caused by a variety of organisms. These syndromes are loosely defined and the list of causative agents varies with the author.

Cutaneous larva migrans

Cutaneous larva migrans occurs when parasitic larvae migrate through the skin of the host. These infections are often acquired by skin contact with environmental sources of larvae, such as the soil. The larvae cause a pruritic, migrating dermatitis as they travel through the skin. Many of these infections are self-limiting.

Animal hookworms are the most common cause of cutaneous larva migrans in humans. *Ancylostoma braziliense* is the most important species. Less often, cutaneous larva migrans is caused by *A. caninum*, *A. ceylonicum*, *A. tubaeforme, Uncinaria stenocephala* or *Bunostomum phlebotomum*. In their normal animal hosts, these parasites can enter the body through the skin. They penetrate the dermis to reach the blood, and migrate through the lungs before reaching the intestines, where they mature into adults. In abnormal hosts such as humans, the zoonotic hookworms can enter the epidermis but cannot penetrate the dermis, and migrate for a period of time in the epidermis before dying.

Strongyloides papillosus, *S. westeri*, *S. stercoralis*, *S. procyonis* and *S. myopotami* can cause a very similar clinical syndrome. *Strongyloides* spp. larvae move more rapidly in human skin than hookworms, and some authors call this infection larva currens ("racing larva") rather than cutaneous larva migrans.

Other parasites such as *Gnathostoma spinigerum* and *Dirofilaria repens* can travel through the skin and cause dermatitis or swelling. Some authors consider these syndromes to be cutaneous larva migrans.

Non-zoonotic parasites can cause some cases of cutaneous larva migrans. The human hookworms *Ancylostoma duodenale* and *Necator americanus* migrate through the skin to reach the intestinal tract. In people who have been previously exposed, an allergic reaction to the parasites results in a pruritic dermatitis similar to that caused by the zoonotic hookworms.

Rare cutaneous infections by free-living nematodes such as *Peloderma strongyloides* have also been reported in humans.

Visceral larva migrans

Visceral larva migrans occurs when parasitic larvae migrate through the internal organs of the host. Humans can acquire these infections by ingesting parasite eggs, or by eating tissues from intermediate or paratenic hosts that contain larvae. The symptoms vary with the number of parasites and the tissue(s) invaded. CNS infections are often the most serious form.

Toxocara canis and *T. cati* are the most important causes of visceral larva migrans in humans. In their normal canine or feline hosts, *Toxocara* eggs hatch in the intestines but the larvae leave the gastrointestinal tract and migrate through the tissues. When they reach the intestines a second time, they mature into adult worms. In humans and other paratenic hosts, the larvae do not complete this migration and eventually encyst in the tissues. *T. vitulorum* and *T. pteropodis* may also be able to cause visceral larva migrans, but these species have been less well studied.

Baylisascaris procyonis, an ascarid of raccoons, can cause serious infections in humans and domestic animals. Human infections are similar to toxocariasis, but *B. procyonis* larvae migrate more extensively and continue to grow, resulting in more severe clinical signs. As of 2003, only 25 infections had been reported in humans but five of these were fatal. Natural patent infections have also been reported in dogs, and visceral larva migrans has been seen in dogs, rabbits, lambs, non-human primates, domestic and wild fowl, sea otters and other species.

Ascaris suum, an intestinal roundworm of pigs is a rare cause of visceral larva migrans in humans. Human infections usually occur after accidentally ingesting parasite eggs, but can also be the result of eating larvae in raw beef or chicken liver. In humans,

A. suum larvae can invade the liver and lungs, resulting in eosinophilic pneumonia as well as pseudotumors and other liver lesions. Rare cases of myelitis, and neurologic syndromes including encephalopathy and myeloradiculitis, have also been reported. *A. suum* infections have also been reported in other species including cattle.

Many other parasites also migrate through the tissues and cause similar syndromes. Some but not all authors consider these syndromes to be visceral larva migrans. These parasites include:

- *Gnathostoma spinigerum* (gnathostomiasis).
- *Capillaria hepatica* (capillariasis).
- *Angiostrongylus cantonsensis* (angiostrongyliasis)
- *Angiostrongylus costaricensis* (angiostrongyliasis)
- *Gongynolema* spp. (gonglynemiasis)
- *Lagochilascaris* spp.
- *Dirofilaria immitis* (dirofilariasis)
- *Anisakis* spp. (anisakiasis)
- *Pseudoterranova* spp. (anisakiasis)
- The tissue phase of some human nematodes, including *Strongyloides stercoralis* and *Ascaris lumbricoides*, can cause clinical syndromes similar to visceral larva migrans.

Ocular larva migrans

Ocular larva migrans occurs when migrating larvae invade in the eye of the host. Symptoms of visceral larva migrans may or may not be present at the time; in toxoplasmosis, concurrent systemic signs are uncommon. Ocular larva migrans is often unilateral. The symptoms vary with the location and activity of the larvae, as well as the amount of inflammation, but can include blindness. Zoonotic nematodes that have been found in the eye include:

- *Toxocara canis* and *T. cati*. These species are the most common cause of ocular larva migrans.
- *Baylisascaris procyonis*
- *Ancylostoma* spp.
- *Gnathostoma spinigerum*

References

Acha PN, Szyfres B (Pan American Health Organization [PAHO]). Zoonoses and communicable diseases common to man and animals. Volume 3. Parasitoses. 3rd ed. Washington DC: PAHO; 2003. Scientific and Technical Publication No. 580. Cutaneous larva migrans; p. 249-252.

Aiello SE, Mays A, editors. The Merck veterinary manual. 8th ed. Whitehouse Station, NJ: Merck and Co; 1998. Zoonoses. Nematodes; p 2174-2177.

Douglass MC, Juzych LA. Cutaneous larva migrans. eMedicine.com; 2004 Aug. Available at: http://www.emedicine.com/derm/topic91.htm. Accessed 13 Dec 2004.

Inatomi Y, Murakami T, Tokunaga M, Ishiwata K, Nawa Y, Uchino M. Encephalopathy caused by visceral larva migrans due to *Ascaris suum*. J Neurol Sci. 1999 1;164:195-9.

Juckett G. Pets and parasites. Am Fam Physician. 1997;56:1763-74, 1777-8.

Kelsey DS. Enteric nematodes of lower animals transmitted to humans: zoonoses [monograph online]. In Baron S, editor. *Medical Microbiology*. 4th ed. New York: Churchill Livingstone; 1996. Available at: http://www.gsbs.utmb.edu/microbook/. Accessed 28 July 2004.

Kim S, Maekawa Y, Matsuoka T, Imoto S, Ando K, Mita K, Kim H, Nakajima T, Ku K, Koterazawa T, Fukuda K, Yano Y, Nakaji M, Kudo M, Kim K, Hirai M, Hayashi Y. Eosinophilic pseudotumor of the liver due to *Ascaris suum* infection [abstract]. Hepatol Res. 2002;23:306.

Kwon IH, Kim HS, Lee JH, Choi MH, Chai JY, Nakamura-Uchiyama F, Nawa Y, Cho KH.A serologically diagnosed human case of cutaneous larva migrans caused by *Ancylostoma caninum*. Korean J Parasitol. 2003;41:233-7.

Osoegawa M, Matsumoto S, Ochi H, Yamasaki K, Horiuchi I, Kira YO, Ishiwata K, Nakamura-Uchiyama F, Nawa Y. Localised myelitis caused by visceral larva migrans due to *Ascaris suum* masquerading as an isolated spinal cord tumour. J Neurol Neurosurg Psychiatry. 2001;70:265-6.

Sakakibara A, Baba K, Niwa S, Yagi T, Wakayama H, Yoshida K, Kobayashi T, Yokoi T, Hara K, Itoh M, Kimura E. Visceral larva migrans due to *Ascaris suum* which presented with eosinophilic pneumonia and multiple intra-hepatic lesions with severe eosinophil infiltration--outbreak in a Japanese area other than Kyushu. Intern Med. 2002;41:574-9.

Velho PE, Faria AV, Cintra ML, de Souza EM, de Moraes AM. Larva migrans: a case report and review. Rev Inst Med trop S Paulo. 2003;45: 167-71.

Yoshida S, Matsui M, Wang HY, Oeda T, Sasaki T, Komure O, Ozawa K, Konisi T, Saida T, Yoshikawa H, Nawa Y. [A case of myeloradiculitis as a complication of visceral larva migrans due to *Ascaris suum*] [abstract]. Rinsho Shinkeigaku. 2004;44:198-202.