

ANGIOSTRONGYLOSIS

ANIMAL GROUP AFFECTED	TRANSMISSION	CLINICAL SIGNS	FATAL DISEASE ?	TREATMENT	PREVENTION & CONTROL
Mainly New World monkeys (naturally in rats !)	Perorally via mollusc vectors	Lethargy, Ataxia, incoordination, tumorlike masses, death	Yes	Mebendazole (Cave: anaphylactic shock!)	<i>In houses</i> <i>in zoos</i> Physical removal of infected slugs, snails, crabs etc.

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Susceptible animal groups Callitrichidae, Cebidae, 1 x <i>Hylobates lar</i> , <i>Lemur variegatus</i> , <i>Miopithecus talapoin</i> , rats, man.	
Causative organism <i>Angiostrongylus costaricensis</i> , <i>A.cantonensis</i> .	
Zoonotic potential Only indirectly through slugs.	
Distribution Central- and South America, South East Asia,China,Hawaii, (Africa, Europa ?).	
Transmission Perorally via uptake of larvae-containing slugs (<i>Vaginulus plebius</i>) or fresh-water snails (<i>Achatina</i> sp , <i>A. fulica</i>). <i>Pamacea canaliculata</i>). <i>A. cantonensis</i> also through freshwater prawns, land crabs, frogs etc.	
Incubation period Prepatent period : 4 weeks.	
Clinical symptoms Lethargy, ataxia, palpable abdominal masses, incoordination in walking, death. In man: headache, stiffness, vomiting, myalgia (cranial nerve palsies III, IV, VI, VII)	
Post mortem findings <i>A. costaricensis</i> : mesenteric tumor-like,larvae containing granulomas, otherwise congested lungs, eosinophilic meningoencephalitis.	
Diagnosis Necropsy, serology (IF or EIA), CSF leocytosis	
Material required for laboratory analysis Altered tissues.	
Relevant diagnostic laboratories Local parasitological /pathological laboratories.	
Treatment Repeatedly Mebendazole (5 mg/kg). Cave : The death of migrating larvae after anthelmintic treatment may increase inflammatory and anaphylactic responses .	
Prevention and control in zoos Physical removal of slugs and snails from animal and public contact.	
Suggested disinfectant for housing facilities	
Notification	
Guarantees required under EU Legislation	
Guarantees required by EAZA Zoos	



Measures required under the Animal Disease Surveillance Plan
Measures required for introducing animals from non-approved sources
Measures to be taken in case of disease outbreak or positive laboratory findings
Conditions for restoring disease-free status after an outbreak
Experts who may be consulted
References <ol style="list-style-type: none">1. Aguiar, P. H., P. Morera, and J. Pascal. 1988. First record of <i>Angiostrongylus cantonensis</i> in Cuba. <i>Am. J. Trop. Med. Hyg.</i> 30 : 963 – 965.2. Aguilar, R. F., K. Topham, J. J. Heatley, D. Nichols, J. Cross, R. Bauer, and M. Garner. 1999. Neural angiostrongylosis in nonhuman primates : Diagnosis, treatment and control of an outbreak in Southern Louisiana. <i>Am. Assoc. Zoo Vet. Annu. Conf. Proc.</i> 1999 : 272 – 276.3. Alicata, J. E. 1991. The discovery of <i>Angiostrongylus costaricensis</i> as a cause of human eosinophilic meningitis. <i>Parasitol. Today</i> 7 : 151 – 153.4. Andersen, E., D. J. Gubler, K. Sorensen, J. Beddard, and L. R. Ash. 1986. First report of <i>Angiostrongylus costaricensis</i> in Puerto Rico. <i>Am. J. Trop. Med. Hyg.</i> 35 : 319 – 322.5. Anon. 1998. <i>Angiostrongylus (Parastrongylus) cantonensis</i> persists in southern USA. <i>Trop. Med. Hyg. News</i> 48 (1,2,3) : 15.6. Baird, J. K., R. C. Neafie, L. Landie, and D. H. Connor. 1987. Abdominal angiostrongyliasis in an African man : Case study. <i>Am. J. Trop. Med. Hyg.</i> 37 : 353 – 356.7. Brack, M. 1987. <i>Agents Transmissible from Simians to Man.</i> Springer, Berlin.8. Brack, M., und M. Schröpel. 1995. Angiostrongylosen nichthumaner Primaten. <i>Verh. ber. Erkr. Zootiere</i> 37 : 201 – 204.9. Campbell, B. G., and M. D. Little. 1988. The finding of <i>Angiostrongylus cantonensis</i> in rats in New Orleans. <i>Am. J. Trop. Med. Hyg.</i> 38 : 568 – 573.10. Gardiner, C. H., S. Wells, A. E. Gutter, L. Fitzgerald, D. C. Anderson, R. K. Harris, and D. K. Nichols. 1990. Eosinophilic meningoencephalitis due to <i>Angiostrongylus cantonensis</i> as the cause of death in captive non-human primates. <i>Am. J. Trop. Med. Hyg.</i> 42 : 70 – 74.11. Ko, R. C. 1978. Occurrence of <i>Angiostrongylus cantonensis</i> in the heart of a spider monkey. <i>J. Helminthol.</i> 52 : 229.12. Mota, E. M., and H. L. Lenzi. 1995. <i>Angiostrongylus costaricensis</i> life cycle : a new proposal. <i>Mem. Inst. Oswaldo Cruz</i> 90 : 707 – 709.13. Pascal, J. E., R. P. Bouli, and H. Aguiar. 1981. Eosinophilic meningoencephalitis in Cuba, caused by <i>Angiostrongylus cantonensis</i>. <i>Am. J. Trop. Med. Hyg.</i> 30 : 960 – 965.14. Rambo, P.R., A. A. Agostini, and C. Graeff – Teixeira. 1997. Abdominal angiostrongyliasis in southern Brazil –prevalence and parasitic burden in mollusc intermediate hosts from eighteen endemic foci. <i>Mem. Inst. Oswaldo Cruz</i> 92 : 9 – 14.15. Shan, L. V., Yi Zhang, P. Steinmann, and Xiao-Nong Zhou. 2008. Emerging angiostrongylosis in mainland China. <i>Emerg. Infect. Dis.</i> 14 : 161 – 164.16. Terada, M., H. Kino, C. V. Akyol, and M. Sano. 1993. Effects of mebendazole on <i>Angiostrongylus costaricensis</i> in mice , with special reference to the timing of treatment. <i>Parasitol. Res.</i> 79 : 441 – 443.