



Eosinophilic meningitis

衛福部 疾病管制署
中區傳染病防治醫療網
王任賢 指揮官



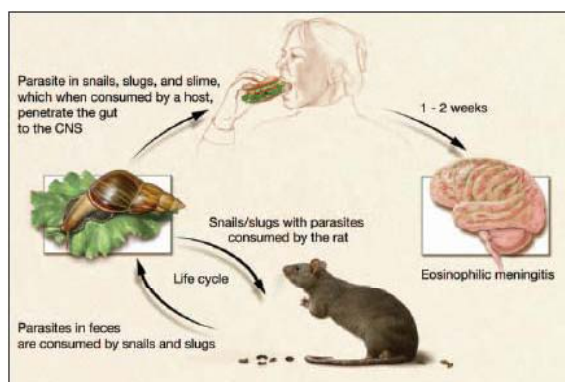
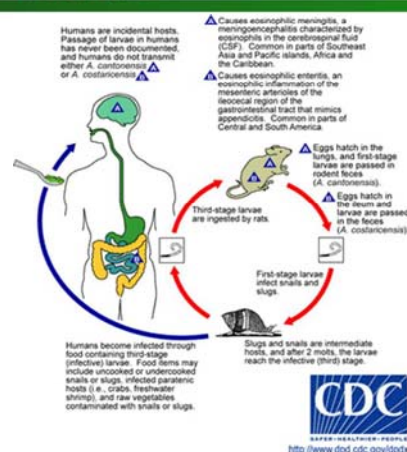
病例報告

- 46-year-old male executive from Phoenix, Arizona presents to the ER with recent history of going on a cruise to Jamaica. One week after returning, he developed headaches, stiff neck, and vomiting.
- He had no significant PMH and was sexually active with multiple partners.
- Physical exam revealed low-grade fever and meningismus, but was otherwise negative.
- CSF examination revealed a WBC count of 300/mm³ with **60% eosinophils**, glucose of 45 mg/dL and protein 150 mg/dL.
- Gram stain was negative.



Helminthic eosinophilic meningitis

- *A. cantonensis*
 - cause eosinophilic meningitis (pleocytosis with >10% eosinophils)
 - acquire the infection by ingesting raw mollusks.
 - present with nonspecific and self-limited abdominal pain caused by larval migration into the bowel wall.
 - On rare occasions, the larva can migrate into the CNS and cause eosinophilic meningitis
- *G. spinigerum*
 - cause eosinophilic meningoencephalitis
 - acquire the infection following ingestion of undercooked infected fish and poultry.



Angiostrongylus cantonensis的歷史

- 1933年：由陳心陶在廣東家鼠體內發現，並命名
 1937年：Matsumoto臺灣15歲男孩（患腦膜炎）體內發現
 1946年：Dougherty 確定本蟲
 1960年：明確太平洋地區和東南亞等國家嗜酸性粒細胞增多性腦膜炎與本蟲有關
 1979年：中國大陸發現第一例疑似病例
 1984年：大陸腦脊液發現幼蟲
 1995年：美國發現第一例病人
 1997年：我國溫州小流行，為我國首次暴發
 2006年：北京暴發流行，共131例病人（無死亡病例）
 迄今：全球共3000多例病人



Features of *Angiostrongylus cantonesis* meningitis - rat lungworm

- Most common cause of eosinophilic meningitis
- Reported from many countries of the world (Thailand, Malaysia, Vietnam, Indonesia, Papua New Guinea, Taiwan, Pacific Islands); recent outbreak in Jamaica
- Rat infection rate in urban Bangkok ~40%
- May spread as rats move freely from port to port on ships
- Symptoms begin 6-30 days after ingestion of raw mollusks or other sources of the parasite.
- Clinical findings are headache (90%), stiff neck (56%), paresthesias (54%), and vomiting (56%)
- CSF reveals a moderate pleocytosis with 16-72% eosinophils; larvae are occasionally found in CSF



A. cantonensis in rodents

- Definitive host : genus Rattus
- Adult nematode : pulmonary arteries
- Oviposition : pulmonary arteries
- 1st stage larvae : pulmonary arteries to trachea, then swallowing, to feces
- 2nd and 3rd stage larvae : mollusks ingest fecal matter of infected rodents
- 3rd stage larvae : infectious, in snails, plants, water
 - Penetrate intestine, systemic to brain, 2 molts, young adult, surface of brain, subarachnoid space, pulmonary artery



Angiostrongyliasis syndromes in humans

- Angiostrongylosis syndrome in human
 - A. cantonensis : eosinophilic meningitis or meningoencephalitis
 - A. costaricensis : abdominal angiostrongylosis
- accidental host : man
 - In man, an accidental host. the parasite can reach sexual maturity and produce eggs, but the eggs usually degenerate, causing a granulomatous tissue reaction.
- intermediate hosts : mollusks



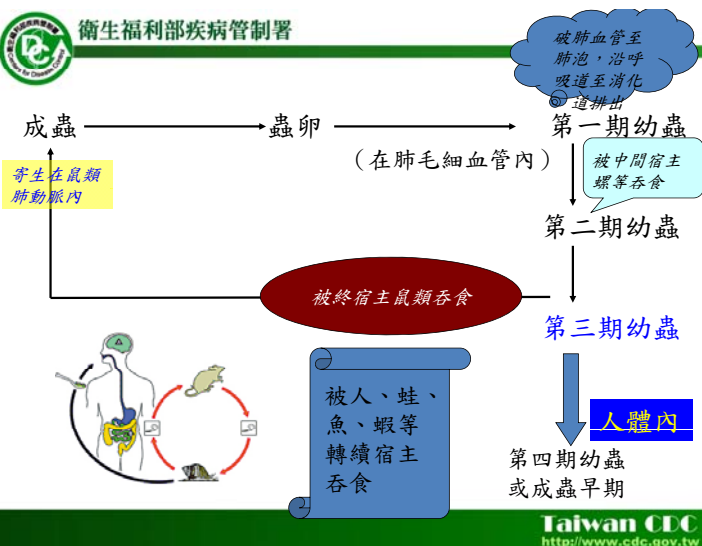
A. cantonensis in human

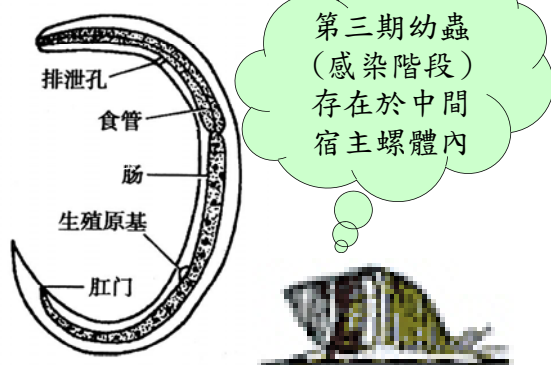
- Accidental host
- Larvae and young adults of A. cantonensis generally die in the brain, meninges, or medulla oblongata
- The nematode can occasionally be found in the lungs



流行型態

- 主要分佈熱帶亞熱帶地區，東南亞、太平洋沿岸地區
- 我國主要在東南沿海地區，目前有擴散之勢
- 福壽螺自然感染率高達65.5%
- 經口感染；幼蟲也可以經皮膚感染人體





中間宿主：福壽螺（大平螺）

其它螺：包括瑪瑙螺、短梨巴蝸牛、圓田螺、方形環棱螺等。

臨床表現

- 嗜酸性粒細胞增多性腦膜腦炎或腦膜炎
- 潛伏期 3-36 天, 平均半個月左右, 起病急
- 發熱 早期多有發熱; 熱度不等, 多為 37.2-39°C, 呈持續性或間歇性
- 體溫多於數日後降至正常
- 少數患者可持續數周

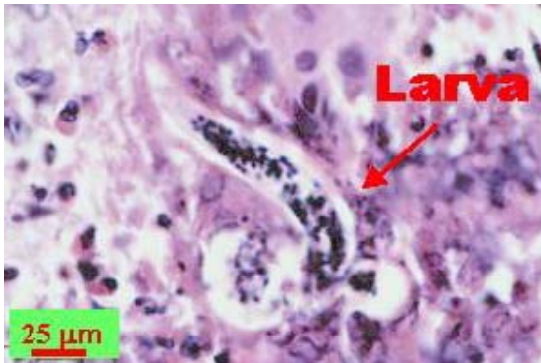


實驗室檢查

- 血液檢查
白細胞總數增加, 嗜酸性粒細胞輕至中度增多
- 腦脊液檢查
腦脊液壓力增高, 嗜酸性粒細胞增多, 蛋白升高, 糖、氯化物可輕度降低或正常, 極少數病例可被檢測到幼蟲或成蟲
- 免疫學檢查
常用方法：酶聯免疫吸附試驗(ELISA)和金標法, 檢測 IgG、IgM 抗體和迴圈抗原(CAg)。
檢測標本為患者的血清或腦脊液

病原學檢查

可從腦脊液、眼或其他寄生部位查見本蟲幼蟲或成蟲, 但陽性率很低



影像學檢查

頭顱MRI表現多種多樣,腦脊髓膜內多發長條形影或結節狀強化病灶和軟腦膜強化是主要的表現。



Treatment

- Usually self limited course and recover completely
- Analgesics
- Corticosteroids
- Frequent but careful LPs if increased intracranial pressure
- Mebendazole, albendazole



A. costaricensis in rodents

- Definitive hosts : cotton rat (*Sigmondon hispidus*)
- Adult nematode : mesenteric arteries and their branch
- Oviposition : mesenteric arteries and their branch
- 1st stage larvae : in the arteries, penetrates the intestinal wall, carried with the fecal matter to the exterior
- 2nd and 3rd stage larvae : be ingested by a slug (*Vaginulus ameghini*)
- 3rd stage larvae : ingested by a rodent
 - ileocecal region, penetrates the intestinal wall, lymphatic vessels, 2 molts, migrate to mesenteric arteries of the cecal region.
- Oviposition after 18 days, 1st stage larvae in 24 days



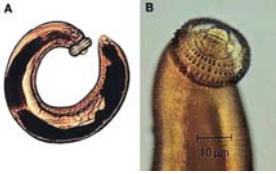
Gnathostomiasis



An Emerging Global Health Threat

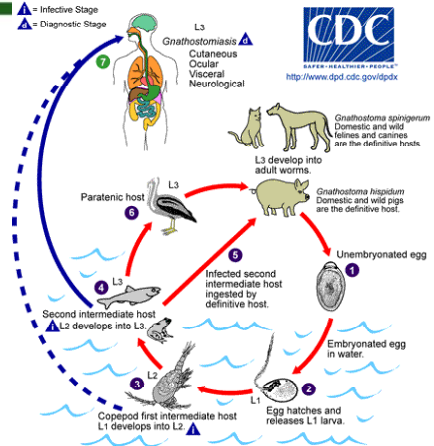
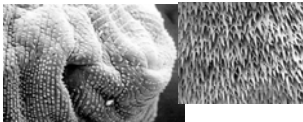
By: Jenna Coalson

General Info



- Caused by the third stage larvae of several species of the nematode genus *Gnathostoma*, most commonly *G. spinigerum* in humans

- Also known as Choko-Fushu Tua chid or chokofishi (Japan), Shanghai rheumatism, consular disease (Nankung), Tau-cheed (Thailand), Woodbury bug (Australia), and Yangtze River edema.



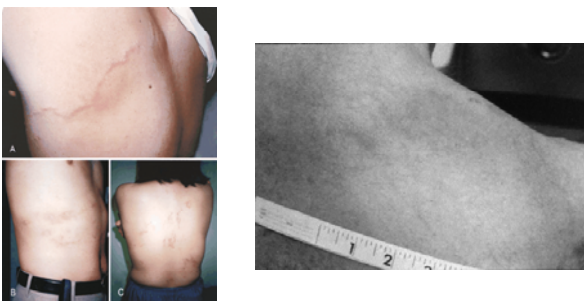
Epidemiology

- Most common in Asia/Oceania, particularly Japan and Thailand
- Since 1970 more than 1000 cases from Latin America, especially Mexico and Ecuador
- In the past 10 years it's been found to be endemic in south central Africa as well
- Dishes with undercooked meat common in these areas (sushi, sashimi, sum-fale, ceviche)
- Increased traveling has led to increased incidence of this typically rare disease

Symptoms

- Worms leave stomach after 24-48 hours→epigastric pain, nausea, vomiting, fever, malaise, anorexia
- Begin random migrations after 3-4 weeks or several years→symptoms specific to area of migration
- Most common associations are broad-based migratory rash and eosinophilia
- Mortality of 8-25% if central nervous system involved due to eosinophilic meningitis

Symptoms (cont.)



Symptoms (cont.)





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Diagnosis and Treatment

- Serologic Tests: ELISA (for IgG antibodies) or Western Blot—not widely available
- Surgical extraction and ID of worm when possible is both diagnosis and treatment
- Albendazole almost always effective, though may take 2 treatments. Ivermectin also used
- Often confused with other parasites



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Prevention

- Since it's still relatively rare, there's no widespread public health strategy
- Avoid undercooked meat
- May be difficult to change cultural eating practices if disease incidence increases
- Large number of hosts make zoonotic interventions futile



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Gnathostomiasis Summary

- Most often caused by *Gnathostoma spinigerum*
- Endemic in Asia, Latin America, Africa...spreading?
- Huge variety of definitive and intermediate hosts; humans are accidental
- Symptoms from third stage larvae randomly migrating through the body and depend on area of migration
- Best diagnosed and treated with surgical extraction or Albendazole
- Can avoid transmission by not eating undercooked meat

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Features of coccidioidal meningitis

- May present acutely, although usually subacute to chronic
- Patients generally complain of headache, low-grade fever, weight loss, and mental status changes;
- Signs of meningeal irritation are usually absent
- Serum complement-fixing antibody titers >1:32 to 1:64 suggest disseminated disease
- CSF examination may occasionally reveal a prominent eosinophilia; CSF protein is almost always elevated
- Only 25-50% of patients have positive CSF cultures
- CSF complement-fixing antibodies present in at least 70% of cases; titers parallel course of meningeal disease

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