

Lecture 2

ARTHROPOD INFECTIONS

DISEASE: Pentastomid Infection

AGENT

***Linguatula serrata*, *Armillifer* spp. (*A. amillatus*, *A. grandis*, *A. rnoniliformis*)**

RECOGNITION

Syndrome: Human: L. ***serrata***; irritation of throat, larynx, and/or nose sometimes accompanied by dyspnea, vomiting, lacrimation, and headache. Self-limiting in a day to 1-3 weeks. ***Armillifer*** spp.; usually asymptomatic but may produce pneumonia or peritonitis.

Animal: nasal discharge and sneezing in definitive host (carnivores). Subclinical in intermediate host.

Incubation period: ***1/2*** hour (***Linguatula***).

Case fatality rate: None. Self-limiting.

Confirmatory tests: Microscopic examination of saliva or nasal secretions to identify larval stage of parasite.

Occurrence: Dogs are primary definitive host; sheep and goats are major intermediate hosts. *Linguatula*: worldwide. *A. armillatus* and *A. grandis* are African species, *A. rnoniliformis* is Asian.

Transmission: *Linguatula*: ova in feces or nasal discharge from infected dogs are ingested by sheep, goats, or humans.

***Armillifer*:** Adults are in snakes. Intermediate hosts (including humans) ingest ova in water or raw snake meat.

CONTROL AND PREVENTION

Individual/herd: Treatment usually not indicated unless worm located in anterior chamber of eye, in which case surgical removal is required.

Severe respiratory syndrome caused by invasion of many *L. serrata* larvae ("halzoun") can be alleviated by use of antihistamines. Avoid contact with dog feces. Boil drinking water. **Cook** snake meat.

Local/community: Prevent feeding of raw viscera of sheep or goats to dogs.

National/international: None.

NEMATODE INFECTIONS

DISEASE: Angiostrongyliasis

AGENT

Angiostrongylus cantonensis*, *Angiostrongylus costaricensis

RECOGNITION

Syndrome: Human: Abdominal form-moderate fever, abdominal pain, anorexia, vomiting, diarrhea. With invasion of central nervous system (most common)-headache, stiff neck and back, paresthesia.

Animal: Primarily subclinical. With heavy infection, rats may have lymphadenopathy and respiratory distress.

Incubation period: 1-3 weeks.

Case fatality rate: Low.

Confirmatory tests: Presumptive; eosinophilic pleocytosis (**25-100%** eosinophils) in cerebrospinal fluid.

Confirmatory; occasionally worms appear in spinal fluid (or eye).

Occurrence: ***A. cantonensis*** : Pacific islands and Southeast Asia. A few cases have been reported in Cuba. ***A. costaricensis***: Western Hemisphere.

Transmission: Ingestion **of** intermediate hosts (snails, slugs, **planaria**) or paratenic hosts (fish, land crabs).

CONTROL **AND** PREVENTION

Individual/herd. No treatment except surgical removal of abdominal mass. Avoid eating greens possibly contaminated by intermediate hosts without first washing and cooking. Cook paratenic hosts before eating.

Local/community: Rodent control. Education regarding transmission and necessity for avoiding food contaminated by intermediate hosts and cooking paratenic hosts.

National/international: None.

DISEASE: Anisakiasis

AGENT

Anisakis marina, other members of family Anisakidae

Syndrome: Human: Signs limited to people after second exposure. Febrile gastrointestinal disease, acute onset, occult blood in feces.

Animal: In fish-hepatosis, weight loss, death. In marine mammals-gastritis from ulcers produced by parasite in gastric mucosa.

Incubation period: 4 hours-10 days.

Case fatality rate: Deaths may occur from peritonitis following intestinal perforation by larvae.

Confirmatory tests: Recognition of larvae imbedded in gastrointestinal wall of tissue removed surgically, or observed by gastroscopic examination.

Occurrence: Most cases observed in northern Europe and Japan among **20-** to 40-year-old males with a history of eating raw, pickled, or lightly salted fish or squid. A few cases have been reported in North America.

Transmission: Ingestion of infective larvae in uncooked or inadequately treated marine fish, usually herring or squid. Dolphins and porpoises are the usual definitive hosts. After ova hatch they are eaten by an intermediate fish host and encyst in intestinal wall.

CONTROL AND PREVENTION

Individual/herd: Treat by resecting damaged gut wall and administering antibiotics for secondary infections. Larvae may be removed from stomach with gastrofiberscope in cases with short incubation. Gut and salt fish immediately after catching. Cook or freeze fish.

Loca/community: Require appropriate handling/treatment of commercial fish catch.

National/international: None.

DISEASE: Ascariasis

AGENT: *Ascaris suum*

RECOGNITION

Syndrome: Human: Initially, respiratory distress, coughing, and fever associated with pulmonary migration of larvae. Intestinal phase usually mild unless parasite load is heavy, in which case there may be colic, vomiting, and diarrhea.

Animal: Same as human.

Incubation period: 2 weeks until the respiratory phase begins; 2 months until the intestinal phase.

Case fatality rate: Very low unless a massive infection produces bowel obstruction, or adult worms migrate to the peritoneal cavity, upper respiratory tract, or invade the liver or pancreas and obstruct ducts.

Confirmatory tests: Microscopic examination of fresh feces for ova of *A. suum* (Ova are not present in feces during the 2-month prepatent period).

Occurrence: Most common in warm, humid climates. Swine are the normal reservoir. The prevalence in swine varies with the level of care and ranges from 20%-70%. Infection is most common among children and persons working with swine. A related organism, ***Lagochilascaris minor***, normally found in clouded leopards, has been reported as the cause of subcutaneous abscesses in humans. ***Parascaris equorum*** and ***Neoascaris vitulorum*** can cause visceral larva migrans in humans.

Transmission: Ingestion of ova in contaminated soil or on fresh vegetables.

CONTROL **AND** PREVENTION

Individual/herd Treat with albendazole, mebendazole, or pyrantel pamoate. Proper personal hygiene

Local/community: Sanitary disposal of swine feces. Steam clean concrete runs. Treat sows with ascaricide

National/international: None..

DISEASE: Capillariasis

AGENT

Capillaria hepatica, hepatic form; ***Capillaria philippinensis***, intestinal form; ***Capillaria aerophila***, pulmonary form

RECOGNITION

Syndrome: Human: Hepatic-hepatomegaly, splenomegaly, intermittent fever, nausea, vomiting, diarrhea, edema, and ascites. Intestinal- abdominal pain, intermittent diarrhea, weight loss. Pulmonary-asthmatic breathing, cough, fever, mucoid or bloody expectoration.

Animal: Same as human.

Incubation period: 3-4 weeks.

Case fatality rate: Approximately **10%**. Higher if untreated.

Confirmatory tests: Hepatic: Microscopic examination of liver biopsy for ova of *C. hepatica*. Intestinal: Microscopic examination of fresh feces for ova, larvae, or adults of *C. philippinensis*. Pulmonary: Microscopic examination of sputum and feces for ova of *C. aerophila*.

Occurrence: Hepatic: Worldwide. Rats are major reservoir, but also present in many species of domestic and wild mammals. Intestinal: Southeast Asia (Philippines and Thailand). Reservoirs may be birds and fish. Pulmonary: Cases reported from Russia and Middle East. Reservoirs are dogs, cats, foxes, and other carnivores.

Transmission: Hepatic and pulmonary: Ingestion of soil contaminated with ova or infective larvae. Intestinal: Ingestion of raw or undercooked fish containing infective larvae.

CONTROL AND PREVENTION

Individual/herd: Intestinal and pulmonary: Treat with mebendazole. Hepatic and pulmonary: Prevent ingestion of soil potentially contaminated with ova or larvae. (Particularly important around silver fox farms.) Intestinal: Prevent ingestion of raw or undercooked fish.

Local/community. Hepatic: Institute effective rodent control program. Prevent dogs and cats from eating rodents. Intestinal: Treat cases with mebendazole and educate public about necessity of **cooking** fish. Pulmonary: Treat cases with mebendazole. For all forms: Institute proper fecal waste disposal system.

National/international: None