Fish borne zoonotic diseases

A large number of parasites infect fish, but only a few cause illnesses in humans. Many marine and freshwater fishes serve as a source of medically important parasitic zoonoses that include trematodiasis, cestodiasis, and nematodiasis. Some of these infections are highly pathogenic. These diseases are mainly acquired through eating raw or under cooked fish. Generally, fish can either be intermediate host of parasites involving man as the definitive host, or harbor larval parasites of other animals which can invade human tissues. However, the larval stages of a few species of parasite can mature both in animals and man. The reported incidence of these fish-borne zoonoses has increased in recent years due to the development of improved diagnosis, increase in raw fish consumption in those countries in which.

such dishes have commonly been eaten, increased consumption elsewhere of regional fish dishes based on raw or poorly processed fish, the growth in the international market in fish and fish products, and the remarkable development of aquaculture.

Trematodiasis

Trematodiasis is the infection of humans by trematode parasites. Among the fish-borne parasitic diseases, infections by digenetic trematodes are the most common. A considerable number of digenean metacercaria from fish may infect humans. The disease is important in Southeast Asia and the Far East where many people are dependent on freshwater fish as the major source of protein. The most significant of these digeneans are perhaps *Clonorchis sinensis, Opisthorchis viverrini*, and *Opisthorchis felineus*. A large number of freshwater fish species can transmit the infective trematode metacercariae with fish belonging to the Cyprinidae (carps) being the most common. Farmed fish of a variety of species have also been shown to be hosts of trematode parasites.

Clonorchiasis caused by the liver flukes *C. sinensis* is endemic in South China, Taiwan, South Korea, and North Vietnam. It is estimated that 35 million persons globally could be infected by *C. sinensis*, including 15 million in China. The disease is being associated with biliary obstruction leading to hepatic necrosis, cirrhosis, and portal hypertension, in heavy infections. The parasite may also locate in pancreatic ducts, causing acute obstructive pancreatitis, a most painful condition. Opisthorchiasis caused by *O. viverrini* is endemic in Thailand, Lao,

Cambodia, and Central Vietnam. It is estimated 6 million humans in Asia may be infected with *O. viverrini*. Human infection due to *O. felineus* is found in Russia and countries of Central Europe.

Cestodiasis

There are relatively few cases of fish-borne cestode infections in man. The cestodes that mature in the small intestine of man are not pathogenic, and diseases are never fatal. Diphyllobothriasis is the major cestodiasis transmitted by freshwater, marine, and anadromous fishes. The disease is caused by pseudophyllid cestodes belonging to the genus *Diphyllobothrium*. At least 13 species of the cestode genus *Diphyllobothrium* have been recognised from humans. The genus is found in fish, mammal, and avian hosts, and is usually associated with cold-water habitats. The species most often reported from humans is *D. latum*, which is relatively common in the Baltic region, the European Alps, eastern Russia and Japan. It is considered a mild disease; persons infected with the tapeworm may often be symptomless, in others it may cause diarrhea, abdominal pain, and anemia. Recent estimates indicate that approximately 20 million individuals could be affected by the disease.

Nematodiasis

Fish-borne nematodiasis are generally caused by the incidental infestation of man with nematodes whose natural definite hosts are marine mammals, birds, pigs, or other animals. Freshwater, brackish, or marine fishes are the second intermediate host. In most infections, the worms can only survive for a limited period after the initial invasion of the gastrointestinal tract. The method of infection is by ingesting the infective larvae which are located in the muscles, intestine, or viscera of fish.

Capillariasis is caused by nematode *Capillaria philippinensis*. The disease was originally presumed to be an indigeneous disease of the Philippines, where an epidemic was first recorded in 1967. Subsequently, the disease was also found in Thailand, Japan, Taiwan, Indonesia, Korea, Iran, Egypt, and India. Freshwater fish may be important as a source of infection of humans with this nematode. The adult worms are found in the gut of humans, where they can cause a severe and even fatal illness.

Gnathostomiasis is caused by members of the genus *Gnathostoma* who undergo visceral larval migration. The disease occurs in Southeast Asia, China, Japan, Korea, the Indian subcontinent, and Middle East. Its life cycle is complex involving intermediate (crustaceans and fishes), paratenic (piscivorous birds, reptilian, and small mammals), and final

hosts (wild and domestic animals). Man is considered an accidental host in whom the parasite can cause a wide clinical picture, internal or external, where the condition ‘larva migrans’ is one of the known symptoms.

Anisakiasis refers to infection by larval ascaridoid nematodes if ingested with raw or lightly cured fish. The genera involved are *Anisakis*, *Pseudoterranova*. and *Contracaecum.* Their normal definitive hosts are marine mammals. Larvae (located in squids and marine fish) can invade the gastrointestinal tract of man, causing an eosinophilic granuloma syndrome. In Europe, it has also been referred to as the ‘herring worm’ disease. These nematodes cannot mature in humans, but may cause a severe allergic reaction with granulomatosis of the stomach wall.

A. simplex causes an acute or chronic infection that may lead to abdominal pain, nausea, vomiting, and/or diarrhea. Some patients develop syndromes exhibiting clinical manifestations of allergy following infection or following consumption of dead larvae. The incidence of the disease varies widely among countries, with Japan reported as having the highest incidence.