
Streptococcosis

Definition "Sub-acute, and chronic bacterial disease of marine, brackish and freshwater fishes characterized by depression or excitability, anorexia, unilateral or bilateral exophthalmia with or without eye hemorrhages, erratic swimming and whirling, "C-shaped" posturing, septicemia, and death".

Etiology Three different genera of gram-positive cocci including Streptococci, Lactococci, and Vagococci are the most gram-positive cocci species incriminated in fish streptococcosis. **Streptococcus iniae** and **Lactococcus garvieae** are the principal pathogens of Streptococcosis although several other species and genera of pathogens associated with the disease have been identified causing similar disease symptoms. They are one of the major problems of warm water aquaculture, but has very few limitations in regard to geographic boundaries or host ranges.

Susceptibility Infections are reported in 22 fish species, both cultured and wild. The affected species reported include rainbow trout (*Oncorhynchus mykiss*), tilapia (*Oreochromis* spp.), yellowtail (*Seriola quinqueradiata*), amberjack (*Seriola dumerili*), European seabass (*Dicentrarchus labrax*), European seabream (*Sparus aurata*), red drum (*Sciaenops ocellatus*), bastard halibut (*Paralichthys olivaceus*), eels (*Anguilla anguilla*) and Asian seabass (*Lates calcarifer*).

Predisposing causes (stressors)

- Overcrowding.
- Low dissolved oxygen.
- Presence of large amount of organic matter.

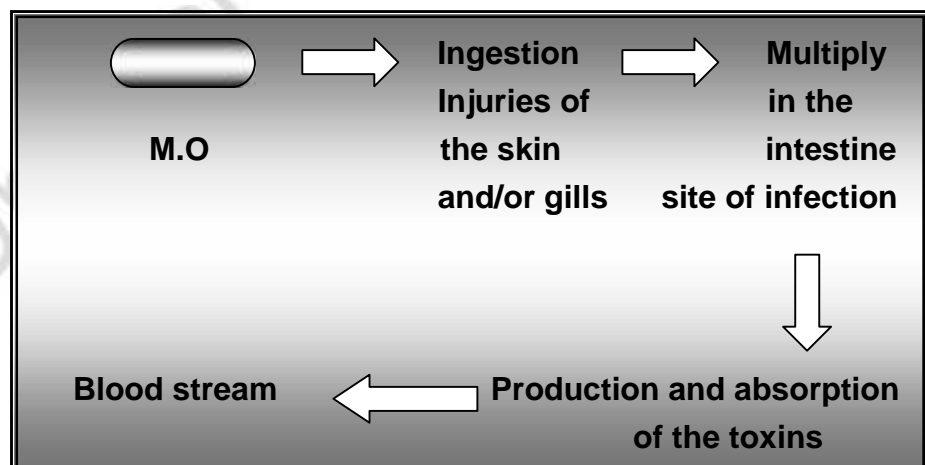
- Nutritional deficiencies.
- Injuries of the skin or gill either by trauma or ectoparasites.
- Temperature variation between seasons (eg. summer & spring).
- Rough handling especially during transportation.

Mode of infection Mainly through ingestion of contaminated food (e.g. fish offal's) and injuries of skin and/or gills.

transmission The transmission or the spread of the disease is usually horizontal (from infected material to the fish).

- Source of infection**
- Shaded microorganisms from infected aquatic animals, infected dead carcasses as well as polluted water with the microorganism act as the source of infection.
 - Carriers and latent infected fishes.
 - Polluted water with animals byproducts (e.g. integrated fish-agriculture) consider as a source of infection.

Pathogenesis

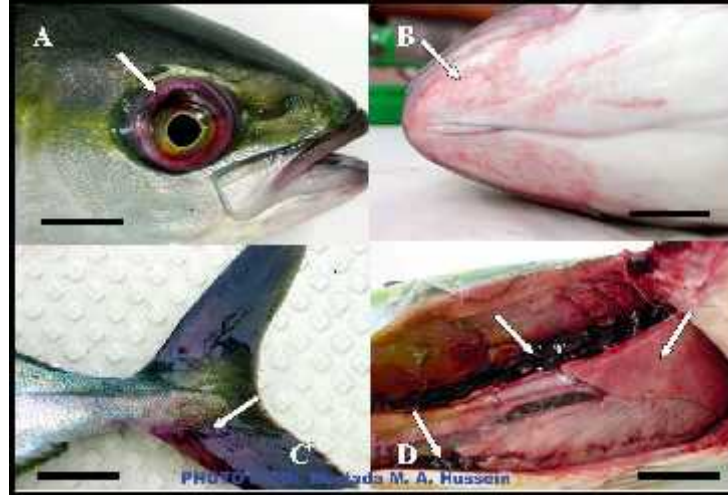


Disease signs

- Abnormal swimming behaviors including erratic swimming, swimming and whirling on the water surface, and "C-shaped body" curvature while on water surface.
- Ocular abnormalities include peri-orbital and intra-ocular

hemorrhages, opacity, purulence and exophthalmia.

- Hemorrhages were scattered on the body surface, particularly, at the base of lower jaw, base of the dorsal fin, and massively at the peduncle region and tail fin.



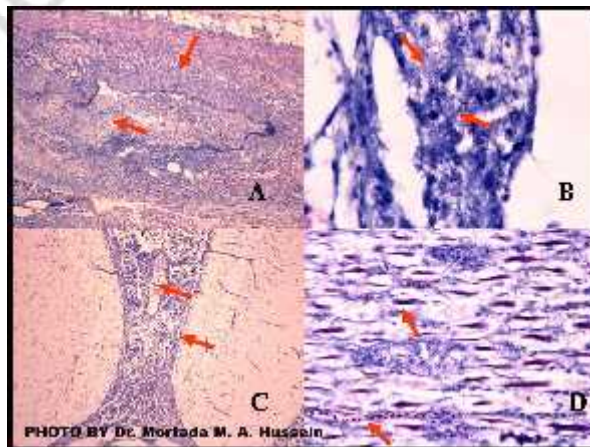
Yellowtail fish with streptococcosis, (A) Exophthalmia together with peri-orbital and intra-ocular hemorrhages. (B) Hemorrhages at the base of the lower jaw. (C) Massive hemorrhages at the peduncle region and tail fin. (D) Paleness of the liver and slight enlarged spleen and kidney (arrows). Scale bar = 5 cm.

**Postmortem
(P.M.)**

- Internally, there were no clear clinical change except paleness of the liver and slight enlarged spleen and kidney.
- Kidney and liver may become friable and soft.

Findings

**Microscopic
Pathology**



Histopathological alterations associated with streptococcosis infection in naturally infected yellowtail and amberjack. (A) Focal necrosis in periorbital tissue together with inflammatory cell infiltration, hemorrhages and fibroplasias (H&E, x40). (B) Sever edema, infiltration of lymphocytes and macrophages in the periorbital tissue together with massive invasion of cocci bacterial cells (Giemsa, x100). (C) Brain showed meningitis, dilatation of blood vessels and massive cellular infiltration (H&E, x40). (D) Optic nerve showed edema, fibroplastic degeneration together with dilated blood vessels and erythrocytes infiltration (Giemsa, x100). Arrows.

Diagnosis

I. Case history:

- Cessation of feeding or the fish refuse the food.
- Abnormal swimming behaviors and the fish swimming just below the water surface.
- Presence of mortalities and moribund fishes with characteristic lesions of streptococcosis .

II. The disease signs

III. The P. M.

IV. Laboratory diagnosis:

- Samples: kidney, liver, spleen, blood, muscles especially the deep layer of the muscles.
- Squash smear from the organs stained with Gram.
- Blood smear stained with Giemsa.
- Isolation and identification:

Streptococci could be isolated and grow well on Todd Hewitt medium supplemented with 3-5% blood, typto-soy agar (TSA) with sodium azide, Brain heart agar (BHA) at 20-25° C giving white round small colonies.

Identification through using biochemical tests, API kits, gel-diffusion test, FAT, ELISA, and PCR (polymerase chain reaction).

- Histopathological findings.

Chemotherapy

Therapy & Control

As with many gram-positive infections, treatment is problematic. Success has been achieved using a number of different antibacterial compounds; however, problems with antibiotic resistance haven't been encountered.

- In early stages of infection antiseptic bathes are recommended.

- Oxytetracycline 55mg/Kg fish in the food for 10 days.
- Sulfamerazine 264mg/Kg fish in the food for 3 days followed by 154mg/Kg fish for additional 11 days.
- Sulfaguanidine + sulamerazine combination (1 : 2) 130mg/kg fish for 3days followed by 90mg/Kg fish for 11days
- Nitrofurzone 56mg/kg fish for 10 days.
- Oxolinic acid 10~30mg/Kg fish for 10 day.

Control

Good hygiene and removal of all stressors is the proper way for disease control this can be achieved through:

- Avoid overcrowding.
- Proper disposal of dead and dying fishes either by burning or burying.
- Control of aquatic animals such as reptiles and amphibians.
- Destruction of the carriers and disinfectant of the eggs.
- Proper disposal of infected fish if in small number.
- Proper drainage, drying, and disinfectant of the pond (quick lime 4 tone/acre.
- Vaccination using oral bacterine, hyperosmotic infiltration poly-vaccine and DNA vaccines.