
Edwardsiellosis

Emphysematous Putrefactive Disease, Edwardsiella Septicemia

Definition

"Septicemic disease, which is temperature (seasonal) related especially at the mid-summer when the temperature exceed or above 30° C affecting freshwater, brackish water and marine water fishes, characterized by septicemia, slowly developed mortalities and skin ulceration".

Etiology

Edwardsiella tarda, Gram negative short rods, aerobic and facultative anaerobic microorganism, motile by peritrichous flagella, non-spore forming, non-acid fast, non-capsulated, cytochrome oxidase negative, produces hydrogen sulfide and indole.

The organism attacks glucose oxidatively and fermentatively with production of acid and gas, while attacks mannitol with production of acid only and doesn't attack other carbohydrates.

The organism produces extracellular enzymatic and/or toxic products as haemolysine, enterotoxins, as well as dermo-necrotic toxins. Also a slimy layer that acts as a production layer against the host defense mechanism surrounds the organism.

The organism grows well on ordinary medium, Nutrient agar (NA), typto-soy agar (TSA), MacConkey agar and Brain heart agar (BHA) at 30-35° C.

On Rimler-Shotts medium (selective medium for aero monads & pseudomonads) it grows as large deep greenish round colonies with black center.

Susceptibility

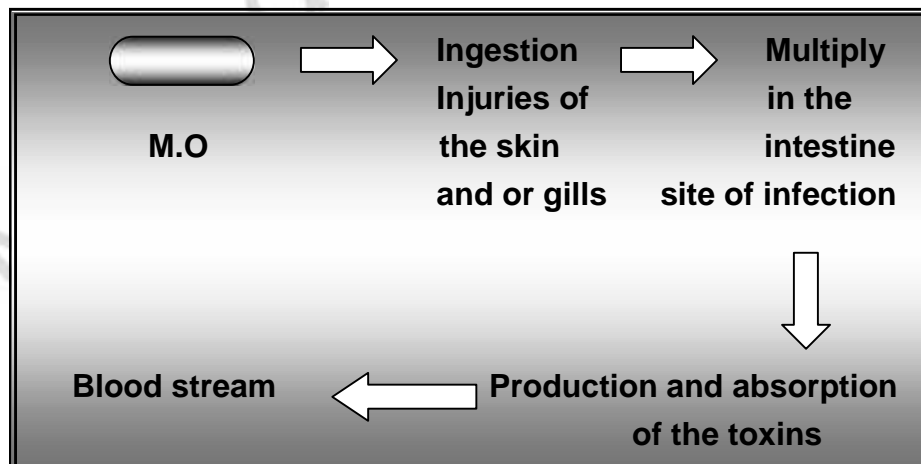
Freshwater fishes are the most susceptible ones, catfish, tilapia, Japanese eel, flounder, mullets, turtles, and amphibians are also susceptible to the disease.

Edwardsiella tarda is reported as an important zoonotic

organism as it causes commonly gastroenteritis.

- Predisposing Causes (stressors)**
- Increase of temperature above 30 ° C.
 - Overcrowding.
 - Low dissolved oxygen.
 - Presence of large amount of organic matter.
 - Nutritional deficiencies.
 - Injuries of the skin or gill either by trauma or ectoparasites.
 - Presence of carries and/or infected aquatic animals.
 - Rough handling especially during transportation.
- Mode of infection** Not defined but mainly through ingestion 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 and/or aquatic animals.
- Source of infection**
- The organism is a normal inhabitant of the intestine of snakes that may shad their faces in the water leading to contamination of the water.
 - Shaded microorganisms from infected fishes and/or other infected aquatic animals.

Pathogenesis



The clinical signs of edwardsiellosis were considerably variable from fish species to another

In catfish:

- Mainly the lesions are initially seen as subcutaneous abscesses or as reddened foci on the sides of the flank and

Disease signs

posterior regions, which undergo ruptured oozing sanguinous fluid of offensive foul-smelling.

- Although the affected fish loses the control of its posterior part, it may continue to eat even if severely affected.

In tilapia:

- Skin depigmentation, swollen abdomen and corneal opacity.
- Hemorrhagic inflammation of the vent was also recorded.
- Internally, ascites together with presence of white small nodules scattered on the visceral organs and intestine.

Channel catfish, *Ictalurus punctatus*, with shows external abscess on the head



Nile tilapia, *Oreochromis niloticus*, affected with edwardsiellosis. Note the loss of pigmentation of the skin.

In eels:

- Abscesses that may opened and ulcerate through the body surface.
- Internally, abscessation of the visceral organs with distribution of necrotic foci.



Postmortem Findings

- Ascetic fluid together with peritoneal and visceral adhesion.
- Kidney and liver become friable and soft.
- Presence of white small nodules scattered on the visceral organs and intestine.

Microscopic Pathology

- Subepidermal hemorrhages and edema together with coagulative necrosis of the epidermal cells.
- Swollen acidophilic skeletal muscle fibers and surrounded by erythrocytes and small lymphocytes.

- Coagulative necrosis of hepatocytes and renal tubules.

Diagnosis

I. Case history revealed that:

- Loss of appetite or may the fishes refuse food.
- Sluggish swimming and the fish seek the sides of the holding facilities.
- Presence of mortalities.

II. The disease signs (as mentioned above).

III. P. M. findings.

IV. Laboratory diagnosis:

- **Samples:** kidney, liver, spleen, blood, muscles especially the deep layer of the ulcer.
- Squash smear from the organs stained with Gram.
- **Isolation and identification:**
Edwardsiella tarda could be isolated on NA, BHA, TSA, and MacConkey agar at 22~36 °C from kidney of the fish with hemorrhagic septicemia.
 Identification through using biochemical tests, API kits, gel-diffusion test, FAT, ELISA, and PCR (polymerase chain reaction).
- Histopathological findings (as mentioned above).

Chemotherapy

- Addition of vitamin C as a food supplements at a rate of 150mg/Kg fish in the food.
- 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
- Oxolinic acid 10~30mg/Kg fish for 10 day.

Therapy & Control

Control

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

- Elimination and control of snakes is a principle for control of the disease occurrence.
- Avoid overcrowding.
- Proper disposal of dead and dying fishes either by burning or

- burying.
- Control of aquatic animals such as reptiles and amphibians.
- Proper disposal of infected fish if in small number.
- Proper drainage, drying, and disinfectant of the pond (quick lime 4 tone/acre).
- Vaccination, formalized whole cultured or living attenuated one.

Enteric Septicemia of Catfish

ESC, *Edwardsiella ictaluri* infection

Definition

"Acute and chronic septicemic disease mostly affecting catfish (mainly channel catfish), especially at the mid-summer when the temperature around 24~28° C characterized by septicemia, spiral swimming, ascites, skin hemorrhages and ulceration and hole formation on the skull".

Etiology

Edwardsiella ictaluri, Gram negative short rods, aerobic and facultative anaerobic microorganism, motile by peritrichous flagella, non-spore forming, non-acid fast, non-capsulated, cytochrome oxidase negative, doesn't produce hydrogen sulfide.

Susceptibility

Enteric septicaemia of catfish is a highly infectious bacterial disease of catfish, especially ictalurids.

Black bullhead (*Ictalurus melas*)
 Blue catfish (*Ictalurus furcatus*)
 Brown bullhead (*Ictalurus nebulosus*)
 Channel catfish (*Ictalurus punctatus*)
 Glass knife fish (*Eigenmannia virescens*)
 Rosy barb (*Puntius conchonus*)
 sind danio (*Danio devario*)
 sutchi catfish (*Pangasius hypophthalmus*)
 Walking catfish (*Clarias batrachus*)
 White catfish (*Ictalurus catus*)
 Yellow bullhead (*Ictalurus natalis*)
 zebra fish danio (*Brachydanio rerio*)
 chinook salmon (*Oncorhynchus tshawytscha*)
 Rainbow trout (*Oncorhynchus mykiss*)
 Tilapia spp.

Disease signs

Acute form:

- Infected fish occasionally hang head up in the water and exhibit spiral swimming usually followed by death.
- Abdominal distention, exophthalmia, or pale gills.
- Petechial hemorrhages on the dorsum, flanks, jaws and operculum.

Chronic form:

- Formation of hole in the head, which undergo ulcerate.
- Nervous manifestations characteristics to meningitis.



Postmortem

- Body cavity contains clear or bloody fluid.
- Hemorrhages and necrosis of the liver.

Findings

- Hypertrophy of the spleen and kidneys.
- Petechial hemorrhages in the muscles.

Microscopic

- Enteritis, hepatitis, myositis, and interstitial nephritis begin as acute lesions and developed into chronic foci.

Pathology

- Inflammation of the olfactory nerve and eventually reach the olfactory lobe of the brain.
- Meningoencephalitis with aggregation of macrophages in the lesion that often harboring the invading bacteria.

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Chemotherapy

The treatment should be start as fast as possible before the fish refuse to food

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