Puffer fish poisoning

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Puffer Fish

- Puffer fish is most common in the coastal areas of Bangladesh.
- Mainly in the rive rain districts and sea belt areas.
- Completely absent from cold water.

Background about puffer fish

- Also known as Fugu in Japan(means river pig)
- Other name ballon fish,blow fish,bubble fish,potka fish,tepa fish,globe fish,swell fish etc.
- They puff up by sucking in either air or water.
- They can grow upto 70 cm.

Bakground continue

- There are more than 120 species of puffer fish worldwide.
- 20 species found in Bangladesh.
- 2 are fresh water puffer and rest are marine

Tetraodon Patoca

Tetraodon Cutcutia

Marine Puffers

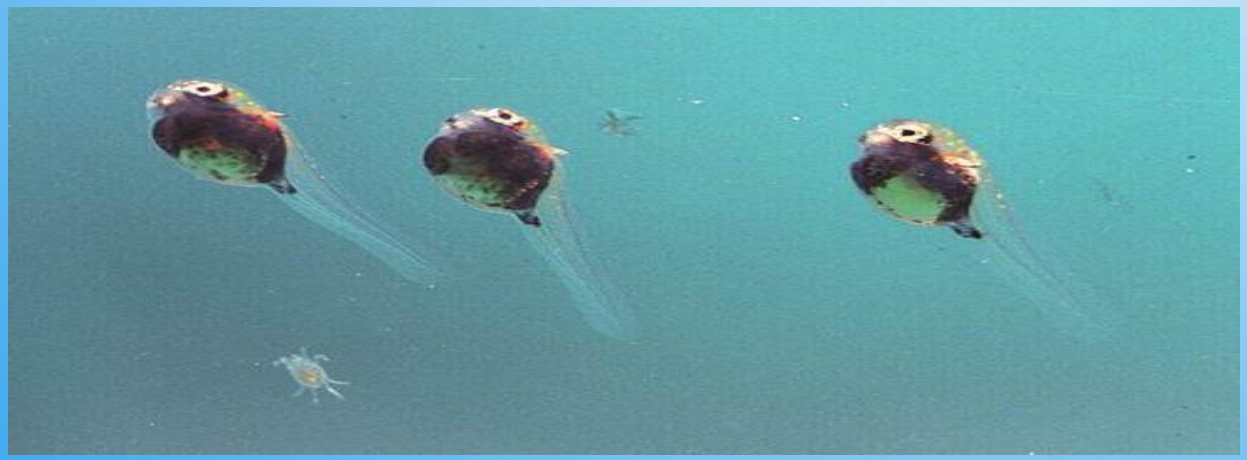
There are several marine puffer species in Bangladesh.Mostly found in Cox's bazar district.Among them two are very common .

Takifugu Oblongus

Takifugu Vermiularis

Breeding

- Spawning can take place at any time during A day, year-round.
- One-year old fish are already in the reproductive age.
- Average fecundity—3000 eggs, maximum—about 6000.



In Bangladesh the fish is popularly known as potka fish (local name, dora potka or badami potka) or Tepa fish

What does a puffer fish eat ?

1.Small crustaceans

2. Mollusks

3.Algae

4.Invertebrates

Poison

- Allmost all puffer fish contain the toxin.
- Known as Tetradotoxin(TTX)
- No antidote available
- Second most poisonous vertebrates in world.
- 1 milligram is lethal to an adult human
- 100 times more lethal than black widow
- 10,000 times more lethal than Cyanide

Source and site Of Poison

- TTX located in the internal organ like kidneys, testes,overy,intestine ,liver.
- The poison is produce by a toxin in algae.Puffer fish eat the bacteria and digest it to produce the toxin.
- Mostly poisonous during reproductive period.
- The body musculature is usually free of poison.
- If the puffer fish is raised in artificial place it is not poisonous.

Why host organism are not effected

- A single point mutation in the amino acid sequence of Na+ channel makes it immune from being bound by TTX.
- TTX will not recognise the channel in these organism.
- The only known predators resistant to the toxin is the common garter snake.

Animals that contain Tetradotoxin

Parrotfish
Frogs of the genus Atelopus
Starfish
Blue-ringed octopus
Angelfish
Triggerfish
Xanthid crabs
Boxfish
Porcupine fish
Globefish
Horseshoe crab
Marine snails

How Prepared/Ingested

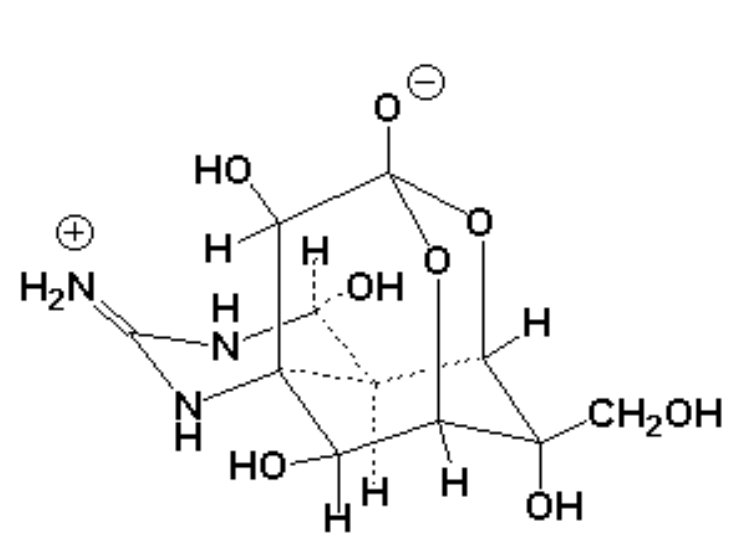
- The first symptoms occur 15 minutes to several hours postingestion of tetrodotoxin-containing food. A recent report on toxicity found that initial symptoms may occur up to 20 hours after ingestion.

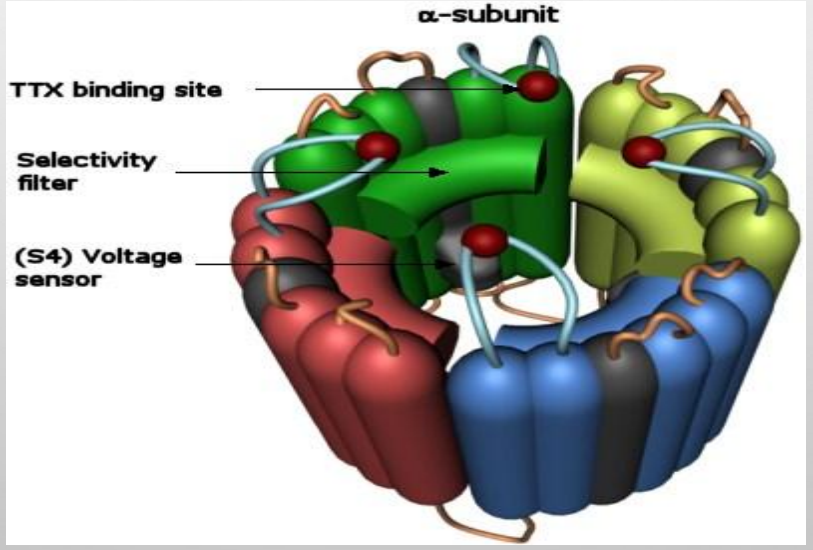
Eating The Honorable Fugu

- Fugu has been eaten in China and Japan for thousands of year.
- Fugu is one of the most expensive foods in Japan.
- A single fish served in a restaurant, it can bring in $200.
- Fugu's trade volume is rising because of people's curiosity in eating the toxic fish.

Mode of action

- Binds to site1of the fast voltage gated Na^+ channel.
- It blocks the Na^+ current, prevents contraction of voluntary muscles including diaphragm and intercostal muscles and leads to respiratory paralysis.





Incidence and mortality of Poisoning

- Puffer fish poisoning have been reported from Japan,Taiwan,Hongkong,Combodia,India,Bangladesh and also in USA.
- Many milder cases were not repored.
- In Japan 50 death annually occurs from puffer fish poisoning and 458 csaes were treated as puffer fish poisoning.

  (T Benzar emedicine journal 2011,Tokyo public health department)
- In Taiwan more than 100 cases were reported from 1988 to 2008 and the mortality rate was 10%(journal of natural toxin vol 10 no1 2011)

Incidence and mortality of Poisoning

- Before 2017 there were 15 attacks from puffer fish poisoning in bangladesh.3 from fresh water puffer,13 from marine puffers and 1 remain unidentified.
- Poisoning was repored from Cox'sbazar, Khulna,Kishoreganj,Natore,Dhaka and Sylhet disrict.
- There Were 368 Victims And A Death Toll Was 60.
- 16.1% case fatality overall.

(Source:Ban Trop Trox 2017,DGHS Bangladesh)

STAGES OF POISONING

1. Numbness of the lips and tongue

- Numbness in the face and extremities
- Sensations of lightness or floating

2. Increasing paralysis

- Some victims are unable to move, sitting may be difficult.
- Increasing respiratory distress
- Speech is affected

3.Death usually occurs within 4 to 6 hours

- Due to respiratory paralysis

Treatment of TTX poisoning

- There are no specific antidote for TTX poisoning and treatment is predominently symptomatic and supportive.
- Good cardiovasccular and respiratory support is critical.
- Atropine can be given for systolic arrest.
- Haemodialysis was attempted but there were little data about their effectiveness.

Neostigmine

- Cholinesterase inhibitors has been attemed for TTX induced muscle weakness with succesful outcome in a limited number of poisoned patients.
- The effectiveness of cholinesterase inhibitors however remain unsubscribed.
- Large scale RCT are required to prove its usefullness in the treatment of TTX poisoning.

Medical uses of TTX

- Anesthetics in animals
- Prevention of damage to brain following stroke
- Suppressing pain in cancer patients
- Relieving the symptoms of withdrawal in opiate addicts

Conclusions

- An urgent need for education and training:

  - Awareness campaigns targeting populaion at risk.

  -awareness campaigns targeting healthcare personnel.

  -Training and skills improvement in assisted ventilation.

- Multidisciplinary studies on biotoxins in the Bay of Bengal and the rivers of Bangladesh are required to formulate policy recommendations.

thank you