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Original Article

PUFFER FISH POISONING: A CLINICAL ANALYSIS

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ABSTRACT:

Objective: To ascertain the clinical manifestations, complications and clinical outcome of Puffer fish poisoning.

Setting: The study was carried out in the Department of Medicine and Paediatrics, Khulna Medical College Hospital (KMCH), Khulna, Bangladesh. The period of study ranged from admission of patients till discharge.

Subjects and Methods: On April 18, 2002, a large number of patients from eight families were admitted to KMCH. A presumptive diagnosis of Puffer fish (tetrodotoxin) poisoning was made on the basis of history of recent consumption of Puffer fishes (Fugu) and classical clinical presentations. The cases were clinically reviewed periodically and routine investigations were done.

Results: A total of forty-five persons developed manifestations of Puffer fish poisoning out of which thirty-seven needed hospitalizations. Important symptoms observed were peri-oral tingling sensation (24), weakness of both lower limbs (22), tingling and numbness throughout the body (18), headache (15) etc. Twenty-two patients developed ascending paralysis and 17 of them developed respiratory muscle paralysis. Out of thirty-seven admitted patients twenty-nine improved with conservative treatment. Eight patient died due to respiratory failure.

Conclusion: Although Puffer fish is available in our country and Puffer fish poisoning is sporadic, ignorance regarding its proper cooking process may lead to serious clinical hazards including fatality. It has no specific treatment. Health personnel should have sufficient knowledge regarding its clinical manifestations, complications and management. People should be made aware of the potential risk of eating Puffer fish.

KEYWORDS: Puffer fish, Poisoning, Fugu, Tetrodotoxin.

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INTRODUCTION

Poisoning is a common medical emergency in Medical and Pediatric wards of Bangladesh. Common causes are insecticides, dhatura, sedatives, corrosives etc.[1] Some unusual forms of poisoning are encountered in some areas and the trend of poisoning in one country may change over time.[2] For example, copper sulfate poisoning is an uncommon poisoning with high morbidity and mortality not encountered in most parts of Bangladesh, but it is frequently encountered in Southern region of our country.[3] Puffer fish poisoning is also sporadic in our country. Since, it is an uncommon poisoning and happened to occur in a large scale it prompted us to report the cases. Possibly it is the first report of this form of poisoning from our country in a scientific journal.

PATIENTS AND METHODS

On April 18, 2002 thirty-seven patients from eight families were admitted to Medical and Paediatrics wards of Khulna Medical College Hospital, Khulna, Bangladesh with history of consumption of Puffer fish. Puffer fish was bought from a nearby village market and these eight families had no past experiences in preparing, cooking and eating Puffer fish. A presumptive diagnosis of puffer fish (tetrodotoxin) poisoning was made on the basis of history of recent consumption of Puffer fish (Fugu) and classical clinical presentation of the cases.[4] Other members of those eight families who didn't ingest Puffer fishes were free of symptoms. All patients were treated with gastric lavage, intravenous fluid, and in some cases injection Neostigmine.[5] The cases were clinically reviewed periodically and routine investigations were done. Age and sex of patients, onset of symptoms in minutes after the ingestion of the fish and the clinical features of the admitted cases were recorded and are presented here.

RESULTS

A total of forty-five (male 24 and female 21) patients from eight families ingested Puffer fishes during their mid-day meal and developed manifestations of Puffer fish (Tetradotoxin) poisoning. Out of them thirty-seven patients (male 19, female 18) having significant manifestations were admitted to hospital (Table-I). The amount of fish taken during meal varied approximately from 40 to 400 grams. Time taken for onset of symptoms varied from 10 minutes to 48 hours (Table-II). Important symptoms observed on the first day were peri-oral tingling sensation, weakness of both lower limbs, tingling and numbness throughout the body, headache, difficulty in respiration etc. Ten patients became unconscious and eight patients cyanosed. On the second day headache, vertigo and weakness of both limbs were predominant symptoms (Table-III). Twenty-two patients developed ascending paralysis of limbs and it ascended up to respiratory muscle involvement in 17 patients. Out of them eight patients died (Table-IV). These patients died within one to five hours of consumption of the fishes and cause of death in all of them was respiratory muscle paralysis leading to respiratory failure. Symptoms gradually resolved in others without any residual effects and they were discharged.

Table-I: Age and sex distribution of patients admitted with Puffer fish poisoning (n=37)

Age in years	*Male*	*Female*	*Total*
0 - 10	4	5	9
11 - 20	6	4	10
21- 30	5	3	8
31- 40	-	2	2
41- 50	1	3	4
51- 60	-	1	1
61- 70	2	-	2
71- 80	-	-	-
81- 90	1	-	1
TOTAL	19	18	37

Table-II: Onset of symptoms in patients with Puffer fish poisoning (n=37)

In minutes	*Number of patients*
< 30	14
31 – 60	3
61 – 90	1
91 – 120	13
≥ 121	6

Table-III: Clinical features in patients with Puffer fish poisoning in relations to days (n=37)

Clinical Features	*No. of patients developing symptoms*		
	1st day	*2nd day*	*3rd day*
Symptoms			
Tingling and numbness around oral cavity	24	1	-
Weakness of both lower limbs	22	11	11
Tingling and numbness throughout the body	18	2	1
Headache	15	14	2
Difficulty in respiration	14	2	1
Weakness of jaw muscles	10	1	-
Nausea and vomiting	8	-	-
Blurring of vision	7	2	1
Vertigo	6	11	6
Dizziness	5	-	-
Cramping pain in the limbs	4	-	-
Difficulty in speech	2	-	-
Salivation	2	-	-
Signs			
Unconsciousness	10	-	-
Cyanosis	8	-	-

Table-IV: An overview of patients who died

Age in Years	*Sex*	*Approximate amount ingested in grams*	*Onset of symptoms within minutes*	*Cause of death*	*Death within*
70	Male	60	60	Respiratory failure due to respiratory muscle paralysis	4 hours 15 minutes
30	Male	200	30	"	4 hours 30 minutes
22	Female	100	30	"	5 hours 05 minutes
2	Female	40	30	"	4 hours 25 minutes
70	Male	100	20	"	5 hours
4	Female	100	15	"	1 hour
60	Female	150	30	"	1 hour 45 minutes
25	Male	400	10	"	2 hours 25 minutes

DISCUSSION

Puffer fish has different names (e.g. Blowfish, Balloon fish, Globefish, Fugu, Potka fish etc.) in different countries and localities. Sometimes after ingestion of various species of puffer fish, poisoning with a potential neurotoxin, tetrodotoxin (TTX) occurs. The flesh of the puffer fish is considered delicious in Japan and also among Japanese American community. It is prepared there by chefs specially trained and certified by the Government to prepare the flesh free of the toxic liver, gonads and skin. Poisoning usually occurs in Japan after eating fish caught and prepared by uncertified handlers.[6] In our country as well puffer fish is available particularly in rural areas and eaten mostly by our villagers. Thus cases with puffer fish poisoning may not be unusual in our country, as there is no restriction or supervision on puffer fish culture, sales and cooking. The first symptoms were noticed within ten minutes to 48 hours post ingestion of puffer fish, which supports the view of Benzer.[6] Thirty-one of our admitted cases were observed to develop the symptoms within two hours of ingestion. Initial symptoms include paraesthesia of tongue and lips followed by facial and extremity paraesthesia[6] and these usually began 10-45 minutes after ingestion[7] as were also observed in 24 of our cases. Other common initial symptoms include headache, nausea, vomiting, blurring of vision, vertigo, dizziness[7] etc. A rapid ascending paralysis developed over 4-24 hours[6] as happened in 22 of our patients. Ascending paralysis was followed by respiratory muscle paralysis in 17 cases. Patient with severe toxicity may fall into coma and death can occur within 4-6 hours of ingestion[6,7]. Typically it is from respiratory muscle paralysis. In this series eight patients died, the first case within one hour and the last one within five hours of ingestion and the cause of death in all were respiratory paralysis. The liver, gonads and skin of Puffer fish contain tetrodotoxin, a powerful neurotoxin that can cause death in approximately 50-60% of persons who ingest it.[4-6] Of course, the death rate may vary depending on cooking practice, amount taken, vomiting after ingestion and post-ingestion management etc.

Tetrodotoxin is heat-stable, water-soluble and a non-protein quinazoline derivative.[6] It blocks sodium conductance and neuronal transmission in skeletal muscles.[7] Thus, all of the observed toxicity is secondary to the blockade of action potential.[6] Tetrodotoxin acts on the central and the peripheral nervous systems (i.e. autonomic, motor, sensory nerves). Tetrodotoxin also stimulates the chemoreceptor trigger zone in the medulla oblongata and depresses the respiratory and vasomotor centers in that area.

Since, Puffer fish is available in our country and is said to be a very delicious one, out of curiosity or due to its low cost people may take this fish. Moreover, its cooking process needs a special technique about which most of our people are ignorant. During its preparation liver, gonads, intestines and skin of Puffer fish, which contain highest level of tetrodotoxin should be removed. Since, it has no specific treatemnt[6,7] people should be aware of the potential risk of eating puffer fish, about the warning symptoms and signs of Puffer fish poisoning and when to seek medical help. On the other hand health personnel should be trained and equipped so that they can take effective measures in such medical emergencies to save lives.

REFERENCES

1. Ahasan HAMN, Rahman MT, Khatun H, Nasir M, Haque A. Poisoning – An Analysis of the Khulna General Hospital Cases. Bangla Med J (Khulna Branch) 1989;22(2):1-9.
2. Ahasan HAMN, Azhar MA, Chowdhury MAJ, Rafiquddin AKM. Poisoning pattern in medical indoor - Is it changing? Teachers' Association Journal (TAJ, Rajshahi) 1994;7: 69-71.
3. Ahasan HAMN, Chowdhury MAJ, Azhar MA, Rafiquddin AKM. Copper Sulphate Poisoning. Trop Doct 1994;24: 52-3.
4. Sims JK, Ostman DC. Puffer fish poisoning: Emergency diagnosis and management of mild human tetradotoxication. Ann Emer Med 1986;(9):1094-8.
5. Sun Ko. Management of puffer fish poisoning. Br J Anaesthesia 1995;75(4):500.
6. Benzer T. Tetrodotoxin. Medicine Journal 2001; 2(6): 1-9.
7. Sun Diego Department of Environmental Health, FDA: Tetradotoxin poisoning associated with eating puffer fish transported from Japan-California, 1996. MMWR Morb Mortal Wkly Rep 1996;45(19):389-91.