
Nicotinic acid food poisoning: case report

Alberto Kurzbaum MD, Safori Gassan MD, Lucy Lieberman MD

Department of Emergency Medicine, Poryia Government Hospital, Tiberias, Israel

MeSH words: Flushing, Chemically Induced, Nicotinic Acid, Food Poisoning, Meat Products

Introduction

Food borne diseases are a common problem in emergency medicine. Most of the cases result from improper food handling. The mechanism is the ingestion of either food or water contaminated with pathogenic organisms, microbial toxins, chemicals, naturally occurring plant or animal toxins.

The diagnosis of food borne disease is usually considered when an acute illness with gastrointestinal or neurological manifestations, or both, affects two or more persons who recently shared a meal.

The usual clinical presentations often follow distinct patterns: upper gastrointestinal tract manifestations with nausea and vomiting; bowel symptoms, with noninflammatory watery diarrhea or with inflammatory, dysentery like diarrhea; or neuromuscular or systemic symptoms with or without gastrointestinal manifestations.

We present an outbreak of food poisoning with an unusual pattern of presentation and due to an uncommon chemical cause.

Case presentation

At noon the triage nurse was informed by a nearby factory that about 50 people were feeling sick and in distress after eating lunch in the factory cafeteria, and were going to be transported to the hospital. The Emergency Department made immediate arrangements to

receive a large influx of patients. Within twenty minutes, patients started to arrive to the hospital by ambulance or private cars. A total of 49 patients were registered, 47 men and 2 women. Most of them were previously healthy, but 4 had prior medical problems. One patient suffered from mitral valve prolapse with palpitations, one from asthma, one of recurrent urticaria and one had aortic valve disease.

Each patient gave a similar history: About 5 to 10 minutes after eating meat balls and while still in the cafeteria, they started suffering from flushing, feeling of warmth, mild itching and tingling; especially in the face and upper torso. Some patients complained of headaches.

On examination, all were hemodynamically stable and in no distress. All demonstrated (with varying intensity) flushed skin in the upper part of the body. In other areas a morbiliform rash was present. The flushed skin was with diffuse erythema or confluent large patches of erythema. Workers who did not eat meatballs did not experience these symptoms or signs. All patients were stable and had an otherwise unremarkable physical examination. The patient known to be suffering from mitral valve prolapse had multiple ventricular premature beats, and the asthmatic patient had mild wheezing. A toxic or chemical cause was suspected.

Flushing was the dominant manifestation. The patients were administered antihistamines by mouth and remained in observation. After about

three hours all of them were discharged from hospital without symptoms.

The Ministry of Health authorities were informed of the outbreak and took samples of the ground meat for laboratory analysis. The results of the chemical studies showed a high concentration of nicotinic acid.

Discussion

The differential diagnosis of flushing may be broad in individual cases. Many diseases and drugs may produce it. Flushing secondary to food poisoning is a main manifestation in Scombroid fish poisoning (Histamine fish poisoning). It probably is one of the most common forms of seafood poisoning worldwide. The enteric marine microflora of some fish (tuna, bonito, mackerel), when improperly processed, especially inadequate cooling, degrade histidine and high concentrations of histamine and urocanic acid, a mast cell degranulator, that may augment the effects of exogenous histamine, are present in the meat fish [1]. A similar mechanism was suspected then in our outbreak (in spite of that they did not eat fish).

The results of the chemical analysis showed that nicotinic acid added to the ground meat was the cause. Nicotinic acid (niacin) is a water soluble-B-complex vitamin. In humans is necessary for the prevention and cure of pellagra. In high doses, it has been shown to lower total cholesterol, LDL-Cholesterol, and VLDL-triglycerids, while rising HDL-Cholesterol in patients with type II, III, IV and V hyperlipoproteinemia. Its exact mechanism of action is not known, but it inhibits VLDL synthesis in the liver; inhibits release of free fatty acids from adipose tissue and increases the activity of lipoprotein lipase. Nicotinic Acid has an ideal pharmacological profile, especially for combined hyperlipidemia, but is not in common use because of side effects. In the doses that reduce serum cholesterol, it induces intense flushing in a high proportion of patients [2]. The flushing can be avoided or reduced in intensity by previous intake of aspirin. The vasodilatation following ingestion of nicotinic acid is due to the release of prostaglandin (PG) D₂ locally in the skin [3] from PGD₂ responsive cells in the skin most probably macrophages [4].

Nicotinic acid, like nitrates, is used as a food additive in order to give a pink-red color to meat and increase customer satisfaction by giving an impression of freshness. In Israel it is not recognized as a permissible food additive. Increased awareness of this etiology of food poisoning may improve diagnosis and, as with Scombroid fish poisoning, prevent the incorrect diagnosis of food allergy.

References

1. Lehane L., Olley J. Histamine fish poisoning revisited *Int J Food Microbiol* .2000; 58(1-2): 1-37
2. Droad JM, Zimetbaum PJ, Frishman WH Nicotinic acid for the treatment of hyperlipoproteinemia. *J Clin Pharmacol* 1991; 31(7): 641-50.
3. Morrow JD, Awad JA, Oates JA, Roberts LJ. Identification of skin as a major site of prostaglandin D₂ release following oral administration of niacin in humans. *J Invest Dermatol* 1992, 98(5): 812-5.
4. Ward PE, Sutherland J, Glen EM, Glen AI. Niacin skin flush in schizophrenia: a preliminary report. *Schizophr Res* 1998; 29(3): 269-74

This paper has been peer reviewed.

Correspondence:

A. Kurzbaum.
Emergency Medicine Department.
Poria Government Hospital, Tiberias, Israel.
E-mail: akurzbaum@poria.health.gov.il
Fax: (972)4-6738478