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### H7 Fatal Ice Cream: A Rare Case of Food-Induced Anaphylactic Shock

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After attending this presentation, attendees will understand the importance of a complete methodological forensic approach in fatal cases suspected for anaphylaxis and the relevance of immunoserological investigation to detect IgE-specific response to allergens.

This presentation will impact the forensic science community by emphasizing the rarity of fatal food-induced anaphylaxis and the importance of carrying out an exhaustive immunohistochemical study with anti-tryptase antibodies and of measuring allergen-specific IgE in blood samples from the corpse to indicate sensitivity to certain allergens in order to obtain a reliable postmortem diagnosis of anaphylactic shock.

Food-Induced Anaphylaxis (FIA) is a serious allergic reaction that may rapidly cause death in otherwise healthy individuals. There is no universal agreement on its definition or criteria for diagnosis. According to international recommendation, a food-induced allergy is diagnosed when two or more of the following symptoms occur rapidly and acutely after exposure to a known allergen: acute onset of an illness (minutes to several hours) with involvement of the skin, mucosal tissue, or both (e.g., generalized hives, itching or flushing, swollen lips, tongue, or uvula, rhinorrhea, conjunctivitis); respiratory compromise (e.g., dyspnea, bronchospasm, stridor, hypoxia); and, cardiovascular compromise (e.g., hypotension, collapse). Food-induced allergy is generally sustained by an immunological mechanism which is often IgE-mediated or by alternative immune systems (such as other forms of antibodies, immune complexes, or T-sensitive lymphocytes). The epidemiology of food-induced allergy has been difficult to quantify, with estimates varying widely. Most surveys indicate that food-induced reactions account for 30% to 50% of anaphylaxis cases in North America, Europe, Asia, and Australia, and up to 81% of anaphylaxis cases in children; however, the precise incidence of fatal anaphylaxis cases due to people with food allergies remains unknown. Fatal food anaphylaxis is rare and represents only 0.1% of all cases. Although a wide range of foods have been reported as the cause of FIA, the most commonly implicated foods worldwide are peanuts, tree nuts, milk, eggs, sesame seeds, fish, and shellfish.

This presentation concerns a 16-year-old male who had a medical history of allergic asthma, celiac disease, and known food-induced allergies for fish, fresh milk, peanuts, hazelnuts, walnuts, apples, kiwis, and peaches. He immediately collapsed a few minutes after eating a Danish-style ice-cream sandwich. Advanced life support with intramuscular adrenaline and resuscitation maneuvers were unsuccessful. A complete postmortem examination was performed a few days after death. Gross examination was unremarkable, except for mild cerebral edema and white foam in the main bronchi. Lungs were normal in shape, increased in volume and weight, and exhibited small subplueral petechiae. Histological examination revealed polivisceral stasis, mild cerebral edema, and acute pulmonary edema mixed to acute pulmonary emphysema. Myocardial interstitial edema was also detected. An immunohistochemical technique was used to estimate the mast-cell population using the anti-tryptase antibody as a mast-cell specific marker. A great number of degranulating mast cells with extracellular tryptase-positive material were observed. The identification of positive CD3 (++) and CD8 (+) cells in the duodenal mucosa confirmed the diagnosis of celiac disease. Toxicological analysis on blood specimens was unremarkable. A serum concentration of mast cell tryptase from femoral blood was 41.4ug/l. Research of total and specific IgE for more common food allergens was performed showing high values for kiwi, wheat, peach, shell fish, and gluten. Wheat composition of the ice-cream sandwich was indicated as the cause of food-induced fatal anaphylaxis.

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#### **Food-Induced Allergy, Anaphylactic Shock, Allergen-Specific gE**