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Case report

Suicide of a man with known allergy to fish protein by ingesting tinned fish

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ABSTRACT

On a day in November, the body of a 31-year-old man was found near a swimming lake with two open and partly emptied fish tins lying next to him. Further investigations showed that the man had been allergic to fish protein and suffered from severe depression and drug psychosis. Already some days before the suicide, he had repeatedly asked for fish to kill himself. Although the results of the chemical and toxicological examinations were negative, the autopsy findings and histological tests suggest that death was caused by an anaphylactic reaction.

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1. Introduction

In the medicolegal literature, reports on unusual suicide methods are not uncommon. As examples of unusual tools a drill [4], explosives [12], a tractor [8] or a guillotine [14] have been mentioned. Another very rare method of committing suicide is that persons knowing to suffer from hypersensitivity to an allergen deliberately bring about an allergic reaction [3,6]. In cases like that, it may be very difficult to determine both the manner and the cause of death. Macroscopically, these deaths often show only uncharacteristic findings, so that histological and serological tests are necessary [1,2,5,15,16]. In the following, we present the case of a young man who knew that he was allergic to fish protein and committed suicide by ingesting preserved fish.

2. Case report

2.1. Situation prior to the incident and findings at the scene

On a day in November around 09:00 a.m., a 31-year-old man was found lifeless on the shore of a swimming lake. Resuscitation attempts were unsuccessful and were stopped at 09:50 a.m. Next to the body, there were two open and partly emptied fish tins (coalfish and herring). According to the investigation results, the man had left his parents' house at 08:00 a.m. on that particular day, bought the fish tins and went to the shore of the swimming lake. He

knew that he had been strongly allergic to fish protein since childhood and also suffered from depression and bronchial asthma. Several months before, he had already made a first attempt to kill himself by eating fish.

2.2. Autopsy findings

Autopsy of the man (height 163 cm, weight 74 kg) showed cerebral oedema and a mucous, transparent mass in the bronchi; the mucosa of the respiratory tract was reddened. The lungs were dilated and filled with blood; the other organs also revealed acute blood congestion. There were no signs to indicate an asthmatic disease. The stomach content clearly smelled of fish and isolated pieces of fish could be identified. The organ weights were determined as follows: brain 1450 g, heart 420 g, left lung 550 g, right lung 700 g, liver 1500 g, spleen 150 g, kidney each 150 g.

2.3. Histology

The histological tests included HE and Giemsa stains to identify the granules contained in mast cells and a CD117 stain to visualize the mast cell membrane.

Especially in the lung sections, the CD117 stain (Fig. 1) showed more mast cells (mean 57 per field of view, optical magnification 200 times) than the Giemsa stain taken from the same region (Fig. 2). Similarly, CD117 appeared to visualize more mast cells in the myocardium (mean 17 per field of view, optical magnification 200 times) (Fig. 3). HE staining of the spleen showed a massive increase of eosinophilic granulocytes (Fig. 4).

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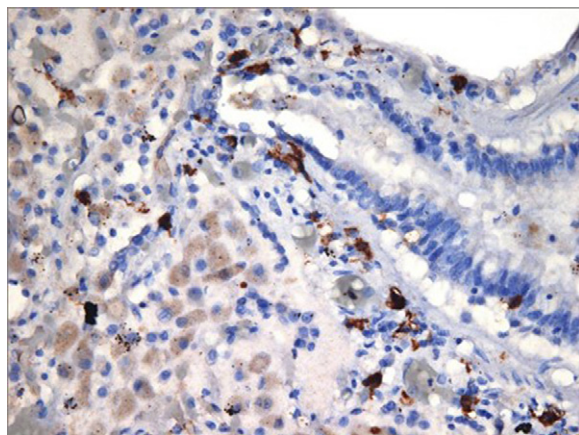


Fig. 1. Immunohistochemical visualization of the mast cell membrane by means of CD117 in the lung.

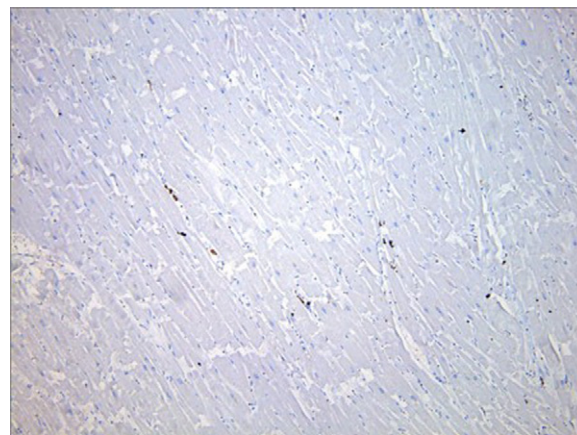


Fig. 3. Visualization of mast cells in the myocardium (CD117).

2.4. Laboratory tests

In the blood sample taken from the heart during autopsy 72 h after death, a significantly elevated total IgE level of 358 kU/l (normal value < 100 kU/l) as well as an also markedly elevated tryptase concentration of 30.1 µg/l (normal value < 11.4 µg/l) were determined. Moreover, specific IgE against herring was detected, which was assigned to class 3 of the classification ranging from 0 (no specific IgE demonstrable) to 5 (maximum specific IgE detection). The chemical and toxicological tests including blood alcohol concentration produced negative results.

3. Discussion

As there were no signs of trauma or hypothermia, the investigations concentrated on the question, whether this death was due to an anaphylactic shock.

Under pathophysiological aspects, an anaphylactic reaction is mainly caused by IgE-mediated immediate-type hypersensitivity. After the first contact with an allergen, the immune system produces specific IgE molecules which initiate the activation of mast cells and their degranulation upon later exposure to the same allergen [10]. This results in histamine-mediated vascular dilation, mucosal oedema, increased gland secretion and bronchial constriction. Clinical manifestations include life-threatening respiratory obstruction and hypotension.

Most deaths due to anaphylactic shock can be classified as accidents [5,9,11,15,16]. Heinze et al. [5] reported the example of a fatal tortellini meal in the presence of an allergy to nuts and Schneider et al. [11] as well as Trübner et al. [15] published reports on deaths following wasp stings. However, there are hardly any reports on suicides or suicide attempts in the literature where persons intentionally exposed themselves to allergens or refused medical treatment [5,6]. Homicides committed by deliberately causing an anaphylactic shock are not known to us from the medicolegal literature.

In the present case, the investigation results suggested suicide by ingestion of tinned fish with subsequent anaphylaxis before the autopsy already, as the man was known to be allergic to fish protein.

At autopsy, oedematous swelling of the laryngeal mucosa and haemorrhagic pulmonary oedema may be found in deaths due to an anaphylactic reaction. In most cases, however, the macroscopic findings are unspecific; as a consequence, additional histological and serological tests are very important [1,2,5,15,16]. In our case, a significantly elevated total IgE level was found in the blood of the deceased, which was attributable to the allergic reaction. The same applied to the markedly elevated tryptase concentration [7]. Although Edston and Van Hage-Hamsten [2] found elevated heart blood tryptase levels in cases such as traumatic deaths, deaths after heroin-injection and unexplained deaths, in the present case the elevated tryptase level seems to be part of an anaphylactic reaction. The high number of mast cells in the pulmonary and

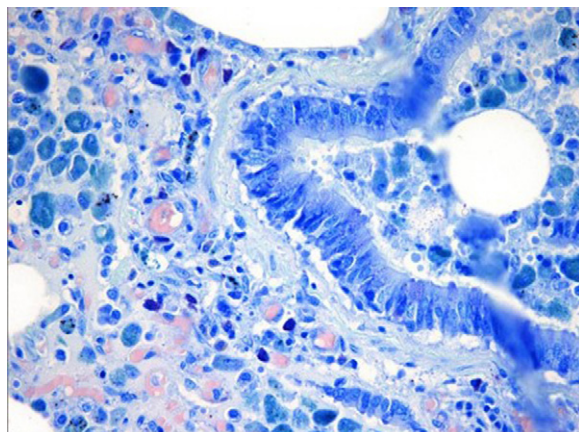


Fig. 2. Giemsa stain of the lung to visualize the granules contained in the mast cells.

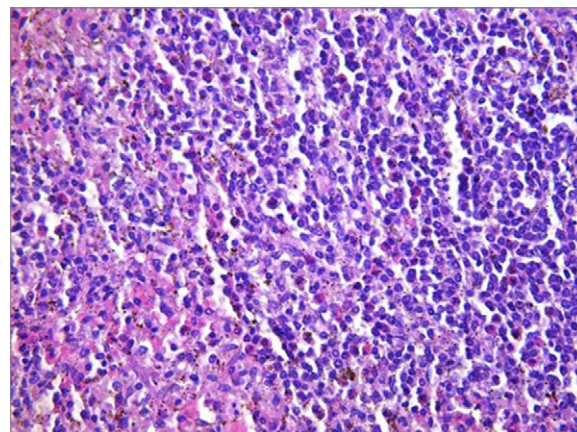


Fig. 4. Numerous eosinophilic granulocytes in the spleen (HE).

cardiac tissue has also been described before in deaths due to anaphylaxis [5,13] just as the fact that the CD117 stain, which visualizes the mast cell membrane, showed more mast cells than the Giemsa stain, which visualizes the granules contained in the mast cells. This suggests degranulation of the mast cells and can be regarded as further evidence of an anaphylactic reaction. As the deceased did not show any symptoms of a parasitic disease, the eosinophilia of the spleen tissue is most probably due to an allergic reaction. Considering the circumstances and the other findings of the case, the significantly elevated total IgE level and especially the presence of specific IgE to herring can be regarded as proof that death was caused by anaphylaxis.

References

- [1] U. Da Broi, C. Moreschi, Post-mortem diagnosis of anaphylaxis: a difficult task in forensic medicine, *Forensic Sci. Int.* 201 (2011) 1–5.
- [2] E. Edston, M. Van Hage-Hamsten, Postmortem diagnosis of anaphylaxis, in: M. Tsokos (Ed.), *Forensic Pathology Reviews*, Humana Press Inc., Totowa, NJ, 2005.
- [3] A.K. Ellis, Deliberate ingestion of peanut as a suicide attempt, *Can. J. Psychiatry* 49 (2004) 708.
- [4] R. Hausmann, P. Betz, Suicide by a power drill, *Forensic Sci. Int.* 129 (2002) 191–193.
- [5] S. Heinze, A. Erbersdobler, M. Tsokos, Todesursache: anaphylaxie, *Rechtsmedizin* 20 (2010) 282–284.
- [6] N.J. Lewiston, S. Rubinstein, Sudden death in adolescent asthma, *N. Engl. J. Med.* 7 (1986) 448–453.
- [7] M. Osawa, F. Satoh, H. Horiuchi, W. Tian, N. Kugota, I. Hasegawa, Postmortem diagnosis of fatal anaphylaxis during intravenous administration of therapeutic and diagnostic agents: evaluation of clinical laboratory parameters and immunohistochemistry in three cases, *Legal Med. (Tokyo)* 10 (2008) 143–147.
- [8] S. Racette, T. Vo, A. Sauvageau, Suicidal decapitation using a tractor loader: a case report and review of the literature, *J. Forensic Sci.* 52 (2007) 192–194.
- [9] H.A. Sampson, Food anaphylaxis, *Br. Med. Bull.* 56 (2000) 925–935.
- [10] R.F. Schmidt, F. Lang, G. Thews, Blut und Immunabwehr, in: *Physiologie des Menschen*, Springer, Heidelberg, 2004, pp. 510–550.
- [11] V. Schneider, H. Kulike, K.S. Saternus, Todesfälle nach wespennstichen, *Dtsch. Z. Gesamte Gerichtl. Med.* 926 (1986) 79–91.
- [12] C. Schyma, L. Hagemeyer, B. Madea, Suicide by head explosion: unusual blast wave injuries to the cardiovascular system, *Int. J. Legal Med.* (2010) 12.
- [13] Y. Shen, L. Li, J. Grant, et al., Anaphylactic deaths in Maryland (United States) and Shanghai (China): a review of forensic autopsy cases from 2004 to 2006, *Forensic Sci. Int.* 186 (2009) 1–5.
- [14] K. Shorrock, Suicidal decapitation by guillotine: case report, *Am. J. Forensic Med. Pathol.* 23 (2002) 54–56.
- [15] K. Trübner, F. Mohsenian, U. Müller, M. Kiehn, K. Püschel, Drei Todesfälle nach wespennstichen, *Rechtsmedizin* 1 (1991) 153–157.
- [16] J.W. Yunginger, D.R. Nelson, D.L. Squillace, et al., Laboratory investigation of deaths due to anaphylaxis, *J. Forensic Sci.* 36 (1991) 857–865.