Confirming anaphylaxis post-mortem utilising serodiagnostic tests

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The difficulty of diagnosing anaphylaxis post-mortem has remained a challenge during an autopsy investigation. The main challenges as summarised by Da Broi et al. are;

a. Most cases occur outside the medical environment and are seldom witnessed, which means a lack of vital supportive information or medical history;

b. The lack or absence of internal and external signs (macro- and microscopic) of anaphylaxis at autopsy;

c. Biological fluids may be unavailable and chemical composition of analytes may be modified due to cytolytic or thanatological processes;

d. Biomarkers indicative of anaphylaxis are marred by a myriad of complications and remain mostly unreliable in forensic medicine;

e. Forensic experience, or the lack thereof, especially concerning the immunopathology of anaphylaxis also can curtail the diagnosis [1].

The main immunological biomarkers most commonly used in diagnosing allergy related anaphylaxis are mast cell tryptase (MCT), total IgE and allergen-specific IgE (sIgE) levels and have been utilised with some success in forensic pathology. However, the utility of these markers has been questioned due to varied cut-off values for positivity post-mortem as both MCT and IgE have been shown to increase with prolonged post-mortem intervals. [2] During an anaphylactic episode circulatory MCT levels are elevated after 15-30 minutes post mast cell degranulation, peak at 2 hours and return to normal levels after 3 days. Post-mortem, MCT increases are due to several factors such as trauma an ensuing anaphylaxis, as well as the post-mortem setting per se. These issues further exacerbate the interpretation of MCT levels determined during the autopsy. [3-5] A recent review of MCT values in the post-mortem setting has comprehensively established a positive value of ≥53.8ug/L from femoral blood as indicative of anaphylaxis. As such, MCT levels above the indicated cut-off should be considered as an indicative test in assisting the diagnosis of anaphylactic death irrespective of contributing factors. [4]

Although the use of serum total IgE post-mortem seems unaffected either by trauma or an increased post-mortem interval, its relevance remains doubtful as the anaphylaxis may be non-IgE mediated together with the prevalence of raised total IgE levels in allergic people. [6] However, total IgE and

sIgE from femoral and pericardial blood have been shown to be indicative of IgE levels at death and may support the diagnosing of anaphylaxis. [7]

Protein analysis of gastric content, vomitus and the prepared food as done in this case, to identify the causative agent is rare in post-mortem investigations. The described preparation of these materials to prohibit further degradation of the samples and their analysis are informative and will be a useful inclusion in an autopsy protocol to assist in identifying the possible food source that may have triggered the anaphylaxis. As a reference, the Royal College of Pathologists has released anaphylaxis autopsy guidelines with little or no reference to this aspect in the autopsy investigation [8], which further strengthens the conclusions of this case study.

References

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