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Cross reactivity among cephalosporins- Weight of forensic evidences in a rare case of fatal anaphylactic shock

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Learning Objective: After attending this presentation, attendees will understand the relevance of a complete methodological approach in fatal cases of anaphylactic shock and the opportunity of a complete immuno-serological investigation.

Synopsis of Content: The most frequent reactions to cephalosporins are non pruritic, non-urticarial rashes which occur in 1.0% to 3% of patients for most, the mechanism is considered idiopathic and not a contraindication for future use. Anaphylactic reactions from cephalosporins are extremely rare with the risk estimated at 0.0001% to 0.1%. Several studies suggest that cephalosporin-induced anaphylaxis occurs no more frequently among patients with known penicillin allergy than among those without such allergy. Allergic reaction to cephalosporins may occur because of sensitization to unique cephalosporin haptens or to determinants shared with penicillins, although the different epitopes have not been defined. Lack of knowledge of the exact chemical structure of cephalosporin antigen determinants has hindered clinical interpretation of allergic reactions and cross-reactivity. In patients with a primary response to cephalosporins, selective recognition of the R1 side chain has been observed with some degree of cross-reactivity between different cephalosporins, which almost always concerned cephalosporins with identical or similar R1 side chains. Authors present the case of a 79 year old man who suddenly died after administration of ceftriaxone. Dyspnoea, cyanosis and cardiac arrest occurred immediately after administration. Resuscitation manoeuvres were unsuccessful. In the history coronary by-pass and multiple administrations of different antibiotics were recorded in the last ten years from general practitioner, without symptoms. Lipotimic crisis after administration of cefepime occurred few month before death. A complete post-mortem examination was performed. Gross examination was unremarkable except for mild pulmonary oedema. Histological examination revealed polivisceral stasis, mild cerebral oedema and acute pulmonary oedema mixed to acute pulmonary emphysema. Myocardial interstitial oedema was also detected. An immunohistochemical technique was used to estimate mast-cell population, using the anti-tryptase antibody as a mast-cell specific marker. Pulmonary mast cells were identified and a great number of degranulating mast cells with tryptase-positive material outside were observed. Toxicological analysis on blood specimens was unremarkable. Serum dosage of mast cell tryptase from femoral blood detected serum values of 93.5 k UA/ml. Research of total and specific IgE was performed showing that the subject was sensible for penicillins, amoxicillin, cephalosporins and also for the most common allergens. Death was due to anaphylactic shock; past administrations of cefepime sensitized the man to cephalosporins and a fatal cross reactivity of ceftriaxone with cefepime occurred due to the identical 7 position side chain structure in both molecules.

Paper's Proposition: This presentation will impact the forensic community by alerting on the cross reactivity between cephalosporins as a potential cause of malpractice claim in general practice and by advising on the importance of collecting more evidence as possible in fatal cases of anaphylaxis.

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