MAST CELL TRYPHTASE

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Serum tryptase is a very useful marker for the detection of mast cell activation. Upon activation, mast cells release a variety of mediators that result in allergic reactions such as systemic anaphylaxis. Tryptase is found in the circulation after a patient suffers an anaphylactic reaction. The half-life of tryptase released into the circulation is considerably longer than that of histamine. Increased levels of tryptase peak at about 1 hour and can be detected from 3 to 6 hours after the anaphylactic reaction. Levels return to normal within 12 - 24 hours after release. An initial increase in tryptase levels followed by a sharp decrease indicates an allergic reaction. If the tryptase remains elevated at high levels, other conditions such as mastocytosis must be considered. Tryptase levels remain stable in stored serum samples for many months.

Indications
• Even when only one specimen can be taken, as in a postmortem case, it is a valuable indicator that anaphylaxis was a likely cause of death.
• We have found that one of the most useful clinical indications for the determination of tryptase levels is intraoperative anaphylaxis. Common drugs causing anaphylaxis during surgery are the muscle relaxants, but latex allergy is also an important cause.
• A recently recognised indication for tryptase determination is the assessment of risk in bee venom-hypersensitive patients. Those who have elevated basal tryptase levels are at greater risk of severe anaphylactic reactions and of more serious adverse reactions during bee venom immunotherapy. In these patients tryptase levels can be used for ongoing monitoring of relative risk.
• Tryptase determination is a valuable marker for the diagnosis and monitoring of systemic mastocytosis.
• Tryptase levels are not raised in patients who have food allergies or atopic dermatitis, but may be useful in acute, severe food-induced anaphylaxis.

Local survey
A retrospective study of 221 patients tested at the Allergy Diagnostic and Clinical Research Unit of the UCT Lung Institute and Groote Schuur Hospital was recently conducted. Mast cell tryptase levels ranging from < 1.0 µg/l to 13.5 µg/l are considered to fall within normal limits. Thirty-nine of the samples submitted to our laboratory had levels > 13.5 µg/l. Seventeen postmortem specimens were tested and values from 3.73 µg/l to 4.275 µg/l were found.

Specific collection
Venous blood is collected, allowed to clot and serum is separated. Ideally serial samples of 2 ml should be taken at 30 minutes to 1 hour, 2 - 3 hours and again at 12 - 24 hours to detect the characteristic rise and fall in tryptase levels during anaphylaxis. On a postmortem specimen a single sample can be taken up to 24 hours later and is informative if significantly elevated.

WHAT IS ANAPHYLAXIS?

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Anaphylaxis is a severe, life-threatening systemic reaction affecting all ages. The clinical syndrome may involve multiple target organs, including skin, respiratory, gastrointestinal and cardiovascular systems. The underlying mechanism is the presence of biologically active mediators released from mast cells or basophils. In a classic IgE-mediated reaction from previously sensitised mast cells or basophils, anaphylactic reaction is the preferred term. Degranulation of mast cells or basophils may occur by non-IgE-mediated mechanisms – these reactions are termed anaphylactoid. Clinically it is not possible to distinguish the two and treatments for both are identical.

Common causes
• Foods: especially nuts, some kinds of fruit, seafood, egg.
• Drugs: especially penicillin, anaesthetic agents, radiocontrast media, aspirin and other NSAIDs.
• Latex: gloves, catheters and other medical/dental products. Sufferers are usually health care workers with a prolonged occupational exposure to latex. Bananas, avocados, kiwi, figs and other fruit/vegetables (e.g. potatoes) may also cause anaphylaxis due to proteins that cross-react with latex.
• Venom: bee/wasp stings.
• Idiopathic/unknown.

Subjective symptoms
• Common – itchy mouth/palate; generalised warmth/flushing; tingling/pruritus of skin (soles/palms, lips); sensation of lump in throat,