

Correspondence

Serum tryptase determination in patients with acute allergic reactions

To the Editor:

The study by Vadas et al¹ reported on levels of anaphylaxis mediators in 41 patients presenting to the emergency department compared with levels in 23 healthy volunteers. Platelet-activating factor (PAF), histamine, and tryptase levels were measured in patients' sera collected on arrival and analyzed according to (1) anaphylaxis severity, as defined by Brown et al,² and (2) time from onset of reaction to blood collection. The authors concluded that the PAF level increase correlated better with the severity of acute allergic reactions than either histamine or tryptase levels. We would like to draw attention to significant methodologic and interpretational flaws that detract from the value of the presented data on serum tryptase determination.

First, serum tryptase titers were considered increased only if they exceeded 11.4 µg/L, and there was no indication of basal serum tryptase levels in each patient. It has been previously demonstrated that each patient's peak serum tryptase level must be compared with his or her own basal tryptase level³⁻⁵ and not with the manufacturer's upper limit of 95% of serum tryptase concentration, as determined in 126 healthy subjects.⁶ Differential serum tryptase level increases of as little as 135% or 2 µg/L have been shown to occur during true anaphylaxis,^{4,5} underscoring the need for serial tryptase determinations in a given patient. Therefore considering a serum tryptase concentration increased only if it exceeds 11.4 µg/L will miss a number of true mast cell activation reactions, as many as 60% in some reports.⁵

Second, the delay between the onset of the allergic reaction and serum tryptase level determination was not thoroughly documented. Serum tryptase half-life is about 2 hours, and the increase in serum tryptase concentrations might not be detectable during the first 15 or 30 minutes after the onset of an allergic systemic reaction.³ This is a major point in the differential use of serum total tryptase measurement versus histamine or PAF measurement because more than 1 blood sample at early time points is needed to properly assess all mediators. Early tryptase determination is best done between 30 minutes and 2 hours after the onset of anaphylaxis.

Third, 22 of 41 patients experienced allergic reactions triggered by foods. It has been established that food-induced anaphylaxis is inconsistently associated with an increase in serum tryptase concentrations and that peak serum tryptase values are often low in this setting.⁷⁻⁹ Therefore the combined influence of a majority of food-induced allergic reactions and the lack of serial tryptase determinations might result in a number of false-negative results.

Finally, the authors did not provide analysis of reaction severity versus blood collection time. Peak serum tryptase levels were shown to correlate with symptom severity at early times of Hymenoptera venom-induced allergic reactions¹⁰ and with distinct clinical features on admittance for food-induced reactions.⁴ Therefore serum tryptase interpretation is fully useful in light of symptom chronology, and this is particularly true in cases in which basal tryptase levels are not available.

On the basis of these criticisms, we caution against erroneous interpretation of unsubstantial serum tryptase determination data in terms of kinetics, levels, and cause of the allergic reaction. On the basis of major previous studies, we underscore the value of documented peak and baseline serum tryptase measurements in the laboratory workup of allergic reactions.

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