Serological allergy diagnostics

Tryptase

Help from the laboratory when it matters most

Recognizing anaphylaxis quickly and reacting correctly is of importance in clinical practice. An article has already been published on the clinic and possible triggers of anaphylaxis (“Allergy and anaphylaxis”, series In vitro allergy diagnostics, part 3 of 4). However, it is not always clear beyond doubt whether the observed reaction was indeed anaphylaxis. Clinically, other non-allergic causes may have a very similar appearance (Tab 1). Here, the practitioner can make a decisive contribution to clarification by determining tryptase levels during and after the reaction.

Tryptase as a marker of anaphylaxis

Anaphylaxis is based on a rapid release of large amounts of histamine from mast cells, which are found in various tissues, especially on body surfaces. The mast cells also release other mediators such as heparin and tryptase. Tryptase is specific to mast cells and does not occur in other body cells [1]. It is significantly more stable than histamine, both in the body itself and in serum after blood sampling. It is therefore well suited for the detection of mast cell activation. After stabilization of the potentially allergic patient, it is important to take a serum sample within 30 minutes to 2 hours after the onset of symptoms and to compare it with the baseline value to further clarify the reaction. The latter can be determined either from a blood sample taken at the earliest 24 hours after symptoms have subsided or from a previous serum sample. After numerous studies on tryptase kinetics, especially in the context of perioperative anaphylaxis, an acute value of tryptase of ≥ 20% above the individual baseline value plus 2 μg/l has emerged as a threshold that makes mast cell activation likely as the cause of the reaction [2, 3]. Thereby, both values (acute and basal) can also lie within the reference interval (1-11 μg/l) [4]. Conversely, a lacking increase in serum tryptase does not exclude an allergic reaction.

Table 1: Differential diagnosis of anaphylaxis

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypovolemia</td>
<td>Cardiogenic shock</td>
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<tr>
<td>Asthma exacerbation</td>
<td>Inducible laryngeal obstruction (ILO)</td>
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<td>Anxiety/hyperventilation/psychogenic genesis</td>
<td>Pharmacologic (opioids, NSAIDs, ACE inhibitors)</td>
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<tr>
<td>Chronic spontaneous or inducible urticaria</td>
<td>Tryptase as a marker of mastocytosis</td>
</tr>
</tbody>
</table>

Tryptase as a marker of mastocytosis

In addition to its importance in the assessment of possible anaphylactic reactions, the determination of basal serum tryptase also plays a role in the assessment of total mast cell count. Since mast cells release a minimal amount of (pro-)tryptase even in the resting state [5], basal serum tryptase increases in correlation with the total number of mast cells. Elevated serum tryptase above 20 μg/l, measured at rest and monitored in at least one consecutive serum sample, is a minor criterion for the diagnosis of systemic mastocytosis. If the patient presents with repetitive symptoms that can be explained by histamine release (skin itching, urticaria, angioedema, circulatory problems, dyspnea, etc.), further hematological evaluation is recommended.

References:
4. ImmunoCAP Tryptase Directions for Use

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