Technical Brief

Myeloperoxidase and Coronary Outcomes

Background Information

Many patients who present with acute coronary syndromes due to coronary thrombosis will die, develop myocardial infarction, or require revascularization within six months. These adverse events may occur in patients who are negative for troponins, the established markers for cardiac ischemia. Leukocyte activation markers have been shown to add incremental information about risk for adverse outcomes, in addition to information provided by troponins and C-reactive protein.

Myeloperoxidase (MPO) is an enzyme located in the azurophil granules of white blood cells (polymorphonuclear leukocytes and monocytes). MPO normally participates in host defenses using hydrogen peroxide and chloride as substrates to produce hypochlorous acid (bleach), which destroys bacteria. MPO is enriched within human atherosclerotic plaques and culprit lesions in patients with sudden cardiac death (1). MPO also has been linked to the development of lipid-laden soft plaque, the activation of protease cascades affecting the stability of plaque, the production of cytotoxic and prothrombogenic oxidized lipids, and the consumption of nitric oxide leading to vasoconstriction (1-2).

Clinical Indications

Plasma MPO can identify those patients with chest pain who are at risk for a major adverse coronary event despite negative troponin T and a normal ECG (3-4).

Plasma MPO can be used by emergency departments as part of the triage protocol for patients with chest pain. MPO also is useful in an office setting for patients presenting with chest pain to identify those individuals at risk for adverse events. In these cases, MPO values may result in an expedited stress test or cardiac catheterization.

Interpretation

An initial plasma MPO measurement independently predicts the risk of major adverse cardiac events in the 30-day and 6-month period following an incident of chest pain (4). A low MPO value improves negative predictive value, providing greater ability to confirm a patient’s low risk for adverse events in the ensuing 30 to 60 days.

The relative risk for major adverse cardiac events increases with increasing levels of plasma MPO. The predictive power of the MPO concentration is independent of age, sex, CRP value, abnormal ECG; or history of hyperlipidemia, revascularization, or myocardial infarction.

Plasma samples from 150 normal males and 150 normal females demonstrated a reference interval for MPO of 0 – 539 pmol/L.

- MPO > 600 pmol/L, increased risk for adverse cardiac-related events
- MPO > 3000 pmol/L, very high risk for adverse cardiac-related events

Limit of detection: 13 pmol/L.
Total precision: 6 – 10% at MPO values of 440 – 1310 pmol/L.

Limitations of the Assay

The clinical performance of this MPO assay has been verified only in plasma specimens collected with lithium heparin. Use of other specimen types is not recommended.

Methodology

MPO is measured in plasma using a sandwich enzyme immunoassay that employs two highly specific antibodies, one monoclonal capture antibody and one rabbit polyclonal antibody. Detection is by means of an enzyme-labeled anti-rabbit IgG antibody.

References


### Test Overview

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<thead>
<tr>
<th>Test Name</th>
<th>Myeloperoxidase</th>
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<tbody>
<tr>
<td>Reference Range</td>
<td>Myeloperoxidase: &lt; 640 pmol/L</td>
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<tr>
<td>Specimen Requirements</td>
<td>1 mL plasma from a lithium heparin green top tube. Centrifuge within one hour of collection, take off plasma and freeze.</td>
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<tr>
<td>Notations</td>
<td>To ensure validity of the assay, plasma specimens must be collected with lithium heparin.</td>
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<td>Ordering Mneumonic</td>
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