Myeloperoxidase (MPO)

Individuals with elevated MPO levels are more than twice as likely to experience cardiovascular mortality\(^1\).

<table>
<thead>
<tr>
<th>MPO levels are associated with an increased risk for:</th>
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<tbody>
<tr>
<td>Cardiovascular disease</td>
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<td>Myocardial infarction</td>
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<th>MPO levels should be measured in:</th>
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<tr>
<td>Asymptomatic individuals</td>
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<tr>
<td>Individuals at risk for pre-diabetes/diabetes</td>
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<tr>
<td>Individuals with CAD</td>
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What is MPO?

MPO is a white blood cell-derived inflammatory enzyme that is released into the blood at sites of vascular injury such as vulnerable plaque, erosions or fissures.

Why measure MPO levels?

- MPO diminishes nitric oxide bioavailability, leading to endothelial dysfunction\(^2\).
- MPO oxidizes LDL making it atherogenic\(^3\), and HDL rendering it dysfunctional\(^4\) resulting in cholesterol deposition in the artery wall.
- Elevated MPO levels predict the risk of heart disease in subgroups otherwise associated with low risk\(^5,6\).
- Elevated MPO levels also independently predict the early risk of future cardiovascular events in patients with acute coronary syndromes up to 24 months preceding an event\(^7,8\).
- MPO enhances cardiovascular risk prediction when used independently or alongside standard biomarker testing such as hsCRP\(^1\).

Are MPO levels elevated secondary to disease states characterized by inflammation?

MPO levels are not likely to be elevated due to chronic infections or rheumatologic disorders due to the fact that free MPO in the blood is a specific marker of vascular inflammation and vulnerable plaque erosions fissures.

Is the p-ANCA test (anti-MPO antibody test) the same as the MPO test performed by Cleveland HeartLab?

No. The p-ANCA test primarily measures the amount of antibodies directed toward the MPO protein whereas the MPO test performed by Cleveland HeartLab directly measures the amount of MPO protein. The p-ANCA test is useful for identifying systemic inflammation and vasculitis. In contrast, the MPO test performed by Cleveland HeartLab is useful for identifying cardiovascular risk.

How should my patients prepare for the MPO test?

There are no preparations necessary. The patient does not have to be fasting for the MPO test and can be taking medications.

What type of sample is required?

The MPO test should be performed on an EDTA plasma sample.

Is the MPO test covered by insurance?

The MPO test is covered by most commercial insurances and Medicare.

Relative Risk:

- Low: <480 pmol/L
- High: ≥480 pmol/L

References

10. Toyama K et al. Rosuvastatin combined with regular exercise preserves coenzyme Q10 levels associated with a significant increase in high-density lipoprotein cholesterol in patients with coronary artery disease. *Atherosclerosis*. 2011; 217: 158-164.
Myeloperoxidase (MPO)

MPO Treatment Algorithm

MPO Treatment Algorithm

MPO Result

≥480 pmol/L

<480 pmol/L

Retest every 3-6 months

Step 1
Assess LDL-C levels. If not at goal, consider statins, ezetimibe or combination therapy if not contraindicated.

Step 2
Assess risk for pre-diabetes/diabetes. If abnormal fasting glucose or oral glucose tolerance test, consider PPAR agonists, metformin or DPP-IV inhibitor if not contraindicated.

Step 3
Assess the presence of CAD with imaging techniques such as CIMT or CACS. Consider aspirin therapy if not contraindicated. Consider clopidogrel if history of CAD (i.e., myocardial infarction or revascularization).

Step 4
Assess dental health (periodontal disease). Refer to dentist to identify gum disease. Note: Poor dental health may cause significant inflammation and is associated with the presence of atherosclerosis.

Step 5
Assess ApoA1 and/or HDL-C levels. If not at goal, consider niacin or fenofibrate therapy. Assess CoQ10 levels as recent evidence suggests that low ApoA1 and/or HDL-C levels are associated with low CoQ10 levels.

Step 6
Assess smoking habits. Note: Smoking cessation is essential as individuals who smoke are at increased risk of heart disease and thrombosis.

Step 7
Assess blood pressure. If not at goal, consider anti-hypertensive therapy. Note: An elevated blood pressure may damage the endothelium and contribute to disease formation and/or initiate a blood clot.

Step 8
Assess lifestyle habits. Consider diet/exercise/weight reduction efforts if appropriate.

Step 9
Assess the presence of inflammatory conditions such as Crohn’s disease, rheumatoid arthritis (RA), or systemic lupus erythematosus (SLE). Note: Chronic inflammatory diseases may exhibit elevated MPO values due to increased vascular disease associated with these conditions. For example, RA is associated with a 5 times increased risk for acute MI.

Step 10
Assess presence of vasculitis. Note: MPO values may be elevated in individuals with vasculitis as this is characterized by increased vascular inflammation.

Step 11
Assess the presence of bone marrow dyscrasias. Note: MPO values may be elevated in individuals with chronic lymphocytic leukemia or other leukemias that cause increased white blood cell destruction.

Step 12
Assess level of exercise. Note: MPO values may be elevated in marathon runners or extreme athletes and identify increased oxidative stress.

Treatment Recommendations

Retest every 3-6 months

*These recommendations are for educational purposes only. Specific treatment plans should be provided and reviewed by the treating physician.

ClevelandHeartLab
Know your risk.

6701 Carnegie Ave. | Suite 500 | Cleveland, OH 44103 | p 866.358.9828 | f 866.869.0148 | www.clevelandheartlab.com

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