Myeloperoxidase (MPO)

CPT Code: 83876
Sample Type: EDTA Plasma
Order Code: C133
Tube Type: Lavender Top

Description
MPO is a white blood cell-derived inflammatory enzyme that measures disease activity from the luminal aspect of the arterial wall. Briefly, when the artery wall is damaged, or inflamed, MPO is released by invading white blood cells where it accumulates. MPO mediates the vascular inflammation that propagates plaque formation and activates protease cascades that are linked to plaque vulnerability. White blood cell activation in the bloodstream, in response to luminal injury of the artery wall including fissures, erosions or a degrading collagen cap, leads to MPO release in the bloodstream. This combination of detrimental effects demonstrates that MPO is actively involved in the progression of atherosclerosis. The Cleveland HeartLab MPO test measures free MPO in the bloodstream.

Clinical Use
The MPO test may be performed on individuals with multiple risk factors for cardiovascular disease, or those with established disease.

Clinical Significance
- Elevated MPO levels predict the risk of heart disease in subgroups otherwise associated with low risk.
- Elevated MPO levels independently predict the risk of future cardiovascular events in patients presenting with an acute coronary syndrome.
- Individuals with elevated MPO levels are more than 2x as likely to experience cardiovascular mortality.
- MPO enhances cardiovascular risk prediction when used independently or alongside standard biomarker testing such as hsCRP.
- 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.
- The p-ANCA test (anti-MPO antibody test) is not the same as the MPO test performed by Cleveland HeartLab. The p-ANCA test primarily measures the amount of antibodies directed against the MPO protein.

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

Commercial Insurance or Medicare Coverage
Coverage guidelines, also known as NCD (National Coverage Determination) or LCD (Local Coverage Determination) have been established or posted by CMS (Medicare & Medicaid). Guidelines should be reviewed for coverage and limitations. Limited information has been provided by the majority of the larger carriers (Aetna, United HealthCare, Cigna, Blues).

Understanding Medical Necessity
The following ICD-10 codes for MPO are listed as a convenience for the ordering physician. The ordering physician should report the diagnosis code that best describes the reason for performing the test.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Diagnosis Code</th>
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<tbody>
<tr>
<td>Type 2 Diabetes Mellitus with Hyperglycemia</td>
<td>E11.65</td>
</tr>
<tr>
<td>Type 2 Diabetes Mellitus without Complications</td>
<td>E11.9</td>
</tr>
<tr>
<td>Other Specified Diabetes Mellitus without Complications</td>
<td>E13.9</td>
</tr>
<tr>
<td>Pure Hypercholesterolemia, Unspecified</td>
<td>E78.00</td>
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<tr>
<td>Familial Hypercholesterolemia</td>
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<tr>
<td>Mixed Hyperlipidemia</td>
<td>E78.2</td>
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<td>Other Hyperlipidemia</td>
<td>E78.4</td>
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<tr>
<td>Hyperlipidemia, Unspecified</td>
<td>E78.5</td>
</tr>
<tr>
<td>Hyperuricemia without Signs of Inflammatory Arthritis and Tophaceous Disease</td>
<td>E79.0</td>
</tr>
<tr>
<td>Essential (primary) Hypertension</td>
<td>I10</td>
</tr>
<tr>
<td>Atherosclerotic Heart Disease of Native Coronary Artery without Angina Pectoris</td>
<td>I25.10</td>
</tr>
</tbody>
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MPO levels are associated with an increased risk for:
- Cardiovascular disease
- Myocardial infarction

MPO levels may be measured in:
- Individuals with multiple risk factors
- Individuals at risk for pre-diabetes/diabetes
- Individuals with established cardiovascular disease
Treatment Considerations

These treatment considerations are for educational purposes only. Specific treatment plans should be provided and reviewed by the treating practitioner.

- **Assess LDL-C levels.**
  - If not at goal, consider lipid-lowering therapy, ideally with a statin-based regimen if not contraindicated.

- **Assess lifestyle habits.**
  - Consider diet/exercise/weight reduction efforts if appropriate.

- **Assess blood pressure.**
  - If not at goal, consider initiating, or titrating, anti-hypertensive therapy.
  - **NOTE:** An elevated blood pressure may contribute to endothelial dysfunction and coronary disease formation.

- **Assess smoking habits.**
  - Smoking cessation is essential as individuals who smoke are at increased risk of heart disease and blood clots.

- **Assess risk for pre-diabetes/diabetes.**
  - If abnormal oral glucose tolerance test or insulin levels, consider insulin sensitizing therapy.

- **Assess the presence of coronary artery disease (CAD) with imaging techniques such as carotid intima media thickness testing (CIMT) or coronary artery calcium scoring.**
  - If clinically appropriate, consider dual platelet inhibition.

- **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.

- **Assess MPO levels.**

  - If asymptomatic, with all of the above factors ruled out, an elevated MPO value may in fact be the patient’s baseline. MPO levels should be monitored every 3-6 months.

- **Assess HDL-C levels.**
  - If not at goal, consider niacin or omega-3 fatty acids.
  - Assess CoQ10 levels as recent evidence suggests that low ApoA1 and/or HDL-C levels are associated with low CoQ10 levels.

- **Assess, if known to be present, the treatment of inflammatory conditions such as Crohn's disease, rheumatoid arthritis (RA) and 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 5x increased risk for myocardial infarction.

- **Assess the presence of vasculitis.**
  - **NOTE:** MPO values may be elevated in individuals with vasculitis as it is characterized by increased vascular inflammation.

- **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.

- **Assess level of exercise.**
  - **NOTE:** MPO values may be elevated in marathon runners and extreme athletes and may identify those with increased oxidative stress and basal levels of inflammation.

References

7. Cavusoglu E et al. Usefulness of baseline plasma myeloperoxidase levels as an independent predictor of myocardial infarction at two years in patients presenting with acute coronary syndrome. Am J Cardiol. 2007; 99: 1364-1368.
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.