Overview

Useful For
Evaluation of increased risk for cardiovascular disease and events:
- Most appropriately measured in individuals at intermediate risk for cardiovascular disease
- Patients with early atherosclerosis or strong family history of early atherosclerosis without explanation by traditional risk factors should also be considered for testing
- Follow-up evaluation of patients with elevations in Lp(a) mass

Method Name
Electrophoresis, Enzyme Staining, and Densitometry

NY State Available
Yes

Specimen

Specimen Type
Serum

Specimen Required

Patient Preparation: Fasting (8 hours before collection) and abstain from alcohol for 24 hours before collection

Collection Container/Tube:
Preferred: Serum gel
Acceptable: Red top

Submission Container/Tube: Plastic vial

Specimen Volume: 1 mL

Forms
If not ordering electronically, complete, print, and send a Cardiovascular Test Request Form (T724) with the specimen.

Specimen Minimum Volume
0.35 mL

Reject Due To

<table>
<thead>
<tr>
<th>Condition</th>
<th>Acceptance</th>
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<tbody>
<tr>
<td>Hemolysis</td>
<td>Mild OK; Gross OK</td>
</tr>
<tr>
<td>Lipemia</td>
<td>Mild OK; Gross OK</td>
</tr>
<tr>
<td>Icterus</td>
<td>Mild OK; Gross OK</td>
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<tr>
<td>Other</td>
<td>NA</td>
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Specimen Stability Information

<table>
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<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
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<tbody>
<tr>
<td>Serum</td>
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<tr>
<td></td>
<td>Frozen</td>
<td>60 days</td>
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Clinical and Interpretive

Clinical Information

Lipoprotein (a) [Lp(a)] consists of an LDL particle that is covalently bound to an additional protein, apolipoprotein (a) [apo(a)]. Apo (a) has high-sequence homology with the coagulation factor plasminogen and, like LDL, Lp(a) contains apolipoprotein B100 (apoB). Thus, Lp(a) is both proatherogenic and prothrombotic. Lp(a) is an independent risk factor for coronary heart disease (CHD), ischemic stroke, and aortic valve stenosis. Lp(a) has been referred to as "the most atherogenic lipoprotein." The mechanism of increased risk is unclear but most likely involves progression of atherosclerotic stenosis via intimal deposition of cholesterol and promotion of thrombosis via homology to plasminogen.

Concentrations of Lp(a) particles in the blood can be expressed readily by 2 methods: as concentrations of Lp(a) protein or as Lp(a) cholesterol. Mayo's Cardiovascular Laboratory Medicine measures and reports Lp(a) cholesterol individually (LPAWS / Lipoprotein [a] Cholesterol, Serum) and as a part of the lipoprotein profile (LMPP / Lipoprotein Metabolism Profile). The cholesterol content of Lp(a) particles varies little, and Lp(a) can contain significant proportions of the serum cholesterol.

Lp(a) is a highly heterogeneous particle mainly because of the variable number of kringle repeats in the Apo(a) portion of the molecule. Kringles are specific structural domains containing 3 intra-strand disulfide bonds that are highly homologous to similar repeats found in plasminogen.

In the clinical laboratory, immunologic methods are generally used to quantify Lp(a) protein mass. Reagents for Lp(a) mass measurement are available from multiple manufacturers and although standardization efforts are underway, currently available methods are not standardized. Difficulties in standardizing Lp(a) mass measurement arise from the variability in signals produced by different reagents due to the size polymorphisms of apo(a). For this reason, some elevations of Lp(a) mass are associated with low levels of Lp(a) cholesterol. Lp(a) quantification can be done by densitometric measurement of Lp(a) cholesterol. This method measures only the cholesterol contained in the Lp(a) particles and is thus not influenced by the relative size of the apo(a) particle. Because Lp(a) cholesterol measurement is not influenced by apo(a) size, it may provide a more specific assessment of cardiovascular risk than Lp(a) mass measurement. Lp(a) cholesterol measurement may be used in concert with Lp(a) mass determination, or may be used as a stand-alone test for assessment of risk.

Reference Values

Lp(a) CHOLESTEROL

Normal: <5 mg/dL

Suggests increased risk of coronary artery disease: > or =5 mg/dL

LpX
Test Definition: LPAWS
Lp(a) Cholesterol, S

Undetectable

**Interpretation**

Patients with increased Lp(a) cholesterol values have been associated with increased risk for the development of atherothrombotic disease. Aggressive LDL reduction is the recommended treatment approach in most patients with increased Lp(a).

Lipoprotein-X (LpX) is an abnormal lipoprotein that appears in the sera of patients with obstructive jaundice, and is an indicator of cholestasis. The presence of LpX will be reported if noted during Lp(a) cholesterol analysis.

**Cautions**

Lp(a) cholesterol values should not be confused with Lp(a) mass values, although they may be correlated in some individual cases. Lp(a) cholesterol values will be approximately 10 times lower than Lp(a) mass values, but the difference between the measures is not uniform. Lp(a) mass values are considered elevated when greater than 30 mg/dL. Lp(a) cholesterol is increased if greater or equal to 5 mg/dL.

**Supportive Data**

Lp(a) cholesterol and Lp(a) mass were compared in 504 patients who underwent clinically indicated angiography. Although both were correlated to the angiographic coronary disease, Lp(a) cholesterol was the more strongly related disease. Lp(a) cholesterol, but not Lp(a) mass, was associated with cardiovascular outcomes in that study.(8)

**Clinical Reference**

4. Ridker PM, Hennekens CH, Stampfer MJ: A prospective study of lipoprotein(a) and the risk of myocardial infarction. JAMA 1993;270:2195-2199

**Performance**

**Method Description**

Electrophoretic separation of lipoproteins followed by lipid staining and densitometry measurement.
SPIFE Vis Cholesterol Reagent, Helena Laboratories, Beaumont, TX, 09/07/14

PDF Report
No

Day(s) and Time(s) Test Performed
Monday through Friday; 10 a.m.

Analytic Time
2 days (not reported on Saturday or Sunday)

Maximum Laboratory Time
4 days

Specimen Retention Time
7 days

Performing Laboratory Location
Rochester

Fees and Codes

Fees
- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their Regional Manager. For assistance, contact Customer Service.

Test Classification
This test has been modified from the manufacturer's instructions. Its performance characteristics were determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

CPT Code Information
83700

LOINC® Information

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<table>
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