Overview

Useful For
Monitoring therapy for diabetic ketoacidosis

Investigating the differential diagnosis of any patient presenting to the emergency room with hypoglycemia, acidosis, suspected alcohol ingestion, or an unexplained increase in the anion gap

In pediatric patients, the presence or absence of ketonemia/uria is an essential component in the differential diagnosis of inborn errors of metabolism

Serum beta-hydroxybutyrate is a key parameter monitored during controlled 24-hour fasts

Method Name
Photometric, B-Hydroxybutyrate Dehydrogenase (B-HBDH)

NY State Available
Yes

Specimen

Specimen Type
Serum

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

Submission Container/Tube: Plastic vial
Specimen Volume: 1 mL

Collection Instructions:
1. Serum gel tubes should be centrifuged within 2 hours of collection.
2. Red-top tubes should be centrifuged and aliquoted within 2 hours of collection.

Reject Due To
Gross hemolysis    Reject

Specimen Minimum Volume
0.25 mL

Specimen Stability Information

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum</td>
<td>Frozen (preferred)</td>
<td>7 days</td>
<td></td>
</tr>
</tbody>
</table>
Clinical & Interpretive

Clinical Information
Beta-hydroxybutyrate (BHB) is 1 of 3 sources of ketone bodies. Its relative proportion in the blood (78%) is greater than the other 2 ketone bodies, acetoacetate (20%) and acetone (2%). During carbohydrate deprivation (starvation, digestive disturbances, frequent vomiting), decreased carbohydrate utilization (diabetes mellitus), glycogen storage diseases, and alkalosis, acetoacetate production increases. The increase may exceed the metabolic capacity of the peripheral tissues. As acetoacetate accumulates in the blood, a small amount is converted to acetone by spontaneous decarboxylation. The remaining and greater portion of acetoacetate is converted to BHB.

Reference Values
<0.4 mmol/L

Interpretation
The beta-hydroxybutyrate (BHB)/acetoacetate ratio is typically between 3:1 and 7:1 in severe ketotic states.

Serum BHB increases in response to fasting, but should not exceed 0.4 mmol/L following an overnight fast (up to 12 hours).

In pediatric patients, a hypo- or hyper-ketotic state (with or without hypoglycemia) may suggest specific groups of metabolic disorders.

Cautions
Twenty four-hour fasting tests should not be performed in patients <2 years of age.

Dipstick serum ketone determination using nitroprusside reagent is often used to estimate ketone body status, but that method has inherent problems. The dipstick does not measure beta-hydroxybutyrate, the most abundant of the physiological ketone bodies; the nitroprusside reagent only reacts with acetoacetate and acetone.

Clinical Reference

Performance

Method Description
D-3-hydroxybutyrate in the presence of NAD is converted to acetoacetate and NADH at pH 8.5 by D-3-hydroxybutyrate dehydrogenase. At this pH the reaction is favored to the right. The NADH is converted to a colored compound using INT
Test Definition: BHYD
Beta-Hydroxybutyrate, S

and Diaphorase. (Package insert: Stanbio Beta-hydroxybutyrate LiquiColor Procedure No. 2440; DN: RBR.2440.00, 4/16/2002)

PDF Report
No

Specimen Retention Time
1 week

Performing Laboratory Location
Rochester

Fees & Codes

Test Classification
This test has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information
82010

LOINC® Information

<table>
<thead>
<tr>
<th>Test ID</th>
<th>Test Order Name</th>
<th>Order LOINC Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BHYD</td>
<td>Beta-Hydroxybutyrate, S</td>
<td>6873-4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Result ID</th>
<th>Reporting Name</th>
<th>LOINC®</th>
</tr>
</thead>
<tbody>
<tr>
<td>BHYD</td>
<td>Beta-Hydroxybutyrate, S</td>
<td>6873-4</td>
</tr>
</tbody>
</table>