Beta-Hydroxybutyric Acid in Plasma (Enzymatic Quantitation)

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CLINICAL APPLICATION

Beta-Hydroxybutyric Acid (BHB) is useful for monitoring therapy of diabetic ketoacidosis and 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-hydroxybutyric acid is a key parameter monitored during controlled 24-hour fasts.

CLINICAL BACKGROUND

Ketones or ketone bodies are by-products of fat embolism. They are produced when glucose is not available to the body’s cells as an energy source. When fatty acids are metabolized, ketones build up in the blood, causing first ketosis, and then progressing to ketoacidosis, a form of metabolic acidosis. This condition is most frequently seen with uncontrolled type 1 diabetes and can be a medical emergency.

There are three ketone bodies – acetoacetate, acetone, and beta-hydroxybutyric acid (also, known as beta-hydroxybutyrate). Different ketone tests measure one or more ketone bodies and their results are not interchangeable.

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.

Ketone determination using nitroprusside reagent is often used to estimate ketone body status, but that method does not measure beta-hydroxybutyric acid, the most abundant of the physiological ketone bodies; the nitroprusside reagent only reacts with acetoacetate and acetone.

CLINICAL MANAGEMENT

In diabetics, the measurement of BHB as well as the blood glucose is needed for the assessment of the severity of diabetic coma and is essential for the exclusion of hyperosmolar non-ketotic diabetic coma. Moreover, the insulin requirements are often based on the extent of the existing hyperketonemia shown by the blood levels of B-hydroxybutyrylate is therefore extremely important in the assessment of ketosis.

BHB levels can also be used in monitoring ketogenic diets, monitoring hypoglycemia and in diagnosing insulinoma.

Quick Facts

- More frequently used to test for the presence of ketones due to its quantitative and sensitive methodology.
- BHB is the predominant ketone present in severe diabetic ketoacidosis (DKA).
- During diabetic ketoacidosis, BHB’s relative proportion in the blood (78%) is greater than acetoacetate (20%) and acetone (2%).
- Normal BHB levels are less than 3.0 mg/dL and are typically greater than 20.8 mg/dL in patients with ketoacidosis.

ORDER CODE: BHOB

Beta-Hydroxybutyric Acid in Plasma, TCL_BHAP_0003

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Beta-Hydroxybutyric Acid in Plasma (Enzymatic Quantitation)

**TEST INFORMATION**

| CONTAINER TYPE | Green top tube |
| SPECIMEN TYPE  | Plasma         |
| PREFERRED VOLUME | 1 mL           |
| MINIMUM VOLUME  | 0.25 mL        |

**SPECIMEN PROCESSING**
Separate plasma from the cells and place in a separate plastic tube. Store and transport refrigerated.

**STABILITY**
- Room Temp: 2 hours
- Refrigerated: 1 week
- Frozen (-20 °C): 1 month

**ALTERNATE SPECIMENS**
- Serum

**DEPARTMENT**
- PSHMC Chemistry

**CPT CODES**
- 82010

**BILLING CODE**
- BHOB

**TEST SCHEDULE**
- Mon - Sun

**TURNAROUND TIME**
- 1-3 days

**METHOD**
- Enzymatic

**TEST INCLUDES**
- Beta-Hydroxybutyric Acid, mg/dL

**REFERENCE RANGES**
- Beta-Hydroxybutyric Acid: 0.0-3.0 mg/dL

**SELECTED REFERENCES**


For more information, please contact your local sales representative.