Ketones

Interpretive Summary

**Description:** Ketonuria is primarily an indicator of diabetic ketoacidosis.

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### Decreased Ketones

**Common Causes**

- Normal
- False negative
  - Aged urine sample
  - Improper storage of reagent strip (exposed to moisture, heat, or light)

### Elevated Ketones

**Common Causes**

- Diabetic ketoacidosis
- Prolonged fasting or starvation

**Uncommon Causes**

- Low carbohydrate diet
- Strenuous exercise, e.g. endurance racing
- Exposure to severely cold environment
- Lactation (in dogs)
- Genetic diseases
  - Mitochondrial myopathy
  - Glycogen storage disease
- Persistent fever
- False positive
  - Highly pigmented urine
  - Urine containing
    - Phthalein dyes
    - Compounds with sulfhydryl groups (captopril, valproic acid, d-penicillamine, tiopronin, cystine)
    - Aspirin
    - Levodopa

### Related Findings

- Diabetic ketoacidosis
  - Increased glucose, TCO2, ALP, ALT, BUN, creatinine, cholesterol, anion gap
  - Decreased sodium, phosphorus, potassium (can also be normal or increased)
  - Increased fructosamine
  - Glucosuria and ketonuria, variable bacteruria and pyuria
  - Increased Spec fPL® or Spec cPL® if concurrent pancreatitis
Additional Information

Physiology

- Ketones, such as beta-hydroxybutyrate, acetoacetate, and acetone, are produced by lipolysis and are filtered by the glomeruli.
- Normally, ketones are completely resorbed by the proximal tubules.
- Ketonuria is present before ketonemia can be detected.
- The severity of ketoacidosis cannot be correlated with the degree of ketonuria.

Diagnostic Methodology

- Nitroprusside reaction
  - Detects acetoacetate (primarily) and acetone (to a lesser degree)
  - Does not detect beta hydroxybutyrate (the major intermediate in ketosis)

References


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