USEFUL FOR

- Diagnosis of the cause of an acidosis
- Diagnosis and treatment of kidney stones

CLINICAL INFORMATION

The kidney regulates acid excretion and systemic acid base balance. Changing the amount of ammonium in the urine is one important way the kidneys accomplish this task. Thus measuring the urine ammonium level can provide understanding of the cause of an acid base disturbance in individual patients.1-3

The urine ammonium level can also provide a lot of information about the daily acid production in a given patient. Since most of an individual’s acid load comes from ingested protein, the urine ammonium is a good indicator of dietary protein intake.

Urine ammonium measurements can be particularly helpful for the diagnosis and treatment of kidney stone patients:

- High urine ammonium and low urinary pH suggests ongoing gastrointestinal losses. Such patients are at risk of uric acid and calcium oxalate stones.
- Low urine ammonium and high urine pH suggests renal tubular acidosis. Such patients are at risk of calcium phosphate stones.
- Patients with calcium oxalate and calcium phosphate stones are often treated with citrate to raise the urine citrate (a natural inhibitor of calcium oxalate and calcium phosphate crystal growth). However, since citrate is metabolized to bicarbonate (a base) this drug can also increase the urine pH. If the urine pH gets too high with citrate treatment, one may unintentionally increase the risk of calcium phosphate stones. Monitoring the urine ammonium is one way to titrate the citrate dose and avoid this problem. A good starting citrate dose is about one-half of the urine ammonium excretion (in mEq of each). One can monitor the effect of this dose on urine ammonium, citrate, and pH values, and adjust the citrate dose based upon the response. A fall in urine ammonium should indicate whether the current citrate is enough to partially (but not completely) counteract the daily acid load of that given patient.4

REFERENCE VALUES

Random: 3–65 mmol/L

No reference values established for <18 years and >77 years of age.

ANALYTIC TIME

Same day
SPECIMEN REQUIRED

Specimen Type
Urine

Container/Tube
Plastic, 5-mL tube (Supply T465)

Specimen Volume
4mL

INTERPRETATION

If a patient has an acidosis, and the amount of ammonium in the urine is low, this suggests a renal tubular acidosis. If the amount of ammonium is high, this suggests that the kidneys are working normally and that there are other losses of bicarbonate in the body. Typically this implies gastrointestinal losses.

CLINICAL REFERENCE