TEST

Fractional excretion of sodium

This test estimates the percentage of filtered sodium that your kidneys pass into urine.

WHAT IT MEASURES
Percentage of filtered sodium that leaves in urine

SAMPLE
Blood and spot urine collected around the same time

FASTING NEEDED?
No

HOW LONG IT TAKES
About 10 minutes for both samples

RESULTS IN
Often same day; turnaround differs by laboratory

USED FOR
Evaluating the cause of acute kidney injury

MAIN LIMITATION
Diuretics can raise the result and mislead interpretation

Overview

Fractional excretion of sodium, usually shortened to FENa , is a calculated test used when kidney function has changed suddenly. This sudden change is called acute kidney injury , or AKI.

Your kidneys filter blood and then return most filtered sodium to the bloodstream. FENa estimates the percentage of filtered sodium that remains in urine rather than being taken back into the body.

The calculation uses four measurements:

Creatinine is a waste product used to assess kidney filtration. The blood and urine samples should be collected at about the same time.

FENa does not measure kidney function by itself. It provides one clue about why kidney function has changed and must be interpreted with your symptoms, medical history, medicines, fluid balance, and other test results.

- Sodium in your blood

- Creatinine in your blood
- Sodium in your urine
- Creatinine in your urine

Why the test is ordered

FENa is most often ordered to help investigate AKI. It may help show whether the kidneys are holding on to sodium or allowing more sodium to pass into urine.

A low result can occur when less blood is reaching the kidneys, such as during dehydration, blood loss, or reduced circulation. In these situations, the kidneys often conserve sodium.

A higher result can occur when the kidney tubules are injured and cannot take sodium back into the bloodstream normally. Tubules are tiny structures that adjust the contents of urine after blood has been filtered.

These patterns are not absolute. Several conditions and medicines can produce results that do not follow them.

Who should have the test

FENa may be useful if blood tests show a recent rise in creatinine, urine output has fallen, or there is another reason to investigate possible AKI.

It is usually performed in a hospital or urgent assessment setting. It is not a routine screening test for people without evidence of a recent kidney problem.

The test may be less helpful if you have chronic kidney disease, recently received intravenous fluids, take a diuretic, or have a condition that affects how your kidneys handle sodium. A diuretic is a medicine that increases urine and sodium output and is sometimes called a water pill like furosemide or hydrochlorothiazide .

How to prepare

Fasting is not normally required. However, you may receive different instructions if other blood tests are being collected at the same time.

Drink your usual amount unless you have been given fluid restrictions or specific instructions. Drinking a large amount just before the test, or deliberately avoiding fluids, may make the

result harder to interpret.

Tell the healthcare team about all medicines and supplements you take. In particular, report diuretics and when you last took them. Do not stop a prescribed medicine unless the healthcare professional responsible for your care tells you to do so.

If practical, avoid unusually strenuous exercise immediately beforehand. Prolonged exercise can alter hydration and temporarily affect kidney-related measurements.

What happens during the test

A blood sample is taken from a vein, usually in your arm. You will also provide a small urine sample. If you already have a urinary catheter, urine may be collected from its sampling port by trained staff.

A fresh, one-time urine sample is usually enough. A 24-hour urine collection is generally not needed.

The urine and blood should be collected close together because blood sodium and creatinine levels can change over time, especially during acute illness or treatment with fluids.

The laboratory measures sodium and creatinine in both samples. FENa is then calculated as:

FENa (%) = (urine sodium × blood creatinine) ÷ (blood sodium × urine creatinine) × 100

Understanding your results

FENa is reported as a percentage. It represents the estimated proportion of filtered sodium that leaves the body in urine.

In a person with AKI, a result below about 1% may suggest that the kidneys are conserving sodium because blood flow to them is reduced. A result above about 2% may support injury to the kidney tubules. Results between these values are often less clear.

These are commonly used interpretation points, not universal reference ranges. Results and their meaning vary by laboratory, age, sex, pregnancy status, kidney function, medicines, recent treatment, and clinical context.

A low result does not prove that the kidney tissue is normal. A high result does not prove that the kidney tubules are damaged. Your creatinine trend, urine output, blood pressure, fluid balance, urine microscopy, and sometimes imaging may provide more useful information.

What affects the results

FENa is especially sensitive to factors that change how the kidneys handle sodium.

Diuretics are the most important limitation. Loop and thiazide diuretics increase sodium loss in urine. They can produce a higher FENa even when reduced blood flow or dehydration is contributing to the kidney problem.

Other influences include:

The test must therefore be interpreted according to what was happening when the samples were collected, including recent medicines, fluids, illness, and changes in urine output.

- Intravenous saline: Sodium-containing fluids can increase urine sodium, particularly if given before sample collection
- Chronic kidney disease: Damaged kidneys may not conserve sodium normally, making standard cutoffs less reliable
- Timing: Blood and urine collected far apart may not reflect the same stage of illness or treatment
- Urinary obstruction: FENa can be low, high, or change over time
- Sepsis: Severe infection can alter kidney blood flow and tubular function in complex ways
- Certain kidney diseases: Glomerulonephritis and some forms of early tubular injury can produce a low result despite kidney tissue injury
- Contrast or pigment-related injury: FENa may remain low in some cases, even when the kidneys have been directly affected
- Hydration and sodium intake: Dehydration, excess fluids, or major changes in salt intake can alter sodium handling
- Age and pregnancy: Kidney filtration and sodium handling differ in newborns, older adults, and during pregnancy

Accuracy and limitations

FENa can be useful when the clinical situation is straightforward, especially in someone with a sudden reduction in urine output who has not taken diuretics and does not have chronic kidney disease.

In broader hospital populations, it is less reliable. It can miss kidney tissue injury when FENa remains low. It can also suggest tissue injury when the real reason for a high result is a diuretic, intravenous fluids, or reduced baseline kidney function.

The fractional excretion of urea , or FEUrea, is sometimes considered when diuretics may have altered FENa. Urea is another waste product. However, FEUrea also has important limitations and is not consistently more accurate.

Urine microscopy may be a better next test when direct evidence of tubular injury, inflammation, crystals, or blood cells is needed. Ultrasound may be more appropriate when a blockage is possible. No fractional excretion calculation should be used alone to determine the cause of AKI.

Risks and complications

A blood draw may cause brief discomfort, a small bruise, or light-headedness. Providing a urine sample has no direct physical risk, although collection may feel inconvenient or affect privacy.

What happens next

Your result will usually be reviewed with repeat creatinine measurements, urine output, blood pressure, fluid balance, medicines, and the reason you became unwell.

Routine follow-up may include repeat blood tests, a urine test, medicine review, or monitoring after fluids or another treatment. An unclear FENa result does not necessarily mean that something serious has been found; it often means other information is needed.

Seek urgent medical assessment if you develop a major reduction in urine, worsening swelling, repeated vomiting, or increasing weakness while waiting for follow-up. Call emergency services for severe trouble breathing, chest pain, fainting, new confusion, or an inability to wake normally.

Common questions

Can I drink coffee before the test?

Usually, yes. FENa does not require fasting, but another test collected at the same time might. Drink your usual amount rather than using coffee to replace all fluids.

Does the time of day matter?

Usually not. It is more important that the blood and urine samples are collected close together and before major changes in treatment when possible.

Can I exercise beforehand?

Normal activity is generally acceptable. Avoid unusually long or strenuous exercise immediately beforehand because it can change hydration and temporarily affect kidney measurements.

Should I stop my water pill?

Do not stop it on your own. Tell the healthcare team which diuretic you take, the dose, and when you last took it because this information is central to interpreting FENa.

Why do I need both blood and urine samples?

The calculation compares sodium with creatinine in both blood and urine. A urine sodium level by itself cannot show the fraction of filtered sodium being excreted.

Will I need a 24-hour urine collection?

Usually not. FENa is generally calculated from a fresh spot urine sample collected around the same time as the blood sample.

Sources

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