CONDITION

Poststreptococcal glomerulonephritis (GN)

Poststreptococcal glomerulonephritis is kidney inflammation that can develop after a group A streptococcal throat or skin infection.

WHAT IT IS
Kidney-filter inflammation after a group A strep infection

BODY SYSTEM
Kidneys and urinary system

MAIN SYMPTOMS
Dark urine, facial swelling, less urine, high blood pressure

WHAT CAUSES IT
Immune reaction following bacterial infection

HOW IT IS DIAGNOSED
Urine and blood tests showing nephritis and recent strep

MAIN TREATMENT
Supportive kidney care and blood pressure control

CAN IT BE CURED?
Sometimes - most children recover completely

IS IT AN EMERGENCY?
Sometimes - breathing trouble, confusion, or very little urine

LONG-TERM OUTLOOK
Most children recover; adults have greater lasting kidney risk

Overview

Poststreptococcal glomerulonephritis, often shortened to PSGN, is inflammation of the kidney's filtering units after an infection with group A Streptococcus bacteria. These bacteria can cause strep throat and certain skin infections, such as impetigo.

The filtering units, called glomeruli, remove waste and extra water from the blood. When they become inflamed, blood and protein can leak into the urine. The kidneys may also have trouble removing salt and water. This can cause swelling, high blood pressure, and reduced urine production.

PSGN usually begins after the original infection has improved. It is more common in children, but adults can also develop it. Most children recover fully with monitoring and supportive care. Recovery may be slower in adults, who have a greater risk of lasting kidney problems.

Symptoms

Symptoms often begin about 1 to 3 weeks after a strep throat or skin infection. The earlier infection may have been mild or may not have been formally diagnosed.

Possible symptoms include:

Dark urine comes from red blood cells leaking through the inflamed kidney filters. The colour may be noticeable even when there is no pain during urination.

Some people have a mild form found only through urine or blood tests. Others develop more obvious swelling or a significant reduction in kidney function. Symptoms alone cannot confirm PSGN because other kidney conditions can cause a similar pattern.

- Reddish-brown, tea-coloured, or cola-coloured urine
- Puffiness around the eyes, especially in the morning
- Swelling of the feet, ankles, legs, or abdomen
- Passing less urine than usual
- High blood pressure
- Tiredness, nausea, or reduced appetite
- Headache, sometimes related to high blood pressure

Causes and risk factors

PSGN is caused by the immune system's response to certain strains of group A Streptococcus . It is not usually caused by bacteria directly infecting the kidneys.

While responding to the infection, the immune system produces proteins and other substances that can collect in the kidney filters. This activates inflammation and temporarily interferes with filtration.

The condition can follow:

Only a small proportion of people with strep infections develop PSGN. The reasons one person develops it while another does not are not fully understood.

School-aged children are affected most often. Adults can develop the condition at any age. Older adults and people who already have kidney, heart, or metabolic health problems may be more likely to have a complicated course.

PSGN itself is not contagious. However, the group A strep infection that comes before it can

spread through respiratory droplets or direct contact with infected skin.

- Strep throat or tonsillitis
- Impetigo or another group A strep skin infection
- Less commonly, another group A strep infection

Diagnosis

Diagnosis is based on the pattern of symptoms, urine and blood test results, and evidence of a recent group A strep infection. There is no single routine test that proves every case.

A urine test may show:

Casts are tiny tube-shaped collections that form inside the kidney's filtering and drainage structures. Red blood cell casts strongly suggest that bleeding is coming from the kidneys rather than the bladder or urethra.

Blood tests measure creatinine and urea, which rise when kidney filtration is reduced. Electrolytes such as potassium may also be checked. A complement blood test often shows a low level of C3, an immune-system protein. C3 generally returns toward normal as the inflammation settles.

Evidence of a recent strep infection may come from a throat or skin culture or from antibodies in the blood. Common antibody tests include antistreptolysin O, called ASO, and anti-DNase B. A culture may already be negative because PSGN develops after a delay.

A kidney ultrasound may be used to examine kidney size or exclude another cause of reduced urine flow, but it does not confirm PSGN.

A kidney biopsy is not needed in a typical case. It may be considered if kidney failure is severe, complement levels remain low, the diagnosis is uncertain, or the test results and recovery pattern are unusual. A biopsy removes a very small kidney sample for examination under a microscope.

- Red blood cells and sometimes red blood cell casts
- Protein leaking into the urine
- Other signs of kidney inflammation

Treatment and management

Treatment mainly supports the body while the kidney inflammation improves. The level of care

depends on kidney function, swelling, blood pressure, urine production, and blood electrolyte levels.

Some people can be monitored at home with close follow-up. Hospital care may be needed for significant swelling, very high blood pressure, breathing problems, electrolyte changes, or rapidly worsening kidney function.

Management may include:

Antibiotics help prevent remaining strep bacteria from spreading to other people. They do not directly reverse kidney inflammation once PSGN has developed. Evidence is insufficient to show that treating the original infection always prevents PSGN.

Dialysis filters the blood when the kidneys cannot do enough temporarily. It is needed only in a minority of cases and does not necessarily mean dialysis will be permanent.

Steroids or other immune-suppressing medicines are not routine treatments for typical PSGN. A kidney specialist may consider them in unusual, rapidly progressive cases, often after a biopsy.

Follow-up usually includes blood pressure checks and repeat urine and blood tests. Ask before taking non-steroidal anti-inflammatory drugs, such as ibuprofen or naproxen, because these medicines can place extra strain on kidneys that are not filtering normally.

- Limiting salt to reduce fluid retention
- Temporarily limiting fluids when swelling or low urine output is significant
- Medicines that help the kidneys remove extra salt and water
- Medicines to control high blood pressure
- Antibiotics like amoxicillin or doxycycline to clear any remaining group A strep bacteria
- Dialysis for severe kidney failure or uncontrolled fluid and electrolyte problems

Complications

Most children recover without major complications, but the condition can sometimes become serious.

Possible early complications include:

A small number of people develop rapidly progressive glomerulonephritis, in which kidney function worsens quickly because of severe inflammation.

Longer-term concerns include ongoing protein or blood in the urine, persistent high blood pressure, or chronic kidney disease. These outcomes are more common in adults than in

children and are more likely after a severe initial illness.

- Acute kidney injury, meaning a sudden fall in kidney function
- Fluid in the lungs, which can cause breathing difficulty
- Dangerous increases in blood pressure
- High potassium or other electrolyte changes
- Confusion or seizures caused by severe high blood pressure
- A temporary need for dialysis

Prevention

PSGN cannot always be prevented. Even prompt treatment of a strep infection has not been proven to prevent every case.

Reducing the spread of group A strep may lower the chance of infections that can lead to PSGN. Helpful measures include washing hands, covering coughs and sneezes, avoiding shared eating utensils, and keeping infected skin clean and covered.

Strep throat and infected skin should be assessed when symptoms suggest a bacterial infection. If antibiotics are prescribed, take them as directed. This treats the infection and reduces spread, even though it does not guarantee that PSGN will be prevented.

PSGN is not an inherited condition, and there is no screening test recommended for healthy relatives.

Living with it and what to expect

Swelling, reduced urine production, and high blood pressure often improve as the kidneys begin removing salt and water again. This may happen over days to weeks, but the timing is not the same for everyone.

Visible blood in the urine usually clears before all laboratory changes resolve. Small amounts of blood or protein may remain detectable on urine tests for months. This does not always mean that permanent kidney damage has occurred, but it should be followed until the pattern is clearly improving.

Children usually have an excellent outlook and commonly regain normal kidney function. Adults can also recover fully, but recovery may take longer. Adults have a higher chance of persistent high blood pressure, protein in the urine, or reduced kidney function, especially after

a severe episode or when other health conditions are present.

Normal activities can usually be resumed gradually as swelling, blood pressure, and kidney function improve. Temporary limits may be advised during the acute illness, particularly if strenuous activity worsens tiredness or if blood pressure remains high.

Routine follow-up may continue for months. It often includes blood pressure measurements, urine tests for blood and protein, and blood tests for kidney function. Persistent abnormalities may lead to longer follow-up with a kidney specialist.

A second episode is uncommon, but a previous episode does not provide reliable protection from future group A strep infections.

When to get medical help

Seek urgent medical assessment if dark urine, facial or leg swelling, or clearly reduced urine production develops after a recent sore throat or skin infection. These symptoms have several possible causes and need testing rather than self-diagnosis.

Get same-day medical advice if someone already being monitored for PSGN has increasing swelling, repeated vomiting, worsening headache, much less urine, or difficulty taking prescribed medicines and fluids.

Seek emergency help for:

Routine follow-up remains important even when the urine looks normal and swelling has disappeared. Blood pressure, microscopic blood or protein in the urine, and kidney function can take longer to return to normal.

- Severe or rapidly worsening breathing difficulty
- Confusion, unusual drowsiness, fainting, or a seizure
- Severe headache with vision changes or repeated vomiting
- Chest pain or blue, grey, or very pale skin
- Almost no urine together with worsening swelling or illness

Common questions

Is poststreptococcal glomerulonephritis the same as a kidney infection?

No. A kidney infection usually means bacteria are growing in the kidney tissue or urinary tract. PSGN is inflammation caused by the immune response after a group A strep infection

elsewhere in the body.

Does cola-coloured urine always mean PSGN?

No. Blood in the urine has several possible causes, including other forms of glomerulonephritis, urinary stones, infections, and urinary tract conditions. Cola-coloured urine with swelling or reduced urine production needs prompt medical assessment.

Will the kidneys return to normal?

Most children recover normal kidney function. Adults also often recover, but they have a greater risk of ongoing high blood pressure, urine abnormalities, or chronic kidney disease. Follow-up tests show whether recovery is continuing.

Can I catch PSGN from someone else?

PSGN itself does not spread between people. The group A strep throat or skin infection that comes before it can be contagious. Appropriate antibiotic treatment and hygiene help limit bacterial spread.

Why are antibiotics used if the throat or skin infection is already better?

Group A strep bacteria may still be present even after symptoms improve. Antibiotics help remove the bacteria and reduce transmission. They do not directly treat the kidney inflammation that has already started.

How long can blood stay in the urine?

Visible blood often clears relatively early, but microscopic blood found on testing can last for months. Persistent or worsening blood, protein, high blood pressure, or reduced kidney function requires continued assessment.

Sources

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