CONDITION

Membranoproliferative glomerulonephritis

Membranoproliferative glomerulonephritis is a pattern of kidney-filter inflammation caused by immune deposits or abnormal complement activity.

WHAT IT IS
Inflammatory damage to the kidneys' filtering units

BODY SYSTEM
Kidneys and urinary system

MAIN SYMPTOMS
Foamy urine, blood in urine, swelling, high blood pressure

WHAT CAUSES IT
Immune deposits, infection, complement problems, or unknown causes

HOW IT IS DIAGNOSED
Kidney biopsy, supported by urine and blood tests

MAIN TREATMENT
Kidney protection and treatment of the underlying cause

CAN IT BE CURED?
Sometimes - removing the cause may stop inflammation

IS IT AN EMERGENCY?
Sometimes - severe breathlessness or very low urine output

LONG-TERM OUTLOOK
Some remain stable; others develop chronic kidney disease

Overview

Membranoproliferative glomerulonephritis, often shortened to MPGN, is a pattern of injury in the kidneys' tiny filtering units. These filters are called glomeruli. They remove waste and extra water from the blood while keeping blood cells and useful proteins in the body.

In MPGN, inflammation changes the walls and supporting tissues of these filters. Protein and blood can then leak into the urine. The kidneys may also become less able to control fluid, blood pressure, and waste levels.

MPGN is not a single disease with one cause. It is a biopsy pattern that can result from several conditions. Modern classification usually groups it by what is driving the inflammation:

Complement normally helps defend against infection. When it remains active in the wrong

place, it can injure kidney tissue. Some complement-mediated cases are classified as C3 glomerulopathy , which includes C3 glomerulonephritis and dense deposit disease.

Finding the underlying cause matters because it guides treatment and helps estimate the chance of future kidney problems.

- Immune complex-mediated MPGN: clusters of antibodies and other immune proteins collect in the kidneys.
- Complement-mediated MPGN: part of the immune system called complement becomes overactive or poorly controlled.

Symptoms

MPGN may develop gradually and cause few symptoms at first. It is sometimes found after a urine test or blood pressure check.

Possible symptoms include:

Blood in the urine may be visible, but it is often present only in amounts found by laboratory testing.

Heavy protein loss can cause nephrotic syndrome . This means there is a large amount of protein in the urine, low protein in the blood, and swelling. MPGN can also cause nephritic syndrome , which involves blood in the urine, high blood pressure, inflammation, and reduced kidney function. Some people have features of both.

These symptoms can occur with many kidney and urinary conditions. Tests are needed to find the cause.

- Foamy or frothy urine from protein leakage
- Pink, red, brown, or tea-coloured urine from blood
- Swelling around the eyes, ankles, legs, or abdomen
- Weight gain caused by retained fluid
- Passing less urine than usual
- Tiredness, nausea, or reduced appetite
- Headaches linked with high blood pressure

Causes and risk factors

In immune complex-mediated MPGN, immune proteins form deposits in the kidney filters. This may be associated with:

Complement-mediated MPGN results from uncontrolled activity in the complement system. This may be caused by an acquired antibody that disrupts complement control. Less often, an inherited change in a complement-related gene contributes to the condition.

A family history of complement-related kidney disease may increase risk, but most MPGN is not passed directly from parent to child. Even when a gene change is present, it may not be the only factor involved.

Sometimes testing does not identify a cause. This may be described as idiopathic MPGN. Doctors may repeat parts of the investigation over time because an infection, immune condition, or abnormal blood protein can occasionally become clear later.

- Long-lasting infections, including hepatitis B or hepatitis C
- Infection of a heart valve, called infective endocarditis
- Autoimmune conditions such as systemic lupus erythematosus
- Cryoglobulins, which are abnormal immune proteins that may clump in the cold
- Abnormal antibody-producing blood cells, sometimes called a monoclonal gammopathy
- Certain cancers or disorders affecting blood and immune cells

Diagnosis

Urine and blood tests can suggest glomerular inflammation, but a kidney biopsy usually confirms the MPGN pattern.

During a kidney biopsy, a clinician uses a needle to remove a very small piece of kidney tissue, usually with ultrasound guidance. Specialists examine the sample with several types of microscopy. They look at the structure of the filters and identify deposits of antibodies, complement proteins, or other material.

Other tests help measure the effects on your kidneys and look for a cause. These may include:

Imaging may check kidney size and rule out blockage, but a scan alone cannot confirm MPGN.

Genetic testing may be considered when results suggest abnormal complement control, particularly in C3 glomerulopathy. It does not find an explanation in every case.

- Urine testing for blood and protein
- A urine protein-to-creatinine or albumin-to-creatinine ratio

- Blood creatinine and estimated glomerular filtration rate, or eGFR
- Blood albumin, blood counts, and complement levels
- Tests for hepatitis and other suspected infections
- Autoimmune blood tests
- Tests for cryoglobulins or abnormal antibody proteins

Treatment and management

Treatment is based on the cause, the amount of protein in the urine, biopsy findings, and how well the kidneys are working. Some people need treatment aimed mainly at protecting kidney function. Others need treatment for active immune inflammation or an underlying condition.

Measures used to protect the kidneys may include:

A dietitian may help if you have severe swelling, reduced kidney function, or questions about protein, salt, potassium, or fluid. Restricting these without individual advice can be unnecessary and may make it harder to eat well.

Cause-specific treatment may include antiviral or antibiotic treatment for an infection. Autoimmune conditions may require medicines that reduce immune activity. If abnormal antibody-producing cells are responsible, care may involve a blood specialist and treatment directed at those cells.

Corticosteroids or other immunosuppressive medicines may be considered when there is active inflammation and a reasonable chance that treatment will preserve kidney function. These medicines have important risks, including infection, and are not suitable for every form of MPGN.

Specialist complement-targeting treatment may be available for some people with C3 glomerulopathy. Eligibility and access are influenced by the exact diagnosis and local approval.

If kidney function becomes severely reduced, dialysis can remove waste and extra fluid. Kidney transplantation may be an option for long-term kidney failure. MPGN can return in a transplanted kidney, but this risk differs by cause.

- Medicines that lower blood pressure and reduce protein leakage
- Diuretics like furosemide or hydrochlorothiazide , sometimes called water tablets, for fluid-related swelling
- A lower-salt eating plan to help control swelling and blood pressure

- Treatment of high cholesterol or other cardiovascular risks
- Avoiding tobacco and maintaining activity suited to your health

Complications

MPGN may cause a sudden decline in kidney function, called acute kidney injury. It can also lead to chronic kidney disease, in which kidney function remains reduced for at least several months.

Other possible complications include:

Complications are not inevitable. Risk is influenced by the underlying cause, biopsy findings, response to treatment, amount of urine protein, and kidney function at diagnosis.

- Persistent high blood pressure
- Ongoing protein loss and swelling
- Nephrotic syndrome
- Increased risk of infection or blood clots with severe nephrotic syndrome
- Anaemia and mineral or bone problems in advanced kidney disease
- Kidney failure requiring dialysis or transplantation
- Recurrence after kidney transplantation

Prevention

MPGN often cannot be prevented. Inherited complement abnormalities cannot currently be avoided, and some people develop the condition without a known cause.

Preventing or promptly treating certain infections may reduce one possible trigger, but it does not prevent every case. If you have hepatitis, an autoimmune condition, or an abnormal blood protein, keeping up with planned care may help identify kidney changes earlier.

After diagnosis, the focus is usually on limiting further damage. Taking prescribed blood pressure treatment, avoiding smoking, and attending urine and blood monitoring can reduce risks linked with chronic kidney disease.

Some pain medicines, particularly non-steroidal anti-inflammatory drugs such as ibuprofen, can worsen kidney function in certain situations. Ask a pharmacist or clinician whether over-the-counter medicines are suitable for you.

Living with it and what to expect

The course of MPGN is different from person to person. Kidney inflammation may improve when a treatable infection or immune trigger is controlled. Some people continue to have blood or protein in their urine but maintain useful kidney function for years. Others develop a gradual decline despite treatment.

Changes are usually followed with blood pressure readings, urine protein measurements, creatinine, and eGFR. Complement tests or other cause-specific blood tests may also be repeated. More frequent monitoring is often needed after diagnosis, during treatment changes, or if kidney function is unstable.

Swelling may improve over days or weeks with fluid management, while protein leakage can take longer to settle. Scarring already present in the kidneys may not reverse, even when the active inflammation is controlled.

Day-to-day life may include taking medicines, limiting salt, and arranging blood and urine tests. Many people continue work, education, exercise, and family activities, although fatigue or appointments may require adjustments. Advanced kidney disease can place greater limits on energy and diet.

Keep a current list of medicines and tell healthcare professionals that you have a glomerular kidney condition. Discuss pregnancy planning in advance because kidney function, blood pressure, protein loss, and some treatments can affect pregnancy care.

When to get medical help

Arrange routine follow-up as recommended for blood pressure, kidney function, and urine protein. Contact your healthcare team sooner if swelling, foamy urine, visible blood in the urine, fatigue, or blood pressure readings are becoming worse.

Seek urgent medical assessment if you:

Call emergency services for severe breathlessness, chest pain, fainting, a seizure, new confusion, or difficulty waking. These can indicate serious fluid overload, a severe blood pressure problem, or another urgent condition.

- Pass much less urine than usual
- Develop rapidly increasing swelling
- Have repeated vomiting and cannot keep fluids down

- Develop fever while taking immune-suppressing treatment
- Have a severe headache, blurred vision, or very high blood pressure

Common questions

Is membranoproliferative glomerulonephritis a type of cancer?

No. MPGN is a pattern of kidney inflammation. In some people, it is triggered by abnormal blood cells or a cancer affecting antibody-producing cells, but MPGN itself is not cancer.

Can MPGN go away completely?

Sometimes. Kidney inflammation may settle when an infection or another removable cause is treated. Other forms are long-lasting or return after treatment. Existing kidney scarring may remain even when inflammation improves.

Will I need dialysis?

Not everyone with MPGN needs dialysis. The chance is higher when kidney function is already severely reduced, protein loss remains heavy, or biopsy findings show extensive scarring. Your results over time are more informative than a single test.

Is MPGN inherited?

Most cases are not inherited in a simple way. Some complement-mediated cases involve gene changes that affect immune control. Genetic counselling or testing may be offered when your results or family history suggest this.

Why do I need a kidney biopsy?

Blood and urine tests show that the filters may be damaged, but they cannot reliably identify the exact pattern. A biopsy distinguishes immune complex deposits from complement-dominant inflammation and shows how much active injury or scarring is present.

Can MPGN come back after a kidney transplant?

Yes. Both immune complex-mediated MPGN and C3 glomerulopathy can recur in a transplanted kidney. The risk and possible treatment depend on the original cause, so transplant assessment includes a careful review of that diagnosis.

Sources

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