CONDITION

Serum sickness

Serum sickness is a delayed immune reaction to certain medicines or foreign proteins.

WHAT IT IS
Delayed immune reaction to certain medicines or foreign proteins

BODY SYSTEM
Immune system, skin, joints, and sometimes kidneys

MAIN SYMPTOMS
Fever, rash, joint pain, swollen lymph nodes

WHAT CAUSES IT
Immune complexes formed after particular medical treatments

HOW IT IS DIAGNOSED
Clinical assessment supported by blood and urine tests

MAIN TREATMENT
Trigger removal and medicines for inflammation and itching

CAN IT BE CURED?
Yes - usually resolves after trigger removal

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

LONG-TERM OUTLOOK
Usually full recovery within several weeks

Overview

Serum sickness is a delayed reaction of the immune system. It can develop after exposure to certain medicines or treatments containing proteins that the immune system recognizes as foreign.

The immune system makes antibodies against the trigger. Antibodies can join to the foreign proteins and form clusters called immune complexes . These clusters may settle in tissues and cause inflammation, especially in the skin, joints, blood vessels, and kidneys.

Symptoms usually begin several days to about two weeks after a first exposure. They may start sooner if you have previously received the same or a closely related treatment.

A related condition called a serum sickness-like reaction causes a similar rash, fever, and joint pain. However, tests do not show the same immune complexes or low complement levels seen

in true serum sickness. Complement is a group of proteins that helps the immune system work. Serum sickness-like reactions are more common after certain medicines, especially in children.

Both conditions usually improve after the trigger is removed. Serum sickness is not contagious, and it is not an inherited condition.

Symptoms

The typical combination is fever, rash, and pain or swelling in several joints. Not everyone develops all three.

Possible symptoms include:

The rash may cover much of the body. Unlike ordinary hives, individual patches may remain in the same place for longer than a few hours. Some people develop small areas that look bruised.

Joint symptoms often affect the knees, ankles, wrists, hands, or feet. Walking and everyday tasks may be uncomfortable until the inflammation settles.

True serum sickness can sometimes affect the kidneys. This may cause dark or bloody urine, foamy urine, swelling, or reduced urination. Other organs are affected much less often.

Breathing difficulty, throat swelling, or collapse are not typical delayed serum sickness symptoms. They may indicate anaphylaxis , a rapid and potentially life-threatening allergic reaction, and need emergency care.

- An itchy, hive-like, or blotchy rash
- Fever and a general feeling of being unwell
- Pain, stiffness, or swelling in the joints
- Swollen lymph nodes, sometimes called swollen glands
- Swelling of the hands, feet, or face
- Headache or muscle aches

Causes and risk factors

True serum sickness was first recognized after treatments made from animal serum. Modern examples of possible triggers include some antivenoms, antitoxins, immune globulin products, and biological medicines. Biological medicines are treatments made from living cells or proteins.

Many reactions linked to commonly used medicines are classified as serum sickness-like reactions rather than true serum sickness. Antibiotics like amoxicillin or doxycycline are among the medicines that can be associated with these reactions, but many other conditions can also cause a rash while someone is taking an antibiotic. A rash does not by itself establish the diagnosis.

The chance of a reaction may be greater after a previous exposure to the same substance. On repeat exposure, symptoms can appear more quickly because the immune system already recognizes it.

Serum sickness is different from an immediate medicine allergy. Immediate allergies commonly begin within minutes or hours and may cause hives, wheezing, or throat swelling. Serum sickness usually takes days to develop because immune complexes need time to form.

It is also different from an autoimmune condition. In an autoimmune condition, the immune system mistakenly attacks the body over a longer period. Serum sickness is usually a temporary response to a specific exposure.

Diagnosis

There is no single test that proves every case of serum sickness. Diagnosis is based on your symptoms, examination, recent treatments, and the timing of the reaction.

It is important to give the healthcare professional a complete list of:

Blood tests may look for inflammation and check blood cell counts, kidney function, and liver function. Tests for complement proteins may help distinguish true serum sickness from a serum sickness-like reaction. Complement levels are often reduced in true serum sickness but usually remain normal in a serum sickness-like reaction.

A urine test can look for blood or protein, which may suggest kidney inflammation. Further testing may be needed if there are signs that another organ is affected.

Other conditions can look similar, including viral infections, autoimmune conditions, ordinary hives, inflammation of blood vessels, and other serious medicine reactions. The pattern of the rash, whether the mouth or eyes are affected, and the results of blood and urine tests can help separate them.

- Prescription and non-prescription medicines
- Injections, infusions, antivenoms, and immune treatments
- Recent vaccines or blood products

- The date each treatment was started or given
- Any similar reaction in the past

Treatment and management

The main treatment is to remove the trigger when this can be done safely. If you develop possible serum sickness after starting a medicine, contact the prescriber promptly before taking another dose. Do not restart a suspected medicine on your own after symptoms improve.

Some treatments, such as antivenom or a biological medicine, may have been given as a one-time dose or infusion. In that situation, treatment focuses on controlling inflammation while the substance is gradually cleared from the body.

Mild symptoms are often managed with rest and medicines that relieve itching, fever, and joint discomfort. Antihistamines like cetirizine or loratadine may help itching and hives. Anti-inflammatory pain medicines may help some people, but they are not suitable for everyone, particularly when kidney problems, stomach ulcers, bleeding risks, or certain other conditions are present.

A clinician may consider a corticosteroid like prednisone or hydrocortisone for more severe inflammation or symptoms that are not settling. Corticosteroids reduce immune activity. They are not needed for every case, and the choice depends on symptom severity and whether organs are involved.

Kidney inflammation or other significant organ involvement may require hospital monitoring and specialist care. Treatment is then based on the affected organ as well as the immune reaction.

Complications

Most people recover without lasting effects. Complications are uncommon but are more likely when true serum sickness causes inflammation in an organ.

Possible complications include:

Kidney inflammation can cause blood or protein to leak into the urine. It often improves as the serum sickness resolves, but follow-up blood pressure, urine, or kidney function checks may be needed.

A separate concern is mistaking another serious medicine reaction for serum sickness. A

painful rash with blistering, skin peeling, or sores in the mouth, eyes, or genitals needs urgent assessment.

- Kidney inflammation, called nephritis
- Inflammation of small blood vessels, called vasculitis
- Persistent joint pain while the reaction settles
- Rare nerve or other organ involvement

Prevention

Serum sickness cannot always be prevented. A first reaction may occur without any known warning, and it is not caused by something you did.

After a suspected reaction, the exact treatment and timing should be recorded in your medical notes. Keep the name of the medicine or product, the date it was given, and a description of the symptoms. A photograph of the rash may also be useful if it was taken safely.

Tell healthcare professionals about the reaction before receiving related treatments. This does not mean that every medicine in the same broad category will be unsafe. The risk depends on the exact trigger and whether alternatives are available.

Avoiding the confirmed trigger can reduce the chance of recurrence. If the treatment may be medically important in the future, an allergy or immunology specialist can help assess the reaction and discuss the risks of another exposure. Premedication does not guarantee that serum sickness will be prevented.

Living with it and what to expect

Symptoms usually begin improving after the trigger has been removed or cleared. Fever and rash may settle before joint pain and swelling. Recovery may take several days to a few weeks, and some reactions take longer.

During recovery, activity can be adjusted according to joint pain and fatigue. Gentle movement may help prevent stiffness, but strenuous exercise can wait until fever and significant inflammation have settled. Fluids may be helpful unless you have been advised to restrict them for another medical reason.

Follow-up is usually straightforward when symptoms are clearly improving and initial kidney tests are normal. If urine or blood tests were abnormal, repeat testing may be needed to confirm that the kidneys and complement levels have recovered.

Serum sickness does not usually turn into a long-term immune condition. Most people return to their usual activities without lasting restrictions. However, another exposure to the same trigger can cause a new reaction, sometimes sooner than the first one.

Keep the suspected trigger on your medicine list even after you feel well. If later assessment shows that a different condition caused the symptoms, the record can be updated so that useful treatments are not avoided unnecessarily.

When to get medical help

Arrange prompt medical advice if you develop a new rash, fever, and joint pain within days or weeks of starting a medicine or receiving an injection, infusion, antivenom, or immune treatment. Bring the product name and the date it was given.

Seek urgent same-day assessment if you have:

Call emergency services for trouble breathing, swelling of the tongue or throat, fainting, severe confusion, or blue or grey lips. These symptoms may indicate anaphylaxis or another medical emergency rather than routine serum sickness.

- Much less urine than usual, dark urine, or blood in the urine
- New swelling around the eyes, hands, legs, or feet
- A rapidly worsening or painful rash
- Blisters, peeling skin, or sores in the mouth, eyes, or genitals
- Severe weakness, persistent high fever, or difficulty walking
- Symptoms that continue to worsen after the suspected trigger is stopped

Common questions

Is serum sickness contagious?

No. It is an immune response to a medicine or foreign protein. It cannot spread to other people.

How long does serum sickness last?

Many cases improve over several days and resolve within a few weeks after the trigger is removed or cleared. Joint discomfort can sometimes outlast the fever or rash. Organ involvement may require longer follow-up.

Is serum sickness a drug allergy?

It is a type of immune reaction, but it is different from an immediate allergy such as anaphylaxis. Serum sickness develops more slowly and involves immune complexes. The distinction matters when assessing future treatment options.

Can antibiotics cause serum sickness?

Certain antibiotics can be associated with serum sickness-like reactions. A rash and fever during antibiotic treatment can also have other causes, including the infection itself. The timing, symptoms, examination, and tests are used to assess what happened.

Can I ever take the same medicine again?

Re-exposure may cause another reaction, possibly with a faster onset. Do not test this yourself. Whether the medicine should be avoided permanently depends on how certain the diagnosis is, the exact product, the severity of the reaction, and whether alternatives exist.

Does serum sickness cause permanent kidney damage?

Most people do not develop kidney involvement, and lasting damage is uncommon. Blood or protein in the urine, reduced urination, or swelling needs prompt assessment and follow-up.

Sources

- Royal Children's Hospital Melbourne. Clinical Practice Guidelines: Serum Sickness and Serum Sickness-Like Reactions
- Merck Manual Professional Edition. Serum Sickness
- National Library of Medicine, StatPearls Publishing. Serum Sickness
- DermNet New Zealand. Serum Sickness-Like Reaction