CONDITION

Cardiogenic shock

Learn how cardiogenic shock affects blood flow, what symptoms require emergency care, and how hospital teams diagnose, treat, and monitor this critical condition.

WHAT IT IS
Life-threatening heart pumping failure

BODY SYSTEM
Heart and circulation

MAIN SYMPTOMS
Shortness of breath, chest pain, confusion, cool sweaty skin

WHAT CAUSES IT
Heart attack or other heart problems

HOW IT IS DIAGNOSED
ECG, blood tests, echocardiogram, coronary angiography

MAIN TREATMENT
Emergency circulatory support and cause treatment

CAN IT BE CURED?
Sometimes - the cause can be corrected

IS IT AN EMERGENCY?
Yes - requires immediate hospital treatment

LONG-TERM OUTLOOK
Recovery varies and it can be fatal

Overview

Cardiogenic shock is a life-threatening condition in which the heart cannot pump enough blood to meet the body's needs. As blood flow falls, the brain, kidneys, liver, and other organs may not receive enough oxygen.

A severe heart attack is a common cause, but cardiogenic shock can also result from advanced heart failure, a dangerous heart rhythm, inflammation of the heart muscle, or a sudden problem with a heart valve. It may develop quickly or worsen over several hours.

Cardiogenic shock is a medical emergency. Treatment takes place in a hospital, usually in an emergency department, cardiac catheterization laboratory, or intensive care unit. The care team works at the same time to support blood flow, identify the cause, and correct that cause when possible.

Low blood pressure is common, but it is not the only feature. A person's blood pressure may appear acceptable early in the process because the body tightens blood vessels to compensate. Doctors also look for signs that organs are not receiving enough blood, such as confusion, cool skin, or reduced urine output.

The outlook depends on the cause, how much heart damage has occurred, whether other organs are affected, and how quickly effective treatment begins. Even after recovery, close follow-up is important because the underlying heart condition may require long-term care.

Symptoms

Symptoms can reflect both poor blood flow and the condition causing the shock. They may include:

Some people, particularly older adults or people with diabetes, may have a heart attack without typical chest pain. Shortness of breath, nausea, sweating, weakness, or sudden confusion may be more noticeable.

Call emergency services immediately for new chest pressure, severe difficulty breathing, fainting, blue or gray lips, sudden confusion, or cold and clammy skin with marked weakness. Do not wait for symptoms to improve or drive yourself if emergency transport is available.

Cardiogenic shock cannot be confirmed from symptoms alone. Other emergencies, including a major blood clot in the lungs, severe infection, internal bleeding, or fluid around the heart, can cause similar findings and require different treatment.

- Shortness of breath or rapid, difficult breathing
- Chest pain, pressure, squeezing, or discomfort
- Cool, pale, or sweaty skin
- A fast, weak, very slow, or irregular pulse
- Dizziness, fainting, confusion, or unusual sleepiness
- Severe weakness or restlessness
- Little or no urine
- Swelling, sudden weight gain, or worsening breathlessness from fluid buildup

Causes and risk factors

A heart attack can damage a large area of heart muscle, leaving the heart too weak to maintain

circulation. Shock may be present when the person arrives at the hospital, or it may develop later because of ongoing damage or a complication of the heart attack.

Other possible causes include:

Risk is higher in people with significant coronary artery disease, a previous heart attack, heart failure, valve disease, or cardiomyopathy. Older age and health conditions such as diabetes or chronic kidney disease may make the situation more difficult to tolerate. However, cardiogenic shock can also occur in someone without a previous diagnosis of heart disease.

Getting emergency care promptly for possible heart attack symptoms matters because restoring blood flow may limit further heart damage.

- Severe heart failure: The heart may suddenly worsen or gradually reach a point where it cannot maintain blood flow.
- Myocarditis: Inflammation of the heart muscle, sometimes related to an infection or immune response, can weaken pumping.
- Cardiomyopathy: Diseases of the heart muscle can cause severe loss of pumping strength.
- Dangerous heart rhythms: A rhythm that is extremely fast, slow, or irregular can prevent the heart from filling or pumping effectively.
- Valve emergencies: Sudden, severe leakage or narrowing of a heart valve can disrupt circulation.
- Mechanical complications of a heart attack: The wall between the heart's lower chambers may tear, or the structures supporting the mitral valve may rupture.
- Stress cardiomyopathy: Also called takotsubo syndrome, this condition can temporarily weaken the heart and occasionally cause shock.
- Problems after heart surgery or another major procedure: The heart may sometimes have difficulty maintaining circulation during recovery.

Diagnosis

Evaluation and treatment usually begin together. The medical team checks blood pressure, heart rate, breathing, oxygen level, mental alertness, skin temperature, and urine output. Repeated assessments help show whether circulation is improving or worsening.

An electrocardiogram , or ECG, records the heart's electrical activity. It can identify some heart attacks and dangerous rhythms. Continuous heart monitoring is usually needed.

Blood tests may measure:

An echocardiogram uses ultrasound to show how well the heart pumps. It can identify weak or poorly moving heart muscle, valve problems, fluid around the heart, and certain mechanical complications.

A chest X-ray may show fluid in the lungs or another cause of breathing difficulty. If a heart attack is suspected, coronary angiography may be performed urgently. During this procedure, contrast dye and X-rays show whether an artery supplying the heart is blocked.

Some patients need a thin catheter placed through a blood vessel and into the heart or nearby lung artery. This allows the team to measure pressures and blood flow directly. These measurements may be useful when the cause of shock is unclear or when the response to treatment is difficult to judge.

Clinicians may describe shock by stages based on its severity and whether it is improving or deteriorating. Staging supports communication among teams, but it does not replace an individualized assessment.

- Troponin , a protein released when heart muscle is injured
- Lactate , which can rise when tissues are not receiving enough oxygen-rich blood
- Kidney and liver function
- Blood counts and electrolyte levels
- Blood acidity and oxygen or carbon dioxide levels
- Markers that may support an assessment of heart strain or infection

Treatment and management

The first goals are to maintain breathing and circulation while treating the cause. Care often involves emergency medicine clinicians, cardiologists, critical care specialists, nurses, pharmacists, and, when needed, heart surgeons or advanced heart-failure teams.

Supplemental oxygen is used when blood oxygen is low. Some people need noninvasive breathing support through a tight-fitting mask. Others need a breathing tube and mechanical ventilator. Sedation and ventilation can affect blood pressure, so the team monitors the response closely.

Fluids may help in selected situations, but they must be used carefully. Too much fluid can worsen congestion in the lungs when the heart is already struggling. Treatment is guided by the person's examination, test results, and pressure measurements.

Medicines given through a vein may be used to support circulation. Vasopressors tighten

blood vessels to raise pressure, while inotropes help the heart contract more strongly. These medicines can also increase the heart's workload or trigger abnormal rhythms, so clinicians use the lowest support needed and reassess often.

If a blocked coronary artery caused the shock, emergency coronary angiography and percutaneous coronary intervention , or PCI, may be needed. During PCI, a small balloon and usually a stent are used to reopen an artery. The team decides which blockage or blockages to treat based on the emergency findings and the person's overall condition. Coronary bypass surgery may be considered when PCI is not suitable or when a mechanical complication requires surgery.

A dangerous rhythm may require electrical cardioversion, defibrillation, a temporary pacemaker, or rhythm-control medicine. Severe valve damage or a tear inside the heart may require urgent surgery or a catheter-based procedure.

When medicines and treatment of the cause do not provide enough circulation, temporary mechanical circulatory support may be considered. Devices include an intra-aortic balloon pump, a small pump placed across the aortic valve, or venoarterial extracorporeal membrane oxygenation, known as VA-ECMO. VA-ECMO circulates blood outside the body and adds oxygen before returning it.

These devices may stabilize selected patients, but they are invasive and can cause bleeding, infection, blood clots, stroke, or reduced blood flow to a limb. Research has not shown that one device should be used routinely for every person with cardiogenic shock. Decisions depend on the cause, severity, likely chance of recovery, and expertise available.

If the heart does not recover, an advanced heart-failure team may assess whether a durable heart pump or heart transplant is appropriate. These options apply only to selected patients after a detailed evaluation.

Complications

Poor circulation can injure several organs. Possible complications include acute kidney injury, liver injury, confusion, stroke, and damage to the intestines or limbs. Fluid may collect in the lungs and make breathing difficult.

The heart may develop further injury or dangerous rhythm problems. A cardiac arrest can occur if the heart stops pumping effectively.

Treatment can also carry risks. Blood-thinning medicines, procedures, and support devices may cause bleeding. Catheters and breathing tubes may increase infection risk. Mechanical support can contribute to blood clots, damage to blood cells, or poor circulation in the limb

where a device enters a blood vessel.

Some complications improve as circulation recovers. Others may require dialysis, prolonged breathing support, rehabilitation, or ongoing specialty care. Cardiogenic shock can be fatal despite intensive treatment, particularly when heart damage is extensive or several organs are failing.

Follow up

After hospital discharge, follow-up usually focuses on the cause of the shock, recovery of heart function, and effects on other organs. Visits may include a review of symptoms, blood pressure, heart rhythm, kidney function, and all medicines. An echocardiogram may be repeated to see whether pumping strength has improved.

Do not restart, stop, or change heart medicines without speaking with the treating clinician. The appropriate medicines depend on blood pressure, kidney function, heart rhythm, and the underlying diagnosis. A medication list should include prescriptions, over-the-counter products, vitamins, and supplements.

Cardiac rehabilitation may be recommended after a heart attack, PCI, bypass surgery, or another qualifying heart condition. It combines supervised activity, education, and support for reducing future cardiovascular risk. Recovery may be gradual, especially after a long intensive care stay.

At routine appointments, report increasing fatigue, swelling, reduced exercise tolerance, dizziness, or a gradual rise in breathlessness. Ask how to monitor weight, blood pressure, pulse, or fluid intake if these measures are part of the discharge plan.

Seek prompt medical advice for rapidly worsening swelling, repeated dizziness, new palpitations, or breathlessness that is getting worse. Call emergency services for chest pressure, severe breathing difficulty, fainting, sudden confusion, blue or gray lips, or cold and sweaty skin with profound weakness.

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