CONDITION

Cardioversion

Learn how electrical and medication cardioversion can restore a normal heart rhythm, including preparation, risks, recovery, and follow-up care.

WHAT IT IS
Treatment restoring a normal heart rhythm

BODY SYSTEM
Heart and circulation

MAIN SYMPTOMS
Irregular heartbeat, shortness of breath, tiredness, lightheadedness

WHAT CAUSES IT
Abnormal heart rhythms from varied causes

HOW IT IS DIAGNOSED
Electrocardiogram

MAIN TREATMENT
Electrical shock or antiarrhythmic medicine

CAN IT BE CURED?
No, underlying rhythm tendency may persist

IS IT AN EMERGENCY?
Sometimes, with fainting or serious trouble breathing

LONG-TERM OUTLOOK
Abnormal rhythm may recur, requiring additional treatment

Overview

Cardioversion is a treatment used to change an abnormal heart rhythm back to a normal rhythm. It is most often used for atrial fibrillation or atrial flutter, which begin in the heart's upper chambers. It may also treat certain fast rhythms that begin above or within the heart's lower chambers.

Cardioversion can be performed in two main ways:

Planned electrical cardioversion is not the same as the emergency defibrillation shown during cardiac arrest. For cardioversion, the machine usually times the shock to a specific part of the heartbeat. This synchronization reduces the chance of triggering a more dangerous rhythm.

During planned electrical cardioversion, a person usually receives short-acting sedation or

anesthesia and should not feel the shock. The procedure itself takes only a few minutes, although preparation and recovery take longer.

Restoring a normal rhythm may reduce symptoms such as shortness of breath, fatigue, or a racing heartbeat. It may also help the heart pump more effectively. However, cardioversion does not remove the underlying tendency to develop an abnormal rhythm. The rhythm may return, and additional treatment may be needed.

A major concern around cardioversion for atrial fibrillation or flutter is stroke. Blood can pool and form a clot in the upper chambers when the rhythm is abnormal. Returning the heart to a normal rhythm can allow a clot to travel to the brain or another organ. Careful planning, blood-thinning medicine, and sometimes heart imaging help lower this risk.

- Electrical cardioversion uses a controlled electrical shock delivered through pads on the chest, and sometimes the back.
- Pharmacologic cardioversion uses an antiarrhythmic medicine to restore a normal rhythm.

Symptoms

Cardioversion itself is a treatment rather than a condition. The symptoms leading to cardioversion depend on the abnormal rhythm and how it affects blood flow.

Possible symptoms include:

Some people have few or no symptoms. An abnormal rhythm may be found during a routine examination, on an electrocardiogram, or through a wearable heart monitor.

Symptoms do not always show how medically important an arrhythmia is. A person with mild symptoms may still have a risk of stroke or other complications, while noticeable palpitations may occur without immediate danger. Clinicians consider the rhythm, heart rate, blood pressure, other health conditions, and test results.

An unstable abnormal rhythm can cause low blood pressure, severe chest discomfort, confusion, fainting, or serious trouble breathing. In that situation, synchronized electrical cardioversion may be needed urgently.

- A fast, pounding, fluttering, or irregular heartbeat
- Shortness of breath, especially during activity
- Unusual tiredness or reduced exercise ability
- Lightheadedness
- Chest discomfort

- Weakness
- Anxiety or a sense that the heart is "skipping" beats

Causes and risk factors

Cardioversion may be considered when an abnormal rhythm continues on its own, causes symptoms, or interferes with the heart's ability to pump blood. The most common reasons include atrial fibrillation and atrial flutter. Certain supraventricular tachycardias, which are fast rhythms starting above the lower heart chambers, may also be treated this way. Selected fast rhythms arising from the ventricles may require urgent cardioversion if a pulse is still present.

Conditions associated with abnormal rhythms include:

Age and family history can also affect the chance of developing an arrhythmia. Stimulants, including some medicines or recreational drugs, may trigger a fast rhythm in some people.

The chance that an abnormal rhythm will return after cardioversion depends on several factors. These include how long the rhythm has been present, enlargement of the heart's upper chambers, underlying heart disease, sleep apnea, alcohol use, and whether the condition that contributed to the rhythm has been treated.

Not everyone with atrial fibrillation needs cardioversion. Some people are treated with rate control , which slows the heartbeat without trying to restore a normal rhythm. The choice between rate control and rhythm control depends on symptoms, health history, rhythm duration, heart function, and personal preferences.

- High blood pressure
- Coronary artery disease or a previous heart attack
- Heart valve disease
- Heart failure
- Congenital heart disease
- An overactive thyroid
- Sleep apnea
- Obesity
- Lung disease
- Heavy alcohol use
- Recent heart surgery

- Infection or other acute illness
- Abnormal levels of potassium, magnesium, or other electrolytes

Diagnosis

Before planned cardioversion, the healthcare team confirms the type of arrhythmia and looks for factors that could affect treatment.

An electrocardiogram , often called an ECG or EKG, records the heart's electrical activity. It shows the rhythm and helps determine whether cardioversion is appropriate. Blood pressure, oxygen level, and heart rate are also checked.

Blood tests may look for thyroid problems, anemia, infection, kidney or liver problems, and abnormal electrolyte levels. Kidney and liver function can influence the choice of medicines.

An echocardiogram uses sound waves to create pictures of the heart. It can show heart function, chamber size, and valve disease. A standard echocardiogram does not always show clots inside the left atrial appendage, a small pouch where clots often form during atrial fibrillation.

A transesophageal echocardiogram , or TEE, may be used to look more closely for a clot. During this test, a flexible probe is guided into the esophagus after numbing medicine and sedation are given. The esophagus sits close to the heart, allowing detailed images.

For atrial fibrillation or flutter lasting at least 48 hours, or when the duration is unknown, blood-thinning treatment is generally established before planned cardioversion and continued for at least four weeks afterward. In some situations, a TEE or another suitable imaging test may allow earlier cardioversion if no clot is found. The exact plan depends on rhythm duration, stroke risk, bleeding risk, and urgency.

If the abnormal rhythm is causing dangerous instability, immediate cardioversion may be performed without waiting for all routine testing. Blood-thinning treatment is then considered as soon as it is medically appropriate.

Treatment and management

Before electrical cardioversion, the care team reviews medicines, allergies, previous anesthesia experiences, and whether the person has a pacemaker or implantable cardioverter-defibrillator. Patients receive specific instructions about eating, drinking, and taking medicines before the procedure. These instructions should be followed exactly rather

than changing medicines independently.

Adhesive pads are placed on the chest and sometimes the back. Monitoring equipment tracks heart rhythm, blood pressure, and oxygen. A short-acting sedative or anesthetic is given through a vein. Once the person is asleep or deeply relaxed, the machine delivers a synchronized shock. More than one attempt may be needed.

Most people wake within several minutes. They are monitored until their breathing, blood pressure, and alertness are stable. Because sedating medicine can affect judgment and coordination, someone else usually needs to drive them home after an outpatient procedure.

Pharmacologic cardioversion uses an antiarrhythmic medicine given by mouth or through a vein. The appropriate medicine depends on the rhythm, heart structure, other medical conditions, and medicines already being used. Some antiarrhythmics can cause another abnormal rhythm, slow the heart, or lower blood pressure, so monitoring may be required. These medicines should not be started, stopped, or adjusted without clinical guidance.

After either form of cardioversion, management may include:

Long-term anticoagulation is based mainly on the person's future risk of stroke, not only on whether cardioversion appears successful. A normal rhythm after the procedure does not always mean a blood thinner can be stopped.

- Continuing an anticoagulant like warfarin or apixaban , often called a blood thinner
- Taking a medicine that helps maintain a normal rhythm
- Taking a medicine that controls heart rate if the rhythm returns
- Treating thyroid disease, sleep apnea, high blood pressure, or heart failure
- Reducing heavy alcohol use and addressing other personal triggers
- Considering catheter ablation if symptoms continue or the rhythm repeatedly returns

Complications

Cardioversion is commonly performed, but complications are possible.

A blood clot can travel to the brain and cause a stroke, or travel elsewhere in the body. Anticoagulation and pre-procedure imaging are used when appropriate to reduce this risk.

Electrical cardioversion can occasionally trigger a different abnormal rhythm. The heart rate may also become too slow, especially if there is an underlying problem with the heart's natural pacemaker. Monitoring allows the team to respond promptly.

The pads may leave temporary redness, tenderness, or mild skin irritation. Significant skin

injury is uncommon.

Sedation can affect breathing, blood pressure, or alertness. The team monitors for these problems during and after the procedure. Nausea, headache, or temporary grogginess may occur.

Antiarrhythmic medicines have their own possible effects, including low blood pressure, slow heart rate, or new rhythm problems. The risks differ by medicine and by the person's heart and other organs.

If a pacemaker or implanted defibrillator is present, the device may need to be checked after cardioversion. The care team adjusts pad placement and energy delivery to protect the device as much as possible.

The most common longer-term issue is recurrence of the original arrhythmia. Recurrence does not necessarily mean that the procedure was performed incorrectly. It reflects the underlying condition that makes the abnormal rhythm possible.

Follow up

Mild tiredness, brief grogginess, and skin soreness can occur after electrical cardioversion. Follow the discharge instructions for activity, driving, bathing, and skin care. Avoid making important decisions while sedating medicine is still affecting you.

Take anticoagulants and rhythm medicines exactly as directed. Missing blood-thinner doses around cardioversion may increase stroke risk. Contact the prescribing team before stopping a medicine, including for a dental or surgical procedure.

Routine follow-up may include an ECG, review of symptoms, medication monitoring, and discussion of home pulse or rhythm readings. Blood tests may be needed for certain medicines. Follow-up also helps address sleep apnea, blood pressure, alcohol use, weight, thyroid disease, and other factors linked to rhythm recurrence.

Contact the healthcare team promptly for a return of palpitations, increasing shortness of breath, unusual dizziness, medication side effects, or bleeding that does not seem normal. These concerns may need timely assessment but are not always emergencies.

Seek emergency medical help for:

- Signs of stroke, such as sudden facial drooping, arm weakness, speech difficulty, vision loss, or severe loss of balance
- Fainting or new confusion

- Severe or persistent chest pain
- Serious difficulty breathing
- Heavy or uncontrolled bleeding
- A sustained rapid heartbeat accompanied by weakness, chest discomfort, or lightheadedness

Sources

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