TEST

His bundle electrography

His bundle electrography records electrical signals from the heart's central conduction pathway using a catheter

WHAT IT MEASURES
Electrical conduction through the His bundle and nearby pathways

SAMPLE
None; catheter electrodes record electrical signals inside the heart

FASTING NEEDED?
Sometimes, before sedation or anesthesia

HOW LONG IT TAKES
About one to four hours, including catheter setup

RESULTS IN
Initial findings immediately; final report timing varies by laboratory

USED FOR
Diagnosis and treatment planning

MAIN LIMITATION
Intermittent conduction problems may not occur during recording

Overview

His bundle electrography records electrical signals from the His bundle, a small group of specialized heart cells. The His bundle carries each heartbeat's electrical signal from the upper chambers of the heart to the lower chambers.

The recording is usually made during an electrophysiology study, often called an EP study. A clinician guides thin, flexible tubes called electrode catheters through a vein and into the heart. One catheter is positioned near the His bundle.

This is an invasive test rather than a routine electrocardiogram, or ECG. An ECG records electrical activity from electrodes on your skin. His bundle electrography records signals from inside your heart, allowing more precise measurement of where an electrical delay or block occurs.

The test may also be performed during catheter ablation, a procedure that treats certain abnormal heart rhythms.

Why the test is ordered

Your heart's electrical signal normally travels through the atrioventricular, or AV, node before entering the His bundle and the branching pathways that activate the ventricles. The ventricles are the heart's lower pumping chambers.

His bundle electrography can help separate a delay in the AV node from a delay within or below the His bundle. This distinction may affect decisions about monitoring, medicines, ablation, or a pacemaker.

The test may be ordered to:

It is not generally used to screen people without symptoms or relevant ECG findings.

- Locate the level of an AV conduction block
- Investigate fainting when a heart rhythm cause is suspected
- Assess conduction disease seen on an ECG
- Identify or map certain rapid heart rhythms
- Guide catheter ablation or pacemaker planning
- Clarify findings that other heart rhythm tests could not explain

Who should have the test

His bundle electrography is reserved for selected situations because it requires catheters to be placed inside the heart.

It may be considered if you have unexplained fainting and an ECG suggests disease in the heart's conduction pathways. It may also be used when the location of heart block is uncertain or when you are already having an EP study for an abnormal rhythm.

Not everyone with a slow heartbeat, palpitations, or fainting needs this test. A standard ECG, wearable monitor, echocardiogram, exercise test, or implanted rhythm monitor may provide the needed information with less risk.

The decision is based on your symptoms, ECG findings, heart history, medicines, and the likelihood that the result will change your care.

How to prepare

Follow the instructions from your electrophysiology team. Preparation differs according to

whether you will receive sedation or general anesthesia and whether another procedure is planned at the same time.

You may be asked not to eat or drink for several hours beforehand. Ask specifically whether clear liquids, water, or morning coffee are allowed.

Provide a complete list of medicines, vitamins, and supplements. Some heart rhythm medicines can change conduction measurements or make an abnormal rhythm harder to reproduce. Do not stop them unless your care team gives you specific instructions.

Tell the team if you:

You will usually need someone to drive you home if you receive sedation. Remove jewelry and follow any instructions about bathing or shaving. Do not shave the catheter area unless asked, because small skin cuts can increase infection risk.

- Take blood thinners or diabetes medicines
- Have allergies to medicines, latex, adhesives, or contrast dye
- Have kidney problems or a bleeding disorder
- Could be pregnant
- Have an implanted pacemaker or defibrillator
- Have had a previous ablation or heart operation

What happens during the test

You will lie on an X-ray table while heart rhythm, blood pressure, and oxygen levels are monitored. An intravenous line is placed for fluids and medicines.

The skin over a vein, usually in the groin and sometimes the neck or arm, is cleaned and numbed. You may feel pressure when a small access tube is inserted, but the local anesthetic should reduce sharp pain.

The clinician guides electrode catheters through the vein into your heart. X-ray imaging or three-dimensional mapping may be used for positioning. No surgical opening of the chest is needed.

A catheter near the His bundle records its small electrical signal. Other catheters record activity elsewhere in the heart. The team may deliver brief pacing impulses or give medicines to see how electrical signals travel at different heart rates.

You may notice skipped beats, a racing heartbeat, or brief chest sensations during pacing. Tell the team if you feel pain, breathlessness, dizziness, or other discomfort.

Afterward, the catheters are removed and pressure or a closure device is applied to the access site. You may need to lie flat while the vein seals. The full appointment commonly lasts several hours, particularly if ablation is also performed.

Understanding your results

The recording is interpreted together with your surface ECG and signals from other intracardiac catheters. Results are not based on one number alone.

Important measurements may include:

A longer-than-expected AH interval generally points toward delayed conduction in or near the AV node. A prolonged HV interval can suggest slower conduction below the AV node, within the His-Purkinje system that activates the ventricles.

Reference ranges are not completely universal. Interpretation varies with the laboratory, age, sex, pregnancy status, medicines, heart rate, pacing method, existing heart disease, and the clinical reason for testing.

An abnormal measurement does not automatically mean that you need a pacemaker or another procedure. Your symptoms, ECG, overall heart function, and whether block occurred during testing all matter.

- AH interval: Time for the signal to travel through the AV node toward the His bundle
- HV interval: Time for the signal to travel from the His bundle through the ventricular conduction system
- His potential: The small electrical signal produced as the His bundle activates
- Block location: Whether conduction fails above, within, or below the His bundle

What affects the results

Several factors can change the measurements even when the equipment is working correctly.

Heart rate and pacing speed affect how the AV node conducts. Stress, pain, sleep, and sedation can change the body's automatic control of heart rate. These effects are especially relevant to the AH interval.

Medicines may also alter conduction. Beta blockers like metoprolol or propranolol , some calcium channel blockers like amlodipine or diltiazem , digoxin, antiarrhythmic medicines, and certain anesthetic or sedating medicines can change what is recorded. This is why the team

needs an accurate medicine list.

Other influences include:

Age and structural heart disease can influence conduction. Pregnancy does not usually create a false His signal, but it changes procedural planning because radiation and medicines may affect the pregnancy. Kidney function mainly matters if contrast dye or certain medicines are used; contrast is not required for every study.

Eating, a recent blood transfusion, and mild everyday exercise do not usually alter the His recording directly.

- Catheter position, movement, or poor contact with heart tissue
- Electrical interference or difficulty separating nearby signals
- Electrolyte abnormalities, such as unusual potassium levels
- Low body temperature or significant illness
- Existing bundle branch block or previous heart procedures
- An abnormality that occurs only occasionally

Accuracy and limitations

His bundle electrography directly records conduction inside the heart, making it more precise than a surface ECG for locating some conduction delays. Correct catheter placement and experienced interpretation are important.

The test can miss a problem that is intermittent and does not occur during the study. Pacing or medicines may help reveal it, but no protocol reproduces every real-life episode.

It can also appear abnormal when temporary factors, such as medicines, sedation, electrolyte changes, or catheter positioning, have slowed conduction. An induced rapid rhythm may not always be the same rhythm that caused symptoms outside the laboratory.

There is no single reliable figure for how often His bundle electrography correctly identifies every conduction disorder. Accuracy differs according to the suspected condition, testing protocol, and result used to define an abnormal study.

For symptoms that occur rarely, an external monitor or implantable loop recorder may be better at matching symptoms with the heart rhythm. A surface ECG may already provide enough information when conduction disease is clear.

Risks and complications

A small bruise, tenderness, or minor bleeding at the catheter site is common after venous access. Some people feel faint during needle or catheter placement.

Less common complications include infection, significant bleeding, a blood clot, damage to a blood vessel, or an abnormal heart rhythm requiring treatment. Rarely, a catheter can injure the heart and cause bleeding around it. Temporary or permanent worsening of heart block may require pacing.

Sedation can affect breathing or blood pressure. The imaging used to guide catheters involves a limited amount of radiation, although some laboratories use mapping systems to reduce exposure.

Your individual risk is affected by other procedures performed at the same time, particularly ablation.

What happens next

The electrophysiology team can often discuss the main findings soon after the procedure. A final report may follow after all recordings are reviewed.

A routine follow-up visit may cover wound healing, medicine changes, monitoring, pacemaker assessment, or further treatment. Keep the catheter site clean and follow instructions about lifting, exercise, bathing, and driving.

A small, stable bruise is usually expected. Contact your care team promptly if the site becomes increasingly painful, red, warm, swollen, or begins draining, or if you develop a fever or recurring palpitations.

Seek urgent medical help for bleeding that does not stop with firm pressure, rapidly increasing swelling, fainting, severe chest pain, marked breathlessness, or signs of stroke such as facial drooping, arm weakness, or difficulty speaking.

Common questions

Can I drink coffee before the test?

Possibly not. Coffee may be restricted because of fasting instructions or because caffeine can affect heart rate. Follow the specific instructions from your testing center.

Does the time of day matter?

Usually not. Scheduling is mainly determined by fasting, medicine timing, sedation, and

laboratory availability.

Can I exercise beforehand?

Light normal activity is unlikely to change the recording. Avoid strenuous exercise on the day of the procedure unless your team says it is acceptable, especially if you have symptoms with exertion.

Will I be awake?

Many people receive local anesthetic with light or moderate sedation. Some procedures use deeper sedation or general anesthesia, particularly when ablation is planned.

Is it the same as an ECG?

No. An ECG uses electrodes on the skin. His bundle electrography uses a catheter inside the heart to record a specific part of the electrical pathway.

Can I drive home afterward?

Usually not if you received sedation. Arrange transportation and follow the center's instructions about when you may drive again.

Sources

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