Non-pharmacological Treatment of Arrhythmias: Ablation

Tratamiento no farmacológico de las arritmias: la ablación

Catheter ablation is a procedure that is performed to correct some heart rhythm disorders. It is therefore necessary to first understand how the normal heart rhythm occurs.

NORMAL HEART RHYTHM

Cardiac muscle cells are stimulated by electrical impulses that cause them to contract in a uniform and regular way. This contraction causes blood to be pumped out of the heart into the arteries and distributed to all parts of the body.
In the normal heart, electrical impulses arise from an area of specialized cells called the sinus node, located in the right atrium, which is the heart's normal pacemaker. Then they reach the atrioventricular (AV) node located near the center of the heart between the atria and the ventricles, and finally pass to the right and left ventricles through two conduction branches.
In this way, cardiac muscle cells produce a normal heartbeat.

ARRHYTHMIA - ITS DIAGONSIS

On occasions, the electrical impulse does not originate in the appropriate area and competes with the normal rhythm; in other cases, it travels across the heart in an abnormal way, causing irregular heartbeats and sometimes an accelerated heart rhythm.
When the disorder arises in the atria, it is known as supraventricular arrhythmia. When it arises in the ventricles, it is known as ventricular arrhythmia.
Medications are often used as the initial therapy of arrhythmias to restore normal heart rhythm. Their effectiveness is variable, and many patients present recurrence despite receiving medication.
Radiofrequency ablation (RFA) is an alternative treatment option, whose efficacy depends on the type of arrhythmia, though in general it is more effective than pharmacological treatment.

SYMPTOMS AND COMPLEMENTARY STUDIES

Arrhythmias can be detected by the patient in the form of palpitations, dizziness, weakness and irregular heartbeat.
Some types of arrhythmias are temporary and non-life-threatening.
Patients can be taught certain maneuvers that may stop these arrhythmias. Other types are difficult to control and may cause complications.
Its diagnosis is always confirmed by an electrocardiogram during the arrhythmic episode.
The doctor can diagnose the arrhythmia through cardiac auscultation, pulse check, and an electrocardiogram. Eventually, prolonged electrocardiographic recording (Holter monitoring) can also be used to determine if the arrhythmia is permanent, paroxysmal (it comes and goes) or if it is more frequent at some time during the day.

HOW ABLATION IS PERFORMED

Medication is discontinued in the days before the procedure. During the procedure, patients are given a sedative or receive anesthesia, so they are not awake during the ablation. The procedure is carried out under strict controls (blood pressure, oximetry, rhythm control, and in some cases, transesophageal echocardiography).
Guide wires and introducers are inserted into the veins (of the neck or groin), and sometimes into the arteries. Catheters are threaded under X-ray guidance, and are positioned in different tissue areas (in the atria and/or ventricles) (Figure 1) causing the arrhythmia.
In general, the arrhythmia should be explored and provoked in order to "map" its location.
Once the location is identified, tissues are permanently "injured" using heat (radiofrequency ablation) or cold (cryoablation).
Today, with the help of three-dimensional navigation systems, the fusion of multislice computed-tomography images of the heart can produce three-dimensional images using less X-rays.
The damaged tissue cannot generate or conduct electrical impulses.
When the procedure is completed, the doctor will again try to provoke the arrhythmia. If it cannot be initiated, the procedure is considered to be successful, and the patient cured. If the arrhythmia cannot be suppressed, it may be necessary to deliver additional radiofrequency.
The length of the procedure varies depending upon the type of arrhythmia being treated and individual factors, but typically the procedure lasts 2 hours or more.

NOTES

A pregnancy test is usually done immediately before the procedure in women of child-bearing potential due to radiation exposure, and female patients are advised not to get pregnant 3-4 months after the procedure to avoid late radiation effects.

WHICH RHYTHM PROBLEMS CAN BE TREATED?

Radiofrequency ablation can be used to treat the following arrhythmias: paroxysmal supraventricular tachycardia, Wolfe-Parkinson-White syndrome, atrial flutter, ventricular tachycardia, and atrial fibrillation.

POST-ABLATION CARE

Recovery will take place in a special care unit to monitor and observe the cardiac rhythm and to prevent complications in the catheter puncture site. Pain medication may be used. Thereafter, the doctor will indicate the medication to be taken and what activities can be done.

WHAT COMPLICATIONS MAY RFA PRODUCE?

Like any invasive procedure, radiofrequency ablation carries some risk, and though scarce, the complications include: 1) bleeding, infection and injury to the vessels due to catheter threading; 2) injury to the heart muscle or damage to the valves; 3) thrombus formation; and 4) heart block (this complication, if permanent, requires pacemaker implantation).
Although exposure to radiation during the procedure occurs, the risk of complications due to radiation is extremely low. The death rate is also very low (approximately in 0.1% of cases).

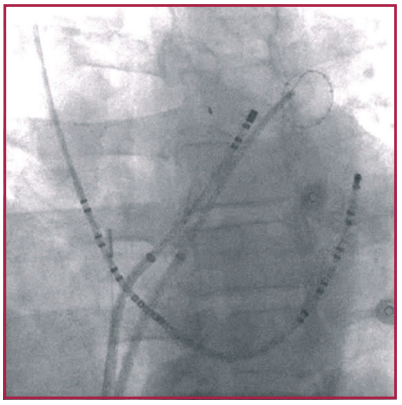

Fig. 1. Catheters inserted in different locations to perform the procedure.

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