



Ablation Therapy for Arrhythmias

Background

Management of arrhythmias starts with a careful assessment of the patient and a search for a possible underlying cause. Cardiac arrhythmias most commonly result from the development of a re-entry circuit caused by a myocardial scar or a developmental anomaly. Wolff Parkinson White Syndrome is a classic example where the re-entry current is due to the presence of a congenital accessory pathway. Destruction of this and any other abnormal electrical circuits is termed 'ablation therapy'. Radiofrequency ablation came into clinical practice at the end of the 1980's and revolutionised the way patients with abnormal heart rhythms could be treated and sometimes cured.

Radiofrequency ablation

A cardiac catheter is introduced in the standard fashion to the cardiac chambers via the peripheral vascular system. Mounted on the end of the cardiac catheter is an electrode through which a radiofrequency current is passed. The lesion which this creates is very localised, approximately 4-5mm in depth and diameter. This is adequate to eradicate local electrical pathways but has no effect (either long or short term) on cardiac function. However, complications can occur if the lesion is situated in a critical area: for example, ablation of a pathway close to the AV node may require implantation of a pacemaker (less than 1% of cases). Rarely, cardiac wall perforation may occur but this is usually the consequence of catheter manipulation rather than the lesion creation.

Arrhythmias suitable for ablation

As there are many different types of cardiac rhythm abnormality, so too there are different forms of ablation procedure. As a rough generalisation, supraventricular tachycardias tend to be less dangerous and easier to ablate curatively than ventricular tachycardia, since, with the exception of atrial flutter and atrial fibrillation, most cases of supraventricular tachycardia are the consequence of developmental abnormal electrical connections. Ablation techniques for atrial flutter may be curative, but patients with this arrhythmia may also suffer from atrial fibrillation. The latter may be related to generalised atrioopathy and curative or palliative ablation techniques are only now emerging. Nevertheless, in patients who are very debilitated

by atrial fibrillation and in whom standard pharmacological therapy has failed, or proved toxic, a decision may be taken to interrupt the atrioventricular node and then control the rhythm of the ventricles with an implanted pacemaker. The procedure is called 'AV node ablation' but it has the major disadvantage of making the patient pacemaker dependent and there is a continued need for oral anticoagulation.

Most ventricular arrhythmias result from myocardial scarring by heart disease and consequential damage to the electrical system, most commonly myocardial infarction. Since these arrhythmias are secondary to other diseases, treatment with ablation is not usually curative but may make the rhythm disturbance easier to control by means of anti-arrhythmic agents or an implantable device with anti-tachycardia therapies.

The Ablation Procedure – the patient's experience

For the patient, the experience of instrumentation is fairly similar to that of angioplasty but the procedure is more technically challenging and can take an hour or two (and sometimes longer). The patient may feel discomfort during the ablation itself, but it is unusual for it to actually hurt. Afterwards it is quite common for patients to feel that they are about to get a palpitation or be aware of their heart beating even though there is no recurrence of the abnormal rhythm. Patients appear to be particularly sensitised to their normal heartbeat after the procedure but this sensation disappears after a period of a few weeks. Patients do not require long-term follow up if the arrhythmia has been cured.

Developments

Research has shown that a sub group of patients, whose atrial fibrillation cannot be controlled by drug treatment or ablated by catheter-based techniques, may benefit from a surgical procedure known as the Cox's maze operation. In this a surgeon (at open-heart surgery) dissects atrial tissue so as to compartmentalise the atrial mass, rendering atrial fibrillation unsustainable. This technique is rarely used in the UK because it is so invasive. Fortunately, ablation therapy is a rapidly advancing area of medical technology and new ways of performing ablation are likely to be found to be useful.

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References:

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