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NHS
National Institute for
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Percutaneous (non-thoracoscopic) epicardial catheter radiofrequency ablation for ventricular tachycardia

1 Guidance

1.1 The evidence on percutaneous (non-thoracoscopic) epicardial catheter radiofrequency ablation for ventricular tachycardia (VT) is limited to a small number of patients, but it shows that the procedure is efficacious in carefully selected individuals and raises no major safety issues, in the context of a condition which is potentially life-threatening. Therefore, the procedure may be used with normal arrangements for clinical governance, but with special arrangements for consent.

1.2 During the consent process clinicians should ensure that patients understand the risks of potentially serious complications, including damage to the heart muscle.

1.3 Patient selection and treatment should be carried out only by a team specialising in the treatment of cardiac arrhythmias that includes experts in electrophysiology and ablation.

1.4 The procedure should only be carried out by interventional cardiologists with specific training in electrophysiology and in accessing the pericardial space and performing complex ablation procedures.

1.5 The procedure should only be carried out in units with arrangements for emergency cardiac surgical support in case of complications.

1.6 The NHS Information Centre for health and social care runs the UK Central Cardiac Audit Database, and clinicians should enter details about all patients undergoing percutaneous (non-thoracoscopic) epicardial catheter radiofrequency ablation for VT onto this database (www.ccad.org.uk).

1.7 NICE encourages further research into and publication of the outcomes and potential serious complications of percutaneous (non-thoracoscopic) epicardial catheter radiofrequency ablation for VT in larger numbers of patients.

2 The procedure

2.1 Indications and current treatments

2.1.1 Ventricular tachycardia is caused by abnormal electrical circuits originating from diseased areas of the ventricular myocardium. It usually results in a rapid heartbeat, preventing effective ventricular refill and adequate cardiac output. Untreated VT is usually life-threatening.

2.1.2 Depending on the type, VT may be managed by antiarrhythmic drugs. People who have recurrent VT episodes may need an implantable cardiac defibrillator (ICD) or endocardial catheter ablation to destroy diseased areas of the ventricular myocardium and interrupt the abnormal electrical circuits.

2.2 Outline of the procedure

2.2.1 The procedure is carried out with the patient under sedation or general anaesthesia. The pericardial space is accessed by a subxiphoid needle puncture under fluoroscopic guidance. A guidewire is introduced through the needle and a sheath is advanced over the guidewire so that the tip is placed inside the pericardial sac. The sheath is aspirated to check for bleeding. A radiofrequency catheter is inserted into the sheath. After electrophysiological mapping to determine target sites for ablation, radiofrequency energy pulses are applied to the epicardium.

Interventional procedure guidance 295

Interventional procedures guidance makes recommendations on the safety and efficacy of a procedure. The guidance does not cover whether or not the NHS should fund a procedure. Decisions about funding are taken by local NHS bodies (primary care trusts and hospital trusts) after considering the clinical effectiveness of the procedure and whether it represents value for money for the NHS.

Interventional procedures guidance is for healthcare professionals and people using the NHS in England, Wales, Scotland and Northern Ireland. This guidance is endorsed by NHS QIS for implementation by NHSScotland.

NHS Quality Improvement Scotland

2.2.2 During the procedure, catheter position is monitored with a three-dimensional mapping system to avoid collateral damage. Saline is placed in the pericardial space to reduce the risk of oesophageal injury, and steroids are administered to reduce the risk of pericarditis.

2.2.3 Patients can have a combined procedure that includes electrophysiological mapping and ablation by both endocardial and epicardial approaches.

Sections 2.3 and 2.4 describe efficacy and safety outcomes from the published literature that the Committee considered as part of the evidence about this procedure. For more detailed information on the evidence, see the overview, available at www.nice.org.uk/IP709overview

2.3 Efficacy

2.3.1 In a case series of 48 patients with VT, of whom 18 had epicardial ablation, the procedure eliminated VT-inducing circuits in 94% (17/18) of patients (mean follow-up 25 months). In a case series of 14 patients, an epicardial VT circuit was mapped in 7 patients and was successfully terminated with epicardial ablation in all patients (mean follow-up 14 months). In a case series of 10 patients, VT-inducing circuits were eliminated in 8 (there were no episodes of syncope at 18-month follow-up).

2.3.2 The Specialist Advisers stated that key efficacy outcomes included termination of VT (acutely and making it non-inducible), lack of VT recurrence, and reduction in the need for ICDs.

2.4 Safety

2.4.1 No deaths directly attributable to the procedure have been reported in the literature. There were three deaths because of progression of severe heart failure. One patient in a case series of 48 patients died from decompensated congestive heart failure several weeks after successful epicardial ablation. Two patients in a case series of 20 patients died because of progressive heart failure during follow-up (mean 12 months).

2.4.2 In a case series of 20 patients, one patient developed arteriovenous fistula formation needing surgical repair. In the same study, another patient developed an atrioventricular block.

2.4.3 In a case series of 10 patients, one patient developed haemopericardium needing drainage. In the same study three patients developed pericardial friction rub without haemopericardium.

2.4.4 In a case series of 48 patients, three patients developed transient pericarditis that resolved within 1 week. In a second case series of 10 patients, two patients reported acute thoracic pain needing analgesia.

2.4.5 In a case series of 10 patients, five patients were in heart failure during the procedure, and one of these needed urgent heart transplantation after the procedure.

2.4.6 The Specialist Advisers considered that potential safety concerns included myocardial puncture; pericarditis; coronary artery damage; perforation of the right ventricle; damage to the oesophagus, bronchi and phrenic nerve; gastric puncture and damage to abdominal vessels and organs when accessing the pericardial space.

3 Further information

3.1 The National Patient Safety Agency runs the National Reporting and Learning System (NRLS), and clinicians should report any serious adverse events relating to the use of this procedure to the NRLS (www.npsa.nhs.uk/nrls).

3.2 NICE has published interventional procedures guidance on percutaneous (non-thoracoscopic) epicardial catheter radiofrequency ablation for atrial fibrillation and technology appraisals guidance on implantable cardioverter defibrillators for the treatment of arrhythmias. For more information see www.nice.org.uk

Information for patients

NICE has produced information on this procedure for patients and carers ('Understanding NICE guidance'). It explains the nature of the procedure and the guidance issued by NICE, and has been written with patient consent in mind. See www.nice.org.uk/IPG295publicinfo

Ordering printed copies
Contact NICE publications (phone 0845 003 7783 or email publications@nice.org.uk) and quote reference number N1837 for this guidance or N1838 for the 'Understanding NICE guidance'.

National Institute for Health and Clinical Excellence
MidCity Place, 71 High Holborn, London WC1V 6NA; www.nice.org.uk

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