NICE National Institute for Health and Care Excellence

NICE guidance

Radiofrequency ablation for atrial fibrillation in association with other cardiac surgery

HealthTech guidance

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Your responsibility

This guidance represents the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, healthcare professionals are expected to take this guidance fully into account, and specifically any special arrangements relating to the introduction of new interventional procedures. The guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

All problems (adverse events) related to a medicine or medical device used for treatment or in a procedure should be reported to the Medicines and Healthcare products Regulatory Agency using the Yellow Card Scheme.

Commissioners and/or providers have a responsibility to implement the guidance, in their local context, in light of their duties to have due regard to the need to eliminate unlawful discrimination, advance equality of opportunity, and foster good relations. Nothing in this guidance should be interpreted in a way that would be inconsistent with compliance with those duties. Providers should ensure that governance structures are in place to review, authorise and monitor the introduction of new devices and procedures.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

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This guidance replaces IPG121.

1 Recommendations

1.1 Current evidence on the safety and efficacy of radiofrequency ablation (RFA) for atrial fibrillation in association with other cardiac surgery appears adequate to support the use of this procedure provided that the normal arrangements are in place for consent, audit and clinical governance.

1.2 Patient selection and follow-up should be carried out by a multidisciplinary team. Cardiac surgeons undertaking this procedure should have specific training in the use of radiofrequency equipment.

2 Information about the procedure

2.1 Outline of the procedure

2.1.1 Radiofrequency ablation (RFA) for atrial fibrillation is typically carried out in patients undergoing concomitant open heart surgery (often mitral valve replacement or repair). The procedure uses thermal damage, rather than incisions, to block impulse conduction. The heat generated coagulates the heart tissue, forming linear scars or lesions that disrupt the transmission of the abnormal electrical impulses. The procedure may be carried out on both atria or on the left atrium only. It can be performed from within or outside the atrium.

3 Committee discussion

3.1 Indications

3.1.1 Atrial fibrillation is the irregular and rapid beating of the upper two chambers of the heart (the atria). It may be classified as paroxysmal, persistent or permanent. It is the most common type of arrhythmia and the incidence increases markedly with age. Patients with atrial fibrillation may be asymptomatic or they may have symptoms such as palpitations, dizziness and breathlessness. They also have an increased risk of stroke as a result of blood clots forming in the left atrium and then embolising to the brain.

3.1.2 Atrial fibrillation usually occurs in the absence of structural heart disease. However, if structural heart disease is present, it is most commonly mitral stenosis.

3.1.3 Conservative treatments include medication, electrical cardioversion to control the heart rhythm, and anticoagulants to prevent the formation of blood clots. The conventional surgical approach, known as the Cox maze procedure, involves making multiple, strategically placed incisions in both atria to isolate and stop the abnormal electrical impulses. Alternative methods of creating lesions in the atria by ablation have been developed, using energy sources such as microwave, cryotherapy and ultrasound.

3.2 Efficacy

3.2.1 In one small randomised controlled trial, 82% (9/11) of patients treated with atrial RFA and a mitral valve replacement were in sinus rhythm at 12 months, compared with 21% (3/14) of patients treated with a mitral valve replacement alone ($p < 0.05$). One non-randomised controlled trial reported that 81% (83/102) of patients treated with atrial RFA and cardiac surgery were in sinus rhythm at a mean follow-up of 12.5 months, compared with 11% (3/27) of patients who had cardiac surgery without RFA ($p < 0.0001$). For more details, see the overview.

3.2.2 The Specialist Advisors considered this procedure to be a variation on the Cox maze technique.

3.3 Safety

3.3.1 This procedure is performed during open heart surgery; therefore it is difficult to differentiate the complications that relate specifically to RFA.

3.3.2 In-hospital mortality was reported by six studies, and ranged from 0.8% (1/132) to 8% (3/40). In a study of 103 patients, one death was reported to be the result of an oesophageal perforation caused by RFA. Another study noted that none of the peri-operative deaths was considered to be related to the use of RFA.

3.3.3 Two studies reported that 2% (3/132) and 8% (18/234) of patients needed re-exploration for bleeding. Two studies reported that 0.8% (2/234) and 8% (16/200) of patients required re-operation. Other less common complications included the need for an intra-aortic balloon pump, sternal wound infection, stroke, atrio-oesophageal perforation and left atrial thrombus. For more details, see the overview.

3.3.4 The Specialist Advisors listed the potential adverse effects of RFA as oesophageal injury, heart block, perforation of the heart and coronary artery damage.

3.4 Other comments

3.4.1 Most of the data were on patients having mitral valve surgery. There was only limited evidence on the efficacy of RFA when performed with other procedures such as coronary artery bypass grafting.

3.4.2 This procedure appears to be more efficacious in patients whose atrial fibrillation has been of short duration (less than 1 year).

3.4.3 It was noted that there are variations in technique and radiofrequency energy

settings used for this procedure. It was also noted that it may be difficult to determine when full-thickness ablation has been achieved.

Further information

Sources of evidence

The evidence considered by the committee is in the overview.

Information for patients

NICE has produced information on this procedure for the patients and carers. It explains the nature of the procedure and the guidance issued by NICE, and has been written with patient consent in mind.

Update information

Minor changes since publication

January 2026: Interventional procedures guidance 121 has been migrated to HealthTech guidance 72. The recommendations and accompanying content remain unchanged.

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Endorsing organisation

This guidance has been endorsed by Healthcare Improvement Scotland.