

Ablation of The Atrioventricular Node and Pacemaker Implantation Information for Medical Professionals

Symptoms in Atrial Fibrillation arise principally from the rapidity and or irregularity of the pumping of the ventricles, the main pumping chambers of the heart. This occurs because the chaotic electrical activity of the upper heart chambers, the atria, bombards the atrioventricular node (AV node – the normal pathway for electrical activity flowing from the atria to the ventricles) and much of this electrical activity gets through this gateway, the result being rapid and irregular pumping activity. Although drugs in some patients can effectively control the gateway, thereby slowing and regularising the pumping of the ventricles, some patients do not respond to these drugs adequately. These patients tend to continue to be symptomatic of their rapid and irregular heart, or if their Atrial Fibrillation is of the sort that starts and stops, interspersed by normal rhythm (paroxysmal) they may be highly symptomatic as the heart switches from one rhythm to another. Alternatively patients may be intolerant of the sorts of drugs that control the AV node gateway.

If the decision has been made in such patients that the best thing for them is to continue along the lines of making efforts to control the rate and regularity of the ventricular pumping rather than a plan to attempt control or cure of the Atrial Fibrillation itself, there is a treatment option that involves closing the AV node gateway (by ablation – see procedure section) and thereby taking control of the ventricular pumping activity with implantation of a pacemaker (this whole treatment being referred to as “ablate-and-pace”- discussed below).

Ablate-and-pace was the first invasive approach to dealing with patients with atrial fibrillation. With the development of techniques that more effectively treat Atrial Fibrillation,

and in particular, treatments that control or cure the fibrillation itself, the practice of ablate-and-pace tends to be less commonly performed than previously but nevertheless remains a reasonable treatment option even in the most experienced and advanced atrial fibrillation centres. Reasons for this approach today would be a combination of:

- A highly symptomatic patient
- Failed efficacy of drugs controlling the AV node
- Lack of efficacy or tolerance of drugs to stabilise the atria in a normal rhythm
- Curative ablation excluded as an option because of:
 - Excessive risk to the patient
 - Likely ineffective
 - Patient decision
- Patient needing or already having a pacemaker for other reasons related to an excessively slow heart.
- Patients with sufficiently weakened heart muscle to require special pacing to strengthen heart function (biventricular pacing – resynchronization therapy)

Aims of this therapy

By preventing the chaotic electrical fibrillation activity from getting to the ventricles it no longer controls the rate and rhythm of heart pump function and this requires implantation of a pacemaker to maintain and control.

Advantages of this therapy

- The high rate and irregularity of the heart's pumping is totally abolished
- The rate of the heart can be controlled precisely by pacemaker programming

- It is relatively simple to perform
- Avoidance of drugs otherwise needed to help control the AV node

Disadvantages of this therapy

- Permanently destructive of the AV node gateway
- Permanently dependent on implanted pacemaker
- The Atrial Fibrillation is left to continue untreated
- Continued requirement for anticoagulation (Warfarin)
- Permanent pacing of the ventricles may not be good for heart pumping function long term

Procedure

Destruction (ablation) of the AV node gateway and the implantation of a pacemaker may be done in one procedure or as two separate procedures in either order. If the pacemaker is implanted as the first procedure (see section on pacemakers) this is often left to heal in for several weeks before the AV node ablation. If the AV node ablation is performed first this requires immediate pacemaker implantation at the same hospital visit. The procedure of AV node ablation is usually relatively simple and straightforward (and was the first type of ablation ever performed in clinical practice in the 1970s). If the pacemaker is implanted first it sometimes becomes apparent that ablation of the AV node gateway is not then required with the pacemaker alone improving overall symptoms significantly.

Evidence of patient benefit of this treatment

In the late 1980s and early 1990s there were many studies showing significant improvement of symptoms of patients undergoing AV node ablation and pacing. With response rates of about 80% of patients and low rates of complications from the procedure.

Role of this treatment in modern practice

Although performed less than previously, this treatment still has a place in modern practice. Because it is irreversible and permanently destroys the AV node gateway, requiring implantation of a pacemaker all alternatives need to have been considered and there needs to be the expectation that the patient will feel better with evidence of good ventricular function before undertaking this treatment. It does not abolish the need for Warfarin. This is treatment for symptoms only, doing nothing to stop the Atrial Fibrillation occurring.

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