Cryoablation versus radiofrequency ablation for treatment of atrioventricular nodal reentrant tachycardia: cryoablation with 6-mm-tip catheters is still less effective than radiofrequency ablation


Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
This study examined the clinical and economic impact of cryoablation versus radiofrequency ablation in patients with atrioventricular nodal re-entrant tachycardia. The authors concluded that cryoablation was less effective and more expensive than radiofrequency ablation, which should be recommended as the first-line treatment for this condition. The study had some methodological limitations that might affect the validity of the authors’ conclusions.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study examined the clinical and economic impact of cryoablation versus radiofrequency ablation in patients with atrioventricular nodal re-entrant tachycardia.

Interventions
Cryoablation with 6mm-tip catheters was compared with radiofrequency ablation.

Location/setting
UK/hospital.

Methods
Analytical approach:
The analysis was based on a single study with a short time horizon (median three months). The authors did not explicitly state the perspective adopted.

Effectiveness data:
The clinical data came from a prospective cohort study, in which 272 patients were identified between 2005 and 2008, using a hospital database. There were 123 patients (mean age 55 years; 84 female) in the cryoablation group and 149 patients (mean age 54 years; 100 female) in the radiofrequency ablation group. All patients were seen at three months or earlier if they had symptoms suggesting a recurrence. The main endpoint was the success rate, without the use of an alternative energy source, and no recurrence. Acute procedural success was defined as the inability to induce atrioventricular nodal re-entrant tachycardia and the presence of no more than a single atrial echo beat, during programmed atrial stimulation, at least 15 minutes after the final ablation lesion.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
The success rate (rate of acute procedural success plus no recurrence) was the summary benefit measure. The number and type of complications were also reported.

Cost data:
The economic analysis included the costs of medical staff within the electrophysiology laboratory (doctors and nurses)
and equipment used, ward costs including staff time and bed costs, pharmacy costs, overheads, all high-cost consumables including ablation catheters, and the costs of non-medical staff (managers, porters, and cleaners). The resource use data were derived from the sample of patients enrolled in the clinical study. The unit costs were from the hospital database. All costs were in UK pounds sterling (£).

Analysis of uncertainty:
Not investigated.

Results
The acute procedural success rate was 93% with cryoablation and 95% with radiofrequency ablation (p=0.8), while there was a statistically significant higher recurrence rate with cryoablation (10%) than with radiofrequency ablation (3%, p=0.02). The overall success rate was 83% with cryoablation and 93% with radiofrequency ablation (p=0.02).

The cost of the procedure was £3,141 with cryoablation and £2,153 with radiofrequency ablation. The average cost per successfully treated patient was £3,428 with cryoablation and £2,236 with radiofrequency ablation (p<0.0001).

There was only one major complication in the radiofrequency ablation group (complete atrioventricular block) and no complications in the cryoablation group.

Authors' conclusions
The authors concluded that cryoablation was less effective and more expensive than radiofrequency ablation, which was recommended as the first-line treatment for atrioventricular nodal re-entrant tachycardia.

CRD commentary
Interventions:
The selection of the comparators was appropriate as they appear to have been the relevant procedures for patients with atrioventricular nodal re-entrant tachycardia. A description of the two surgical procedures was given.

Effectiveness/benefits:
The clinical evidence came from the review of a prospective database and a major weakness was the lack of randomisation to allocate patients to treatment arms. The reasons for deciding to perform either procedure and who made this choice were unclear. The two groups were comparable at baseline, but selection bias cannot be ruled out. The size of the sample was not formally justified. The evidence was from a single institution and might not be generalisable to other patient populations, but the study is likely to have represented the usual clinical practice. The benefit measure was disease specific and clearly of importance for clinicians, but possibly not the most appropriate outcome for decision makers. Especially given that radiofrequency ablation was associated with a higher success rate, but also with the occurrence of the only major complication.

Costs:
The economic viewpoint was not explicitly stated, but those costs relevant to the hospital appear to have been included. The unit costs and quantities of resources used were not reported and neither was a list of cost items. All the economic data were from a single institution, which might not be representative of other medical centres. The cost estimates were treated deterministically and the impact of variations in them was not reported. The price year was not reported, which will hinder reflation exercises.

Analysis and results:
Average cost-effectiveness ratios were calculated to synthesise the costs and benefits of the two approaches, but an incremental analysis would have been more appropriate given the dominance of radiofrequency ablation over cryoablation, when comparing their success rates. The results were clearly presented. The issue of uncertainty was not investigated. The authors stated that the main limitation of their analysis was the use of a non-randomised observational study for the clinical data.

Concluding remarks:
The study had some methodological limitations that might affect the validity of the authors’ conclusions.
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