Single chamber atrial pacing: an underused and cost-effective pacing modality in sinus node disease

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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.

Health technology
Single chamber atrial pacing in patients with sinus node disease.

Type of intervention
Treatment and secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Patients with sinus node disease.

Setting
Tertiary referral centre. The economic study was carried out in Liverpool, UK.

Dates to which data relate
Effectiveness data corresponded to the patients undergoing pacemaker implants between 1992 and 1996. Resource use data were related to the period between 1995 and 1996. Prices refer to 1995/96 financial year.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
Costing was retrospectively performed on a larger patient sample than that used in the effectiveness analysis, and included all patients who would have had atrial pacemakers in 1995 and 1996.

Study sample
Power calculations were not used to determine the sample size. The study sample for patients undergoing single chamber pacemaker implant consisted of the records of 68 patients with a mean age of 71.8, median of 72, (range: 42-90) out of 81 who had single pacemaker implant between 1992 and 1996 (of whom 8 patients died between 1993 and 1997). The distribution of patients (n=343) with sinus node disease with no evidence of atrioventricular block, who underwent pacemaker implants between 1995 and 1996 was as follows: 19 (5.5%) patients with atrial pacemakers, 271 (79%) with dual chamber pacemakers, and 53 (15.5%) with ventricular pacemakers.
Study design
Retrodictive cohort study, carried out in single centre. The duration of follow-up was 108 months (mean 29.5, median 25). Loss to follow-up was 5 patients whose case notes could not be retrieved and examined.

Analysis of effectiveness
The principle used in the analysis of effectiveness was treatment completers only. The clinical outcome measure was the percentage of patients with single atrial pacemaker who required a pacemaker upgrade to a dual chamber system due to the development of high grade atrioventricular block.

Effectiveness results
The percentage of patients with single atrial pacemaker who needed a pacemaker upgrade to a dual chamber system due to the development of high grade atrioventricular block was 5.8% (4 patients).

Clinical conclusions
In this study (the authors) followed up patients retrospectively and found that the percentage of patients with single chamber atrial pacemakers who subsequently required an upgrade procedure was small and in keeping with other studies.

Methods used to derive estimates of effectiveness
The authors made assumptions about effectiveness.

Estimates of effectiveness and key assumptions
The authors implicitly assume that dual chamber pacemakers are at least as good as single atrial pacing.

Measure of benefits used in the economic analysis
No summary benefit measure was identified in the economic analysis, and only separate clinical outcome was reported.

Direct costs
Costs were not discounted because of the short time frame of the study. Quantities were reported separately from the costs only in terms of the number of pacemaker implants and revision procedures performed. Cost items were reported separately. Cost analysis covered the costs of single chamber pacemaker implants and revision procedures performed versus the corresponding costs of current practice in the study institution (involving the use of double chamber system as the main procedure). The perspective adopted in the cost analysis was that of the purchasers. The source of the resource use data was the medical records. The source of (average) cost data was the charges requested by the study institution. The date of the price data was 1995/96.

Indirect Costs
Not considered.

Currency
UK pounds sterling ().

Sensitivity analysis
Not conducted.
Estimated benefits used in the economic analysis
Not applicable.

Cost results
The total cost of current pacing practice in 1995-96 in 290 patients (19 atrial implants, 271 dual chamber implants, and 3 cases of upgrading to dual chamber pacemakers) was 1,108,071. The total cost of the alternative strategy involving the alteration of current pacing practice to the use of single atrial pacing as the main procedure (with an overall rate of 5.8% of requirement for upgrade to double chamber system) was 901,998, leading to a saving of 206,073 in all patients in 1995 and 1996.

Synthesis of costs and benefits
Not combined.

Authors' conclusions
Atrial pacing in patients with sinus node disease is underused. The need for patients to undergo further procedures owing to the development of atrioventricular block is small and changing pacemaker practice could make significant cost savings.

CRD COMMENTARY - Selection of comparators
The current policy in the study institution involving the use of dual chamber pacemakers as the main procedures in the context in question were regarded as the comparator. You, as a database user, should consider whether this is a widely used health technology in your own setting.

Validity of estimate of measure of benefit
The internal validity of the effectiveness results cannot be guaranteed due to the retrospective nature of the study design. It is not clear from the study to what extent the dual chamber pacemakers were superior to single atrial pacing, therefore it is difficult to judge whether it would have been more appropriate to conduct an incremental cost-effectiveness analysis. Also, 8 patients were not included in the analysis as they died between 1993 and 1997. The study was a cost-consequences analysis.

Validity of estimate of costs
Quantities were not fully reported separately from the costs. Adequate details of methods of cost estimation were given. Cost results may not be generalisable to other settings or countries. The study lacked a prospective cost analysis involving the detailed documentation of the resource use involved in single atrial pacing versus double pacemaker implants (it was reported that the double chamber system "is more complicated and time consuming" than the single chamber pacing).

Other issues
The authors' conclusion should be interpreted in the light of the retrospective nature of the study design. Sensitivity analysis and statistical analysis of costs were not conducted. The issue of generalisability to other settings or countries was not addressed, although, appropriate comparisons were made with other studies.

Implications of the study
"An ongoing multicentre international prospective study comparing ventricular pacing with synchronous atrioventricular pacing in patients with sinus node disease (the STOP-AF study) should provide the definitive answer to the question of whether single chamber ventricular pacing is appropriate in such patients."
Source of funding
None stated.

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