Management of the child with Wolff-Parkinson-White syndrome and supraventricular tachycardia: model for cost effectiveness

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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
Management of the child with Wolff-Parkinson-White (WPW) syndrome and supraventricular tachycardia (SVT).

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
A child between the ages of 5 and 21 years was considered to model the typical clinical situation: an infant with WPW has SVT beginning at 6 weeks of age, the tachycardia disappears between 1 and 5 years of age, and at age 5 years, SVT occurs.

Setting
Hospital. The study was set in the USA.

Dates to which data relate
Effectiveness and resource use data were collected from studies published between 1987 and 1994. The dates of the cost data were not stated. The price year was 1994.

Source of effectiveness data
The effectiveness data were derived from a literature review and expert opinion.

Modelling
A decision analytic model was used to determine the cost-effectiveness of the three management strategies.

Outcomes assessed in the review
The review assessed mortality and the course of WFW and SVT.

Study designs and other criteria for inclusion in the review
Not stated.
Sources searched to identify primary studies
Not stated.

Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Summary statistics from individual studies.

Number of primary studies included
At least 5 studies were included.

Methods of combining primary studies
Narrative method.

Investigation of differences between primary studies
Not stated.

Results of the review
The mortality rate with drug treatment was 1.5%. Surgical and catheter ablation mortality rates were 0.5% (range: 0 - 1%) and 0.25%. The assumptions for the course of the disease were as follows. With medical treatment the patient had 1.5 rare episodes of SVT per year. Once in the 16-year period, the patient would be hospitalised for 7 days for regulation of anti-arrhythmic drugs. The patient would be seen approximately once per year in the clinic, but in half of the years, due to episodic recurrences, there would be two clinic visits per year. In the case of surgery at the age of 5 years, the patient would have had two episodes of SVT, two clinic visits, and would have taken medicine for approximately 6 months prior to making the decision for surgery. Assuming a surgical cure, there would be two follow-up clinic visits. For a surgical failure, the patient would revert to the medical treatment arm. Similar assumptions on episodes of SVT and clinic visits were made for catheter ablation.

Methods used to derive estimates of effectiveness
Seven cardiologists, using a Modified Delphi technique for relative severity of a 1-hour time period, were enrolled in the study. The morbidity index was derived using the concept of magnitude estimation.

Estimates of effectiveness and key assumptions
The morbidity estimates were as follows: clinic visit, 0.3 units; episode of SVT, 1 unit; medical hospitalisation, 56 units; surgical hospitalisation, 72 units; catheter ablation hospitalisation, 20 units.

Measure of benefits used in the economic analysis
Mortality and morbidity were used as the measures of benefits.

Direct costs
Direct costs were discounted at an annual rate of 5%. Quantities and costs were not reported separately. Direct costs were based on charges, and included the costs of drug treatment, surgery, and catheter ablation. The quantity/cost boundary adopted was that of the health service. The estimation of quantities and costs was based on actual data. The medication cost was based on an average of digoxin, propranolol, verapamil, and flecainide. The price year was
reported.

**Indirect Costs**
Indirect costs were not included.

**Currency**
US dollars ($).

**Sensitivity analysis**
Sensitivity analyses were conducted on the percentage success of surgery and catheter ablation, surgery and catheter ablation second procedure, severity of medical hospitalisation, duration in recovery room for catheter ablation, clinic visits, and costs.

**Estimated benefits used in the economic analysis**
Overall morbidity was 87.2 units for medical treatment, 76.9 units for surgical strategy, and 27.6 units for catheter ablation. Mortality was 1.5% for medical treatment, 0.53% for surgical strategy, and 0.40% for catheter ablation.

**Cost results**
Total costs amounted to $30,194 for medical treatment, $44,480 for surgical strategy, and $17,236 for catheter ablation.

**Synthesis of costs and benefits**
Costs and benefits were not combined into cost-effectiveness ratios. When the severity of medical hospitalisation was changed to 0.25 units, medical treatment became preferable to surgery. Nonetheless, catheter ablation remained preferable to the other two alternatives. If SVT occurred once every 2 years, medical treatment became preferable to surgery. Nonetheless, catheter ablation remained preferable to the other two alternatives.

**Authors’ conclusions**
Catheter ablation has lower cost, mortality, and morbidity than either medical management or surgery and is the treatment of choice for the child aged 5 years or older with WPW and SVT.

**CRD COMMENTARY - Selection of comparators**
A justification was given for the comparators used, namely current management options. You, as a user of the database, should decide if these health technologies are relevant to your setting.

**Validity of estimate of measure of benefit**
The authors did not state that a systematic review of the literature had been undertaken. More details could have been provided about the design of the review and the method of combining primary effectiveness estimates. Additional data were collected from 7 cardiologists using a Modified Delphi technique. The morbidity index was derived using the concept of magnitude estimation, which was appropriate. The estimation of benefits was obtained directly from the effectiveness analysis. The effect of catheter ablation on coronary stenosis or arrhythmogenesis was not considered. Morbidity data were not available for drug treatment or post-surgery. The morbidity index was developed by physicians. Individual patient preferences need to be considered as well.

**Validity of estimate of costs**
Some good features of the cost analysis were that all relevant cost categories were included, the price year was reported and sensitivity analyses were conducted on costs and on quantities. However, the validity of the cost analysis was limited by the fact that cost estimates were based on charges and quantities and costs were not reported separately.

**Other issues**
The authors did not make appropriate comparisons of their findings with those from other studies and the issue of generalisability to other settings was not addressed. The authors did not present their results selectively. The study considered children 5 years of age or older with WPW and SVT and this was reflected in the authors’ conclusions.

**Implications of the study**
The authors suggest that catheter ablation is the treatment of choice for the child aged 5 years or older with WPW and SVT. This type of analysis could be used for other forms of chronic disease in children.

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