TITLE: 200J Rectilinear Biphasic Waveform and 360J Truncated Biphasic Waveform Defibrillators: Clinical Effectiveness and Equivalency

DATE: 26 March 2010

RESEARCH QUESTIONS:

1. What is the clinical effectiveness of 200 joule (J) rectilinear biphasic waveform and 360J truncated biphasic waveform monitored defibrillators?

2. What is the clinical equivalency of 200J rectilinear biphasic waveform and 360J truncated biphasic waveform monitored defibrillators?

3. What are the guidelines for the use of 200J rectilinear biphasic waveform versus 360J truncated biphasic waveform monitored defibrillators?

METHODS:

A limited literature search was conducted on key health technology assessment resources, including PubMed, the Cochrane Library (Issue 3, 2010), University of York Centre for Reviews and Dissemination (CRD) databases, ECRI (Health Devices Gold), EuroScan, international health technology agencies, and a focused Internet search. The search was limited to English language articles published between 2005 and March 2010. No filters were applied to limit the retrieval by study type. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

RESULTS:

HTIS reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented.
first. These are followed by randomized controlled trials, controlled clinical trials, observational studies, and evidence-based guidelines.

Two randomized controlled trials, one observational study, and two evidence-based guidelines were identified pertaining to the use of 200J rectilinear biphasic waveform and 360J truncated biphasic waveform monitored defibrillators. No relevant health technology assessment reports, systematic reviews, meta-analyses, or controlled clinical trials were identified. Additional information that may be of interest has been included in the appendix.

OVERALL SUMMARY OF FINDINGS:

Data from a randomized controlled trial that directly compared biphasic truncated exponential (BTE) waveform defibrillation and biphasic rectilinear (BR) waveform defibrillation, both using shock escalating protocols, indicated similar success rates between the two types of defibrillation. While less energy was delivered in the BTE group, no difference in efficacy was found and complication rates were low in both groups.

Although the type of biphasic waveform was not specified, a randomized trial compared an escalating protocol (100 J, 150 J, 200 J, 200 J) to a non-escalating energy protocol (200J). Success after one shock was more common for patients randomized to receive 200J versus 100J only in patients with a body mass index (BMI) >25 kg/m². Impedance compensated biphasic waveform was used for cardioversion.

The identified observational study examined the effectiveness of an escalating protocol to deliver shocks with a truncated biphasic waveform defibrillator with respect to reduction in transthoracic impedance (TTI). Sequential truncated biphasic defibrillation resulted in successful cardioversion and decreased TTI.

The American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular care state that although the optimal energy for first-shock has not been determined, both types of lower-energy biphasic waveform shocks are effective. Ideal doses are those that fall within the range of what has been specified for the device, but reasonable first doses may be 150J to 200J for biphasic truncated waveforms and 120J for biphasic rectilinear waveforms. The Scottish Collegiate guideline for Cardiac Arrhythmias in Coronary Heart Disease states that biphasic defibrillation is the recommended waveform, but does not specify truncated or rectilinear or dose.

Overall, limited evidence is available pertaining to the clinical effectiveness and equivalency of 200J rectilinear biphasic waveform and 360J truncated biphasic waveform monitored defibrillators. Evidence from one randomized trial indicates that they may be equally effective. No guidelines were identified that recommended the use of one type of biphasic waveform over the other.
REFERENCES SUMMARIZED:

Health technology assessments
No literature identified.

Systematic reviews and meta-analyses
No literature identified.

Randomized controlled trials


Controlled clinical trials
No literature identified.

Observational studies


Guidelines and recommendations


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APPENDIX – FURTHER INFORMATION:

Review articles


Manufacturer information


Additional references
