Multicenter comparison of truncated biphasic shocks and standard damped sine wave monophasic shocks for transthoracic ventricular defibrillation.


Purpose
To compare the first shock efficacy of the low-energy, impedance-compensating SMART Biphasic truncated exponential defibrillation waveform (Philips Medical) to that of a high-energy monophasic damped sine waveform with short duration VF.

Methods
- Multicenter, blinded, randomized, prospective study of 294 patients receiving defibrillator rescue shocks to short duration VF during implantable cardioverter-defibrillator (ICD) procedures.
- Primary endpoint: First shock defibrillation efficacy of a 130 Joule SMART Biphasic waveform, compared to a 200 J monophasic waveform. Secondary endpoint: First shock efficacy with a 115 J SMART Biphasic waveform and a 360 J monophasic waveform.

Findings
- There was no statistical difference in first shock efficacy between either the 115 or 130 J SMART Biphasic waveform and the 200 or 360 J monophasic waveform.
- There was, however, a statistically significant change in ST-segment from baseline with the 200 and 360 J monophasic (-1.86 and -3.25 mm, respectively; p < 0.05), but not with the 115 or 130 J SMART Biphasic waveform (-0.32 and -0.26 mm, respectively).

Conclusions
- Low-energy (115 and 130 J) transthoracic SMART Biphasic first shock efficacy was equivalent to high-energy (200 and 360 J) monophasic shocks.
- Low-energy (115 and 130 J) SMART Biphasic waveform shocks were not associated with post-shock ST-segment change, whereas monophasic waveform shocks (200 and 360 J) were both associated with significant changes from baseline. The authors concluded: "Such [ECG] abnormalities are likely to be magnified in patients receiving multiple shocks."