Fixed-energy biphasic waveform defibrillation in a pediatric model of cardiac arrest and resuscitation.


Purpose
To evaluate defibrillation efficacy and postresuscitation myocardial function and survival in immature, healthy piglets with weights corresponding to human subjects ranging from newborn to 8 years using a fixed, 50 Joule (J) impedance-compensating biphasic truncated exponential (BTE) waveform (Philips Medical Systems).

Methods
- Prospective, randomized study
- Ventricular fibrillation (VF) was induced and left untreated for 7 minutes, at which time 50 J shocks were delivered to piglets ranging from 3.7 to 25 kilograms (kg), following standard resuscitation protocol. A porcine model was chosen because the chest configuration, anatomy, and physiology is similar to that of humans.
- Upon return of spontaneous circulation and at prescribed periods postresuscitation, neurological alertness and a variety of hemodynamic and myocardial functions were measured.

Findings
- All animals were successfully resuscitated.
- Despite a seven-fold difference in weight, fixed-energy 50 J shocks were associated with no change from baseline in measures of cardiovascular or neurological function at 4 hours post-shock.

Conclusions
The authors state, “Our findings support the use of a fixed, 50-J, low-energy biphasic waveform defibrillation for immature animals ranging in weight from 3.7 to 25 kg without adverse effects on postresuscitation myocardial function and survival.”