

Does Biphasic Defibrillation

Improve Clinical Outcomes of Cardiac Arrest?

Kimberly Freeman, MD, Gregory W. Hendey, MD, Geoff Stroh, MD and Marc Shalit, MD; UCSF Fresno, Medical Education Program, Fresno, CA

OBJECTIVE

- Many EMS systems have implemented biphasic defibrillators despite a paucity of human outcome data to support the change
- Our objective was to compare the outcomes of cardiac arrest victims treated with prehospital monophasic or biphasic defibrillation in an urban EMS system

METHODS

DESIGN: Retrospective case review was conducted on electronic prehospital and hospital records for victims of prehospital cardiac arrest in whom a defibrillator was utilized.

STUDY PERIOD: August 2000 to July 2004. This time span includes two years before and two years after implementation of biphasic defibrillators.

SETTING: Fresno County EMS Agency, Fresno, CA.

MAIN OUTCOME MEASURES: Return of spontaneous circulation (ROSC), survival to hospital discharge, and the percentage of patients discharged to home rather than to an extended care facility.

STATISTICS: Between-group comparisons were accomplished using t-tests and Fisher's exact test as appropriate.

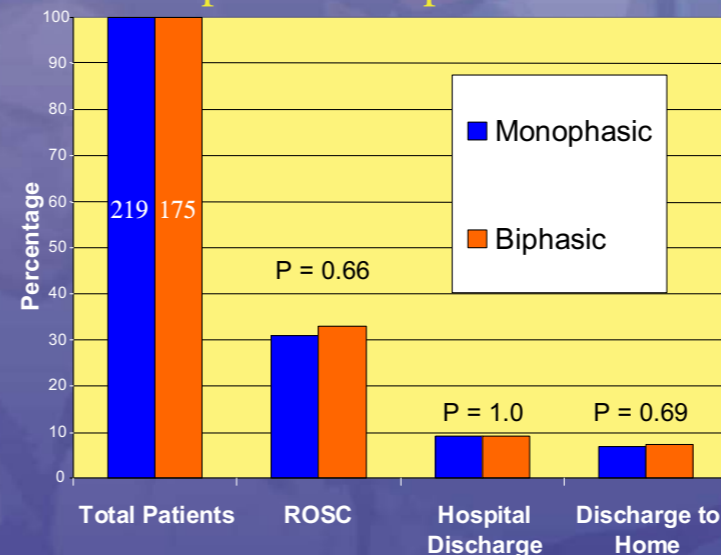
RESULTS

- 394 cases of cardiac arrest in Fresno County during the study period that met inclusion criteria and had records available for review
- 219 patients were treated with monophasic defibrillation, and 175 patients were treated with biphasic defibrillation
- There were no statistically significant differences in age, gender or initial rhythm between the biphasic and monophasic groups (see table)
- ROSC was achieved in 68 (31%) of 219 patients in the monophasic group, and in 58 (33%) of 175 in the biphasic group ($p=0.66$) (see figure)
- Survival to hospital discharge was identical in both groups (9.1%, $p=1.0$). Discharge to home with good neurologic function was accomplished in 14 (6.3%) of the monophasic patients and in 13 (7.4%) of the biphasic group ($p=0.69$)

Patient Profile

	Monophasic	Biphasic	p-value
number	219	175	
age (mean)	63	62	
male	64%	67%	
bystander CPR	24%	23%	
Initial Rhythm			
VT	5%	3%	0.5
VF	42%	34%	0.12
Asystole	26%	23%	0.6
PEA	13%	17%	0.4

Monophasic vs Biphasic Survival



CONCLUSIONS

We found no differences in ROSC or survival to hospital discharge between monophasic and biphasic defibrillation in the treatment of prehospital cardiac arrest.

LIMITATIONS

- Retrospective case review, with selection bias:
 - Only included cases in which defibrillator used
 - Bias toward inclusion of VT/VF patients, higher survival
- Included only patients with electronic record
 - Bias toward urban patients
- Potential advantages of the biphasic waveform not studied:
 - Lower energy may produce less myocardial damage in survivors
- No systematic assessment of neurologic outcomes in survivors

