Volunteers trained in CPR and use of automated external defibrillators increased survival after out of hospital cardiac arrest


Do more patients with out of hospital cardiac arrest survive to hospital discharge when response teams of lay volunteers trained in cardiopulmonary resuscitation (CPR) also use automated external defibrillators (AEDs)?

**METHODS**

**Design:** cluster randomised controlled trial (Public Access Defibrillation [PAD] Trial).

**Allocation:** (not concealed).*

**Blinding:** blinded (data collectors and outcome assessors).

**Follow up period:** to hospital discharge. Community units were involved for a mean 22 months.

**Setting:** 993 community units in 24 North American regions.

**Patients:** patients ≥8 years of age with out of hospital cardiac arrest.

**Intervention:** 993 community facilities (eg, shopping malls, recreation centres, hotels, and apartment complexes) were eligible for randomisation as a community unit, either individually or as a group if they had a pool of lay volunteer responders able to deliver an AED within 3 minutes to a person having cardiac arrest and could expect ≥1 out of hospital cardiac arrest during the study period. Facilities with onsite personnel with a duty to respond or those with existing AED programmes were excluded. Community units were stratified for centre and location (residential or public) and allocated to a CPR plus AED response system (n = 496 units [77 residential, 419 public]) or a CPR only response system (n = 497 units [80 residential, 417 public]). Volunteer responders were trained according to American Heart Association guidelines with scheduled retraining.

**Outcomes:** number of patients with definite out of hospital cardiac arrest surviving to hospital discharge. Secondary outcome was number of patients with definite or uncertain out of hospital cardiac arrest surviving to hospital discharge.

**Patient follow up:** all discovered cardiac arrests were included (intention to treat analysis).

*Information provided by author.

**MAIN RESULTS**

235 cardiac arrests were classified as definite, and 4 were classified as probable or uncertain. The number of definite out of hospital cardiac arrests was 128 in the CPR plus AED group and 107 in the CPR only group (p = 0.09). More patients in the CPR plus AED group survived to hospital discharge than patients in the CPR only group (30 v 15, relative risk 2.0, 95% CI 1.07 to 3.77). All but 2 survivors (1 in each group) were in public units.

**CONCLUSION**

Among patients with out of hospital cardiac arrest, more survived to hospital discharge when response teams of lay volunteers trained in cardiopulmonary resuscitation also used automated external defibrillators.

A modified version of this abstract appears in ACP Journal Club.

**Commentary**

Previous studies have shown that use of AEDs significantly improves outcomes for in hospital and out of hospital cardiac arrest.\(^1\)\(^2\) The PAD Trial investigators studied the difference in outcome delivered by adding use of AEDs to training lay personnel in diverse community settings. Volunteers within these settings were trained according to American Heart Association guidelines for CPR and emergency cardiovascular care. The findings show that teaching CPR plus AED use will increase survival after cardiac arrest.

As is relatively common in clinical trials, the study observed much higher than anticipated rates of survival in the standard care (CPR only) group. This suggests that the trial has underestimated the effect likely to be found when implementing AED use in real world settings. AEDs seem to be safe in the hands of lay volunteers; no inappropriate shocks were given, and any adverse events were related to transient psychological trauma to volunteers and stolen AEDs. It is also noteworthy that the groups did not differ for cerebral performance at discharge. However, the study was not powered for this outcome, so the finding should be viewed cautiously.

The PAD trial does not address the many cardiac arrests that occur in the home, and the findings should not be considered relevant to this population. However, the findings are relevant to facilities likely to service large volumes of people >35 years of age: retirement villages, cardiac rehabilitation programmes, large factories, major transport nodes (eg, airports and central railway stations), shopping centres, and swimming pools are some of the settings that should consider the purchase of AEDs in addition to maintaining trained response teams that receive regular updates. Where facilities already have response teams, the marginal cost of purchasing AEDs will be relatively low when all costs are considered.

Sidney Culhertson, RGN, MPHc, CONS Auckland District Health Board Auckland, New Zealand
