Defibrillation Strategies for Ventricular Fibrillation: Which Produces the Best Outcome?

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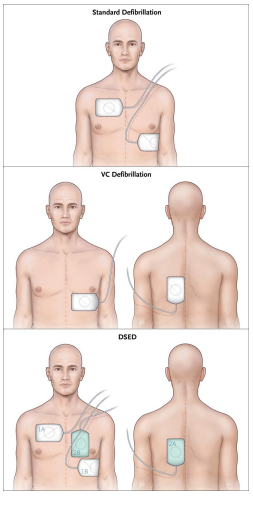
1. INTRODUCTION

Nearly one out of every three out-of-hospital cardiac arrest deaths are caused by ventricular fibrillation, an irregular heartbeat that prevents the lower heart chambers from pumping blood effectively.[1] Defibrillation can be used to restore a normal heart rhythm, however, almost half of patients still remain in ventricular fibrillation.[1] Double sequential external defibrillation (DSED) is a technique that provides a rapid sequence of shocks from two defibrillators with a pad placed in anterior-lateral and anterior-posterior positions on the patient.[2] Vector-change (VC) defibrillation is the technique of switching defibrillation pads from anterior-lateral to anterior posterior position.[2] These techniques have been described in case reports and studies as a last-resort option and are thus confounded by resuscitation time bias.[1] Cheskes et al. aimed to determine the effectiveness of DSED and VC compared to standard defibulation in patients with ventricular fibrillation during out-of-hospital cardiac arrest.[1]



This figure shows various pad placements for different methods of ventricular fibrillation, standard, VC and DSED.[1]

2. PRIMARY FINDINGS

The study employed six Canadian paramedic groups and randomly assigned a defibrillation technique, standard, DSED and VC to treat patients with ventricular fibrillation.[1] The primary outcome was survival to hospital discharge, however, the study also tested for the termination of ventricular fibrillation, return of circulation (normal pulse and blood pressure), and a good neurologic outcome.[1] Of the 405 enrolled patients, both the DSED group and VC had a higher rate of survival at 30.4% and 21.7% respectively, compared to the standard group's 13.3%.[1] Furthermore, the DSED but not VC group had a significantly higher percentage of patients with a good neurologic outcome than the standard with 27.4% of DSED patients having a good outcome compared to 11.2% of standard patients.[1]

3. HOW THIS IMPACTS PATIENT CARE

The study's findings contradict past observational studies which showed no benefit of DSED or VC defibrillation compared to standard.[1] Survival to hospital discharge occurred more frequently in those who received DSED or VC defibrillation as opposed to standard defibrillation.[1] Although DSED had the best outcomes, due to the difficulty of having 2 defibrillators, the study suggested that VC defibrillation may be effective as an alternate treatment for ventricular fibrillation and could reduce patient mortality in out-of-hospital cardiac arrest cases.[1] The study also suggests that increasing defibrillation energy through the use of DSED could play a role in terminating ventricular fibrillation. [1] Because the study involved urban and rural areas and supported the use of different defibrillators, these findings may be broadly generalizable.[1]

REFERENCES

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Claire joined RAP-EMCC to help find ways to improve patients' experiences and explore the field of emergency medicine. She looks forward to gaining research experience and expanding her clinical and research skills. In her free time, she enjoys watching sci-fi movies, creating digital art and animation and drinking coffee.