A descriptive analysis of prehospital refractory ventricular fibrillation

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Introduction

- When repeated defibrillations fail to terminate ventricular fibrillation (VF), it is classified as refractory ventricular fibrillation (RVF)
- Aside from standard ACLS, there is little evidence on appropriate novel treatments for RVF
- There is also little data on prehospital factors associated with RVF
- Double sequential external defibrillation (DSED) has been proposed as a potential viable treatment strategy

Objectives

- Provide a descriptive analysis of patients in an urban EMS system with RVF
- Describe the frequency that DSED may have been utilized in this patient population

Methods

- A retrospective chart review of Ambulance Call Records (ACRs) for out-of-hospital cardiac arrest was performed for the period of Mar. 1, 2012 - Apr. 1, 2016
- RVF defined as ≥ 5 defibrillations
- Patient factors of interest included age and gender
- Clinical factors collected included time from EMS activation to arrival at patient/time to first shock, and bystander CPR
- Descriptive characteristics and clinical factors compared between RVF and non-RVF using Chi-square and t-test where appropriate
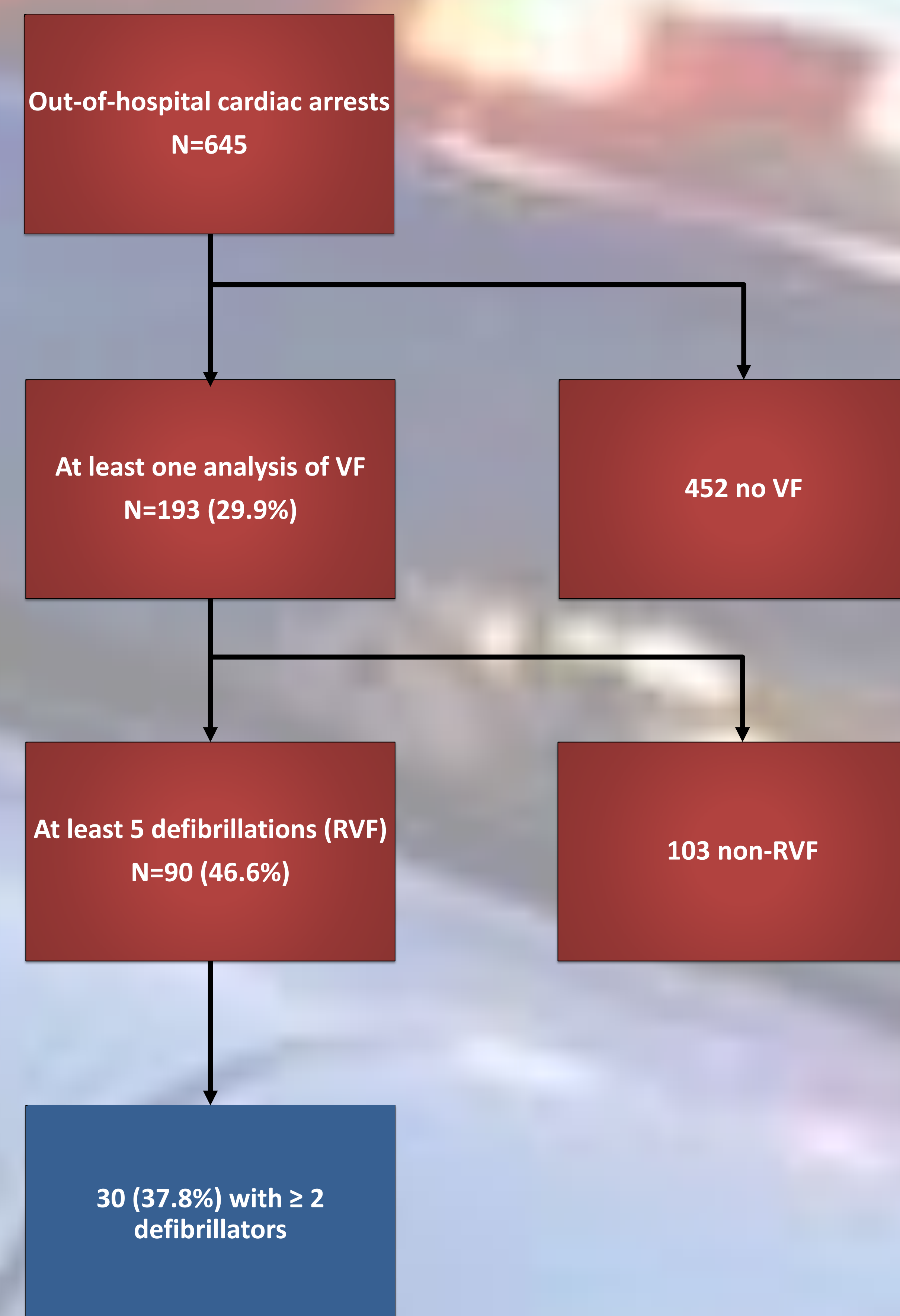

Figure 1. Patient flow of out-of-hospital cardiac arrests during study period.

Results

- Between Mar. 1, 2012 and Apr. 1, 2016 there were 645 out-of-hospital cardiac arrest calls
- 193 (29.9%) of these involved at least one analysis of VF, and 90 (13.9%) of total cases were identified as RVF
- 34 (37.8%) of RVF cases had two or more defibrillators on scene
- There was no difference between the RVF and non-RVF groups with respect to age (65.02 vs 67.28, p=0.313) or gender (p=0.132)
- There were no differences between the RVF and non-RVF groups with respect to any prehospital factors, including time from activation to arrival at patient (9.00 min vs 8.73 min, p=0.610), time to first shock (11.31 min vs 12.63 min, p=0.122)
- There was no difference between groups for incidence of bystander CPR (p=0.840)

Conclusions

- In this study population, nearly half of all out-of-hospital cardiac arrests involving VF were refractory
- Almost 40% of these cases had the potential for DSED to be utilized as a treatment strategy
- There were no measured prehospital patient factors or provider factors that were associated with RVF in this study
- Further efforts need to be made to identify those at risk for RVF as well as potential beneficial treatment strategies