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Letter to the Editor

Importance of the distinction between recurrent and shock-resistant ventricular fibrillation: Call for a uniform definition of refractory VF

Sir,

With great interest we read the article on double sequential defibrillation (DSD) for refractory ventricular fibrillation (VF) during out-of-hospital cardiac arrest (OHCA).[1] The authors provide an extensive overview of the available evidence on DSD, a treatment strategy aimed to improve the outcome of patients with refractory VF. In this study, another important issue is highlighted that goes beyond the scope of DSD alone, i.e. the lack of a universal definition of a patient with refractory VF.

In the guidelines, refractory VF refers to VF that persists despite shock delivery (i.e. shock-resistant VF). This is distinguished from recurrent VF, which is VF that re-appears after it has been terminated.[2] Importantly, some studies on refractory VF include only patients with shock-resistant VF, whereas others include all patients that need multiple shocks, regardless of the type of VF. In the latter, it is likely that patients with both recurrent and shock-resistant VF have been included. This was also the case in at least one of the two studies included in the meta-analysis by Delorenzo et al.[1]

However, the distinction between recurrent and shock-resistant VF seems important, as the type of VF impacts chances of shock success.[3] Appreciating that outcome has been related to the number of shocks needed, distinction between these two VF-types may also have prognostic consequences.[4]

To explore this issue, we selected VF-patients with ≥3 shocks and analysable ECG-recordings (n = 86) from our previously published OHCA-cohort.[5] We classified shocks as given for recurrent (recurring after initial termination) or shock-resistant VF (failing to terminate), and calculated the proportion of shocks on shock-resistant VF per patient.

Secondly, we divided the cohort into quartiles of patients with increasing proportions of shock-resistant VF. We calculated survival to hospital discharge per quartile. Fig. 1 shows that the higher the proportion of shock-resistant VF, the fewer patients survive to discharge (p for trend = 0.04).

Although this observation requires further confirmation, distinction between recurrent and shock-resistant VF may carry important implications for the observed direction and magnitude of benefit when interventions for 'patients with refractory VF' are studied. Delorenzo et al. should therefore be commended for their sub-analysis with specific focus on patients with shock-resistant VF, even though data were limited, and no differences from the overall analyses were found.[1] However, the article only shortly touched upon the rationale for this distinction. Other than from a clinical perspective (prognostic difference), it would be interesting if the authors have information on potential electrophysiological arguments to make the distinction.

In an era of defibrillators with see-through ECG technology that enable detection of VF during chest compression delivery, a more uniform, systematic in-field distinction between recurrent and shock-resistant VF will be facilitated. Future studies may therefore address more clearly defined populations in need for multiple shocks, where refractory VF should be restricted to shock-resistant VF only.

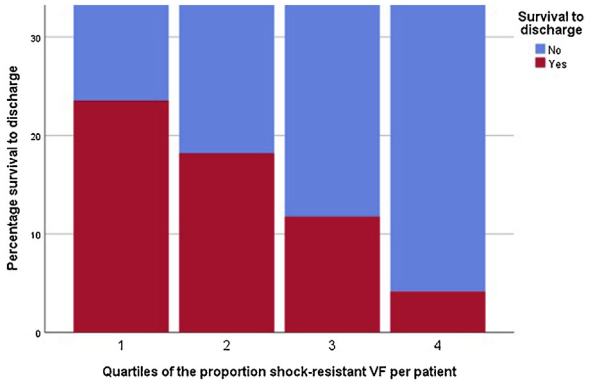

Fig. 1 – Survival to discharge and the proportion of shock-resistant VF per patient.
Percentage survival to discharge for increasing quartiles of the proportion of shocks for shock-resistant VF. Patients in quartile 1 have the lowest and in quartile 4 the highest proportion of shocks on shock-resistant VF. VF: ventricular fibrillation.

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Conflicts of interest

None.

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