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Case Report

The First Reported Use of Dual Sequential Defibrillation in UAE with a Successful Survival to Hospital Discharge Outcome

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Abstract

Refractory ventricular fibrillation (RVF) presents a challenge in cardiac resuscitation, with limited guidelines for management. Dual Sequential Defibrillation (DSD) has been proposed as a potential intervention, with varying success rates reported globally. Here, we present the first reported case of successful DSD utilization in the United Arab Emirates (UAE), resulting in survival to hospital discharge with favourable neurological recovery. A 41-year-old male with RVF was refractory to standard ACLS measures but responded to DSD, underscoring its potential as a salvage therapy in such scenarios.

Keywords: Case Report; Dual Sequential DC Shock; Resistant VF; Refractory Ventricular Fibrillation; Shockable Rhythm; Refractory VF; Dual Sequential Defibrillation

Introduction

Refractory ventricular fibrillation (RVF) poses a significant challenge during cardiac arrest, with limited therapeutic options beyond standard ACLS measures. Dual Sequential Defibrillation (DSD) involves the simultaneous use of two defibrillator devices, offering a potential strategy for terminating RVF. Despite not being included in current guidelines, DSD has shown promise in terminating RVF in select cases [8]. We present a case highlighting the successful application of DSD in a patient with refractory ventricular fibrillation, emphasizing its potential as a salvage therapy in cardiac resuscitation.

Case Presentation

A 41-year-old male presented with acute chest pain and subsequently experienced cardiac arrest. Despite standard ACLS measures, including multiple defibrillation attempts and amiodarone administration, the patient remained in refractory ventricular fibrillation. DSD was employed as a last resort, resulting in successful termination of RVF and restoration of normal sinus rhythm. The patient underwent further interventions, including thrombolysis and coronary intervention, with subsequent discharge without neurological sequelae.

Timeline

2023-02-14 At 20:58: Code Blue announced, CPR started. At 21:00: Rhythm check showed VF, first shock delivered (Biphasic 150 J).At 21:01: Patient was intubated. Wave capnography applied. At 21:05: Amiodarone 300 mg IVP At 21:07: Amiodarone 150 mg IVP	
2023-02-14	At 21:18: total 12 CPR cycles and 9 standard biphasic defibrillations given. At 21:20:Refractory VF, Dual Sequential Defibrillation shock delivered. CPR resumed. At 21:22: ROSC achieved. At 21: 24: ECG showed anterior wall STEMIAt 21: 25: Thrombolysis
2023-02-15	At 00:15 Cath lab (3 vessels stents) At 01:28 Targeted temperature protocol applied (ICU)
2023-03-01	ICD inserted
2023-03-04	Discharged home (ambulatory)

Table 1

Discussion

Refractory ventricular fibrillation poses a significant clinical challenge, with limited options for management. DSD offers a potential salvage therapy in such cases, as demonstrated in our report. While current guidelines do not recommend DSD, emerging evidence suggests its efficacy in select cases of RVF [2-7]. Further research is warranted to elucidate the optimal indications and techniquesfor DSD utilization.

Timeline			
Date	Time	Status	Medical intervention
14/02/2023	20:57	Patient reached the ED	
	20:58	Unresponsive, pulseless, breathless	Code blue announced, CPR started
	21:00	Rhythm check VF (shockable rhythm)	1st shock delivered
	21:00	Rhythm continued to be VF	Patient was intubated
	20:18	Still VF	12 CPR cycles, 9 standard shocks
	21:20	Refractory VF	DSD given
	21:22	ROSC achieved	Order vitals & ECG
	21:25	ECG done: STEMI (anterior wall)	Thrombolysed after ROSC
	23:25	Reached other hospital	Received in Cath lab
15/02/203	00:15	Cath lab	PCI 3 vessels
	01:28	Shifted to ICU	Started hypothermia protocol
01/03/2023	12:50	Recent history of two episodes of VF	ICD inserted
04/03/2023	11:30	Awake, oriented stable vitally, independent	Discharged home
01 May 2023		Patient is ambulatory visited the cardiology OPD for follow-up & medication refill	Cardiology visit in MZH

Figure 1: Customized timeline.

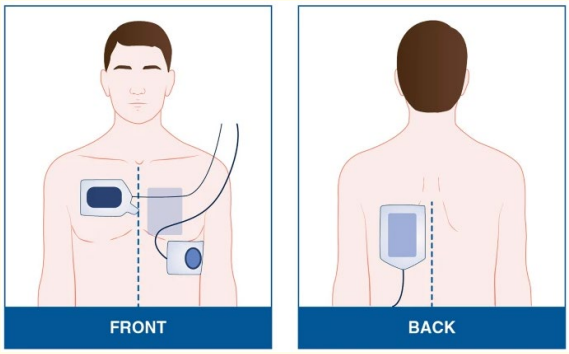

Figure 2: DSD pads applications (front and back).

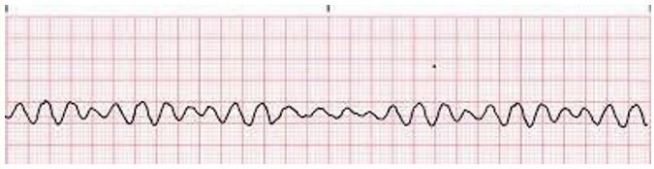

Figure 3: ECG rhythm Strip showing ventricular fibrillation (VF).

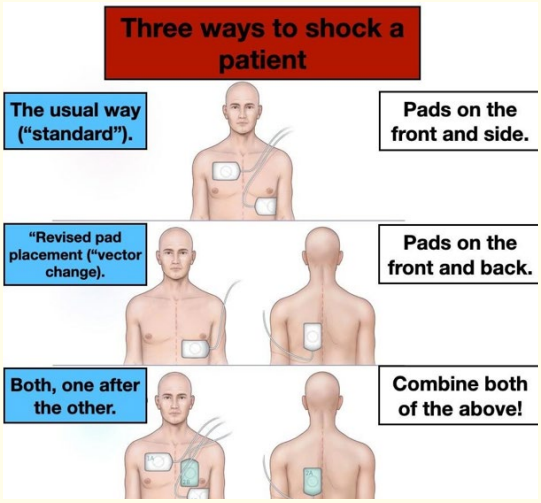

Figure 4: The 3 ways to put the Defibrillator pads.

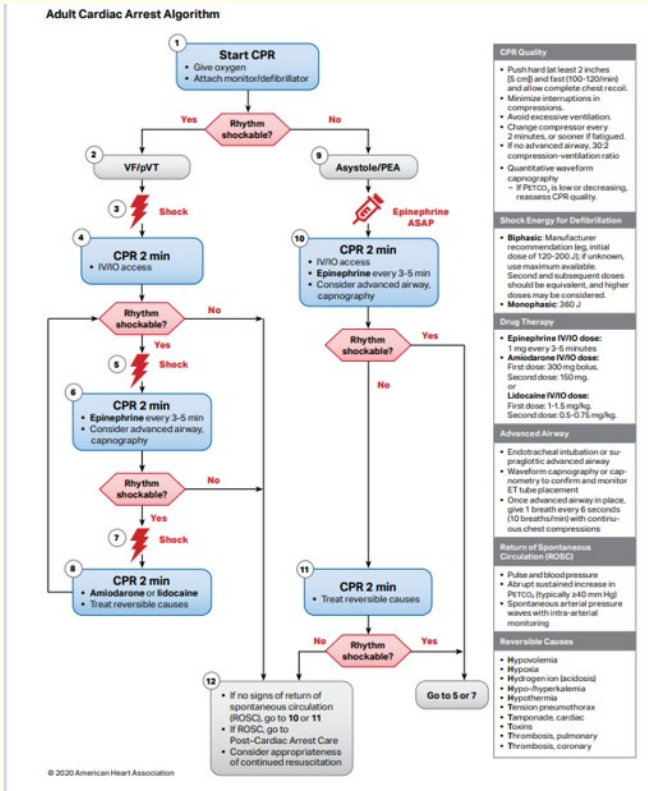

Figure 5: AHA ACLS 2020 Algorithm.

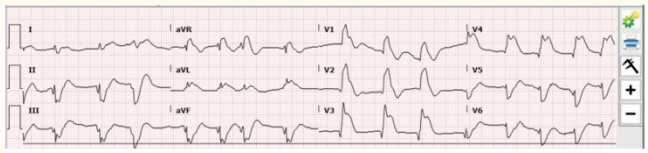

Figure 6: Post-ROSC ECG showed extensive STEMI.

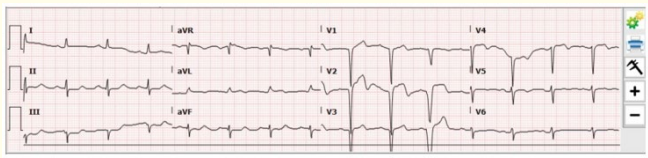

Figure 7: Post PCI triple vessel stenting.

Figure 8: ECG-Post AICD insertion.

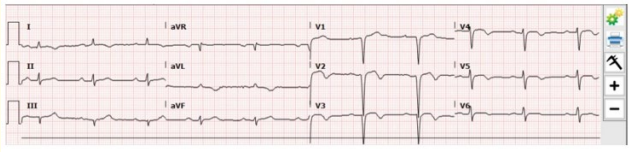

Figure 9: Follow-up ECG, post-discharge.

Conclusion

The successful utilization of Dual Sequential Defibrillation in our case underscores its potential as a salvage therapy for refractory ventricular fibrillation. Despite current guidelines not recommendingits routine use, our report highlights the need for further exploration of DSD's role in cardiac resuscitation. Future studies are warranted to delineate its optimal indications and techniques, potentially reshaping clinical practice in cardiac arrest management [9].

All authors approved the final manuscript as submitted and agree to be accountable for all aspects ofthe work.

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