Poster No. 117

Stomped by the Storm : Electrical Storm in a Patient with Cardiac Resynchronisation Therapy Device

N WANSHAH[1], K KANESAN[1], VBJ LIM[1], NA AYOP[1]
[1]Hospital Seberang Jaya, Pulau Pinang, Malaysia.

INTRODUCTION

Electrical storm (ES) is characterized by the occurrence of three or more ventricular arrythmias within 24 hours. As for a patient with implantable cardioverter defibrillator (ICD), including cardiac resynchronization therapy (CRT) plus ICD (CRT-D), an electrical storm is defined as the occurence of three or more appropriate therapy delivered by the device within 24 hours[1] .The incidence of ES ranges between 4.2-9.0 % in patient with ICD. ES is linked to significant adverse clinical outcome[2].

CASE REPORT

A 52-year-old male with a history of diabetes mellitus type 2, dyslipidaemia, and non-ischemic dilated cardiomyopathy post CRT-D placement in 2018 presented to the Emergency Department with the complaint of generalised malaise and multiple firing from his CRT-D (more than 30 times) for more than one hour prior his presentation. He had similar presentation a month ago due to Acute Coronary Syndrome. Upon examination, he was hypotensive (blood pressure 70/46 mmHg) and cardiac monitoring shows monomorphic ventricular tachycardia (VT). Apart from that, he was still conscious with palpable central pulse.

The monomorphic VT persisted despite repeated external synchronised cardioversions (which terminated the VT into brief junctional rhythm [Figure 1]), and relentless firing from the patient's own CRT-D. Anti-arrhythmic drugs were also administered but the VT remained refractory. He was loaded with IV amiodarone 300mg over 1 hour followed by 600mg infusion over 12 hours and was infused with 2.47g of magnesium sulfate. Urgent cardiology consultation was sought, and device interrogation of his CRT-D was done by the supplier. She noticed that there were reported 62 shocks delivered in total of which 44 of them failed to terminate the arrythmia. His CRT-D was reprogrammed, and the ES had finally managed to be terminated. Later, the patient's blood electrolytes showed hypokalaemia of 2.9mmol/L and he was started on potassium correction.
Subsequently, he was admitted Cardiac Care Unit where he remained free from any further episode of ventricular arrythmia [Figure 2]. The next day, he was transferred to a facility with definitive cardiology services.

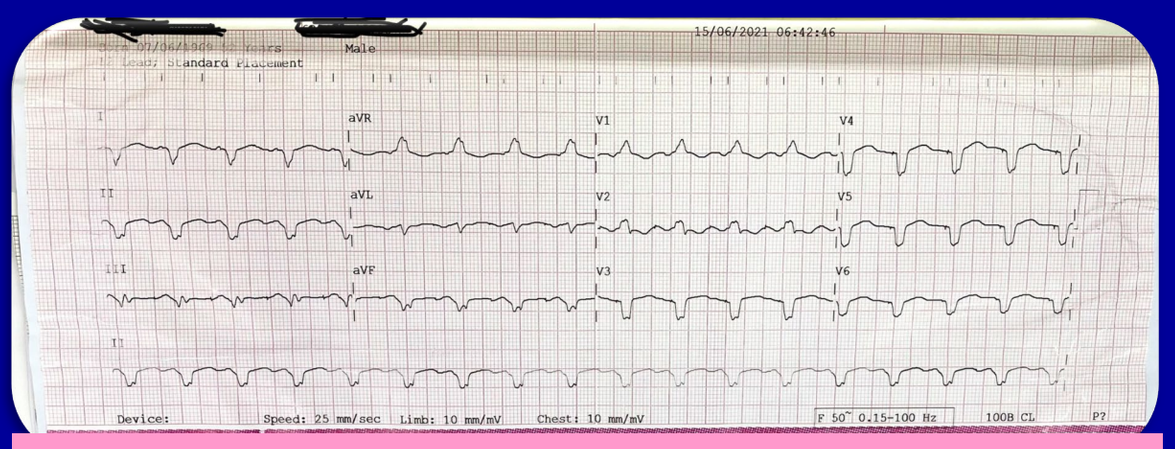

Figure 2 : electrocardiograph in cardiac care unit

DISCUSSION

- The risk factors for ES are male sex, previous episode of ventricular arrythmia, monomorphic VT, underlying structural heart disease, use of CRT-D as secondary prevention and hypokalemia[3], all of which are present in this case.
- Ventricular events, especially in patient with ICD, happened mostly outside office hour[4], as demonstrated in this case.
- The frequent discharges from CRT-D are emotionally distressing and cause the surge in circulating catecholamines, which would worsen the arrythmia. Thus, it is important that patient is given sedation to prevent the vicious cycle[3].
- Amiodarone is preferred in ES that presented as monomorphic VT, thus our choice of antiarrhythmic in this case. Although propranolol is beneficial in monomorphic VT ES, its use should be carefully considered in patients with poor left ventricular systolic function[3].
- CRT-D interrogation and reprogramming is often beneficial, but it's beyond the capability of emergency room. Nevertheless, one should always look for reversible causes and in this case, most likely it is hypokalemia.
- Monomorphic VT is always due to underlying re-entry pathology that is treatable by ablation procedure[3], thus need for transfer to facility with cardiology services

CONCLUSION

This case illustrates the challenges faced to suppress ES in presence of multiple CRT-D shocks encountered in a hospital setting without cardiology service.

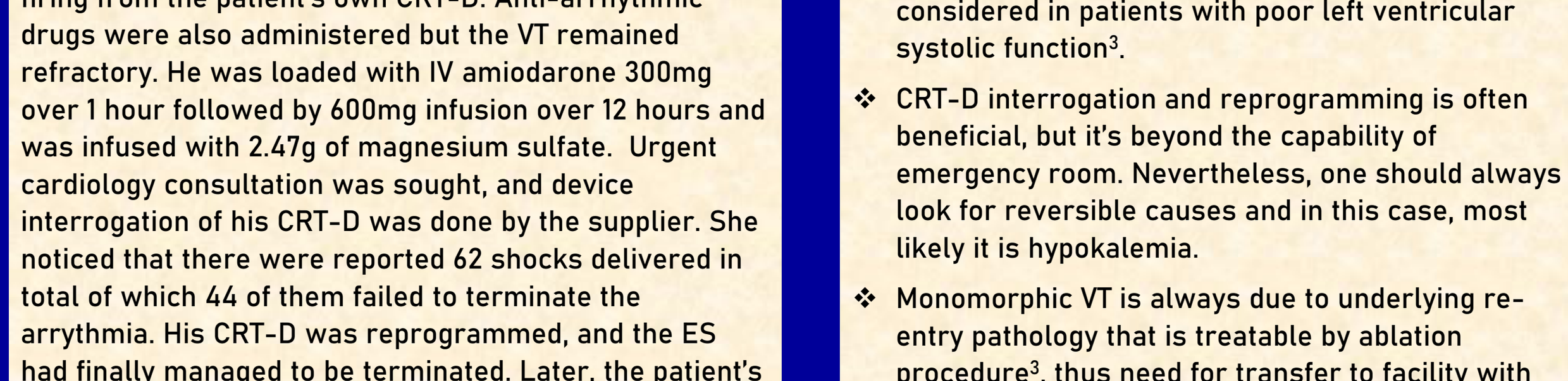

Figure 1 : brief junctional rhythm after shock delivery, followed by monomorphic ventricular tachycardia

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We would like to thank the patient for his consent to share the case

DECLARATION OF CONFLICT FOR ALL AUTHORS

None to be declared

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