Role of percutaneous left stellate ganglion blockade (LSGB) as a rescue therapy in refractory ventricular tachycardia

Ventricular tachycardia (VT) storm is a life-threatening syndrome, which is defined by three or more sustained episodes of VT, ventricular fibrillation or appropriate shocks from an implantable cardioverter-defibrillator within 24 hours with significant haemodynamic consequences[1] Various antiarrhythmics have been described and β-blockers are considered as the first-line treatment.[2] Termination of the electrical storm by Left Stellate Ganglion Blockade (LSGB) can stabilise a patient long enough to perform catheter ablation of a ventricular arrhythmic focus. Stellate ganglion block (SGB) by anatomical landmark technique (paratracheal approach) for ventricular tachyarrhythmias is a well-recognised option. The use of ultrasound to perform this block is effective and safer than landmark technique because of the prevention of drug deposition in closely situated blood vessels like carotid and vertebral arteries.[3] Unfortunately, the sympathetic blockade remains underutilised due to a lack of awareness and understanding of the efficacy and duration of effect.

In our institute, 12 patients with symptomatic ventricular tachyarrhythmias refractory to antiarrhythmics underwent percutaneous LSGB as a rescue therapeutic procedure. It was performed at C6 level by anatomical landmarks [Figure 1a] except for one case which was

done under fluoroscopic guidance [Figure 1b]. After placing the patient in a supine position with neck slightly extended, thyroid and cricoid cartilages at the C6 level were palpated. Then local anaesthesia was injected in the groove lateral to the trachea on the left side near Chassaignac's tubercle (a bony prominence) which constitutes the anterior surface of the C6 transverse process. The skin was anaesthetised with 2 ml of 1% lidocaine and the block was performed using 20 gauge cannula at C6 level by an initial bolus dose of 20 ml 1% lignocaine injected slowly after a negative aspiration followed by 1 mg/kg/hour of lignocaine infusion for 48 hours. Data collected were the mode of presentation, clinical assessment, electrocardiogram (ECG), chest x-ray and 2D echo.

Among 12 patients, nine were females and three were males with a mean age of 31 years. Patient characteristics are shown in Table 1.

No significant changes in haemodynamics was observed throughout the procedure and during post blockade. We observed a decrease in the incidence of VT in all 12 cases for the number of shocks required (before block an average of >5 shocks was required to almost none after block in 24 hours) and termination of VT following LSGB. The duration of block effectiveness outlasted the duration of the analgesic effect of the local anaesthetic for the reasons which were not known. Following the stabilisation of VT, two cases underwent catheter ablation and remaining underwent surgical cervical sympathectomy. There were no major procedure-related complications. Block was repeated in four cases after 5-7 days. All patients had significant symptomatic relief and returned to sinus rhythm on maintenance with antiarrhythmics after LSGB. Ipsilateral ptosis and miosis were noted in eight cases.

This electrical storm is usually associated with a catecholaminergic surge following myocardial ischaemia and manifests as recurrent ventricular arrhythmias requiring frequent DC shocks. Delivering repeated DC shocks induces myocardial damage and further worsens arrhythmias, which are resistant to the antiarrhythmics.[4] Sympatholysis with thoracic epidural analgesia or a stellate ganglion block attenuates myocardial excitability and proarrhythmic effects of sympathetic hyperactivity.[5] Hence, targeted injection of local anaesthetic near the left stellate ganglion provides a sympathetic blockade at the periphery. Therefore, LSGB effectively attenuates electrical storm and can be considered for stabilising ventricular rhythm in patients for whom other therapies have failed.

Table 1: Patient characteristics

	n
Initial presentation	
Recurrent syncope	4
Recurrent VT	7
Torsades de pointes	1
Left ventricular dysfunction	3
Coronary angiogram	4
Diagnosis	
Long QT syndrome	5
CPVT	2
Polymorphic VT	2
VT storm	3
Failed antiarrhythmics	Propranolol, Metoprolol, Amiodarone, Lidocaine

To conclude, the LSGB is an effective method for terminating an electrical storm and should be considered as adjunctive therapy to stabilise the patient and prevent repeated shocks.

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Conflicts of interest

There are no conflicts of interest.

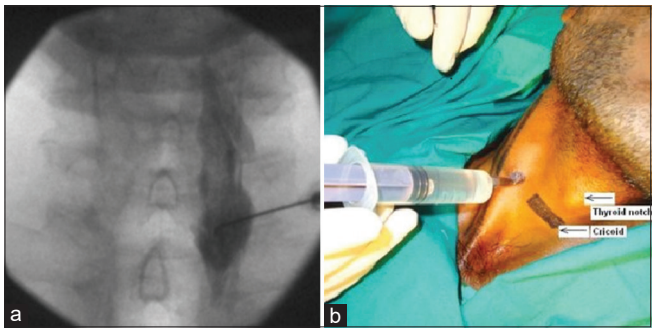

Figure 1: (a) Under fluoroscopic guidance. (b) Landmark technique

Vijitha Burra, Parimala Prasanna Simha[1], Manjunath N

Department of Cardiac Anaesthesia, SRM Institute of Medical Sciences Hospital, Chennai, Tamil Nadu, [1]Department of Cardiac Anaesthesia, Sri Jayadeva Institute of Cardiovascular Sciences and Research, Bangalore, Karnataka, India

Address for correspondence:
Dr. Parimala Prasanna Simha, Department of Cardiac Anesthesia, Sri Jayadeva Institute of Cardiovascular Sciences and Research, Bangalore, Karnataka, India.
E-mail: burravijitha@gmail.com

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