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The Role of Stellate Ganglion Blockade in the Acute Treatment of Refractory Ventricular Arrhythmias

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Advances in the treatment of heart failure and structural heart disease have made refractory ventricular arrhythmias (VA), including electrical storm (ES), increasingly common in clinical practice. ES occurs in about 5% of implantable cardioverter-defibrillator (ICD) recipients for primary prevention and 25% for secondary prevention, with an eightfold increase in mortality and in-hospital mortality of 29.2–53.0%. Standard treatment, including beta-blockers, antiarrhythmic drugs, deep sedation and catheter ablation, is often ineffective or not feasible, and recurrence within 30 days after ablation reaches about 25%. Given the key proarrhythmic role of the sympathetic nervous system, percutaneous stellate ganglion blockade (SGB) has emerged as a promising adjunctive therapy.[1-5] This review summarizes current evidence on its anatomy, technique, safety and efficacy, based on a PubMed and Google Scholar search up to June 2025. No randomized controlled trials have been conducted to date.

The stellate ganglion, formed by the fusion of the inferior cervical and first thoracic sympathetic ganglia, is a key sympathetic relay to the myocardium. SGB is most often performed on the left side using an ultrasound-guided lateral approach at the C6 level. The operator injects 5–15 ml of a long-acting local anesthetic as a single bolus, repeated boluses or continuous infusion. Left-sided and bilateral blockade appear similarly effective. In the study by Tian *et al* (n=30), 60% of patients were free of VA at 24 hours, and ICD therapies decreased by 92% at 72 hours. Chouairi *et al* (n=117) reported a significant reduction in VA episodes and cardioversions/defibrillations at 24 and 48 hours ($p<0.001$). In the largest study, STAR (n=131), 92% of patients achieved at least a 50% reduction in VA within 12 hours, with effects evident within one hour. Efficacy was independent of the underlying heart disease and arrhythmia subtype. Serious complications are rare, adverse effects are mostly transient, and the procedure remains feasible in patients receiving anticoagulant or antiplatelet therapy.

SGB is a rapid, simple and safe bedside technique that effectively reduces recurrent refractory VA and the need for electrical therapy. It serves as an adjunct to standard treatment or a bridge to catheter ablation, surgical sympathetic denervation or heart transplantation. Randomized controlled trials are needed to confirm its efficacy and standardize protocols.

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