Percutaneous stellate ganglion nerve block has been used to treat chronic pain syndromes. It has been described for refractory ventricular arrhythmias.\(^1,2\) However, it has rarely been described in an infant.\(^3,4\) To the best of our knowledge, this block has not been used at this age as a diagnostic challenge and therapeutic bridge to surgical left cardiac sympathetic denervation (LCSD) and cardiac transplant.

This patient presented shortly after birth with orthodromic reciprocating tachycardia and ventricular preexcitation. She was treated with propranolol and discharged. Three months later, she became rigid and cyanotic at home, requiring cardiopulmonary resuscitation, cardioversion, and amiodarone for ventricular tachycardia (VT). She underwent electrophysiology study with successful ablation of her accessory connection, but in the following days she developed recurrent ventricular fibrillation. Magnetic resonance imaging revealed asymmetric left ventricular hypertrophy, otherwise normal anatomy and no focal lesions; catheterization was nondiagnostic. An epicardial implantable cardioverter-defibrillator (ICD) was placed 13 days after presentation, and she was discharged home on amiodarone and propranolol.

At 7 months of age, she had 28 appropriate shocks for monomorphic VT, polymorphic VT, and ventricular fibrillation over 3 days, despite amiodarone and lidocaine drips. She was transferred to our facility for a transplant evaluation. She was listed for heart transplantation 1 day after arrival. We prolonged her ICD detection to allow spontaneous termination, but she continued to have appropriate shocks 2 to 3 times/day. Esmolol, fosphenytoin, and verapamil were tried, but 3 days after presentation she was still having intractable arrhythmia.

A percutaneous ultrasound-guided left-sided stellate ganglion block was performed to test the hypothesis that sympathetic innervation to the heart might be contributing to the intractable arrhythmia. In the cardiac intensive care unit setting, the patient was placed on nasal canula in the supine position, and intravenous sedation with midazolam was administered. Under sterile conditions (gloves, gel, sheath), ultrasound imaging (Sonosite M-Turbo, L25\(\times\)13–6 MHz transducer) was used to identify the anatomy of the lower neck, showing the left stellate ganglion in its typical position surrounded by pretracheal fascia overlying the longus colli muscle (Figure 1). A 27-gauge, 1.25-inch needle was inserted lateral to the left stellate ganglion, and a single dose of 2 mL of 0.2% ropivacaine was injected after negative aspiration. Within 20 minutes of injection, she was predominantly in normal sinus rhythm with occasional ventricular premature beats (Figure 2) and had transient ipsilateral Horner syndrome (Figure 3). The block was repeated daily; she maintained sinus rhythm with <1% ventricular ectopy. Over the next 10 days, mexiletine and propranolol were tried to obtain control of her rhythm with oral medications. The transition to oral medications was unsuccessful because of recurrent ventricular fibrillation, and intravenous medications continued to be required.

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Figure 1. Ultrasound image during left-sided stellate ganglion block. Structures are labeled in the figure.
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Pathology reports from the explant were consistent with his- explant on hospital day 35. She was sent home after 17 days. of polymorphic VT. She underwent heart transplant and ICD of completing her medication changes, she had recurrence respectively, over the week after sympathectomy. Within 96 hours drips were replaced with mexiletine and propranolol, respec- gradually adjusted to an oral regimen: lidocaine and esmolol remained in sinus rhythm, and her medication was again after surgical left stellate ganglion sympathectomy, she underwent heart transplant and ICD explant on hospital day 35. She was sent home after 17 days. Pathology reports from the explant were consistent with his- tiocytoid cardiomyopathy.

Histiocytic cardiomyopathy is a rare arrhythmogenic disorder typically affecting girls <2 years of age. It can present with sudden death or refractory arrhythmias. Affected hearts have myocardial thickening with abnormal Purkinje fibers. Subendocardial nodules can be present containing clusters of histiocytoid myocytes.5 There are few options for this disease. Although resection of histiocytic lesions has been tried when discrete lesions exist, heart transplant has been a common final pathway.6 Cardiac evaluation of our patient, including echocardiography, electrocardiography, magnetic resonance imaging, cardiac catheterization, angiography, invasive electrophysiology testing, and ultimately ICD telemetry, was not diagnostic for histiocytic cardiomyopathy and did not identify a discrete abnormality that was a candidate for surgical or catheter-based intervention.

Our patient’s VT/ventricular fibrillation was refractory to medications. Percutaneous stellate ganglion block allowed us to test the hypothesis that reducing sympathetic tone would reduce the arrhythmia burden. Given the transient duration of the percutaneous blockade (=18–24 hours), this approach was applied as a diagnostic challenge. When found to be successful, the procedure was repeated daily to ameliorate arrhythmias and decrease firing of the ICD. Surgical LCSD was as successful as the percutaneous method, but neither approach allowed transition to oral antiarrhythmic medications. Neither intravenous medication nor LCSD was sufficient in isolation; together they constituted a successful bridge to transplant.

When performed by skilled pediatric anesthesiologists, percutaneous stellate ganglion block under ultrasound guidance is feasible and safe. Although stellate ganglion blocks are tradi- tionally performed under fluoroscopic guidance, the use of bed- side ultrasound guidance facilitated the daily use of this block. Physicians should consider this technique in patients with refractory arrhythmias when reasonable judgment suggests that sympathetic or adrenergic activity may be a contributing factor. Further study is necessary to determine whether percu- taneous sympathetic block can be used to predict the effects of LCSD in patients with refractory arrhythmia.

Disclosures
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References

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