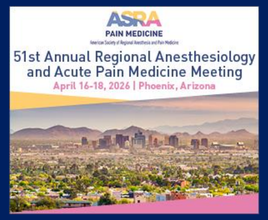


# Altered Local Anesthetic Pharmacokinetics In Patients With Left Ventricular Assist Devices

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## Introduction

In patients with advanced cardiac disease, alternatives to general anesthesia are often preferred. Peripheral nerve blocks (PNBs) are commonly used; however, in patients with ventricular assist devices (VADs), continuous-flow physiology may impair peripheral perfusion and prolong block duration by reducing local anesthetic clearance. We report a case of markedly prolonged motor and sensory blockade following both single-shot and continuous PNBs in a patient with a left ventricular assist device (LVAD).

## Methods

- **Patient-informed consent was obtained**, and the case was exempt from IRB review due to the absence of identifiable patient information per UCSD HRRP policy.
- **Peripheral nerve blocks** were used to **provide surgical anesthesia and postoperative analgesia** for the procedure.
- **Ultrasound guidance was utilized for all blocks**, with local anesthetic choice, dosing, and infusion parameters **following standard institutional practice**.
- **Postoperative monitoring** included **daily neurologic assessments, documentation of pain scores, opioid use, and tracking of block resolution until full recovery**.

## Description

A **62-year-old woman** with **severe systolic heart failure** (ejection fraction 10–15%) **status post LVAD** implantation, coronary artery disease, atrial fibrillation on anticoagulation with a single-chamber ICD, hypertension, and obstructive sleep apnea was transferred for **operative fixation of a right distal fibula fracture** with medial joint widening. **Given her extensive cardiac comorbidities, surgery was performed under PNB with minimal sedation**.

**Preoperatively**, a **right femoral single-shot block** and **right sciatic continuous catheter** were **placed under ultrasound guidance**. Each block utilized 15 mL of 0.5% bupivacaine with epinephrine (1:400,000). The sciatic catheter was infused with 0.2% ropivacaine at 6 mL/hour with patient-controlled 4 mL boluses (30-minute lockout).

**Prolonged blockade was observed**. **Femoral** motor and sensory blockade persisted through postoperative day (POD) 3, with **motor recovery on POD 4** and **sensory recovery on POD 5**. The **sciatic catheter was removed on POD 5**, with **complete motor and sensory resolution on POD 8**. **Pain scores** remained **0–3/10** with **minimal opioid use**, and the patient reported high satisfaction with analgesia.

## Conclusion

- **Peripheral nerve block duration may be prolonged in LVAD patients** due to reduced peripheral perfusion from continuous-flow physiology, which can decrease local anesthetic clearance.
- **Hepatic congestion from residual right-heart failure may impair cytochrome P450 metabolism** of amide local anesthetics, even when liver enzymes are normal.
- These factors may increase the **risk of delayed block resolution and cumulative toxicity**, warranting **dose reduction, lower infusion rates, and increased clinical vigilance**.

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