Precision PICC Placement in LVAD Patients: Real-Time Magnetic & ECG-Guided Navigation

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**Objective:**

To evaluate the feasibility and effectiveness of ECG guidance for peripherally inserted central catheter (PICC) placement in patients with left ventricular assist devices (LVADs). Due to altered cardiac conduction and flow dynamics in this population, it is unclear whether ECG can reliably confirm optimal catheter tip positioning.

**Methods:**

This retrospective observational study examined ECG-guided PICC placements in LVAD patients. Since 2022, a single full-time equivalent (FTE) vascular access service at a tertiary hospital coordinated the insertion of 2,203 central venous lines and midlines, including 24 in LVAD patients. ECG guidance, utilizing both magnetic and real-time electrocardiographic tracking, was attempted in 12 LVAD patients. All LVAD patients underwent follow-up X-ray confirmation.

**Results:**

Among the 12 ECG-guided PICC placements Three cases successfully utilized ECG for optimal tip placement by identifying P-wave changes. In the remaining 9 cases, ECG was useful for assessing tip direction (IJ vs. SVC) but was insufficient for confirming final tip positioning, necessitating X-ray verification. Two of cases showed real time catheter malpositioning into the internal jugular (IJ) vein—one was successfully repositioned using power flush, while the other required interventional radiology (IR) rewiring.

**Conclusion:**

ECG guidance for PICC placement in LVAD patients may assist in determining catheter direction but is often insufficient for final tip confirmation due to p wave interpretation from LVAD interference. Routine X-ray verification remains necessary in this population. Further investigation is warranted to refine ECG-based approaches for LVAD patients.