

## Transvenous vs Epicardial Pacing in Fontan Patients

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**Background:** Previous studies have shown that almost 10% of Fontan patients require postsurgical pacemaker implantation. Historically an epicardial approach has been used though this requires either a sternotomy or thoracotomy. Alternatively, a transvenous approach can be used but carries a risk of Fontan obstruction, thromboembolism, and is technically challenging in an extracardiac conduit. The long term safety and efficacy of these two approaches is not well described.

**Aim:** To determine whether placement of epicardial or transvenous pacemakers results in better outcomes for patients by determining device performance and rate of adverse events.

**Methods:** A retrospective chart review was performed on Fontan patients followed at the University of Iowa Stead Family Children's Hospital who had undergone pacemaker placement.

**Results:** 31 patients who underwent a Fontan operation between 1985 and 2017 were reviewed. Of these, 26 initially had an epicardial pacemaker placed, 5 were initially transvenous and an additional 2 converted to transvenous. Median time from Fontan to pacemaker placement was 108 months for epicardial and 132 months for transvenous. Average atrial sensing at placement was 3.23 mV vs. 2.35 mV for epicardial and transvenous leads respectively ( $p=0.52$ ). Median atrial lead longevity was 86.4 vs 98.8 months in epicardial vs transvenous, while ventricular lead longevity was 73.2 vs 140 months respectively. Similarly, generator longevity was 65.5 vs 73.9 months. There were three adverse events: one major complication in a transvenous patient (pocket hematoma) and two minor complications in epicardial patients (skin infections). For anticoagulation the transvenous lead patients were on warfarin with one that was converted on dabigatran. The majority of epicardial lead patients were on aspirin ( $n = 20$ ) with some on warfarin ( $n=3$ ) or a combination of warfarin and aspirin ( $n=3$ ). Notably, there were no reported thromboembolic events. Revision was required in 13 epicardial pacemakers and 5 transvenous. There were 2 deaths in the study group, none of them related to the pacemaker system.

**Conclusions:** Transvenous pacemakers can be utilized with equal efficacy compared to epicardial pacemakers with trends toward longer lead longevity in transvenous pacemaker systems.