# [Fenestration in the Fontan circulation as a strategy for chronic cardioprotection.](https://www.ncbi.nlm.nih.gov/pubmed/30826770)

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**Take Home Points:**

* Fenestration patency may confer hemodynamic advantages such as lower HR, lower CVP and a better preload reserve.
* Providers should carefully consider the risks and benefits of elective fenestration occlusion prior to proceeding with closure.
* Further study is indicated as to the long term risks and benefits of fenestration patency.



**Commentary from Dr. Konstantin Averin (Edmonton), catheterization section editor of Pediatric Cardiology Journal Watch:** Fenestration of the Fontan connection was initially developed as a strategy to minimize morbidity in the immediate post-Fontan period. The long-term benefits of a Fontan fenestration are not well defined, and some physicians argue for elective fenestration closure to improve systemic oxygenation. The authors hypothesized that a patent fenestration offers hemodynamic advantages and sought to assess the hemodynamic implications of a fenestration utilizing catheter-based, load-independent measures at baseline, with dobutamine stress testing (DST), and rapid atrial pacing.

Thirty-five consecutive Fontan patients undergoing cardiac catheterization were prospectively enrolled to undergo invasive testing – 24 with a patent fenestration (PF) and 11 with a naturally closed fenestration (NCF). The baseline demographics of the 2 groups were similar. Patients with a PF had a lower baseline HR, CVP, PVRi, Qp:Qs ratio, and SaO2; while the cardiac index was similar between the groups.

After baseline assessment, patients underwent various physiologic manipulations (DST +/- transient fenestration occlusion (TFO) and rapid atrial pacing +/- TFO). Among patients who underwent DST, ventricular systolic and diastolic stiffening was significantly greater in those with NCF. Compared to baseline, TFO decreased the ventricular diastolic area, stroke volume, and cardiac index, while increasing afterload and ventricular chamber stiffness. Eight patients with PF had atrial pacing performed both at baseline and with TFO. At higher HRs there was a reduced CI and increased afterload – suggesting that the beneficial effects of a fenestration diminish at higher HRs.

The authors conclude that a chronically persistent fenestration secures preload reserve, reduces afterload and suppresses the adrenergic response; it also results in a lower HR at baseline. The number of patients in this study is small but the implications are potentially significant. If a patent fenestration can be confirmed to have hemodynamic benefits acutely and then demonstrated to decrease long term Fontan morbidity then fenestration patency would become a priority for long term Fontan management.