

Evaluating the Long Term Effects of the Fontan Procedure on the Hepatic System

*Sardar Z. M., Jenkins P.
University of Manchester, UK.*

The Fontan procedure is a palliative procedure performed in univentricular patients which is associated with impaired pulmonary function and liver fibrosis. Currently no national guidelines exist for monitoring liver fibrosis in these patients therefore liver function tests (LFTs) and liver ultrasound (US) scans are used. However these tests are largely targeted at viral mediated fibrosis which has a different mechanism of injury to Fontan associated fibrosis. Acoustic radiation force impulse (ARFI) imaging is an elastography technique that may have an important role in assessing liver stiffness in these patients. We aimed to assess and compare the efficacy of LFTs, liver US and ARFI imaging in testing for liver fibrosis in Fontan patients. We also aimed to assess any relation between cardiopulmonary exercise test (CPET) variables and ARFI scores.

Data was collected retrospectively from the North West Regional ACHD Centre. Fifteen Fontan patients were identified with LFTs, liver US and ARFI results of which 12 also had CPET results. The sensitivity of LFTs and liver US was calculated and confidence intervals applied. Spearman's correlation coefficient was applied to the ARFI and CPET data.

The sensitivity of LFTs and liver US was found to be 6.6% (95% CI 0.3 – 34%) and 86% (95% CI 58 – 97%) respectively. ARFI identified liver fibrosis in all patients with 33% at F2, 33% at F3 and 33% at F4. The % peak VO₂ (62.6 vs 46, p=0.2) and % predicted O₂ (101.1 vs 88.9, p=0.6) was found to be slightly lower in F2 patients with a higher VE/VO₂ (32.5 and 42.0, p=0.2).

LFTs alone are not a suitable screening test for liver fibrosis in Fontan patients. Liver US provides greater information but is limited to identifying structural changes and cannot accurately quantify the degree of fibrosis. ARFI is a sensitive which requires further research in larger study samples to determine a role in routine hepatic monitoring of Fontan patients. This study has identified a weak association between impaired CPET variables and greater ARFI scores which requires further investigation in order to assess the prospect of another screening test for liver fibrosis.