

Endomyocardial Biopsy - A Source of Heartache

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Disclosures

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Abstract

Purpose: Donor fraction cell free DNA (DF cfDNA) was investigated as a marker for cardiac injury in cardiac transplant recipients. We hypothesized that injury from routine biopsy (bx) would produce a detectable rise in circulating DF cfDNA.

Methods: Paired blood samples from 21 asymptomatic pts were drawn pre and post surveillance bx. Percent DF cfDNA was determined using the myTAI-HEART™ test (a proprietary quantitative genotyping assay from TAI Diagnostics, Wauwatosa, WI). Excluding pts with known graft vasculopathy, cancer, mechanical circulatory support, or any cellular rejection with grade >1, 17 sample pairs were available. Biopsy size and number of bx samples taken were recorded and analyzed.

Results: DF ranged from 0.02% pre-bx through 11.1% post-bx with a median of 0.43%. Paired samples are shown in Figure 1. The DF consistently increased post-bx, with a median increase of 8.2x (range 1.5x - 213x). Pt ages ranged from 4 to 32 years (med 12). Pt weights ranged from 17 to 90 kg (med 49). Both age and weight are independently associated with DF change ($p < 0.01$). Pts <17 of age had an average DF increase of 24x versus pts >23 with an average DF increase of 2.7x. Age and weight are correlated, thus similar effects are seen by weight at time of draw. DF change did not correlate with biopsy size ($p = 0.4$). The time between bx and the second blood draw ranged from 1 to 36 minutes and did not appear to be correlated to DF increase. Samples drawn soon after bx had more dramatic DF increases than more delayed samples consistent with the short half life of cfDNA; the five fastest (mean 2 minutes) had an average DF increase of 19.8x, versus the five latest (mean 7.6 minutes) saw just 4.1x. Initial DF is indicative of organ health before bx. A patient with elevated DF (>0.9%) pre-biopsy saw less DF increase post-bx ($p < 0.01$).

Conclusion: Standard endomyocardial bx induces a significant and measurable injury to the transplanted heart, influenced strongly by patient body size and pre-bx level of DF cfDNA. This serves as evidence of the tremendous sensitivity of DF cfDNA as a marker of cardiac injury.

