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Left ventricular myocardial function in ALCAPA: a speckle tracking study.

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Introduction: ALCAPA provides a unique opportunity to study coronary induced ischaemia in the paediatric population.

Aims: To investigate changes in regional wall motion abnormality in ALCAPA patients pre and post revascularisation using speckle tracking.

Methods: Single tertiary centre prospective analysis of pre and most recent post-operative radial, circumferential and longitudinal deformation and (T2P) time to peak deformation (synchronicity of segments), from echocardiograms 2005-10.

Results: Eighteen children (8M/10F) underwent surgical reimplantation (1 death). Median age at surgery was 5 months (range 0.03-8.8 yrs). Median follow up was 39 months (range 1-48). ECG ST changes were seen in 75%. Mean fractional shortening was 21% preop with importantly 4 cases being normal (range 6.3-39.6%) and 25.5% post op (range 4-43.7%). Mitral regurgitation and appearance of endocardial fibroelastosis was universal. There was a significant change in global radial ($p=0.05$) and longitudinal deformation ($p=0.05$) but not circumferential. There were statistically significant changes between pre and post op echocardiograms in some but not all segments. Significant changes occurred in peak longitudinal strain in the basal septal ($p=0.02$), mid lateral ($p=0.006$) and basal lateral segments ($p=0.03$). There were significant changes in radial peak strain in the lateral ($p=0.03$), posterior ($p=0.02$) inferior ($p=0.004$) and septal segments ($p=0.04$). No significant changes occurred in any segment in peak circumferential strain. Synchronicity improved post-operatively with ICC increasing for T2P for all 3 fibres (ICC preop vs post op 0.7 vs 0.8 for longitudinal, 0.8 vs 0.9 for circumferential & 0.7 vs 0.9 for radial fibres). Surprisingly there was an increase in T2P for all segments for all 3 fibres types post-operatively. Intra and interobserver variability was low. Patients with normal 2D and M mode pre-op echos had abnormal speckle tracking analysis of the same scans.

CONCLUSIONS

Contractility (Strain) improved after revascularisation but not in all segments. Dyssynchrony (T2P) improved after revascularisation but not necessarily in corresponding segments. These changes may be due to scar formation. Speckle tracking is a useful technique to assess RWMA, providing better indication of detailed LV systolic function than 2D or M mode.