Reactive Hyperemia Index and Detection of Endothelial Dysfunction after Acute Leukemia Treatment in Children

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Introduction: Endothelial dysfunction (ED) is thought to be an important factor in the development of atherosclerosis, hypertension, and heart failure. Reactive Hyperemic Index (RHI) is considered as an indicator of endothelial function. This plethysmographic method is based on noninvasive assessment of endothelium-dependent changes in vascular tone (PAT) in patient fingertips. Highly efficient treatment protocols of acute lymphoblastic leukemia (ALL) have enlarged the number of leukemia survivors in children over the last decades. ALL survivors are among those at increased risk of cardiovascular complications. Early identification of impaired vascular health may allow for interventions to improve these outcomes. This study was to evaluate vascular health using peripheral artery tonometry and specific biochemical markers in pediatric ALL survivors and compare results with healthy controls (HC).

Materials and methods: Following approval by the institutional review board 45 eligible participants were enrolled in the study 26 ALL patients (14.6 ± 3.4yrs) matched with 19 HC (19.9 ± 4.5yrs). Endo-PAT recorder was used for the determination of RHI as well as specific biochemical markers of endothelial function were assessed (hsCRP, ADMA, E-selectin, VCAM). RHI was evaluated in ALL children and further compared with HC.

Results: Significantly lower RHI were revealed in ALL patients in comparison with HC (1.57±0.52 and 2.03±0.55; p≤0.01). In addition, E-selectin (p<0.01), asymmetric dimethylarginine (p<0.01) and high sensitive CRP (p<0.001), but not vascular cells adhesive molecule-1 values, were also significantly increased in the ALL subjects compared with the control group.

Conclusions: Significantly decreased RHI and elevated plasma levels of specific biochemical parameters seems to be related to ED in children after acute leukemia treatment. This combined method assessment might be a useful tool for detection of ED and stratification of cardiovascular risk in pediatric patients after acute leukemia treatment.

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