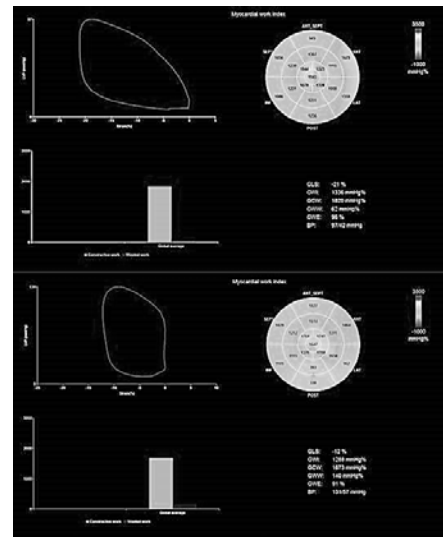


Myocardial work analysis in children with Kawasaki disease: an early diagnostic tool of myocardial dysfunction

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Introduction: Kawasaki disease (KD) is an acute vasculitis of unknown aetiology. It is associated with high morbidity and mortality due to the development of coronary artery aneurysms and myocardial dysfunction. The aim of this study is to evaluate sensitivity and specificity of left ventricular (LV) pressure–strain loop (PSL) area, which reflects regional myocardial work and metabolic demand, in predicting subtle myocardial abnormalities in KD patients with coronaries aneurysms.



Methods: A total of 47 patients (24 male, age 7.9 ± 8.09 years) were included in our study. Among the children admitted in our institution with a diagnosis of KD during the study time frame, 24 patients (16 male) with coronary artery dilatation (Z-score >2.5) were selected. These cases were compared with 23 (8 male) age-matched controls. Classical echocardiographic parameters of LV systolic function were normal for both groups, while global longitudinal strain (GLS) was decreased in 5 KD patients. Global work index (GWI) was calculated as the area of the LV PSL. From GWI, it was estimated also Global Constructive Work (GCW), Global Wasted Work (GWW) and Global Work Efficiency (GWE). We also made a subgroup analysis between KD patients with normal GLS (>-19) and control patients.

Results: Despite normal LV systolic function by routine echocardiography, compared with controls, KD patients had a lower GWI (1332 [1179.75-1537.25] mmHg% in KDg vs 1643 [1509.00- 1763.50] mmHg% in CTRg, p=0.001) and GCW (1840 [1625.50- 2094.25] mmHg% in KDg vs 2017 [1848.00-2338.00] mmHg%, p= 0.04). However, there were not significant differences in GWW and GWE between the two group. When KD patients with normal GLS were analysed separately, they preserved a significant difference in GWI in comparison with controls (1336 [1207.5-1618.5] mmHg% in KDg vs 1643.00 [1509.00-1763.50] mmHg% in CTRg, p=0.01)

Conclusions: The estimation of myocardial work by PSL is a novel tool for the evaluation of patients with KD. GWI and GWE were significantly reduced in KD patients with dilated coronaries. Moreover, in KD patients with normal GLS, estimation of GWI may be a sensitive indicator of myocardial dysfunction and an adjuvant criterion to avoid delayed diagnosis of KD.

	KD group	CTR group	P	KD group (with normal GLS)	CTR group	P
GLS	-19.80 (-20.65 to -18.98)	-21 (-22.60 to -20.35)	0.006	-20 (-20.9 to -19.35)	-21 (-22.60 to -20.35)	0.07
GWI(mmHg%)	1332 (1179.75 - 1537.25)	1643 (1509-1763.5)	0.001	1336 (1207.5-1618.5)	1643 (1509-1763.5)	0.01
GCW(mmHg%)	1840 (1625.5-2094.25)	2017(1848-2338)	0.04	1980 (1702-2163.5)	2017(1848-2338)	0.25
GWW(mmHg%)	92 (57-136.25)	74 (59 - 127.50)	0.52	88 (55.5-131)	74 (59-127.5)	0.95
GWE(mmHg%)	93.50 (91.75-97)	96 (95 - 96)	0.15	95 (92.5-97)	96 (92-96)	0.60