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Diastolic function measured by Tissue Doppler Imaging in paediatric patients with End Stage Renal Disease

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Introduction
Cardiovascular disease is the main cause of death in patients with End Stage Renal Disease (ESRD). Early signs of cardiovascular disease include left ventricular hypertrophy (LVH) and diastolic dysfunction (DD). The aim was to compare the prevalence of LVH and DD in children with ESRD and healthy children using conventional echocardiography and Tissue Doppler Imaging (TDI).

Methods
32 children with ESRD and 79 healthy control subjects, matched for weight or body surface area (BSA), were assessed with conventional echocardiography and TDI. Parameters related to LVH (IVSd%, LVPWd% and LV mass index) and DD (E/a ratio and E/e' ratio) were compared in the ESRD and control groups using linear regression analysis. LVH was defined as LV mass index > 103 for boys and > 84 g/m2 for girls [1]. DD was defined as E/a ratio<1 or E/e' ratio > p 95 for age.

Results
The children with ESRD were significantly older than their healthy controls with the same weight or BSA, mean difference (MD) [95% Confidence Interval (CI)] 2.6 [0.5 - 4.6] years (p=0.015). After adjustment for age, the ESRD patients had a smaller mean IVS-E (MD [95% CI] 3.6 [2.6-4.6], p<0.001) and MV E/a ratio (MD [95% CI] 0.32 [0.09-0.55], p=0.007) and larger IVSd% (MD [95% CI] 20.9 [14.4- 27.5], p<0.001), LVPWd% (MD [95% CI] 19.7 [12.8 -26.7], p<0.001), LV mass index (MD [95% CI] 18.1 [10.9- 25.4], p<0.001) and E/e' ratio (MD [95% CI] 2.5 [1.8- 3.2], p< 0.001) than the control subjects. LVH was diagnosed in 3 of the 31 children (10%) with ESRD and none of the controls (p=0.04). DD was diagnosed in none of the children according to the E/a ratio. According to the E/e'ratio 11/26 (42%) of the patients with ESRD and none of the controls were diagnosed with DD (p<0.001).

Conclusion
Children with ESRD have significantly more LVH, larger IVSd%, LVPWd% and LV mass index, E/e' ratio and a smaller E/a ratio and IVS-E than healthy, weight or BSA matched, controls. It seems that Tissue Doppler is more sensitive in the detection of DD earlier than conventional E/a ratio in patients with ESRD.