

Increased Microvolt T-wave Alternans in Pediatric Patients with Renal Failure Before Developing Severe Hypertrophy and Arrhythmia

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Background: The most important cause of morbidity and mortality in pediatric patients with chronic renal failure is cardiovascular involvement. There are no studies about non-invasive and low negative predictive tests used to determine the risk of ventricular arrhythmias and sudden cardiac death in children. Microvolt T-wave alternans (TWA) test is a non-invasive diagnostic method used in risk stratification for sudden cardiac death. The purpose of this study is to compare the measurements in microvolt TWA between pediatric patients with chronic renal failure and the control group.

Methods: Forty patients with chronic renal failure and 42 healthy controls were included in the study. The history, echocardiography and microvolt TWA values based on 24-hour ECG recordings of the patients were evaluated. Analysis of microvolt TWA was considered on the basis of three leads (V5, V1 and aVF).

Results: Interventricular septum thickening of the heart in patients with chronic renal failure was significantly higher compared to the control group ($p= 0.001$) but no increase observed in the wall of the left ventricle. However, end-systolic and end-diastolic volumes were significantly increased ($p=0.04$ and $p=0.01$ respectively). While there was no systolic dysfunction, Mitral-E values decreased ($p= 0.015$). On the other hand, no severe arrhythmia except "kouplet ventricular extrasystole" in 2 patients observed. When TWA values compared between patients and controls, all of the three leads TWA values increased in chronic renal failure group, but the only statistically significant increase was in lead V5 ($p= 0.03$).

As a result, microvolt TWA values were increased before developing severe left ventricular hypertrophy and arrhythmia in pediatric patients with chronic renal failure. To determine the cut-off levels of microvolt TWA and to determine its possible relations with mortality, long-term follow-up of patients required and numerous, long-term studies are needed.