

The effects of L-Thyroxine treatment on the cardiac functions of the infants with congenital hypothyroidism

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Objective: This study aims to determine how the cardiac functions are altered in infants with congenital hypothyroidism before and after L-thyroxine treatment.

Methods: The patient group consisted of 25 infants who are aged between 0 to 90 days and who are diagnosed with congenital hypothyroidism. The infants with congenital hypothyroidism were treated with L-thyroxine until thyroid function tests were normalized. The control group included 20 healthy infants who were matched with respect to age and body mass index.

Results: Conventional echocardiography showed that the patient group had significantly shorter deceleration time than the control group ($p= 0.001$). After L-thyroxine treatment, systolic volume, end-diastolic volume, diastolic left ventricular posterior wall diameter, end-systole and end-diastole left ventricular internal diameter increased significantly in the infants with congenital hypothyroidism (respectively $p= 0.009$, $p=0.02$ and $p=0.015$ and $p=0.001$). Pulse Doppler echocardiography demonstrated that the patient group had significantly lower mitral A, tricuspid E, right ventricle E' and E'/A' values but significantly higher right ventricle A' values than the control group (respectively $p=0.011$, $p=0.016$, $p=0.033$, $p=0.03$ and $p=0.024$). The E', E'/A', S', TAPSE and TE/TA values of the right ventricle and mitral E and S' values increased significantly after L-thyroxine treatment in the patient group (respectively $p= 0.014$, $p=0.017$, $p=0.004$, $p=0.006$, $p=0.004$, $p=0.03$ and $p=0.003$). Tissue Doppler echocardiography indicated that right ventricle myocardial performance index was significantly higher in the patient group ($p= 0.001$). When compared with the control group, the aort diameter was significantly larger in the patient group ($p=0.037$). The S' value for the interventricular septum and the aort diameter increased significantly after L-thyroxine treatment ($p= 0.038$ and $p=0.015$ respectively).

Conclusion: Hypothyroidism exerts negative effects on the systolic and diastolic functions of the heart and these effects are more prominent in the right ventricle. L-thyroxine treatment provides improvement up to a point and this improvement is more pronounced in the right ventricle. Conventional and pulse Doppler echocardiography may not detect the systolic and diastolic dysfunction in infants with congenital hypothyroidism. Tissue Doppler echocardiography can help to specify the subtle but significant alterations in cardiac functions which are related with hypothyroidism and/or L-thyroxine treatment.