Analysis of different methods of evaluation of myocardial hypertrophy in children with arterial hypertension

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Basics: to analyse indexes of evaluation myocardial mass (MM) and myocardial hypertrophy (MH) in teenagers with arterial hypertension

Methods: 106 boys of 15±1,6 years old. We excluded teens with secondary hypertension and those, who recieved hypotensive therapy during ≥ 3 weeks. All patients were divided into 2 groups: 1st – with ambulatory hypertension I (n=22) with Systolic blood pressure (SBP) load 25-50%, 2d – with severe ambulatory hypertension (n=84) and SBP load over 50%. From all the group 35 (33%) boys had normal body mass, 71 (67%) had increased body mass index (BMI), including 43 (40,6%) with obesity. 11 patients from 1st group (50%) and 60 (71.4%) from the 2nd group had increased BMI. In every patient we performed transthoracic echocardiogram (TTE), estimation of myocardial mass, ambulatory blood pressure monitoring with calculation indexes of SBP load. We focused on 6 indexes to estimate MH: 1) MM/Height2,7(>45 g/m2,7), 2) MM/Height2,7(>48 g/m2,7), 3) MM/Height2,7(>51 g/m2,7), 4) zMM(F) (>1,65), 5) MM/BSA(>115 g/m2), 6) MM/Body Weight(>3,0 g/kg).

Results: frequency of MH varied from 11.3% to 35.9%, depending on the chosen index. MM correlated with SBP and SBP load. Hypertrophy was frequent in patients with severe ambulatory hypertension (28,6%, p<0,05) and with obesity (p<0,05). The highest frequency of MH (n=46 (43.4%)) was recieved using the 1st index: MM/Height2,7(>45 g/m2,7). While using 1-4 indexes, that did not include body weight percentage of MH remained high in obesity teens: 34% (n=24), 27% (n=19), 18% (n=13), 21% (n=15) corresponding with the index list. Analyzing average indexes (MM/Height2,7 и zMM(F)) the number of patients with MH was reliably higher in those with severe ambulatory hypertension, than in ambulatory hypertension I: 24 (28,6%) and 1 (4,5%), p<0,05. Last two indexes (MM/BSA(>115 g/m2), MM/Body Weight(>3,0 g/kg)) could not detect MH in children with obesity, while other indexes confirmed hypertrophy.

Conclusion: severe ambulatory hypertension is more often in obesity children: OR=3,48 (CI 1,07-11,28). Exceeding 95th %tile of SBP is a main reason of appearance of MH. Most adequate indexes to detect MH in teens are MM/Height2,7(>48 g/m2,7) и zMM(F) (>1,65). Indexes MM/BSA, MM/Body Weight are not recomended to use in obesity teenagers.