

## **Cardiovascular risk diagnostic controversies in pediatric metabolic syndrome**

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The concept of “metabolically healthy obesity” has become popular recently. According to different data up to 70 % of obese adolescents could be considered as metabolically healthy. We performed an examination of 413 overweight adolescents and divided them into metabolically healthy obese (MHO) and metabolically unhealthy obese (MUO) with no age and gender difference. We found the cardiovascular parameters are deteriorated in all obese vs. lean healthy (different degree of myocardial hypertrophy and dysfunction, thickening of carotid vessels and systolic hypertension). Meanwhile, obesity associated cardiovascular problems were present in both MHO and MUO. It established low sensitivity ( $Se = 0,28$ ) and low negative predictive value ( $NPV=0,29$ ) of IDF metabolic syndrome criteria to screen obesity associated cardiovascular problems.

The level of physical activity and exercise tolerance to the standard load were low in all obese vs. lean healthy with no significant difference in groups. After using more sensitive stratification criteria, adequate chronotropic reactivity revealed in MHO. Meanwhile, MUO were under the risk of exercise induced chronotropic incompetence together with inotropic (hypertensive) response.

Thus, prognostic capability of current pediatric metabolic syndrome criteria is pretty low due to its sensitivity. Therefore obese adolescents not met diagnostic level for metabolic syndrome by IDF criteria could be falsely excluded from the cardiovascular risk group. It is functionally demonstrated by the exercise tolerance results where metabolically unhealthy subjects demonstrate cardiovascular risk related exercise induced hypertension, chronotropic incompetence and prolonged heart rate recovery.