The impact of BMI on myocardial work and left atrial strain in young overweight patients with preserved left ventricular ejection fraction

Doctor Trimarchi G, Doctor Lofrumento F, Doctor Taverna G, Doctor Mancinelli A, Doctor Cusma Piccione M, Doctor Manganaro R, Doctor Trio O, Professor Di Bella G, Associate Professor Zito C, Professor Carerj S

U.O. Polyclinic G. Martino, Department of Clinical ed Experimental Medicine - Cardiology Unit, Messina, Italy

Funding Acknowledgements: Type of funding sources: None.

Introduction: Overweight and obesity are a health problem of growing significance all over the world with increasing prevalence in both developed and developing countries. Numerous studies have demonstrated a relationship between obesity and cardiovascular diseases, underscoring the need to early treat this pathological condition. Overweight and obesity cause structural and functional changes on left ventricular (LV) and left atrial (LA) performance, which lead to heart failure.

Purpose: to evaluate the impact of BMI on myocardial work parameters and left atrial strain and to early detect LV and LA performance changes in overweight patients.

Methods: 80 young individuals were prospectively enrolled, distinguishing between overweight patients with BMI greater than or equal to 25 to 29.9 kg/m^2 (n= 36; 45 ±11 years) and normal weight patients with BMI greater than or equal to 18.5 to 24.9 kg/m^2 (n=44; 43±9 years). All patients underwent transthoracic echocardiogram to calculate global longitudinal strain (GLS), global work index (GWI), global work efficiency (GWE), global wasted work (GWW), global constructive work (GCW) and left atrial strain.

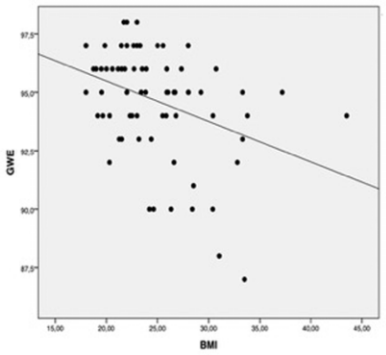
Results: Overweight patients have higher BSA (1,9±0,16 vs 1,6±0,17 mq; p<0,0001), Diastolic Blood pressure (81±12 vs 74±10 mmHg; p = 0,01) mean arterial pressure (98±15 vs 91±11 mmHg; p = 0,01), Heart Rate (71±13 vs 70±12 bpm; p = 0,02) and Global Longitudinal Strain (−19,3% ±1,7 vs −20,3% ±1,8; p = 0,02). With respect to myocardial work parameters, in overweight patients GWE (93% vs 95%; p = 0,01) is significantly reduced, whereas GWW (132 vs 102 mmHg%; p = 0,03) is significantly increased. Left atrial reservoir (LAres) (36% vs 40%; p = 0,04) and conduit (19% vs 24%; p = 0,005) function are significantly reduced in overweight patients. BMI inversely correlates with GWE (r=-0,36; p = 0,005) and LAres (r=-0,33; p = 0,007), whereas it directly correlates with GWW (r=0,31; p = 0,006).

Conclusions: Overweight induces early LV and LA performance changes that can be precociously detected by myocardial work and left atrial strain, in order to better characterize individual cardiovascular risk profile.

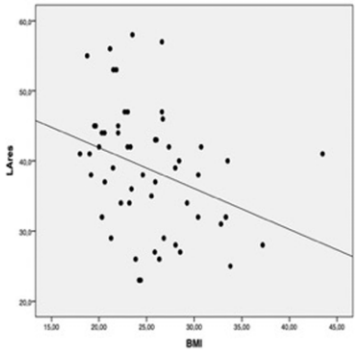
Advanced Echocardiography Data

Advanced Echocardiography Data	Entire population (n=80)	Patients with normal BMI (n=44)	Patients with BMI > 25 (n=36)	P value
Global Longitudinal Strain	-19,4±1,8	-20,3±1,8	-19,3±1,7	**0,02**
Global Work Index	1899±265,6	1880±278	1922±251	0,4
Global Work Efficiency	94,6±2,2	95±1,8	93,9±2	**0,01**
Global Wasted Work	115,8±63,9	102,3±51	132,2±73	**0,03**
Global Constructive Work	2288,7±316,2	2276,8±343	2303,1±284	0,7
Left Atrium Reservoir	38,6±8,5	40,6±9	36,4±7,6	**0,04**
Left Atrium Conduit	-22±7	-24,6±8,5	-19,2±6,3	**0,005**
Left Atrium Booster	-16,6±5,4	-16,1±4	-17,2±6,5	0,4
LAFE	60,2±6,9	60,±7	60±6,4	0,9

Correlation graphs



(r= -0,36; p=0,005)



(r= -0,33; p=0,007)

Downloaded from academic.oup.com/ehjcimaging/article/24/Supplement_1/jead119.230/7198866 by guest on 17 October 2026