Adiposity gain from 17-25years has a substantial effect on cardiac structure, independent of haemodynamics

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Topic(s):
Obesity

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Introduction: Body mass index (BMI) is independently associated with increased left ventricle mass (LVM) and remodeling in children. However associations from adolescence to emerging adulthood are unknown.

Purpose: To investigate associations between the change (Δ) in BMI to ? in cardiac structure from 17-25yrs using a large population-based sample of echocardiography in youth, and to explore the role of possible haemodynamic mediators.

Methods: 901 participants (61% female) underwent echocardiography, anthropometry and sitting blood pressure (BP) measurements aged 17yrs and had repeated measures aged 25yrs. BMI, LVM, concentricity0.67 (LVM/ end-diastolic volume 0.67), total arterial compliance (TACI), peripheral resistance (TPR) and effective arterial elastance (Ea) were calculated. Regression analysis was used to investigate associations between ΔBMI and ΔLVM indexed to height2.7 (?LVMI) and ?concentricity0.67.

Results: From 17-25yrs BMI increased by 2.05±2.1 g/m2 in males and 1.80±3.1kg/m2 in females, LVMI increased by 3.10±6.2g/m2.7 and 2.01±6.0g/m2.7 and concentricity0.67 increased by 0.91±1.2g/ml0.67 and 0.03±1.1g/ml0.67. ΔBMI was associated with ΔLVMI and Δconcentricity0.67 independently of age, socioeconomic status (SES) and smoking status. Haemodynamic measures did not substantially mediate these associations. Table 1. Data are β±SE.

Discussion: BMI gain from adolescence to emerging adulthood has a substantial effect on cardiac structure, independent of haemodynamics. These findings highlight the importance of weight control in early adulthood for good cardiovascular health.

<table>
<thead>
<tr>
<th></th>
<th>ΔLVM (g/m2.7)</th>
<th>ΔConcentricity0.67 (g/ml0.67)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>Model 1: Age, SES and smoking @25</td>
<td>0.78±0.15**</td>
<td>0.53±0.08**</td>
</tr>
<tr>
<td>+ ΔSystolic BP (mmHg)</td>
<td>0.68±0.16**</td>
<td>0.46±0.09**</td>
</tr>
<tr>
<td>+ ΔDiastolic BP (mmHg)</td>
<td>0.83±0.16**</td>
<td>0.47±0.08**</td>
</tr>
<tr>
<td>+ ΔMean Arterial Pressure (mmHg)</td>
<td>0.77±0.17**</td>
<td>0.46±0.08**</td>
</tr>
<tr>
<td>+ ΔPulse Pressure (mmHg)</td>
<td>0.72±0.15**</td>
<td>0.54±0.08**</td>
</tr>
<tr>
<td>+ ΔTACI (ml/m2/mmHg)</td>
<td>0.68±0.16**</td>
<td>0.53±0.08**</td>
</tr>
<tr>
<td>+ ΔTPR (mmHg/min/L)</td>
<td>0.76±0.17**</td>
<td>0.65±0.08**</td>
</tr>
<tr>
<td>+ ΔEa (mmHg/ml)</td>
<td>0.73±0.17**</td>
<td>0.54±0.08**</td>
</tr>
</tbody>
</table>

*p<0.01, **p<0.0001
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ΔLVMI (g/m2.7) ΔConcentricity0.67 (g/ml0.67)
Males 0.78±0.15** 0.12±0.03**
Females 0.53±0.08** 0.083±0.02**

ΔSystolic BP (mmHg) 0.68±0.16** 0.10±0.03*
ΔDiastolic BP (mmHg) 0.83±0.16** 0.12±0.03**
ΔMean Arterial Pressure (mmHg) 0.77±0.17** 0.11±0.03**
ΔPulse Pressure (mmHg) 0.72±0.15** 0.11±0.03**
ΔTACI (ml/m2/mmHg) 0.68±0.16**
ΔTPR (mmHg/min/L) 0.76±0.17** 0.10±0.03*
ΔEa (mmHg/ml) 0.73±0.17** 0.083±0.015**

*p<0.01, **p<0.0001