Increasing body mass index is associated with the incidence of supraventricular tachycardia during follow-up of adults with complex congenital heart disease

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Introduction:
Obesity and weight gain increase the risk of supraventricular tachycardia (SVT) in the general population. In adult congenital heart disease (ACHD), SVT is an important cause of late morbidity, hospital admissions and may predict mortality. Although SVT is a significant complication for patients with ACHD, the role of obesity as a potentially modifiable arrhythmic risk factor has yet to be explored.

Methods:
We retrospectively studied a random sample of complex ACHD patients followed at our institution, all with an initial clinic visit at 17-24 years of age. Patients were categorized by BMI at initial visit as: underweight (BMI < 18.5 kg/m²) normal weight (18.5 ≤ BMI < 25 kg/m²) or overweight/obese (BMI ≤ 25 kg/m²). The percentage change in BMI from initial visit to the maximum during follow-up was calculated and classified as: Mild BMI change (-10% to +9.9%), moderate BMI increase (+10% to +29.9%) and severe BMI increase (≥ +30%). We recorded the occurrence during follow-up of documented SVT on ECG or Holter monitoring and the need for direct current (DC) cardioversion.

Results:
There were 292 patients (60% male) including: TOF n=156, Fontan n=72, Mustard n=44, Rastelli n=16 and ccTGA n=4. Median (IQR) duration of follow-up was 9.1 (2.7 – 13.0) years. At initial visit, 12% were underweight 66% were normal weight and 22% were overweight/obese. BMI classification at initial visit did not predict the occurrence of SVT (p=0.91). During follow-up 37% had a moderate and 22% a severe BMI increase and these groups had increased risk of developing SVT when compared to the group with mild BMI change (Figure). The highest risk of SVT was in patients with a severe increase in BMI (HR [95% CI] = 2.85 [1.14 to 8.64] and 4.35 [1.77 to 13.08] for moderate and severe, respectively, both p < 0.01). DC cardioversion was most frequent in the group with severe BMI change (mild change 1.7% vs. moderate increase 16.5% vs. severe increase 32.8%, p < 0.01).

Conclusions:
Increasing BMI during follow-up is a risk factor for SVT and DC cardioversion in patients with complex ACHD.