

## Evaluation of left atrial volume in obesity. How indexation by body surface compares to indexation by height

Azzari F.; Krsticevic L.; Dionne N.; Veilleux SP.; Rioux L.

Centre Integre de Sante et Services Sociaux de Bas St-Laurent - Rimouski, Rimouski, Canada

**Funding Acknowledgements:** Type of funding sources: None.

### Background:

Left atrial enlargement (LAE) is a risk factor for atrial fibrillation, stroke and heart failure with preserved ejection fraction. Current ASE/EACVI guidelines recommend indexing left atrial volume (LAV) by body surface area (BSA) for LAE grading. However, in overweight patients, this ratio must be interpreted with caution due to a disproportionate increase in BSA.

### Purpose:

We have assessed LAE in overweight (OW), obese (OB) and severely obese (SO) patients by indexing LAV by height (Ht) instead of BSA.

### Methods:

We retrospectively evaluated LAV in 1246 patients from our echocardiography clinic.

We graded LAE by BSA, in patients with a normal body mass index (BMI  $\geq 18.5$  and  $< 25$  kg/m<sup>2</sup>, n = 422). Afterwards, we established the cut-offs for the LAV/Ht ratio by the receiver operating curve (ROC) method. We reported sensitivity (Se), specificity (Sp), area under ROC curve (AUC) and Youden's index (Yi).

Finally, we applied the LAV/Ht ratio to OW (BMI  $\geq 25$  and  $< 30$  kg/m<sup>2</sup>, n = 467), OB (BMI  $\geq 30$  and  $< 35$  kg/m<sup>2</sup>, n = 235) and SO (BMI  $\geq 35$  kg/m<sup>2</sup>, n = 122) patients.

### Results:

There were no differences in Ht between groups. As expected, the weight ( $63.2 \pm 8.8$ ,  $77.4 \pm 9.6$ ,  $91.7 \pm 11.5$  and  $110.4 \pm 17.3$  kg) and BSA were significantly different in between groups.

The cut-offs for the LAV/Ht ratio were  $\geq 35$  ml/m (Se 96.3%, Sp 97.3%, AUC 0.997, Yi 0.94),  $\geq 42$  ml/m (Se 100%, Sp 96.7%, AUC 0.996, Yi 0.97) and  $\geq 48$  ml/m (Se 94.3%, Sp 97.0%, AUC 0.954, Yi 0.94) for mild, moderate and severe LAE, respectively.

The table shows LAV and LAE grading according to BMI group. When applying the LAV/Ht ratio, the LAE grade increased in 29.8% of OW, 48.5% of OB and 66.4% of SO patients.

### Conclusion(s):

LAV is significantly increased in OW, OB, and SO patients.

In this population, the LAV/BSA ratio significantly underestimates the degree of LAE. The LAV/Ht ratio allows an accurate categorization of LAV, leading to a significant reclassification of LAE.

	Normal Weight	Overweight	Obese	Severely Obese
LAV (ml) ¶	58.3 ± 26.4	63.5 ± 24.0	69.3 ± 25.7	76.4 ± 25.1
LAV/BSA (ml/m <sup>2</sup> )	33.9 ± 14.2	33.8 ± 12.1	34.3 ± 11.9	35.3 ± 10.7
Normal / Mild	64.5 / 15.4%	63.2 / 19.3%	64.3 / 16.2%	54.1 / 23.8%
Moderate / Severe	7.6 / 12.6%	6.9 / 10.7%	8.9 / 10.6%	10.7 / 11.5%
LAV/Ht (ml/m)	34.7 ± 15.0	37.6 ± 13.6	41.0 ± 14.6	45.9 ± 14.4
Normal / Mild	--	50.3 / 20.1%	39.1 / 25.1%	21.3 / 23.0%
Moderate / Severe	--	13.9 / 15.6%	13.2 / 22.6%	18.9 / 36.9%

¶ ANOVA between BMI groups:  $< 0.0001$ ; Comparison between LAE grading by BSA or Ht: OW  $\chi^2=22.4$ ,  $p = 0.0001$ ; OB  $\chi^2=30.8$ ,  $p < 0.0001$ ; SO  $\chi^2=36.5$ ,  $p = 0.0001$