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# The Impact of the Left Atrium Appendage Volume and Morphology Found in Computed Tomography on Characteristics of P Wave Morphology in Electrocardiogram

Authors: Viktorija Verhovceva<sup>1</sup>, Dr. Ligita Zvaigzne <sup>2</sup>, Dr. Ketija Apsīte <sup>2</sup>,  
Dr. Anna Labuce <sup>2</sup>, Asst. prof. Kristīne Jubele <sup>1,2</sup>, Prof. Oskars Kalējs<sup>1,2</sup>

<sup>1</sup>Riga Stradins University, Faculty of Medicine

<sup>2</sup>Pauls Stradins Clinical University Hospital

# Summary

## Anatomy and volume

### Cardiac Computed Tomography (CT) scan

- Left atrial appendage morphology
- Left atrial appendage volume



## Electrical activity

### Electrocardiography (ECG)

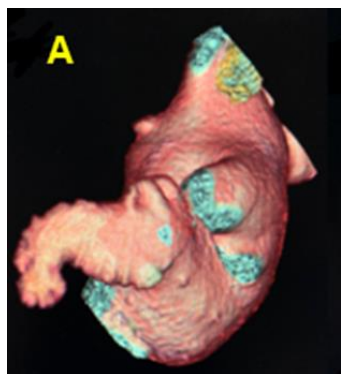
P wave:

- Duration
- Amplitude
- Axis
- Presence of notching in lead II
- Morphology in lead V1

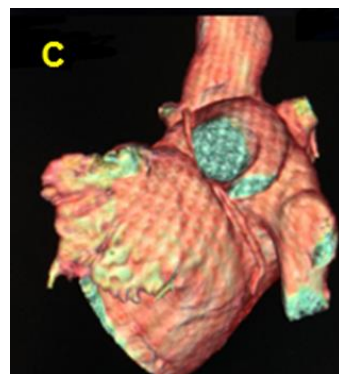
**Aim of the study:** to find statistically significant correlations between left atrial appendage morphology and volume found in cardiac CT in relation to ECG P wave characteristics.

# Results (I)

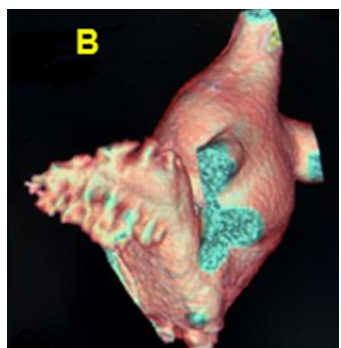
**145 patients** 75.2% (109) male, 24.8% (36) female



(A) **Chicken wing 65.5% (95)**  
Mean volume: 12.2 ml (SD = 5.1)



(C) **Cauliflower 13.1% (19)**  
Mean volume: 12.9 ml (SD = 3.5)



(B) **Cactus 17.9% (26)**  
Mean volume: 12.1 ml (SD = 4.4)



(D) **Windsock 3.4% (5)**  
Mean volume: 6.5 ml (SD = 2.2)

**725 left atrium reconstruction models during the heart cycle**

Figures A – D : Cardiac CT 3D reconstruction models of the left atrium. Lateral view, morphology of the left atrial appendage. A – chicken wing; B – cactus; C – cauliflower; D – windsock.

Verhovceva, 2021

## Results (II)

### Left atrial appendage morphology

- + P wave duration ( $p=0.956$ ),
- + P wave amplitude ( $p=0.860$ ),
- + P wave axis ( $p=0.127$ ),
- + morphology of the P wave in lead V1 ( $p=0.105$ ),
- + P wave notching in lead II ( $p=0.082$ ).

*No statistically significant associations*

### Left atrial appendage volume

- + P wave duration ( $p=0.634$ ),
- + P wave amplitude ( $p=0.659$ ),
- + P wave axis ( $p=0.894$ ),
- + morphology of the P wave in lead V1 ( $p=0.589$ ),
- + P wave notching in lead II ( $p=0.747$ ).

*No statistically significant associations*

# Conclusions

The morphology and volume parameters of the left atrial appendage showed **no statistically significant impact** on the electrical activity of the heart.

## Keypoints for discussion

- The atrial muscle sleeves around the pulmonary vein orifices are known to be the site of focal electrical activity leading to atrial fibrillation.<sup>1</sup>
- Driver localization using phase-mapping algorithms:
  - Reentrant drivers - PV antra (85%), LAA subregion in (55%);
  - Focal drivers - left PVs (51%), LAA (50%).<sup>2</sup>

1. Standring, S. 2015. *Gray's Anatomy: The Anatomical Basis of Clinical Practice*. London: Elsevier. Available from: via GoogleBooks. [viewed 08/03/2021]

2. Biase L.D., Natale A. and Romero J. 2018. Thrombogenic and Arrhythmogenic Roles of the Left Atrial Appendage in Atrial Fibrillation. *Circulation*. American Heart Association, Inc. Vol. 138, 2036–2050. Available from: <https://doi.org/10.1161/CIRCULATIONAHA.118.034187> [viewed 08/03/2021]

# Thank you for your attention!

Questions?