Integrated platform for advanced medical image analysis in clinical support of hemodynamic procedures – HEMO-IMPROVE

PROTECTION

EP24382433 - PCT
Priority Data: 2024/04/23
Owners: Servicio Público de Saúde (SERGAS) and Galician Public Foundation for Biomedical Research Galicia Sur (FPGIBGS)
Inventors: Andrés Iñiguez Romo; Victor Jimenez Díaz; Silvia Campanioni Morfi; Pablo Juan Salvadores; Jose Antonio González Novoa and Laura Busto Castiñeira; César Veiga García.

BACKGROUND

Arterial calcification is associated with a higher likelihood of adverse cardiovascular events, making it essential to accurately determine its extent in order to properly assess risk and implement appropriate prevention and treatment strategies in interventional cardiology.

Assessing aortic calcium burden is particularly relevant when planning certain structural heart procedures, such as transcatheter aortic valve implantation (TAVI) or left atrial appendage closure, since quantifying arterial calcium helps predict post-TAVI complications, such as paravalvular regurgitation.

Calcium assessment based on computed tomography (CT) is a well-established and widely used approach. CT scans can be performed with or without contrast agents in patients. The use of contrast agents improves image quality for specific purposes and is common in various thoracoabdominal CT studies, but it poses a challenge for standardizing and determining calcium. The introduction of contrast agents alters Hounsfield Unit (HU) values in studies involving tissues. Therefore, with contrast, the HU value of each tissue becomes arbitrary, and the contrast agent introduces variability in HU readings. While there is a robust reference methodology for calcium assessment in non-contrast-enhanced CT scans (voxels with HU ≥ 130 correspond to calcium), there is currently no standard reference for calcium evaluation in contrast-enhanced CT scans (CE-CT).

ACHIEVEMENTS AND RESULTS

In this regard, CT contrast agents improve the visualization of blood vessels but at the same time complicate the measurement of arterial calcification. The application of uniform thresholds for detecting calcified plaques in contrast-enhanced CT (CE-CT) scans results in a high rate of misclassification of the volumes (voxels) in the computed tomography images.

Through a computerized system and method capable of determining dynamic calcium thresholds based on the local attenuation of the aorta, it was possible to detect and characterize calcified plaques in contrast-enhanced computed tomography scans with greater accuracy. This innovation significantly reduces classification errors and enables the design of more appropriate and personalized intervention strategies. The present invention represents a significant advancement with high potential impact on clinical practice, contributing to more efficient, safer, and patient-tailored cardiovascular care.

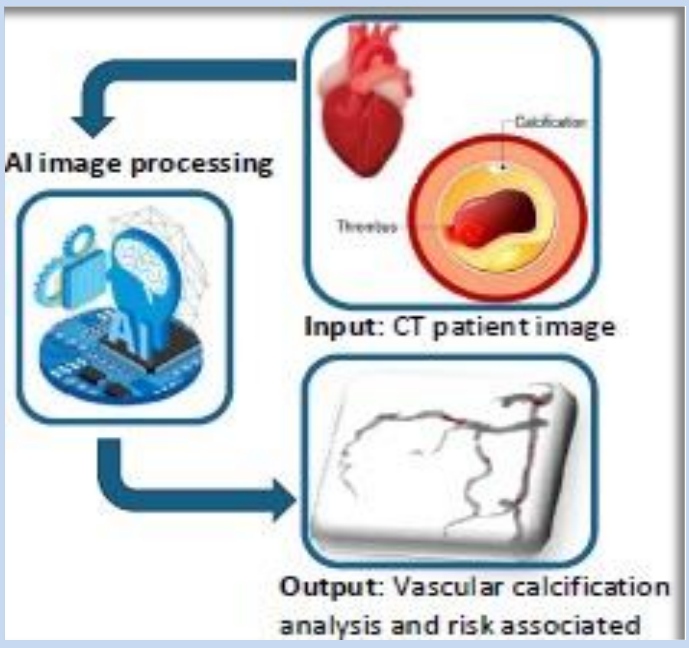
PURPOSES AND ADVANTAGES

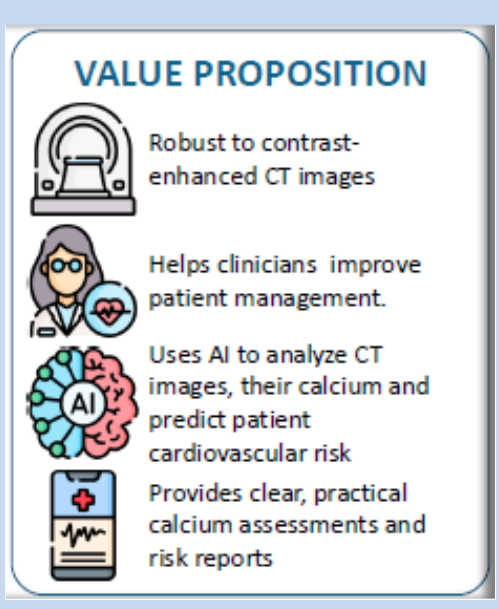
The **main advantages** of this technology are:

- **Detection and quantification of calcium plaques in cardiovascular vessels**, such as the aorta or coronary vessels, using computed tomography (CT) with and without contrast.
- **Improved planning of structural cardiac procedures** through a more accurate assessment of aortic calcium burden.
- **Enables the prediction of post-TAVI complications**, such as paravalvular regurgitation.

COLLABORATION OFFER

This offer can be formalized through a "Partnership Agreement" for the co-development of this technology or a "License Agreement" for the direct use of the proposed technology. If you are interested in this offer or need more information, please contact us.





CONTACT INFORMATION

Nerea Alonso Sousa
Innovation and Technology Transfer Unit
Galician Public Foundation for Biomedical Research Galicia Sur- IIS Galicia Sur
Tel: +34 986 217 454
email: nerea.alonso@iisgaliciasur.es
Webs: http://www.fundacionbiomedica.org/
http://www.iisgaliciasur.es/

Proyecto financiado por:

INSTITUTO DE INVESTIGACIÓN SANITARIA Galicia Sur
Convocatoria Intramural 2025

INSTITUTO DE
INVESTIGACIÓN SANITARIA
Galicia Sur

Hospital Álvaro Cunqueiro
Estrada Clara Campoamor, 341
36312 Vigo, Pontevedra - SPAIN

www.fundacionbiomedica.org www.iisgaliciasur.es