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Arnold et al.

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(54) **AUTOMATIC DETECTION AND
QUANTIFICATION OF CORONARY AND
AORTIC CALCIUM**

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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 1143 days.

This patent is subject to a terminal dis-
claimer.

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(65) **Prior Publication Data**

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(57) **ABSTRACT**

Related U.S. Application Data

(60) Provisional application No. 60/333,223, filed on Nov.
24, 2001.

An automated method measures coronary calcium in a living
subject using x-ray computed tomography (CT). The method
acquires at least one CT image containing voxels representing
x-ray attenuation of the subject which may or may not be
calibrated. The method of analysis may or may not require
operator interactions and includes analyzing the images in a
computer to identify the boundaries of the heart. The method
further includes identifying the approximate location of at
least one coronary artery without operator interaction. The
method further includes placing a region-of-interest (ROI)
surrounding the artery location automatically. The method
further includes analyzing the ROI to identify voxels above a
threshold value. The method further includes determining the
calcium content in mass units.

(51) **Int. Cl.**
A61B 5/05 (2006.01)

(52) **U.S. Cl.** **600/407**; 600/408; 600/410;
600/425; 382/130; 382/131; 128/922

(58) **Field of Classification Search** 600/407-425;
378/8, 18, 54, 56, 98, 207; 382/130, 131
See application file for complete search history.

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44 Claims, 19 Drawing Sheets

