

Identification and characterisation of coronary plaques with CT virtual intravascular endoscopy: A pictorial review

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Abstract

Purpose: To characterize the intraluminal appearances of coronary plaques and identify the relationship between left coronary bifurcation angle and plaque formation using multislice CT virtual intravascular endoscopy (VIE).

Materials and Methods: 33 patients suspected of coronary artery disease undergoing multislice CT angiography were included in the study. 3D VIE images were generated to visualize the intraluminal appearances of coronary wall due to presence of coronary plaques. Left coronary bifurcation angle was measured to determine the relationship between plaque formation and corresponding angulation. Hemodynamic analysis using computational fluid dynamic was performed to demonstrate the flow velocity and wall shear stress in relation to different angulations at the left bifurcation.

Results: VIE was successfully generated in all of the patients with clear demonstration of the spectrum of intraluminal findings of coronary plaques. Regular and smooth intraluminal appearances were observed with VIE in non-calcified and focally calcified plaques, while irregular luminal changes were noticed in the extensively calcified and mixed plaques. There is a direction correlation between plaque formation and coronary angulation at the left coronary artery, with wide angles leading to plaque formation. Hemodynamic analysis confirmed high flow velocity and low shear stress at the wide angulated models.

Conclusion: VIE provides unique information about intraluminal appearances of coronary wall caused by coronary plaques. Coronary plaques tend to form at the wide angulated left bifurcation.

Keywords: Multislice CT, coronary artery disease, plaque, virtual intravascular endoscopy