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Calculation of the Correct Angle of Bifurcation Predicts the Atherosclerotic Lesion Location More Accurately

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Atherosclerosis is one of the most important causes of narrowing or occlusion of the coronary arteries. For this reason, it has become an important issue to find the factors affecting the atherosclerosis process. Although lipid metabolism and the inflammatory process are the most important factors affecting the formation of atherosclerosis, physical factors mainly affect the localization of atherosclerosis [1]. We read with great interest the article of Ziyrek et al., that was published on this topic [2]. However, there are some important issues that should be mentioned for this article.

First of all, researchers found an inverse correlation between the bifurcation angle and the lesion's distance from bifurcation [2]. They assumed that increased shear stress leads to plaque formation. They only calculated the angle of bifurcation between the two side branches. However, force of shear stress comes from the direct flow of main artery to side branches. For example, although the angle between the side branches is wider, one side branch is subjected to less shear stress force if it exits the main branch at a more linear angle (Fig. 1). Friedman et al. used the angle between left main and left anterior descending/left circumflex arteries [3]. So, it would be more accurate to measure the angle between the main branch and the side branches instead of angle between side branches.

Secondly, the authors calculated the bifurcation angles from the fixed coronary angiography views. Coronary arteries have specific locations in the epicardial layer of the heart (atrioventricular groove and anterior interventricular sulcus). However, position of the heart varies in the torso. Therefore, coronary arteries locations are different in the torso for all patients. In a study, researchers found that bifurcation lesions need dynamic monitoring (imaging angles should be adjusted according to optimal

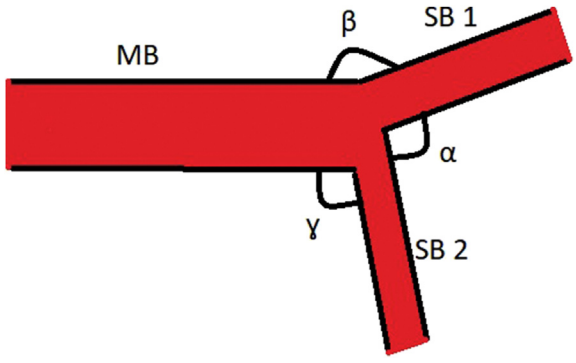

Fig. 1. Blood flow leaks more directly to the first side branch (Angle of the β is the biggest angle and comes with a more linear extension of main branch to side branch 1). Second side branch has more perpendicular angle to main branch so, shear stress is more prominent for the second side branch. As a consequence, angle between main branch and side branches is more important than angle between side branches. MB: Main branch SB: Side branch β>α>γ β: Angle between MB and SB 1 α: Angle between side branches γ: Angle between MB and SB 2.

JSHA is not able to get the author's response from [2] before this publication published on time.

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bifurcation view) not fixed ones [4]. As a consequence, the angle calculation in the fixed angiographic view may underestimate the results. Therefore, it could be better to adapt the angiographic view where the bifurcation angle looks the widest.

Finally, in this article, we did not find the lesions characteristics and exact locations. It is not known whether there is only one lesion on one side branch or two side branches had lesions. In addition, the authors did not mention the lesions characteristics whether they selected only the spot lesions or the diffuse lesions as well. So, addition of these data could strengthen the article more prominently.

Author contribution

Conception and design of Study: Mehmet Ozgeyik. Mehmet Ozgeyik, Onur Kaypakli, Mufide Okay Ozgeyik: Literature review, Acquisition of data, Analysis and interpretation of data, Research investigation and analysis, Data collection, Drafting of manuscript, Revising and editing the manuscript critically for important intellectual contents, Data preparation and presentation, Supervision of the research, Research coordination and management, Funding for the research.

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