

51<sup>st</sup> CARDIOCON 2022: ABSTRACT**SOFTWARE GUIDED NAVIGATION OF CORONARY WIRE FOR CHRONIC TOTAL OCCLUSION RECANALIZATION: A BENCH STUDY OF NAVIWIRE APPLICATION****Muhammad Suleman<sup>1</sup>**<sup>1</sup>Peshawar Institute of Cardiology (PIC), Peshawar, Pakistan

**Objectives:** Chronic Total Occlusion usually requires specialized wires. These specialized wires should not be rotated haphazardly and as this can lead to rotation of wire inside subintimal space and leading to creation of large subintimal space and collapse of main lumen and making difficult wire reentry. Only controlled and intentional rotation of wire is necessary for higher procedural success. Coronary arteries are 3 dimensional structures and fluoroscopy has limitation to locate the wire in three dimensional vessels. 3D wiring is one method for accurate guidewire location in CTO lesions. Previously some authors have proposed methods to make a mental picture of 3D wiring. In order to make this process even less cumbersome. We propose a software application named NAVIWire that does the job in cath-lab with in two steps. The purpose of this study is to assess the accuracy of our software to locate a wire shaft and tip inside 3D printed coronary vessel.

**Methodology:** A 3D printed coronary vessel is printed in such a way that it is divided into 9 quadrants. One operator inserted wire into one of these quadrants. The wire had 1mm tip bend like use in CTO. This operator knew the location of wire and tip orientation. Operator 2 (first time user) and operator (expert user) who were blinded to original location imaged this model under biplane fluoroscope using LAO 45 and RAO 45. The process was repeated 36 times and randomly the first operator changed the location and orientation of tip each time. They inserted the data from these two views into the NAVIWire software and it output the predicted location of wire in these quadrant and tip orientation. We compared this predicted location with original location. We also reported inter-observer variability between first time user and expert user. In addition, we also reported a case of successful crossing of LAD CTO using NAVIWire software. This case report will help operators understand the usage of NAVIWire in real life settings.

**Results:** The location of wire shaft inside all 9 quadrants was 100% correctly predicted by all operators. Although the expert user (operator 2) correctly predicted the tip orientation all 36 times but first time user predicted with 94.4% accuracy. The case report of patient shows successful crossing of CTO wire using NAVIWire assisted 3D wiring.

**Conclusion:** NAVIWire correctly predicts CTO wire location and tip orientation in 3D printed coronary vessel and the case report also reiterate the finding in real life setting.

**Keywords:** Chronic Total Occlusion, Navigation of Coronary Wire

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