CLEAR Visualization of Stent Placement

Courtesy of Nagendra Chouhan, MD, Medanta The Medicity, Gurgaon, India

Coronary artery disease (CAD) is the most common cause of death worldwide in the general population over the age of 20. Percutaneous coronary intervention is one of the standard treatment options for CAD. With deployment of a metallic stent the constricted coronary arteries can be dilated.

"Heavier patients make imaging more difficult, and increasingly finer struts have made our lives difficult. Additionally, stent structures have become more and more delicate, hence CLEARstent technology comes in handy."

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The long term success and safety of percutaneous interventions to administer CAD depends on accurate positioning of stent and proper apposition of stent struts with vessel wall along with other parameters. Visual assessment with conventional two-dimensional fluoroscopic imaging may be misleading due to poor visualization of the non-deployed rapidly moving stent. The struts of upcoming next generation stents are becoming thinner which make them less radio-opaque and even more difficult to visualize on live fluoroscopic images pre- and post-deployment. Although intravascular ultrasound (IVUS) and optical coherence tomography (OCT), are considered the gold standard for optimizing the result of angioplasty post-stent deployment by allowing endovascular imaging of the vessel and stent interaction, they have certain limitations. IVUS is not only invasive and time consuming, but it also has an impact on catheterization, laboratory efficiency, and cost-effectiveness. The other major limitation of these procedures is that they are only useful after stent deployment and are not helpful in positioning of the stent pre-deployment, especially in cases of overlapping stents where it is imperative to prevent geographic misses.

CLEARstent Comes in Handy

CLEARstent enables the operator to rapidly and precisely assess stent deployment. The visibility of the stent is enhanced automatically. Day-to-day work does not need the luxury of complex detail that OCT offers. Physicians need an easy-to-use tool to assess intervention success. Merely knowing that the stent has opened up correctly and is well opposed to the vessel wall is essential information for the interventionist.

Heavier patients make imaging more difficult, and increasingly finer struts have made our lives difficult. Additionally, stent structures have become more and more delicate, hence CLEARstent technology comes in handy (Fig. 1). Depending on the presence of contrast, CLEARstent either shows the stent enhanced image or automatically toggles between the stent enhanced image, and contrast filled vessel. Automatic region of interest selection ensures the visibility of the entire stent and not just the region in between balloon markers. The CLEARstent dynamic loop between inverted static stent image and best matching frame (with contrast medium) system automatically computes and displays the result (Fig. 2A and 2B).

Optimizing the Placement of Overlapping Stents

A 42-year-old male presented with severe retrosternal pressure which had persisted for the last two hours. His ECG revealed anterior MI. In the course of a primary PCI a thrombus containing a large LAD-diagonal lesion was detected. CLEARstent facilitates the visualization of the stents (Fig. 3) and shows that the first stent needs further post-dilatation. Using TAP technique, CLEARstent helps optimize the placement of the two stents to treat the bifurcation lesion (Fig. 4). The technical challenge of minimal overlap could be easily overcome by using CLEARstent, which enables easy and precise treatment without unnecessary expenses.

"CLEARstent makes our job really easy!"

Contact

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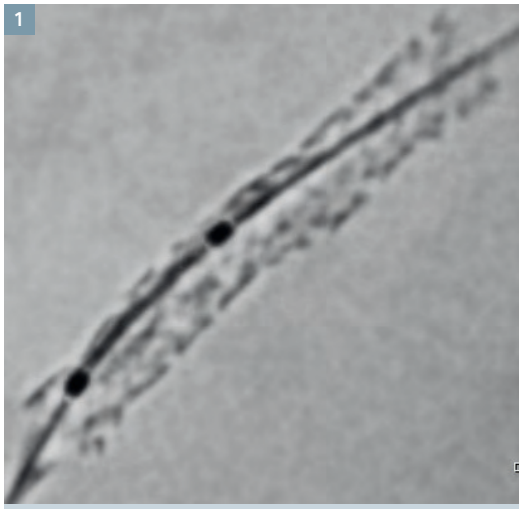
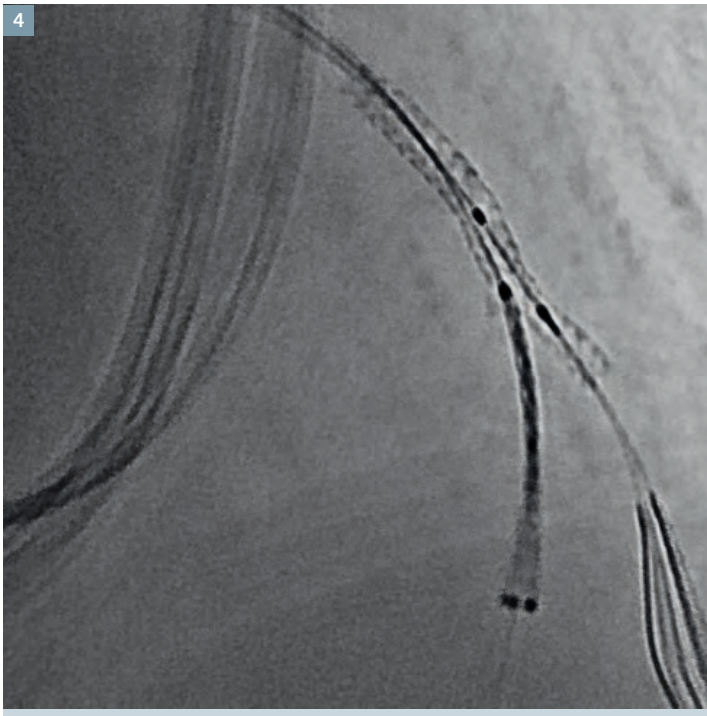


1 CLEARstent for visualization of the finest stent struts.

2 CLEARstent Dynamic: Simultaneous information by looped display of stent (A) and vessel (B) (contrast flow).

3 Shows first stent, which is too narrow.



4 The second stent being placed just abutting the first stent.