

New Tools to Enhance Stent Visualization

With increasingly finer stent struts and patients and clinicians becoming more and more dose conscious, interventional cardiologists need a fast and easy way to assess proper stent deployment with minimum radiation. Ghent's Maria Middelaes Hospital in Belgium has been selected as one of Siemens Cardiology's Clinical Test Sites for new features strengthening their Artis zee cath lab.



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The Maria Middelaes Hospital in Ghent currently performs approximately 1,000 PCIs per year, and the team has access to all contemporary interventional tools such as balloons, stents, rotational atherectomy, IVUS, etc. The clinical collaboration with Siemens has allowed Kristoff Cornelis, M.D., interventional cardiologist, to use Artis zee's new CLEARstent. We had the chance to visit Cornelis in his lab and we asked for a short interview. Here he shares his first experiences with Artis zee and CLEARstent.

Dr. Cornelis, why do you need stent enhancement software and what are its most important requirements?

I believe stent enhancement is a great asset when dealing with more complex lesions. It allows better recognition of stent morphology and behavior in bifurcations and long lesions where multiple stents need to overlap. Furthermore, it allows evaluation of stent expansion without additional use of contrast.

Dr. Cornelis, what is new about the CLEARstent feature you have worked with over the last five months?

Like IC Stent [Artis zee's previous stent

enhancement feature], CLEARstent runs directly on the Artis zee system. It can be activated by using an organ program, where the system automatically acquires the images necessary for calculation, or by one click-activation via touch display. It can also be activated via the Artis zee workplace for post-processing of pre-acquired scenes. Depending on the presence of contrast agent, CLEARstent either shows the stent-enhanced image or automatically toggles between the stent-enhanced image and the contrast filled vessel. On the new software I especially like that automatic ROI selection ensures the visibility of the whole stent and not only the region in between catheter balloon markers.

What have your experiences been after using CLEARstent?

The current configuration allows for fully automatic detection of the balloon markers and automatic processing of the enhanced image. There is no need for offline adjustments.

I once had a bifurcation case where I planned to perform a V-stenting. The main vessel was already treated with a stent proximal in the carina. The distal

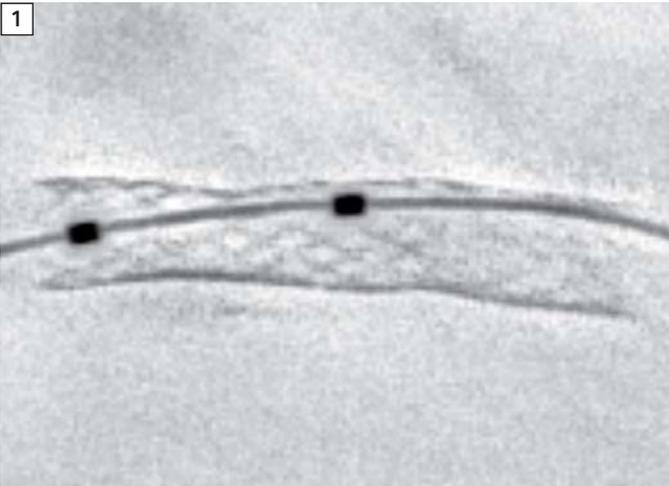
stents needed to be inflated alternately. Before inflating the last stent, we performed a CLEARstent acquisition. Here we found that the distal stent was not overlapping the proximal stent, and the third stent was damaging the second. This allowed us to change strategy. We finally were able to get a full scaffolding of both branches and the carina, based on the CLEARstent acquisition. I predict an even broader use of this technique, since it's so user friendly.

If QCA is used to measure vessel size and degree of stenosis, do you think CLEARstent can be of value to measure stent expansion?

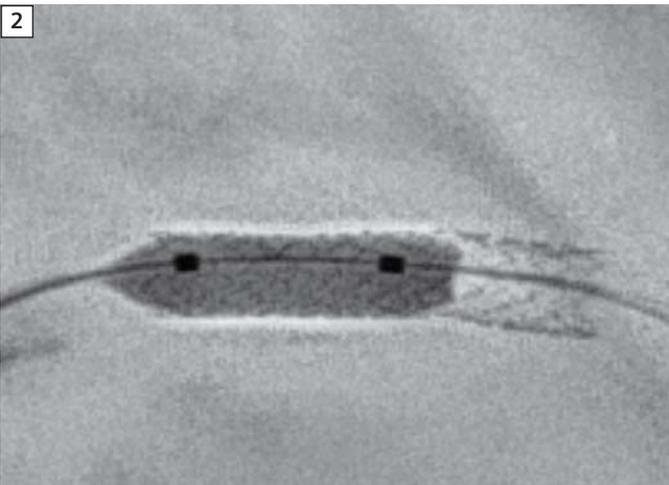
Currently IVUS is used as a gold standard to measure stent expansion, but it's an expensive tool and sometimes cumbersome to use. CLEARstent allows a very adequate border detection, and when calibrated correctly, might even replace IVUS in evaluation of stent expansion.

Contact

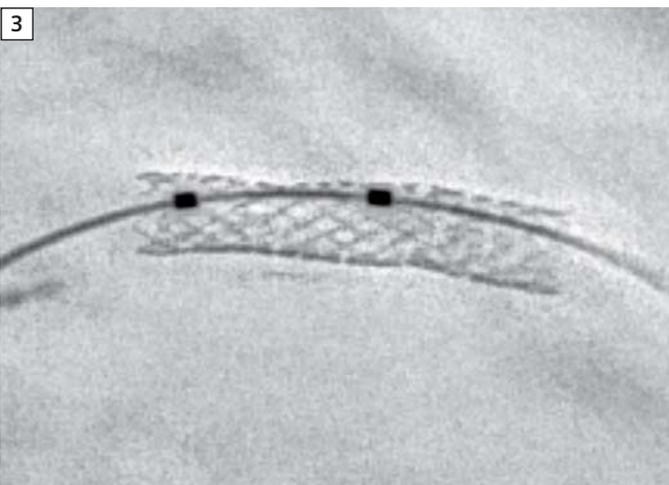
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1 Unsufficient deployment of a stent



2 Post-dilatation with a balloon



3 Final expanded stent

Technical Aspects

CLEARstent –
Taking stent enhancement
to the next level

- Automated 5-second acquisition or use of pre-acquired images
- Stent ROI to avoid cut-off images
- Simultaneous information of looped display and vessel (contrast flow)
- Live fluoro overlay for image guidance during complex procedures
- PACS compatibility for review of scenes using any DICOM viewer
- No separate workstation needed

The enhanced image or sequence is saved as a regular DICOM scene and can be manipulated accordingly, e.g. started, stopped, accelerated, decelerated, windowed or zoomed. It can also be stored to PACS to be reviewed on any DICOM viewer.