

Minimally Invasive Procedure in Practice

—Efforts by Mimihara General Hospital—

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With percutaneous coronary intervention (PCI) becoming increasingly complex and sophisticated, there is a demand for angiography systems that can provide lower radiation exposure, reduced contrast media usage, and shorter examination times. Shimadzu's latest angiography system, Trinias series MiX package, was developed under the concept of a "Minimally invasive eXperience" and includes a variety of original functions for achieving minimally invasive procedure. One of these functions is SCORE StentView+Plus (hereinafter referred to as StentView) software for enhanced stent visualization. StentView supports minimally invasive and highly accurate PCIs by providing real time display of the region of interest in a fixed position.

This article introduces four example applications of StentView that are used during clinical practice at Mimihara General Hospital (Osaka, Japan).

1 StentView with Injecting Small Amounts of Contrast Media

For lesions located near a bifurcation, it is important to understand the position of the side branch accurately before stent dilation. Mimihara General Hospital utilizes small amounts of contrast media together with StentView's major feature, which is display of the region of interest in a fixed position, to perform stenting with accurate information on positional relationships.

Depending on subject conditions, contrast media can reduce stent marker detectability and cause confusion in later images, but Mimihara General Hospital reports this is not a problem as they are able to acquire enough information by viewing images frame-by-frame.

<Steps>

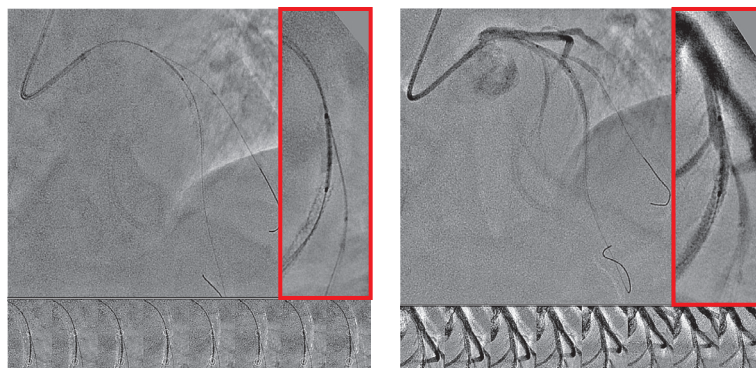
(1) StentView mode ON



(2) Foot switch ON



(3) Just after foot switch on, inject small volume of contrast media.



Placement of Multiple Stents for a Long Lesion in the LAD

After placing the first stent at #7, the second stent was delivered to #6-7. StentView allowed confirmation of the amount of overlap between the stents (red box in left image), and with combination of small volume injection of contrast media (red box in right image), also allowed accurate confirmation of the positional relationship of stent and a lateral branch before dilation.



A Word from Shozo Ishihara, M.D., Department Manager, Department of Cardiology

Not only brilliant response and ease of use, we are very happy that we can have latest image quality and application equipped on Trinias MiX package because of periodical and detailed updates to software. In particular, the SCORE StentView+Plus function has now become well-established and is regarded as essential at our hospital. Its display of images in real time means it has a variety of applications. I hope to be able to provide more clinically valuable information to the system manufacturer and other doctors who use Trinias.

2 StentView + C-Arm Rotation (Rotational StentView)

When a stent has been placed at a lesion on a bifurcation and a guide wire is passed through the side branch to implement the kissing balloon technique (KBT), it is important to confirm where among the stent struts the guide wire has passed into the side branch. If a stent was placed with inadequate dilation or apposition, the recrossed guide wire can mistakenly pass outside the stent, so it is also necessary to confirm that the recrossed guide wire actually passes through the middle of the stent. At Mimihara General Hospital, we confirm the positional relationship of guide wires and stents by using StentView with C-arm rotation when needed. This kind of confirmation is normally performed using intravascular ultrasound (IVUS) or optical coherence tomography (OCT), but with our approach the position of the passing wire can also be confirmed by the same imaging device, which shortens procedure times.

The guide wire is sometimes removed after placement of the stent. In that case, the guide wire must be passed through the stent one more time. If the stent is inadequately dilated, the guide wire may mistakenly enter the stent from between stent struts during the repeat attempt. StentView with C-arm rotation is also useful for checking this phenomenon.

<Steps>

- (1) Decide on rotational direction of C-arm.
(Ideally, the C-arm rotates around the axis of the placed stent.)

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- (2) Set the ROI.

↓

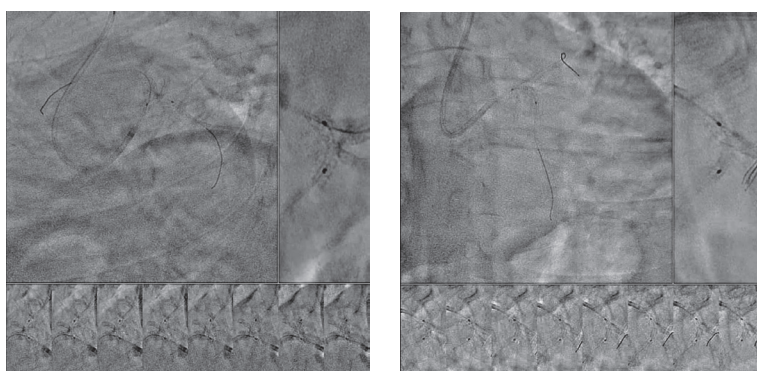
- (3) Use the [Direct Memory] button or C-arm rotation lever to perform a test run with fluoroscopy.
(Markers must be confirmed to always be within the ROI. Adjust ROI if markers fall outside it.)

↓

- (4) StentView ON

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- (5) Simultaneously turn the foot switch ON and start C-arm rotation.
(May be combined with contrast enhancement depending on the patient case.)



Stent Placement at an LMT-LAD Bifurcation Lesion

After placing a stent at #5-6, a guide wire is recrossed to the LCX. By using StentView while rotating the C-arm from an RAO-Caudal direction (left image) to an LAO-Caudal direction (right image), where the recrossed guide wire passes through the stent struts can be confirmed from multiple directions.

3 StentView + Balloon Manipulation

Post-dilation after stent placement requires accurate alignment between the balloon and post-dilation position. Using StentView while manipulating the balloon allows for accurate determination of balloon placement with real time confirmation of alignment with the stent. The procedure is performed quickly in real time while the effect of cardiac movement is suppressed, which results in improvement alignment precision, shortened procedure times, and reduced exposure doses.

4 StentView + IVUS

StentView is normally used with balloons that have 2 markers, but Mimihara General Hospital also uses StentView with IVUS markers. When using IVUS catheters with 3 or more markers, StentView's ROI function can be used to reduce the markers to just 2 points. A balloon is not always present inside the blood vessels when the doctor wishes to use StentView, so IVUS markers can be very useful.

Using IVUS markers also allows the doctor to confirm in real time which part of a stent is being observed with IVUS, and stent fractures that are difficult to confirm by IVUS are obvious when using StentView.

Using IVUS markers in this way increases the number of situations in which StentView can be utilized, resulting in further shortening of examination times and further reductions in exposure doses.