

Vascular

Usefulness of DynamicStentView for PCIs



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1. Introduction

This specialized cardiovascular medical facility was established in October 2008 with the goal of providing the World's best cardiac treatment, 24-hour emergency cardiac care, patient-centered compassionate care, a focus on optimizing care by partnering with regional medical clinics, and promoting the prevention of cardiac disease (Fig. 1). With 64



Fig. 1 Nagoya Heart Center



Fig. 2 Shimadzu Bi-Plane
Angiography System

beds and three angiography rooms, we not only constantly perform coronary artery procedures, such as cardiac catheterization treatment and examinations, ablative treatment of arrhythmias, lower extremity interventions, but also actively perform peripheral interventions.

All our angiography systems are bi-plane FPD systems, one of which is a Shimadzu angiography system (Fig. 2) that we have been using since the facility opened. However, it was updated with new DynamicStentView software in August 2011. This article describes our experience using the software, with a clinical example.

2. Overview of DynamicStentView Software

For details about how the software works, and so on, I defer to the materials published by Shimadzu, but basically, it maximizes visibility for percutaneous

coronary interventions (PCI) in real time by enhancing the image around stents marked with an automatically detected balloon marker. As shown in Fig. 3, images are displayed as a split view of three areas, with the stent view area on the right, which shows a magnified view of the enhanced stent image. One unique feature of this function is that the enhanced stent area centered on the balloon marker appears stationary, almost as though it is a still image. This makes it extremely easy to view. In terms of operability, images are acquired by simply pressing the [DynamicStentView] button and stepping on the foot pedal, which makes it extremely simple to display real-time images without interrupting the flow of PCI procedures. Also, the fact that images are saved automatically as a function of time, in the same manner as for normal cine images, is also a key feature that allows reviewing images after procedures or those not involved in the procedure to clearly understand the intent of procedures.

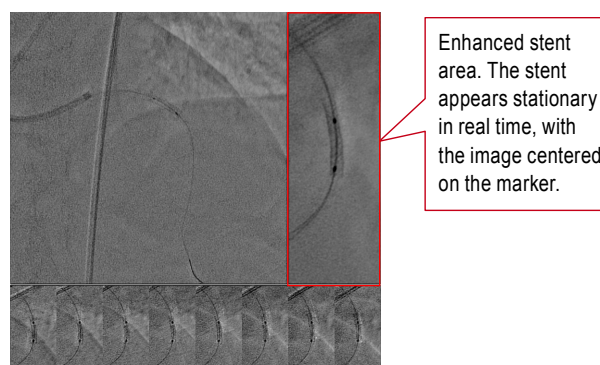


Fig. 3 DynamicStentView Screen Display

3. Clinical Examples

Though we still have not been using the software for very long, the following describes three cases where the DynamicStentView software was especially useful.

Case 1 – 83-year-old male

Past history: Myocardial infarction

Risk factors: High blood pressure

Target: Proximal LAD

Placement of TAXUS Element stent
(3.0 × 16 mm)

A stent was placed in the proximal LAD and then DynamicStentView was used for positioning when re-expanding a stent. As described above, DynamicStentView not only enhances the stent area centered on the marker, but also makes the stent appear stationary, which is especially useful when checking stent edges or positioning the balloon (Fig. 4 to 7).

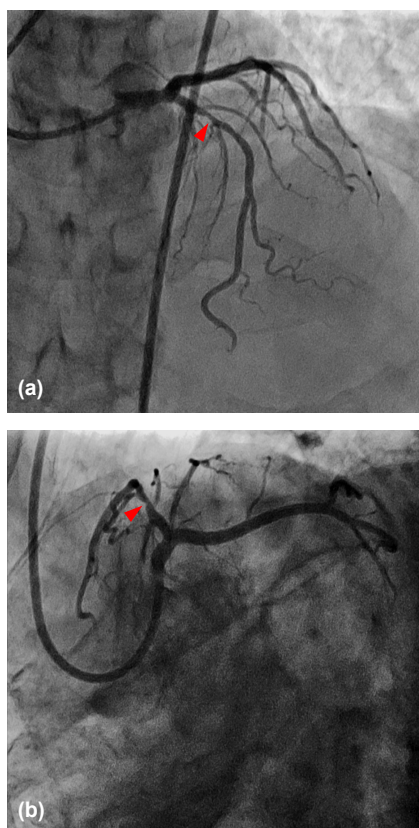


Fig. 4 Pre-Procedure CAG
(a) Cranial View
(b) Spider View

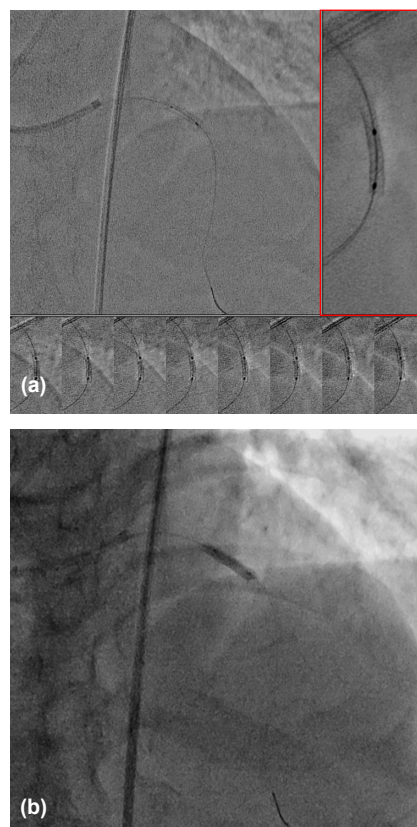


Fig. 5 DynamicStentView Used for Positioning a Balloon When Re-Expanding a Stent in Distal End
(a) DynamicStentView (upper right portion of screen)
(b) Re-Expanding Distal End (saved fluoroscopic image)

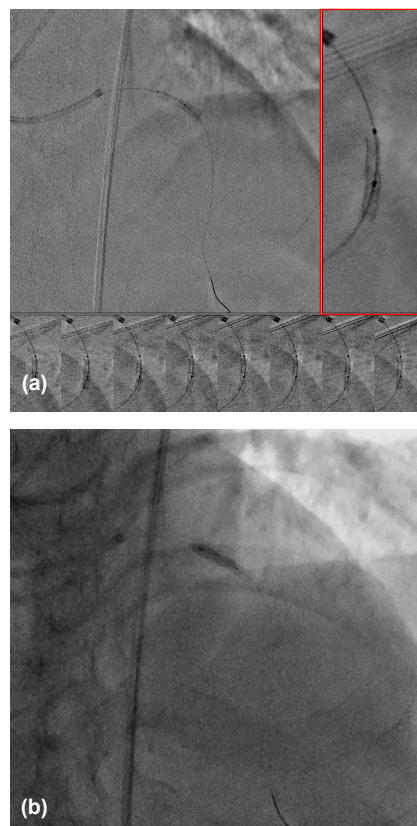


Fig. 6 DynamicStentView Used for Positioning a Balloon When Re-Expanding a Stent in Proximal End
(a) DynamicStentView
(b) Re-Expanding Proximal End (saved fluoroscopic image)

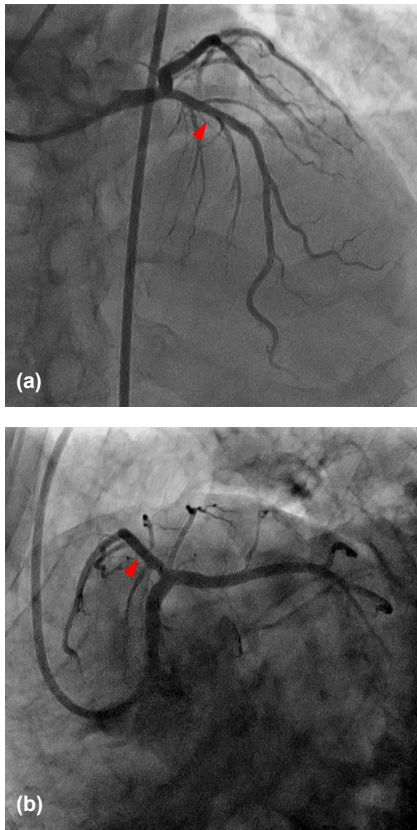


Fig. 7 Post-Procedure CAG
(a) Cranial View
(b) Spider View

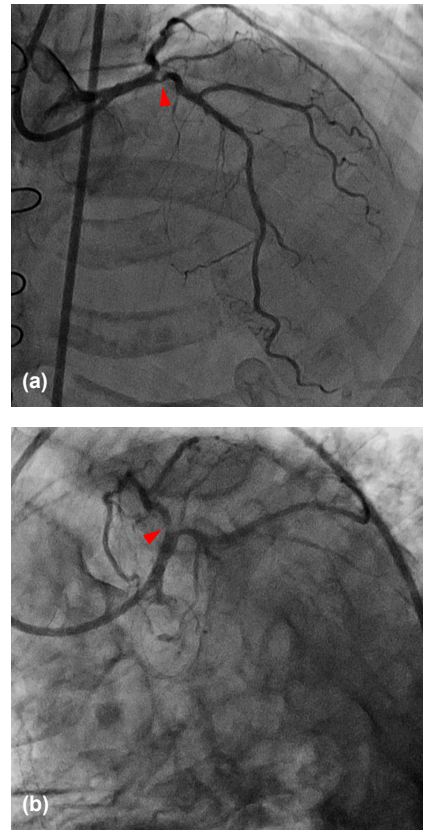


Fig. 8 Pre-Procedure CAG
(a) Cranial View
(b) Spider View

Case 2 – 67-year-old female

Past history: No records

Risk factors: High blood pressure/hyperlipidemia

Target: Lesion at LAD ostium

Placement of Nobori stent (3.5 × 24 mm)

Because the lesion was highly calcified, a rotablator was used to prepare an adequate space in the lumen before inserting the stent from the main coronary trunk. Then the kissing balloon technique was performed on the LAD and circumflex artery. After placing the stent, DynamicStentView allowed clearly viewing the stent as distinct from the calcification and was useful for positioning the balloon when re-expanding the stent (**Fig. 8 to 13**).

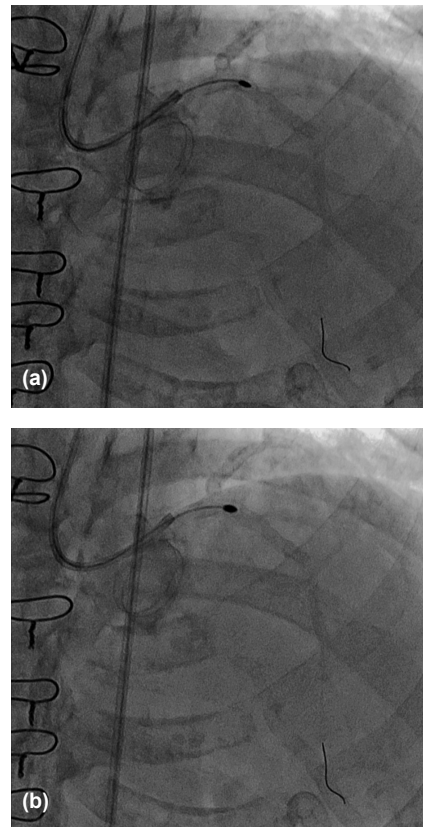


Fig. 9 Rotablator (Used with different burr size)
(a) 1.5 mm diameter
(b) 1.75 mm diameter

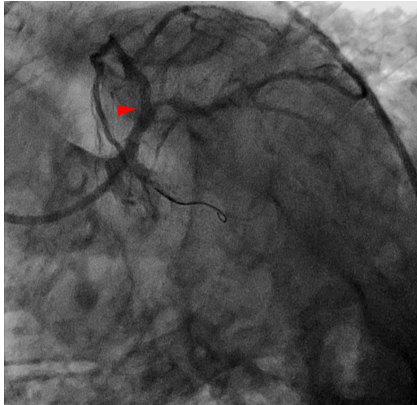
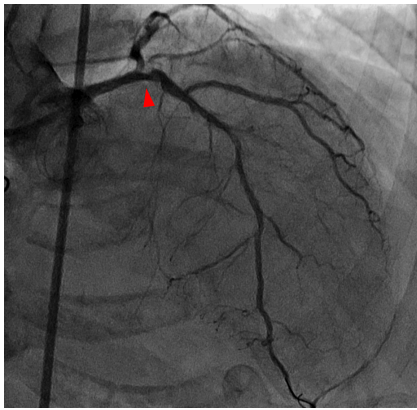


Fig. 10 CAG After Rotablation

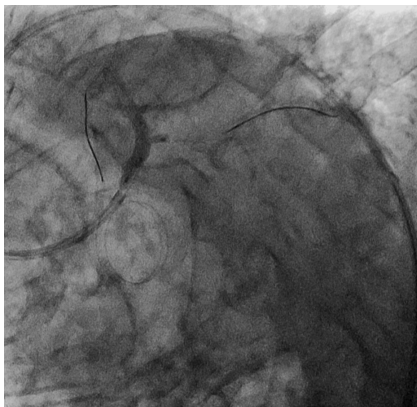
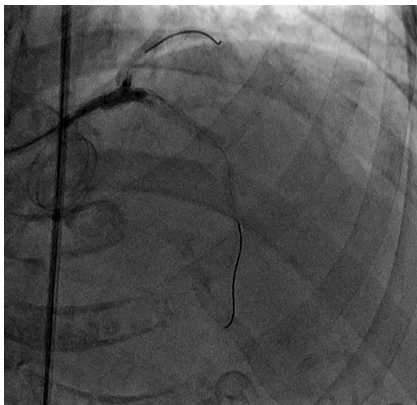


Fig. 11 KBT Performed After Placing Stent

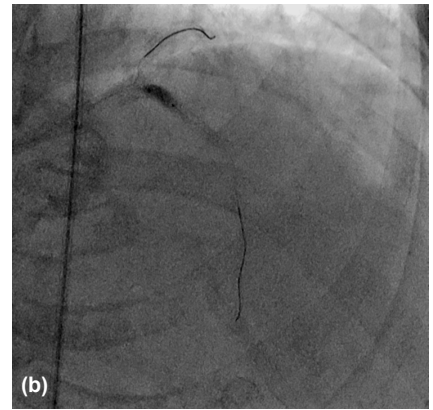


Fig. 12 DynamicStentView Shows Clear Separation Between Calcification and Stent
(a) DynamicStentView
(b) Re-Expanding Distal End (saved fluoroscopic image)

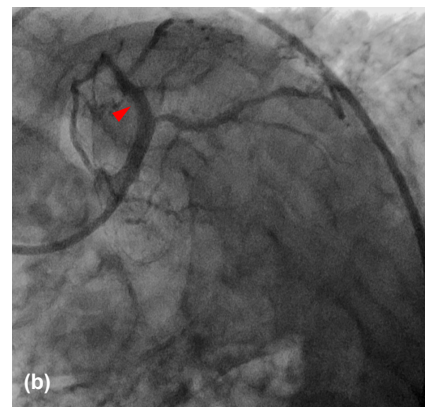
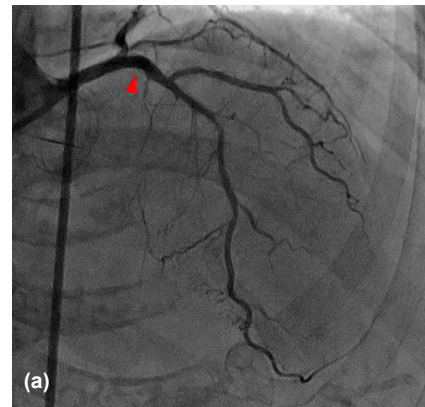


Fig. 13 Post-Procedure CAG
(a) Cranial View
(b) Spider View

Case 3 – 72-year-old female

Past history: No records

Risk factors: High blood pressure

Target: Proximal RCA

This is a case of in-stent restenosis in the proximal RCA. Due to suspected stent fracture, a stent-in-stent technique was used. Because the right coronary artery moves more than the left, the stent is more likely to fracture, but fractures often cannot be confirmed without CT or IVUS. However, DynamicStentView allows confirming the fracture location, which was useful for positioning the stent-in-stent in the appropriate location (**Fig. 14**).

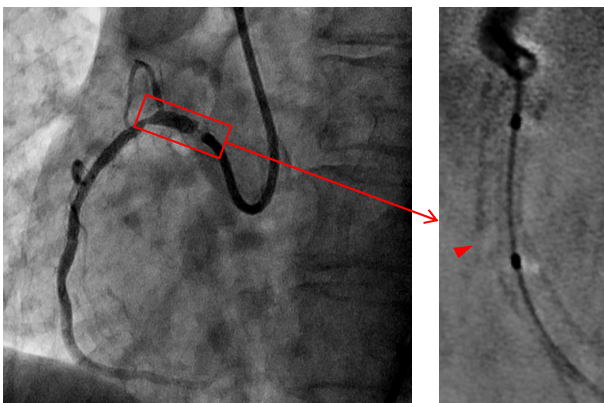


Fig. 14 CAG of RCA (left) and Confirmation of Fracture Location Using DynamicStentView (right)

on-the-spot positioning and inflation. On the other hand, the most important feature of the functionality is being able to automatically recognize two markers, but it is not always successful in recognizing the markers 100 % of the time, so that remains an issue for future improvements.

4. Summary

Recent PCIs often involve placing DESs (drug eluting stents), which require positioning the stent even more accurately. Therefore, as the use of relatively longer stents becomes more common, it is often necessary to use a short balloon for re-expanding a stent. However, inflation outside the stent can damage the blood vessel and may increase the rate of restenosis. Consequently, DynamicStentView is extremely useful for ensuring adequate inflation only within the stent.

Though we have only had about three short months of experience using DynamicStentView since we introduced it, its advantages include a good blend of image quality, display methods, and real-time display capabilities and the fact that it can be used without interrupting conventional PCI procedures. As described above, using DynamicStentView at our hospital enables performing PCI procedures smoothly, from detecting the balloon marker used when re-expanding a stent and enhancing the stent image, to immediate