

Courtesy

Denver Health Medical Center,
Denver, United States
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Interventional Services and
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Symptoms

Patient was presented with an acute onset chest pain. The x-ray angiogram revealed 50-60% stenosis in the proximal portion of the Large OM1 and a small vessel with severe ostial/proximal disease and moderate diffuse disease in the ramus intermedius. There was a large filling defect in the distal RCA stent consistent with thrombus with TIMI II flow.

Patient history

A 64 year old female with a past medical history significant for hypertension, diabetes mellitus, hyperlipidemia, ongoing tobacco abuse, and coronary artery disease s/p 5 stents to the right coronary artery in 2004, and a history of stent thrombosis.

System information

Allura Xper FD20 and StentBoost.

Findings

Two inflations within the stented region in the RCA were performed with flow restoration. However it was not clear if the stent was fully dilated and the stent to stent interaction from the x-ray angiographic images.

Conclusion

StentBoost facilitated the decision to perform kissing balloon inflations and more aggressively postdilate the AV continuation stent. The final results revealed TIMI III flow, 0% residual stenosis and no evidence of dissection or thrombus.

Coronary Stenting

Use of StentBoost to facilitate precise evaluation of stenting, post coronary intervention

Background

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Case

A 64 year old female with a past medical history significant for hypertension, diabetes mellitus, hyperlipidemia, ongoing tobacco abuse, and coronary artery disease s/p 5 stents to the right coronary artery in 2004, and a history of stent thrombosis, presented with an acute onset chest pain. ECG revealed inferior ST segment elevation and the patient underwent emergency cardiac catheterization. She received a heparin and abciximab bolus in the ED along with aspirin, metoprolol, morphine and nitroglycerin.

Angiogram results

Left main: Normal
Left anterior descending artery: mild to moderate diffuse disease.

Left circumflex: 50-60% stenosis in the proximal portion of the Large OM1.

Ramus intermedius: Small vessel with severe ostial/proximal disease and moderate diffuse disease (Figure 1).

Right Coronary artery: Patent proximal and mid RCA stents. Large filling defect in the distal RCA stent consistent with thrombus with TIMI II flow (Figure 2).

Clinical challenge

In this case there was difficulty in clearly understanding the bifurcation stenting technique previously used due to the limitations of conventional angiography techniques.

Solution

The Philips StentBoost provides a rapid means for evaluation of stent deployment post-PCI while the balloon markers are in place, allowing decision to be made for more aggressive postdilate stents when necessary. Various studies have proven the findings from StentBoost corroborate those with IVUS, which can require more time and be resource consuming^{1,2,3,4,5,6}. During percutaneous coronary interventional (PCI) procedures, using the subtraction feature, improves visualization of stents during pre- and post deployment in relation to the vessel wall and the surrounding vasculature.

The subtraction feature, a unique tool of Philips StentBoost was used to improve visualization of stents during pre- and post deployment in relation to the vessel wall and the surrounding vasculature in this percutaneous coronary intervention (PCI) procedure.

Fig 1

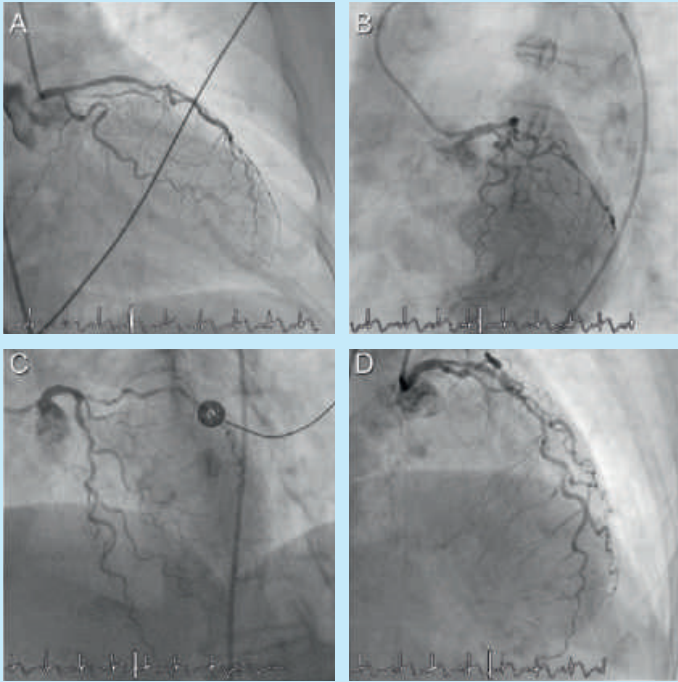


Fig 2

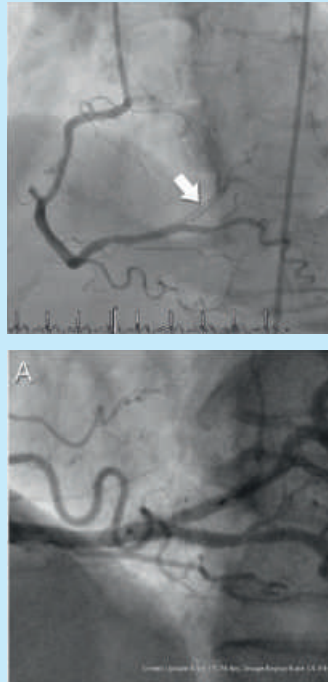


Fig 3

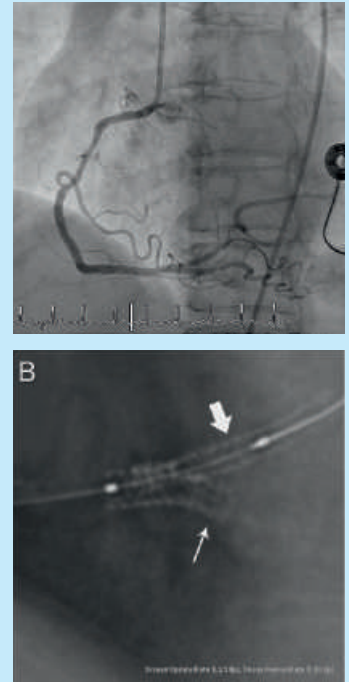


Fig 4

Method and materials used

X-ray system: Allura Xper F20

The RCA was already engaged using a 7 French JR4 (Vistabrite, Cordis, Miami, FL, USA) guide catheter and a 300 cm 0.014 inch Patriot wire (Boston Scientific, Natick, MA, USA), was advanced into the distal RCA over a 2.0 x 12 Maverick balloon (Boston Scientific, Natick, MA, USA). An aspiration thrombectomy was performed using an Export catheter (Medtronic, Minneapolis, MN, USA) from the proximal segment as the catheter could not be advanced beyond the proximal stent revealing some thrombotic material. Next, the 2.0 Maverick balloon was advanced but could not cross beyond the proximal segment, suggesting that the wire was going through stent struts. The distal RCA was rewired which then permitted advancement of the balloon. Two inflations within the stented region were performed with flow restoration (Figure 3).

StentBoost images were acquired at this point.

Acquisition protocol: The first 2 seconds of the acquisition at 15 fps was without contrast, followed by a short contrast injection for 2 seconds at 15 fps. Hand injection was used for contrast media administration.

Decision based on StentBoost images

After inspection of the region using Stentboost Subtract to further elucidate the possible bifurcation stenting technique used, and therefore to maximize stent expansion, the decision was made to perform kissing balloon inflations at the PDA bifurcation (Figure 4).

The bifurcation stenting technique used was corroborated with IVUS (Figure 5).

A second BMW wire was introduced into the PDA over a 2.75 x 12 Quantum Maverick (Boston Scientific, Natick, MA, USA) Rx balloon. With the 2.75 x 12 Quantum Maverick RX balloon in the PDA and the 2.5 x 16 mm NC Stormer

(Medtronic, Minneapolis, MN, USA) in the AV continuation, simultaneous kissing balloon inflations were performed (Figure 6A). The balloons were withdrawn and repeat angiography, with and without the guidewires in multiple projections, revealed TIMI III flow, 0% residual stenosis and no evidence of dissection or thrombus (Figure 6B).

Conclusion

In this case the difficulty in clearly understanding the bifurcation stenting technique previously used was limited by conventional angiography technique. The StentBoost Subtract feature facilitated the rapid evaluation of stent deployment post-PCI while the balloon markers were in place. This approach allowed the team to recognize and more aggressively postdilate stents, understanding the stent to stent interaction. Once it was obvious that the AV continuation stent came as proximal as to the stent edge of the PDA stent, the decision was made to perform kissing balloon inflations and more aggressively postdilate

Fig 5

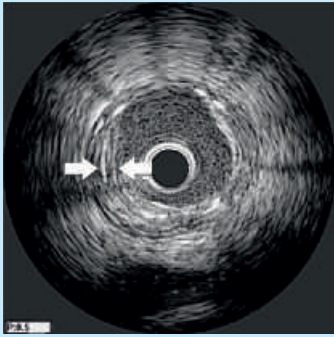
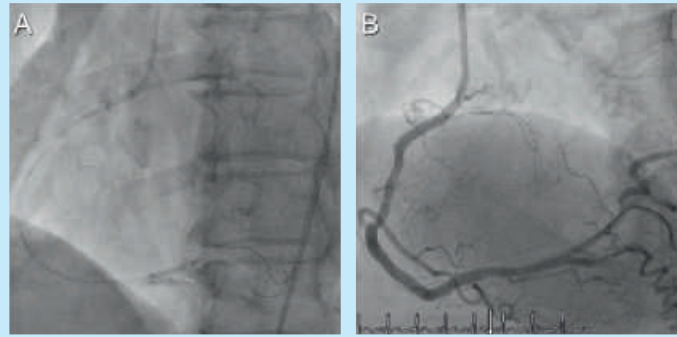


Fig 6



DHMC



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the AV continuation stent (this was not seen with standard angiography). This finding was corroborated with IVUS, which is more time and resource consuming.

Comments from Dr. Joel Garcia

StentBoost Subtract facilitated for the precise evaluation (expansion and to a lesser degree apposition) of the stent post PCI. Our group has rapidly incorporated the technique, as it is easy and reduces contrast agent and radiation exposure, since it is done with the post-deployment conventional angiogram. In this case StentBoost Subtract was helpful in defining the bifurcation stenting technique used on the index procedure at another institution therefore facilitating the intervention. StentBoost Subtract images can also help guide the physician with stent positioning and stent overlap (when desired) in otherwise difficult to see stent edges.

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Printed in The Netherlands.
4522 962 67731 * JUL 2011