

Streamlining Care With Orbital Atherectomy in Complex PCI

Facilitating evidence-based adjunctive therapy for PCI procedures in calcified lesions.

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In the current health care environment, providers and patients are looking for opportunities to improve efficiency and minimize time in the hospital while improving safety. Radial approaches, intravascular imaging, appropriate device selection, and same-day discharge after outpatient percutaneous coronary intervention (PCI) procedures can help achieve these goals.

Calcification can impede stent delivery and deployment and increase procedural risk.^{1,2} Atherectomy has improved clinicians' ability to treat calcified lesions. In 2015, the Centers for Medicare & Medicaid Services assigned unique codes with incremental reimbursement for PCI with atherectomy. This enabled physicians to incorporate imaging and hemodynamic assessment alongside atherectomy to optimize procedural outcomes with less financial concern.

With technical, pharmacologic, and PCI-related advancements, many atherectomy patients are suitable for same-day discharge, enabling patients to recover at home and avoid hospital-related infections; hospitals can also maintain capacity while reducing costs of routine observation. In 2018, the Society for Cardiovascular Angiography and Interventions updated its length of stay guidelines.³ Focus shifted from proscriptive criteria to a more patient-focused approach, including consideration of same-day discharge for stable patients undergoing successful procedures as part of a structured program. We were able to successfully incorporate

Diamondback 360® Coronary Orbital Atherectomy System (OAS) (Cardiovascular Systems Inc.) into this program.

The Diamondback 360® is a useful tool to adjunctively treat severely calcified coronary artery stenoses. It offers several clinical advantages to streamline complex PCI:

- A single Diamondback® device can treat lesions from 2.5 mm to 4.0 mm in diameter, as well as long, diffuse lesions and multivessel disease
- Diamondback is 6-F guide catheter compatible for lesions as large as 4.0 mm, making it ideal for radial access procedures
- Diamondback allows continuous blood flow during treatment, minimizing the risk of slow flow and no reflow that can increase periprocedural complications and prevent same-day discharge
- The need for temporary pacemaker placement is extremely low with Diamondback, eliminating the need for additional access sites

Due to the unique mechanism of action of the Diamondback 360 system, there are other potential advantages that can improve efficiency:

- The ViperWire Advance® Coronary Guide Wire with Flex Tip (Cardiovascular Systems Inc.) has excellent deliverability and can be used to directly wire lesions prior to treatment with Diamondback to avoid wire exchange
- Given its one-size-fits-all design, inventory management may be simplified
- Diamondback's electric-powered drive train requires less setup

Our institution has successfully incorporated Diamondback atherectomy into our outpatient same-day discharge PCI program.

We share two patient cases using Diamondback with the new, nitinol ViperWire® with Flex Tip Guide Wire to treat heavily calcified lesions via a radial approach, safely discharging them on the same day of their procedure.

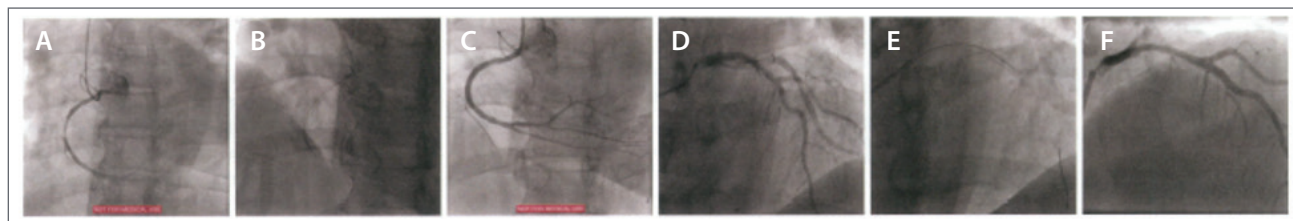


Figure 1. Focal, calcified mid right coronary artery lesion (A). Predilatation with a 1.5-mm balloon (B). Final result after OA and a 3.5- X 23-mm DES deployment (C). Diffuse, calcified left anterior descending artery lesion (D). OA performed at 80 kRPM (E). Final result after deployment of a 2.5- X 23-mm and a 3- X 12-mm DES (F).

CASE PATIENT 1

A 68-year-old woman presented for diagnostic coronary angiography after experiencing chest heaviness during yard work for several weeks. She was diabetic and had hyperlipidemia. Despite the focality of the extremely tight mid-right coronary artery lesion (Figure 1A), due to the extent of calcification we used an orbital-first approach to streamline treatment. Initial attempts to deliver the Diamondback® System were unsuccessful, so a 1.5-mm compliant balloon was used to facilitate access (Figure 1B). We performed atherectomy at 80 kRPM for two passes, administering an aminophylline infusion (250 mg intravenously over 5 minutes) just prior to beginning orbital atherectomy (OA). No bradycardia or heart block was observed during atherectomy. We performed wire exchanges with a 2.5-mm over-the-wire balloon, which we then used for predilatation. Finally, we deployed a 3.5- X 23-mm drug-eluting stent (DES) at 18 atm, noting uniform stent expansion with an optimal angiographic result (Figure 1C). The sheath was removed, and a hemostasis band provided site compression. The patient was observed for 6 hours and was discharged to home at 5 PM. We contacted her the next morning and she had an uneventful night.

CASE PATIENT 2

A 72-year-old man was referred for coronary angiography after anterior wall motion abnormality was observed on stress echocardiography. He had hypertension and hyperlipidemia treated with medications. We confirmed the significance of the left anterior descending artery lesion with fractional flow reserve of 0.72 (at baseline prior to hyperemia). An angiogram identified a long, diffuse, severe calcification

(Figure 1D). After crossing the lesion with a workhorse wire, we exchanged that for a ViperWire with Flex Tip and performed three passes of OA at 80 kRPM (Figure 1E). During treatment, the patient became transiently hypotensive but responded to a bolus injection of Neosynephrine®. (Interestingly, the patient admitted to using an erectile dysfunction medication on the morning of the procedure.) We predilated the lesion with a 2.5-mm balloon, then deployed a 2.5- X 23-mm DES distally and a 3.0- X 12-mm DES proximally in this long, tapered lesion, and we postdilated to 3.25 mm. Final results showed optimal stent expansion with normal flow into the distal vessel and side branch (Figure 1F). The radial band was removed and hemostasis was confirmed. Recovery was uneventful and the patient was discharged after 6 hours of observation. He was contacted the following morning and reported no adverse events overnight.

CONCLUSION

OA with the Diamondback System can facilitate evidence-based⁴ adjunctive therapy for PCI procedures in calcified lesions. Carefully selected patients may be suitable for a shortened length of stay as part of a structured program. With current outpatient reimbursement programs, clinicians can utilize appropriate therapies to achieve optimal clinical results with fiscal responsibility. ■

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