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IMAGES IN CARDIOVASCULAR INTERVENTION

RotaWire fracturing due to spinning under the maximum rotational speed

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Rotational atherectomy (RA) facilitates coronary intervention in complex anatomies; however, its usage is associated with a number of potential complications. These include slow-flow/no-reflow phenomenon, coronary dissection, vessel perforation, burr entrapment and fracture of guidewire. Among these, fracture of guidewire is relatively uncommon (0.1–0.8%) [1, 2]. In this report, we describe a case of the uncoiled guidewire following RA with microscopic images suggesting the mechanism.

A 68-year-old male underwent coronary intervention with RA due to a severely calcified lesion in the left anterior descending artery. Successful RA was performed with 220,000 rotations per minute using a RotaWire Floppy (RW) (Boston Scientific, Natick, MA, USA). Following multiple RA runs, the distal tip of the RW became knuckled in shape and almost knotted (Fig. 1a). To exchange RW for a 0.014-in. guidewire, a microcatheter was advanced over the RW. Upon withdrawal of the RW, marked elongation of the RW was noted (Fig. 1b). By further advancement of microcatheter and gentle rotational manipulation of the wire, safe retrieval of the elongated RW was eventually achieved. The procedure was successfully completed with deployment of a drug-eluting stent with final TIMI III flow.

Inspection of the retrieved RW with a microscope demonstrated an uncoiled spring-tip with disruption of the core-wire in the tip, which indicated strong rotational force applied to the wire (Fig. 1c). Recently, Sakakura et al. [3] reported RW could spin under the maximum speed despite internal brake and WireClip Torquer (Boston Scientific) in a bench test. In the present case, WireClip Torquer was attached appropriately during high-speed mode and dynaglide mode. Therefore, we speculated that spring-tip of the RW was first damaged by spinning of the distally entrapped RW during RA under the maximum rotational speed and then following manual withdrawal of the entrapped and fractured wire with its knuckled shape in the small caliber distal vessel resulted in an uncoiled elongation of the total wire length of more than 10 cm.

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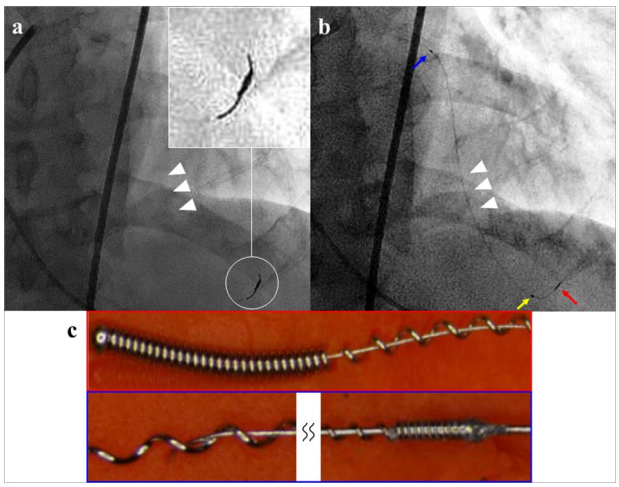

Fig. 1 Uncoiling and elongation of the RotaWire Floppy. **a** Knuckled-shaped RW after multiple rotational atherectomies with a magnified image. Radiolucent core-wire of the RW could be slightly seen on fluoroscopy (white arrow heads). **b** Radiopaque spring-tip was partially uncoiled and elongated, and thus, clearly seen on fluoroscopy (white arrow heads). The rest of the tip could be seen not only at the distal point (red arrow) but also at the elongated proximal point (blue arrow). Yellow arrow indicated the radiopaque gold marker of a microcatheter. **c** The appearance of the retrieved RW with a microscope. Upper image with red frame demonstrated the uncoiled distal spring-tip. Bottom image with blue frame included two split images: the uncoiled proximal spring-tip (right) and the disrupted core-wire with uncoiled spring-tip (left). *RW* RotaWire Floppy

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Compliance with ethical standards

Conflict of interest The authors declare that they have no competing interest.

Ethical standard Human subjects have given informed consent and the authors have conformed to institutional guidelines.

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