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The yin-yang sign in the detection of subintimal hematoma with high-definition intravascular ultrasound

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Editorial p. 4

A 60-year-old male patient, with severe ischemic ventricular dysfunction underwent revascularization of a chronic total occlusion (CTO) in the proximal right coronary artery (Fig. 1A, **Suppl. Video 1**) with retrograde epicardial approach (**Suppl. Video 2**). A reverse controlled-antegrade-retrograde tracking (rCART) technique was performed (Fig. 1B, **Suppl. Video 3**) and the retrograde wire progressed up to the tip of the antegrade catheter, but it could not be externalized, bending continuously near the catheter tip. The intervention was then guided by high definition intravascular ultrasound (HD-IVUS) with a 60 MHz Opticross-HD catheter (Boston Scientific, Marlborough, MA), showing a scenario of antegrade intraplaque / retrograde subintimal (Fig. 1C, arrow pointing retrograde wire, **Suppl. Video 4**), with hematoma (Fig. 1D, arrow-heads) near the antegrade catheter, probably created by wire manipulation in externalization attempts. The speckle of static blood appears enhanced in HD-IVUS as compared with 40-MHz IVUS, thus giving the hematoma a characteristic whitish appearance, in contrast with the dark appearance of the plaque and t he true lumen, thus resembling the yin-yang symbol (Fig. 1D). After rCART with a larger balloon (**Suppl. Video 5**), the wire could be externalised (**Suppl. Video 6**) and a second HD-IVUS was acquired (Fig. 1E–H, **Suppl. Videos 7, 8**), from distal (Fig. 1E) to proximal true lumina (Fig. 1H). The yin-yang sign enabled easy recognition of the subintimal course (Fig. 1F, G), pointing out sharply the entry and exit points. After sizing the stents according to HD-IVUS, the CTO was successfully revascularized (Fig. 1I, **Suppl. Video 9**). According to available research, this is the first report of HD-IVUS in a CTO, suggesting an advantage over other techniques in detecting subintimal hematoma.

Conflict of interest: None declared

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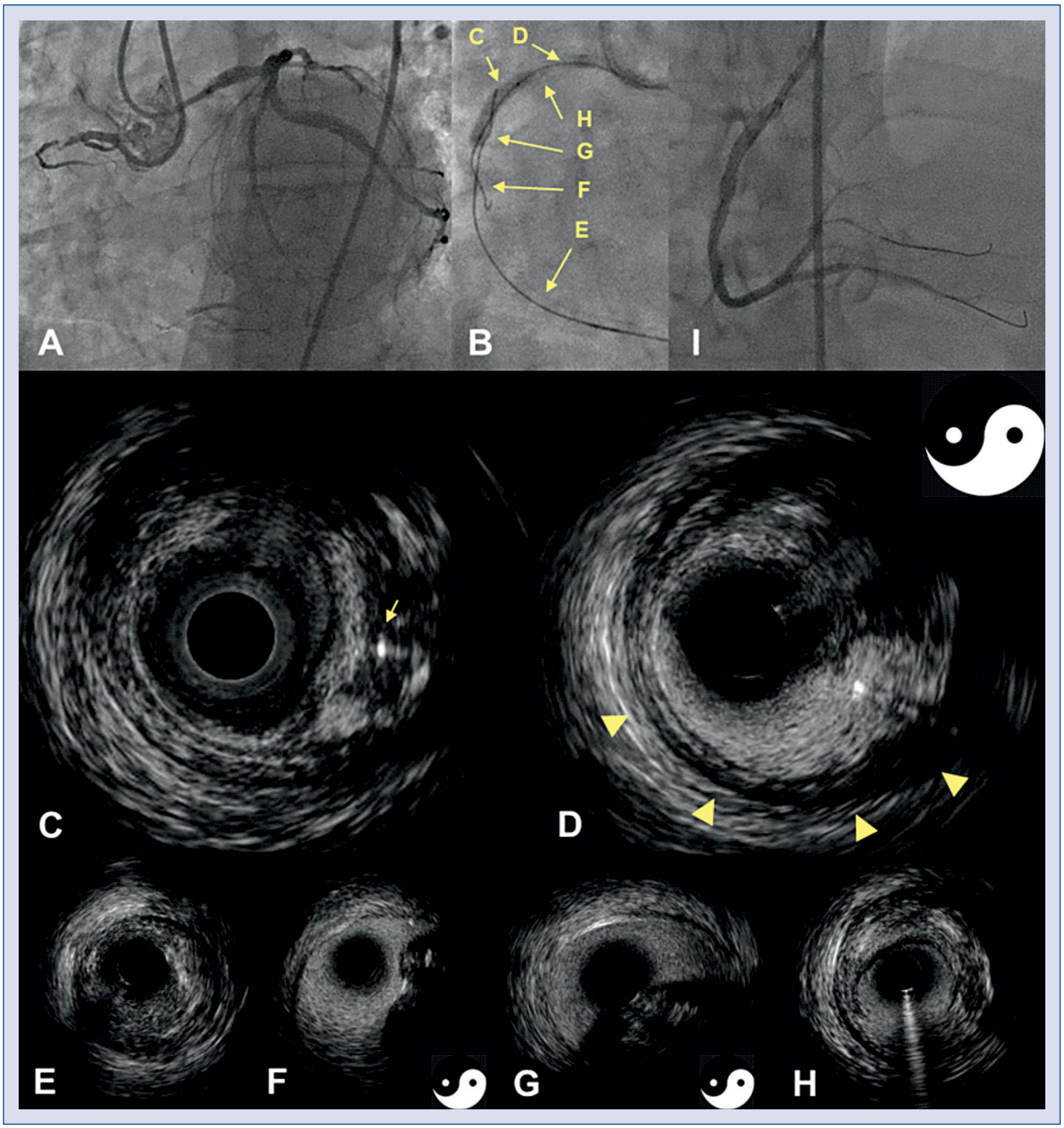

Figure 1. A chronic total occlusion of the proximal right coronary artery (**A**) was percutaneously treated via the retrograde approach with controlled-antegrade-retrograde tracking (rCART) technique (**B**), but the retrograde wire had problems externalizing. Intravascular ultrasound (IVUS)-guided rCART was then performed with a 60 MHz high definition IVUS (**C**, **D**), finding a scenario of antegrade intraplaque/retrograde subintimal (**C**, arrow; **D**, arrow heads). Since the speckle of static blood appears enhanced in 60 MHz IVUS as compared to lower frequencies, the subintimal hematoma appears whitish (**D**), producing a characteristic yin-yang sign: the anatomy of the vessel appears divided in two, with one half dark (true lumen/intraplaque) and the other half whitish (subintimal). After externalization of the wire a final 60-MHz IVUS pullback was acquired (**E**–**H**). The yin-yang sign (**F**, **G**) enables unambiguous and accurate recognition of the subintimal course. An excellent final result was, in the end, achieved (**I**).