tip detection method using the new short-tip IVUS with pull-back system which facilitates the 3D wiring technique in percutaneous coronary intervention for chronic total occlusion

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Topic(s):
Acute Coronary Syndromes: Treatment, Revascularization

Citation:

Background

The strategy of intravascular ultrasound (IVUS)-guided wiring for CTO PCI, that is, leading the second guidewire into the true lumen under observing by IVUS from subintimal space, is the last resort. We developed the angiography-based 3D wiring method. During establishment of the angiography-based 3D wiring method, we deduced that observation of the guidewire tip as well as the shaft named "The tip detection method" simplifies and facilitates 3D wiring under IVUS-guided wiring. Therefore, we produced New CTO IVUS which is the upgraded version of Navifocus WR IVUS by adding the pull-back transducer system. This pull-back system enables us to detect the tip as well as the shaft of the second guidewire in real time (tip detection method), which facilitates the 3D wiring technique under IVUS-guided wiring.

Objective

We evaluated the efficacy of the tip detection method during 3D wiring for CTO PCI with New CTO IVUS.

Method

We created a target pinpoint penetration model and performed the procedures using an experimental heartbeat model. The target (a tube with a lumen 0.6 mm in diameter) was placed in the distal part of a CTO 20 mm in length made of 2.5% agar. After the second guidewire (Conquest-12g) was advanced into the CTO lesion to within 5mm of the target using the angiography-based wiring, IVUS-guided wiring was performed by using Navifocus WR or New CTO IVUS each five times.

Result

The frequency of the puncture time was reduced using the new CTO IVUS compared to the Navifocus WR (1.7±0.8 vs. 28.8±23.2, p=0.17). The procedure time was significantly shorter using the new CTO IVUS compared to the Navifocus WR (103±61 vs. 459±373 seconds, p=0.04).

Conclusion

The tip detection method during 3D wiring with the new short tip IVUS with the pull-back system enables us to easily perform 3D wiring and will change the CTO PCI strategy.
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