Septal surfing in retrograde recanalization of chronic total occlusions: the Quebec experience

Rustem Dautov*, MD, PhD, Claire Gibrat, PhD, Can Manh Nguyen, MD, Stéphane Rinfret, MD, SM

**Background:** Collateral channel (CC) crossing with guidewire and a microcatheter to the distal chronic total occlusion (CTO) cap are essential to succeed in retrograde CTO percutaneous coronary intervention (PCI). This has classically been considered dependent on the CC size and connection visualization with the distal bed of the CTO. However, successful septal CC crossing might depend on the technique used. We examined the feasibility and safety of septal surfing technique (SST) in a consecutive series of patients.

**Methods:** Among 403 CTOs performed in our program between 01.2010 and 01.2015, we selected those where septal CC were utilized in retrograde or hybrid CTO approach. We assessed our ability to place the wire with or without the microcatheter as a function of the appearance of the septal CCs. We preferentially used the STT to cross septal CCs; this technique involves the advancement of the wire searching for a path of least resistance. Tip injections were performed only in failed attempts. We used the Werner CC classification, as well as other factors that may influence success in crossing the CC such as the number of septals from the donor artery, tortuosity, especially in their distal third, need for distal tip injections. We examined what we called the ‘Surfers Paradise’ angiographic sign, defined as the presence of ≥5 septal trunks ≥1mm from the donor artery, each with visible septals running straight in the mid 1/3 of the septum, with a 'tree-like' network in the distal 1/3, as a predictor of septal crossing. We also assessed septal and CTO crossing time, and presence of septal perforations.

**Results:** The final study cohort comprised of 129 patients with J-CTO score ≥2 in 82.9%. A bilateral radial approach was used in 78% of cases. The average septal crossing time with STT was 21±2 minutes. Tip injection was required in 27.1%. Septal CCs were crossed with the STT in 78.3% of cases: in 83.3% with CC0, 72.3% with CC1 and 90.9% with CC2 (p=NS). The microcatheter reached the distal CTO cap in 98% of all CC crossed with the wire. The success of septal crossing was 93.1% with and 74% without Surfers Paradise (p<0.01). One quarter of cases had minor and asymptomatic septal perforations.

**Conclusions:** SST is a simple and safe way of crossing septal CC in retrograde CTO PCI with high technical success. Therefore, small or even invisible channels should not discourage a CTO operator to attempt a retrograde technique when the algorithm suggests it is the preferred approach for a given anatomy. In fact, surfing CC0/CC1 septals rather than CC2 in order to avoid ischemia during collaterals crossing or in case of perforation, may be safer. The Surfers Paradise angiographic sign is a predictor of successful retrograde gear placement.

Département de cardiologie, Institut universitaire de cardiologie et de pneumologie de Québec, Université Laval
Dr. Rinfret has received speaker and proctorship honoraria from Boston Scientific, Abbott Vascular Canada, Medtronic Canada and Terumo US. He currently holds research support for Medtronic Canada and Abbott Vascular Canada.