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Cardiovascular Revascularization Medicine



Left Main Double Stenting for Patients with Cardiogenic Shock: The Faster the Better☆



Editorial

Despite the improved survival in patients with ST-elevation acute myocardial infarction (STEMI), cardiogenic shock still remains a high-mortality condition [1]. In this clinical scenario, patients with distal left main (LM) disease represent a challenge, due to the necessity of quickly warranting sustained flow to both left anterior descending and to circumflex artery, and to the technical peculiarities of the bifurcating lesion.

While unprotected true LM bifurcations (Medina 1-1-1 and 0-1-1), are not commonly found as culprit lesions in STEMI, patients with this anatomy frequently are admitted with clinical instability due to a large area of myocardium at risk. Furthermore, interventional cardiologist has little time to react and no clear decision-making algorithm is available. Indeed, randomized clinical trials assessing the optimal stenting technique for distal left main bifurcations have systematically excluded patients with STEMI and cardiogenic shock [2,3].

In the current issue of *Cardiovascular Revascularization Medicine*, Rigatelli and his colleagues evaluated mid-term outcomes of three different two-stent techniques (Culotte, T-stenting/TAP or Nano-Crush) for unprotected culprit LM bifurcations [4]. Fifty-seven patients presenting with STEMI and cardiogenic shock were included.

The first aspect to underline is that, while a provisional side branch stenting approach is recommended for most LM bifurcations in stable settings [5], patients presenting with cardiogenic shock may be an exception. Indeed, the involvement of large caliber vessels (that consequently have lower risk of stent thrombosis), the usually wide bifurcation angles and the large amount of ischemic burden may support the choice of a planned double-stenting strategy. This concept needs further studies to be proven, but the results presented in the current paper are reassuring, both in term of hard events and of ischemia-driven revascularizations.

Among the two-stent techniques used in the study, nano-crush showed lower cardiovascular mortality and higher ejection fraction improvement as compared with T-stenting; Culotte, conversely, presented intermediate results. These results may be related to the small amount of metal layers on the carina [6] that the nano-crush, based on the use of ultrathin strut stents and very minimal protrusion of just one single stent strut into the main vessel, offers. Furthermore, this strategy re-

quired lower contrast volume and X-ray exposure, shorter fluoroscopy and procedural time, indicating a faster (and likely with shorter ischemic time due to minimized rewiring and kissing steps) procedure. Therefore, we can infer that the faster the technique and the lower the overlapping struts, the better the outcomes, with a good correspondence in terms of left ventricular recovery and long-term survival, at least in this acute setting.

Current results are not sufficient to lead to the adoption of nano-crush as first-line strategy for true left main bifurcations in acute patients, but are hypothesis-generating and may lead to prospective larger studies. The clinical instability of treated patients, however, may limit the possibility of conducting randomized clinical trials in this setting. Furthermore, when designing a trial that aims to compare different techniques, it is essential to include investigators that are able to adequately manage all the proposed strategies in order to minimize biases.

The last discussion point is the relatively low occurrence of adverse events, with a surprisingly low mortality rate. Recently published CULPRIT-SHOCK trial [7] showed that almost 50% of patients that presented with coronary artery disease-related cardiogenic shock, died, regardless of selected revascularization strategy (complete vs culprit vessel). The lower-than-expected occurrence of hard events in the current study may be secondary to a wider definition of cardiogenic shock, as well as a younger population with frequently preserved flow on the culprit vessel (62-year-old patients with $\leq 15\%$ of TIMI 0 flow at presentation). Enrolled patients had also almost preserved ejection fraction at first echocardiography, while the use of inotropic agents (that was almost 90% in the aforementioned trial) is not reported but likely lower. Furthermore, just one third (28%) of the patients received hemodynamic support with intra-aortic balloon pump, while axial pumps or extra corporeal membrane oxygenation were never used. It must be remarked the retrospective nature of the present investigation, including patients from January 2014 until March 2018, a period that did not represent the widespread era of mechanical support for cardiogenic shock patients. We may hypothesize that patients with STEMI presenting with cardiogenic shock with just a single culprit lesion causing a large ischemia burden (such as unprotected distal bifurcation LM disease), probably might benefit from a fast recanalization of the infarct-related artery and mechanical support might not offer additional advantage. On the other hand, a more complex coronary artery disease with a high risk of adverse events [8] and a need of longer procedures, may benefit from a strategy based on combining percutaneous coronary intervention with a support therapy that could potentially unload left ventricle, allow complete revascularization and help recover significant

☆ Editorial to: Long term outcomes of left main bifurcation double stenting in patients with STEMI and cardiogenic shock.

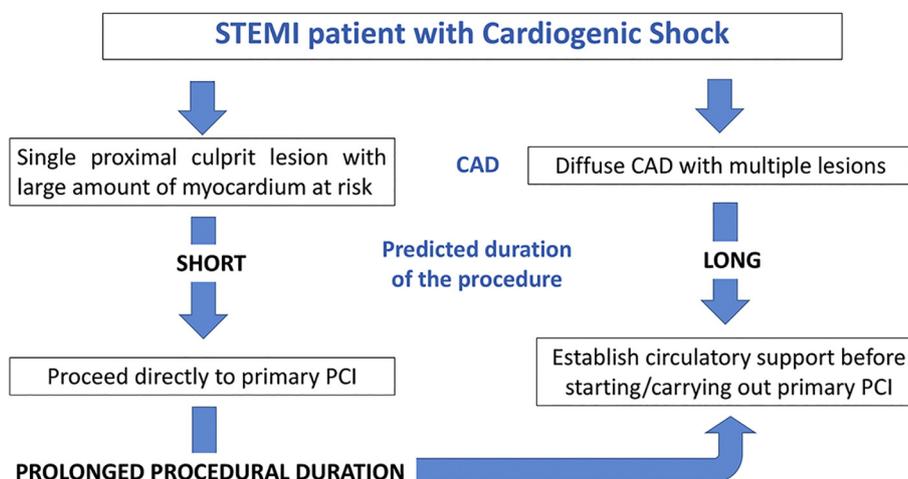


Fig. 1. Proposed flow-chart to select patients that may benefit from mechanical circulatory support. PCI: percutaneous coronary intervention; STEMI: ST-elevation myocardial infarction; CAD: coronary artery disease.

amounts of stunned myocardium after the procedure (Fig. 1). Furthermore, mechanical support devices provide a significantly greater cardiac output with a subsequent increase in mean arterial pressure and improvement in end-organ perfusion, that proceed to have a key-role in this setting. However, the lack of randomized data does not allow a specific recommendation.

In conclusion, authors must be congratulated as they clearly showed that, when facing an unstable patient with left main disease, the faster the technique (and the lower the overlapping struts), the better the outcomes. This key message must be written in stone in every cath-lab and taught to every fellow in training.carrev_1619]

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