

## Cutting balloon inflation for the bail-out management of coronary artery dissections: A promising option

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In clinical practice, cutting balloons (CBs) have occasionally been used for the management of spontaneous coronary artery dissections (SCADs) [1–3]. However, percutaneous coronary intervention (PCI) with coronary stenting has been the preferred strategy in patients with SCAD harboring high-risk features including persistent coronary ischemia, malignant arrhythmias, hemodynamic compromise and left main coronary disease [2]. On the other hand, interventional challenges associated with coronary stenting (malapposition, hematoma propagation) may potentially lead to adverse outcomes in patients with SCAD [2, 3]. Therefore, the use of alternative devices including CBs, has emerged as a promising strategy with excellent results in this context [3].

In their recently published article, Zdzierak et al. [1] demonstrated a bail-out use of CB inflation in an elderly female patient with severe and extensive dissection of the right coronary artery [1]. As we understand from their report, the authors performed CB inflation in the coronary false lumen eventually resulting in the relief of the severely compromised true lumen [1]. In patients with SCAD with a dissection flap, it is well known that the compromise of coronary flow is not only correlated with the severity of superimposed thrombotic complications, but also strongly associated with the size of the false lumen impinging on the true lumen [3]. Therefore, luminal pressure in the false lumen can be considered an important determinant of adverse outcomes in this context.

In the interventional setting, CB inflation is generally performed in the true lumen of the affected coronary artery (most commonly in type 2 and 3 SCADs characterized by intramural hematoma) in an attempt to drain the

intramural hematoma by creating microfenestrations in the intimal layer [2]. After initial CB inflation, subsequent stent implantation may be required in certain cases to further stabilize the dissection line [3]. Notably, in the patient reported by Zdzierak et al. [1], CB inflation could be described as a “bail-out strategy” based largely on the infeasibility of conventional PCI (due to failure to advance the guidewire through the true lumen of the right coronary artery, possibly presenting with an occluding dissection flap rather than an intramural hematoma) in the setting of acute coronary syndrome presentation with ST-segment elevation. In this patient [1], redirection of blood flow from the high-pressure false lumen to the low-pressure true lumen (through microfenestrations created by urgent CB inflation) may have eventually reduced the size of the false lumen along with expansion of the true lumen (leading to restoration of coronary flow). However, we believe that this strategy should not be used routinely in scenarios where the true lumen is not severely compromised. In other words, a mild to moderate compromise of the true lumen (typically with TIMI 2 or 3 coronary flow) in patients with SCAD potentially implies a higher chamber pressure in the true lumen compared to the false lumen. In this context, the creation of intimal microfenestrations with CB inflation may paradoxically expand the false lumen (due to increased blood flow from the true lumen through the microfenestrations), potentially leading to severe compromise of the true lumen. Of note, the selection of a lower size CB (compared with the coronary diameter) is a prudent strategy to avoid coronary perforation [3] regardless of the site of CB inflation (false or true lumen). We also wonder

about the size of the inflated CB along with in-hospital and post-discharge medications in the patient [1, 2].

Finally, the coexistence of SCAD and takotsubo syndrome (TTS) is a well-known phenomenon in the setting of an acute coronary syndrome presentation [4]. These two conditions may result from a common background, such as extreme stress, or one may provoke the development of the other through various mechanisms [4]. The patient was an elderly female, and may also have a potential proclivity for a co-existing typical or atypical TTS episode as well [1]. We wonder if there were any signs of coexisting TTS (ballooning on cardiac imaging, significant natriuretic peptide levels, etc.) in the patient [1].

In conclusion, Zdzierak et al. [1] should be commended for their alternative use of CB inflation as a bail-out therapeutic strategy in a patient with coronary artery dissection. However, the therapeutic implications of CBs in various forms of coronary artery dissections still need to be further established.

## Article information

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