

When the road bends: a novel use of guide catheter extension in overcoming catheter kink to facilitate stent delivery

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<https://doi.org/10.26599/1671-5411.2026.05.006>

Percutaneous coronary intervention (PCI) via the transradial route is now standard practice, particularly in elderly patients, owing to its lower bleeding risk and early ambulation. However, age-related vascular changes such as radial and subclavian tortuosity, elongation, and reduced arterial compliance can pose unique procedural challenges. One such challenge is catheter kinking, which can impede the smooth delivery of stents.^[1]

We report a 65-year-old male with a history of exertional angina and a recent positive stress test who underwent coronary angiography, revealing a significant lesion in the right coronary artery (RCA). PCI was planned via the right radial approach.

A 6F Judkins Right (JR) guide catheter was chosen to engage the RCA via the radial approach. However, engagement was technically challenging due to the marked tortuosity of the radial and subclavian arteries. After multiple manipulations, successful coronary engagement was achieved, and the RCA was successfully wired.

A 2.0 × 12 mm non-compliant (NC) balloon was taken for pre-dilatation. Resistance was encountered while advancing the balloon through the forearm segment, and fluoroscopy demonstrated a kink in the guide catheter at the proximal radial artery segment within the forearm, likely related to marked vascular tortuosity. With careful forward pressure, the balloon crossed the kinked segment and pre-dilatation of the lesion was completed. Subsequently, a 3.0 × 33 mm everolimus-eluting stent (XIENCE Xpedition, Abbott Vascular) was attempted; however, it failed to cross the kinked portion of the guide catheter. Repeated attempts resulted in visible deformation of the distal stent struts.

High-pressure balloon inflation (2.5 × 12 mm non-compliant (NC) balloon at 18 atm) across the kinked guide catheter segment was attempted in an effort to straighten the catheter, but was unsuccessful. Given the inability to correct the mechanical deformity and to avoid guide catheter exchange after lesion preparation, a guide catheter extension (GuidePlus II ST; Nipro, Osaka, Japan) was introduced.

The guide catheter extension was advanced carefully over the coronary guidewire under fluoroscopic guidance, and crossed the kinked segment smoothly with minimal resistance, effectively bypassing and internally stabilizing the deformed portion of the guide catheter. With the extension in place, the stent was delivered and deployed successfully, followed by post-dilatation, achieving an optimal angiographic outcome without procedural complications. All the procedural steps are shown in [Figure 1](#).

The patient tolerated the procedure well, with no immediate complications. The post-PCI angiogram demonstrated good flow through the RCA, with no residual stenosis. Images of the kinked coronary catheter and the deformed distal stent struts are shown in [Figure 2](#). The patient was discharged on dual antiplatelet therapy and instructed to follow up in the outpatient clinic.

Guide catheter extension systems (“mother-and-child” catheters) are well established for improving back-up support and facilitating device delivery across tortuous or calcified coronary segments,^[1,2] minimizing contrast use in selected high-risk PCI patients,^[3] and assisting complex interventions such as chronic total occlusion PCI^[4,5] and thrombus-aspiration strategies during ST-elevation myocardial infarction.^[6] Prior reports by Valvo, et

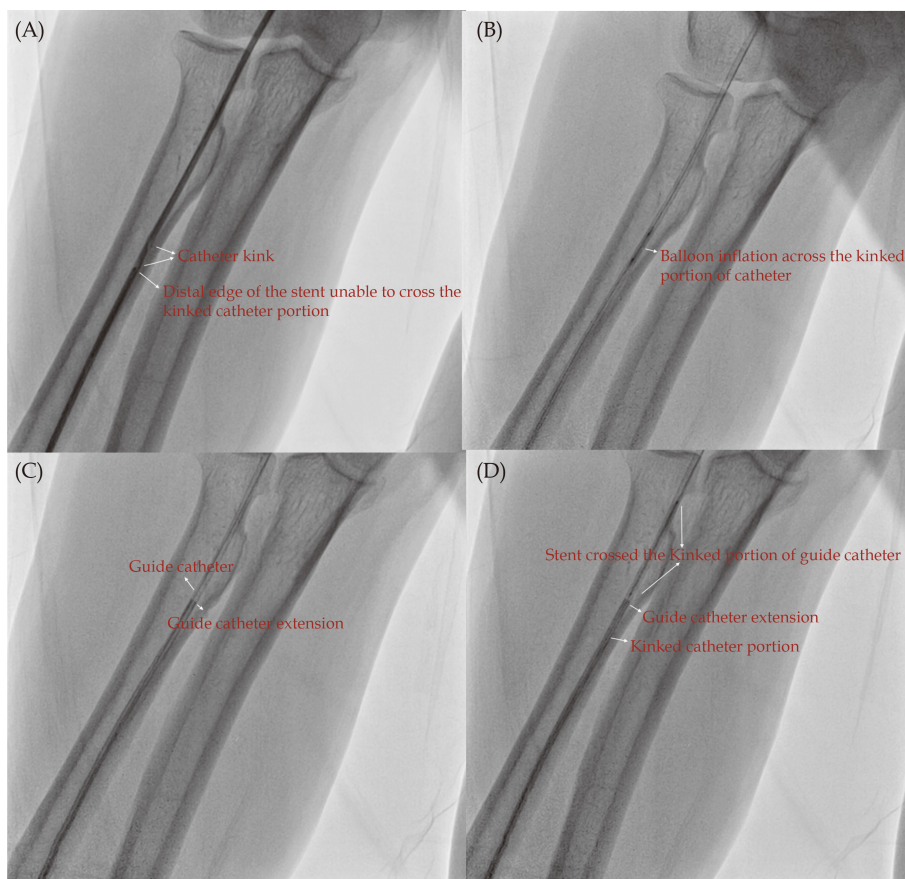


Figure 1 Procedural steps demonstrating guide catheter extension-assisted stent delivery. (A): Kinked JR 6F guide catheter at the proximal radial artery segment in the forearm, with the distal end of the stent unable to pass through it; (B): 2.5 mm non-compliant balloon inflation across the kinked catheter; (C): use of the GuidePlus II catheter extension to bypass the kink and facilitate stent delivery; (D): post-dilatation was performed to ensure adequate stent expansion.

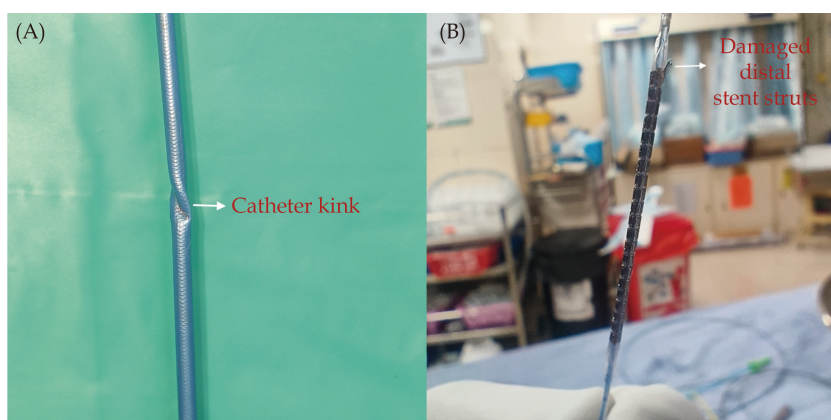


Figure 2 Images showing the kinked catheter and deformed stent. (A): Fluoroscopic image showing the kinked guide catheter at the proximal radial artery segment impeding device advancement; (B): deformed distal stent struts caused by attempts to pass it through the kinked segment.

al.^[7] and García-Blas, *et al.*^[8] have primarily described their use to overcome distal coronary resistance, cha-

llenging lesion morphology, or difficult coronary cannulation, where the procedural limitation lies beyond the

guide catheter within the coronary anatomy. However, their use as a bailout strategy to address mechanical deformation of the guide catheter itself has not been well described. In our case, the limitation was intrinsic to the guide catheter, where kinking within the proximal radial segment prevented device delivery. The extension catheter functioned as an internal conduit across the mechanically compromised segment, restoring coaxial alignment and enabling successful stent delivery – representing a distinct and rarely reported indication.

This scenario is particularly relevant in elderly patients undergoing transradial PCI, where proximal vessel tortuosity increases the risk of guide catheter deformation. Persisting with forceful device advancement in such situations risks stent damage, embolization, or vessel injury. Early recognition of catheter kinking and the judicious use of a guide catheter extension can prevent these complications, avoid guide exchange, and reduce procedural time.

In conclusion, this case highlights a novel and practical application of guide catheter extensions as an effective bailout solution for guide catheter kinking during PCI. Familiarity with this strategy may be especially valuable in anatomically challenging and geriatric patients undergoing transradial coronary interventions.

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Please cite this article as: Manohar TR, Anup V, Babu PR, Noor SM, Supriya R. When the road bends: a novel use of guide catheter extension in overcoming catheter kink to facilitate stent delivery. *J Geriatr Cardiol* 2026; 23(5): 330–332. DOI: 10.26599/1671-5411.2026.05.006

