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INVITED COMMENTARY

Everything Flows, Nothing Stays Still

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Heraclitus' central doctrine of the universe — “all is in flux” — certainly applies to endovascular techniques. In their current study, Timaran *et al.* demonstrate the constant “flux” in complex endovascular aortic repair.¹ In contrast to most European centres, the authors suggest routine use of pre-loaded catheters and wires and upper extremity access (UEA) to speed up complex procedures, whereas others currently push more for transfemoral access and avoidance of UEA with its associated stroke risk.² Variations in technique can be used to drive advancement and exchange of transatlantic experiences has always been fruitful, although this is currently obstructed as a result of the COVID-19 pandemic.

Pre-loaded catheters and wires facilitate target vessel (TV) catheterisation in adverse anatomy such as aortic luminal narrowing or major kinks at the level of the TV. They allow safe access to fenestrations and branches, and can provide a stable sheath position, while TV catheterisation may still be hampered by anatomical challenges. Although details of the technique were first published in 2005 when Timothy Chuter mentioned pre-loaded wires, their use in iliac bifurcation devices by Wolf Stelter goes back to 2001.^{3,4} Krassi Ivancev first reported a case series in 2010 including a new pre-loaded delivery system,⁵ and pre-loaded catheters have become standard in fenestrated aortic arch devices, allowing snaring from retrograde access and thereby enabling TV access.⁶

Timaran *et al.* report the experience from six physician sponsored investigational device exemption studies. Their data quality is superb as a result of well controlled prospective data collection with comparable operative strategies. Over six years, the studies included a substantial number of patients (564) with pararenal (pAAA) and thoraco-abdominal aortic aneurysms (TAAA), and outcomes of “standard devices” (SG) and pre-loaded fenestrated and branched aortic endografts (PG) are reported. The results are outstanding, with very high technical success and patency rates from their longstanding experience and operative mastery of the highly specialised aortic centres involved.

The results of the study, however, must be read and interpreted with caution because of the retrospective and observational character of the study. Techniques and strategies to treat thoraco-abdominal pathologies are continuously evolving.

The steps in this evolutionary process often overlap and occur simultaneously. Observational studies, which aim to evaluate this progress, are at risk of including several overlapping changes in technique and can mix up their effect on the outcome. For that reason, a comparative study design with a seemingly appropriate control group, which includes further evolutionary differences in technique and operative strategy, such as the general learning curve of a group, etc., can easily be misleading. Correspondingly, the groups in this study include significant differences. Underlying pathology (pAAA vs. TAAA) can account for differences in technical success, stroke rate, and mortality and should prevent a causative interpretation, as the authors correctly point out. Other factors differ significantly between groups including anatomical factors, the type of device and its profile.

The use of pre-loaded catheters and wires comes at a cost and should be substantiated by an advantage in operating time, reduction of complications, or improved outcome. Especially in fenestrated procedures, which can be performed using transfemoral access alone, the need for upper extremity access potentially increases the stroke risk of a complex aortic intervention. It is hoped that future innovators will investigate the options to aggregate pre-loaded catheters and wires with a fully transfemoral technique to combine the best of two worlds for the benefit of patients. The excellent results of this expert group at least justify the selective adoption and applicability of pre-loaded devices.

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