

A review on the use of steerable sheaths in complex endovascular aortic repair

Jacky Siu Chung Tam | Stephen Wing Keung Cheng

A review on the use of steerable sheaths in complex endovascular aortic repair - Tam - 2023 - Surgical Practice - Wiley Online Library



BACKGROUND

Cannulation of target visceral vessels (TVVs) during complex endovascular aortic repair is challenging, especially with downward-oriented branches. Upper extremity access (UEA) helps guidewires and catheters reach these vessels more effectively, however, this technique involves manipulating instruments around the aortic arch, which can lead to embolic cerebrovascular events. To avoid manipulating the aortic arch, a total transfemoral (TF) approach has been described. A steerable sheath allows TF cannulation of visceral vessels with steep angles, overcoming directional difficulties and providing mechanical support for inserting catheters and stent grafts.

APPLICATIONS

- Gallito et al. reported the necessity to use steerable sheaths being for TVV catheterization occurred in 13% of patients and 6.5% of TVVs. They served as the planned primary cannulation method in 47% of cases and as an unplanned salvage procedure in 53%.
- UEA during fenestrated and branched endovascular aortic repair (FB-EVAR) has higher risks of complications and can be impossible with a prohibitive arch or supra-aortic trunks. A TF approach can avoid crossing the hostile arch.
- Orrico et al. reported that UEA was unfeasible due to right axillary artery occlusion and left subclavian artery aneurysm, so a branched EVAR was performed using a steerable sheath through a TF approach.
- Ferrer et al. reported using a steerable sheath to cross a previous EVAR's flow divider for an iliac branched device (IBD) and bridging stent-graft deployment. The sheath's curvature and stiffness enabled a through-and-through cross-femoral wire without stressing the prior stent graft.
- Gu et al. reported using a steerable sheath for bailout salvage procedure during EVAR after unintentionally covering renal arteries. A steerable sheath and renal curved guide sheath retracted the fabric for cannulation, allowing stent placement in the renal arteries.

BENEFITS OF STEERABLE SHEATH IN COMPLEX ENDOVASCULAR AORTIC REPAIR

- Success rate for cannulating and bridge stenting TVVs with a steerable sheath is very high (98-100%).
- In a review of 1681 patients undergoing FB-EVAR, 67% used UEA and 33% used the total TF approach, all requiring a steerable sheath for TVV cannulation. The technical success rates for both methods were very high (96.5% vs 96.8%).
- The total TF approach for FB-EVAR resulted in shorter operative times (322 vs 402 minutes), reduced fluoroscopy time (64 vs 90 minutes), less contrast use (78 vs 122 mL), and lower estimated blood loss (44 vs 315 mL) compared to UEA.
- Kapahnke et al. reviewed 196 target vessels cannulated with steerable sheaths via a TF approach, achieving a 99% success rate despite 67% being classified as challenging.

TECHNICAL CONCERNS

- Tight bending in steerable sheaths limits trackability of bridging-covered stents, requiring a larger sheath for stability and torqueability. In patients with tortuous iliac arteries and infrarenal aorta, an additional larger outer sheath may be needed, though this increases bleeding risk.
- Predictors of difficult TVV cannulation include a narrowed aortic lumen at the side branch origin, significant ostial stenosis, and tortuous iliac arteries or infrarenal aorta.
- In a total TF approach, the endograft must be fully deployed before cannulating TVVs, reducing the maneuverability and potentially causing issues if the fenestrations or branches are misaligned.

CONCLUSION

- FB-EVAR via a TF approach, which utilizes a steerable sheath for catheterizing TVVs, reduces risks compared to traditional UEA, highlighting the versatility of the sheath in complex endovascular aortic repair.

Baylis
MEDTECH

*Advancing Technology.
Transforming Care.™*

Baylis Medical Technologies Inc.
2645 Matheson Blvd East
Mississauga, ON Canada L4W 5S4
Tel: 1 (888)-505-4885
www.baylismedtech.com
info@baylismedtech.com