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Commentary: The SINE of the times—vigilance in the era of frozen elephant trunk procedures

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In this article, Wada and colleagues¹ from Akita University in Japan report a single case of a patient who underwent repair of acute type A aortic dissection with total arch replacement (TAR) and frozen elephant trunk (FET) technique. The FET graft diameter was 27 mm (90% of size of descending aorta at location of stent graft termination). In the proximal segment of the covered aorta, as would be expected, there were improvements in true lumen to false lumen (TL/FL) ratios. However, in the distal segment TL/FL ratios decreased over time. Ultimately, at 15 months, the patient experienced new symptoms and was recognized as having experienced a distal stent-induced new entry (dSINE) tear, which was successfully treated by thoracic endovascular aortic repair (TEVAR) to the level of the celiac artery.

The rationale for FET procedures in aortic dissection has been to induce favorable aortic remodeling.² However, the authors report on the changes in stent-flap angle over time related to possible “aortic remodeling mismatch” and consider this a potential additional risk factor for dSINE. The report provides excellent illustrations to characterize this development over time, and reports such as this one should heighten our collective awareness for this phenomenon in patients undergoing endovascular repair of aortic disease. This report also highlights the rationale for TAR FET in acute type A aortic dissection as other reports highlight

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CENTRAL MESSAGE

The frozen elephant trunk procedure is used for acute type A aortic dissection; however, distal stent-induced new entry (dSINE) tears pose additional risk and require recognition and treatment.

successful management of both acute and chronic aortic conditions using a 2-staged repair algorithm.³

The occurrence of dSINE after TAR FET procedures is well documented, and occurrence ranges from 6% to 13% of cases.^{4,5} Importantly, many dSINE occurrences were identified beyond 12 months from FET procedure, highlighting the need for continued vigilance in these patients. Furthermore, the case presented here, with the introduced concept of “aortic remodeling mismatch” begs the question as to whether patients with TAR FET for dissection should undergo preemptive distal TEVAR extension in the setting of large persistent 1b endoleak to exclude complete thoracic FL flow. Balloon fracture, or “knickerbocker technique,” can be used in addition TEVAR extension to exclude FL flow for chronic cases. These additional TEVAR interventions carry further spinal cord risk, and so that risk must be balanced against the risk of dSINE, the natural history of which is not well established.

This case also highlights the need for advancement in currently available technology. Most endografts currently in use were initially designed for aneurysm disease but have slowly evolved to be applied to treatment of thoracic aortic dissection as well. The aortic tissue and biomechanics exerted on the aortic wall are inherently different when endografts are deployed for aneurysm disease versus dissection. While there have been some recent advancements in endovascular devices specifically tailored for

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dissection, this case highlights the need for technological advancements that may be able to lessen the future risk of dSINE, furthering the armamentarium available to treat complex aortic pathology. Wada and colleagues should be commended for prompt recognition and successful management of dSINE with TEVAR extension after TAR FET and also for reinforcing the need for careful surveillance imaging in these patients.

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