When the Patient Outlives the Aorta: Endovascular Repair of Patch Aneurysm After Open Type II Thoracoabdominal Aortic Aneurysm Repair

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Purpose

To describe the endovascular management of a patch aneurysm that developed decades after type II TAAA repair.

Clinical Presentation

Patient is an 80-year-old male with a history of type II TAAA associated with chronic dissection who underwent open repair with partial left bypass, inclusion patch of T9 and T10 intercostals, visceral island inclusion patch of celiac, SMA, and right renal artery, and left aortorenal bypass in 2010. Patient's aorta continued to degenerate below the open repair and underwent further endovascular repair initially with right hypogastric artery embolization and right common iliac artery stenting in 2013 and endovascular aortic aneurysm repair with left iliac branch endoprosthesis in 2019. Patient's follow-up imaging showed an enlarging visceral patch aneurysm measuring up to 7.2cm with rapid enlargement of 5mm within one year, indicating the need for repair.

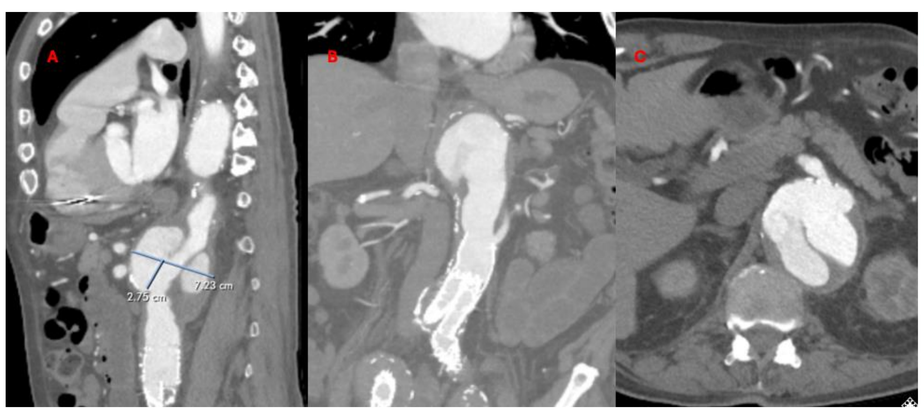

Figure 1: pre-operative computed tomography angiogram (CTA) showing the patch aneurysm in sagittal view measuring 7.23cm (A), coronal view (B), and axial view with SMA coming off the aneurysm anteriorly (C).

Surgical Procedure and Outcome

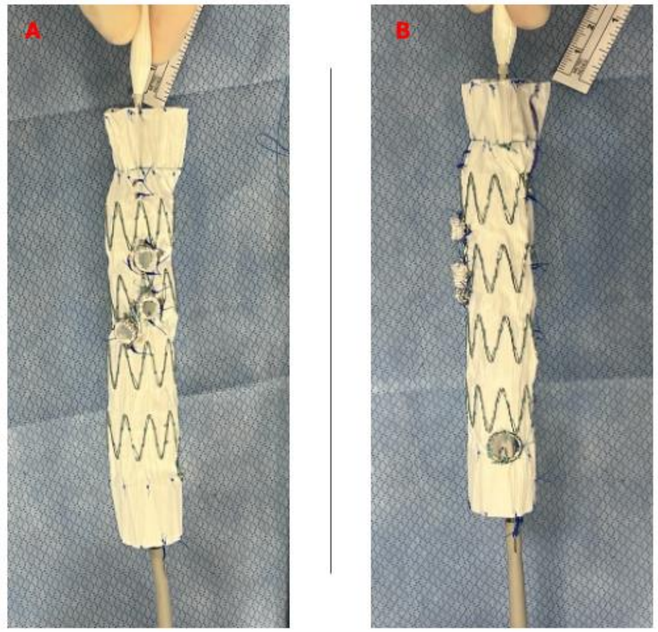

Figure 2: Modification of COOK TX2 graft with three VIABAHN branches sewn onto graft for CA, SMA and RRA (A) and left renal artery fenestration (B).

A 36-154 COOK TX2 graft was selected for modification with 8mm VIABAHN cuffs sewn onto the graft for the celiac artery (CA), the superior mesenteric artery (SMA), and the right renal artery (RRA). A 10mm fenestration was made separately for the left renal artery (LRA). After obtaining access and performing an aortogram, the modified graft was introduced via the right common femoral artery, and a 20 Fr dry seal was introduced via the left common femoral artery. The graft was carefully aligned with the left renal fenestration. After partial deployment, we re-imaged the LRA to ensure proper alignment and performed cannulation of each visceral vessel using a steerable sheath, starting with the LRA, followed by the CA, the SMA, and the RRA. Wires were maintained in these vessels, and the graft was deployed fully, followed by molding with a compliant balloon. Subsequently, a series of balloon-expandable stents were used for each visceral vessel to ensure optimal overlapping into the abdominal aorta proximally and visceral vessels distally. Final aortogram showed satisfactory fenestrated-branched endovascular aortic repair with four patent branch endoprosthesis targets. Patient tolerated the procedure well and was discharged on post-operative day 2.

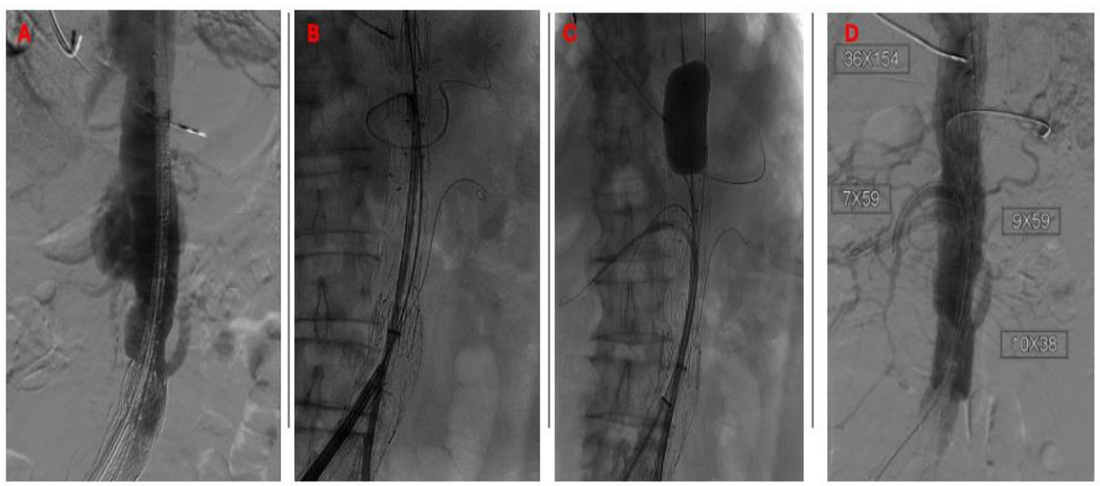

Figure 3: Intra-operative angiogram showing patch aneurysm (A), cannulation of celiac artery (B), molding of stent graft after completion of all visceral vessel cannulation and deployment (C), and final angiogram showing intact repair with patent visceral vessels (D).

Conclusion

We describe a successful endovascular management of patch aneurysm fifteen years after initial open repair. Innovative endovascular techniques are essential in the aging population that we care for, when the patient outlives the aorta.