

PreservationFarrukh Malik¹¹ interventional cardiology, National Institute of Cardiovascular Diseases, Pakistan**Abstract**

Endovascular aneurysm repair (EVAR) is now the favored approach for treating abdominal aortic aneurysms (AAA), especially in patients with elevated surgical risk from factors like advanced age or chronic kidney disease. However, suprarenal AAAs pose distinct anatomical difficulties because of their closeness to vital visceral arteries, such as the renal arteries and the superior mesenteric artery (SMA). These anatomical constraints can make standard EVAR unsuitable due to limited landing zones. As a result, detailed pre-procedural imaging and the use of customized fenestrated grafts are critical to effectively isolate the aneurysm while maintaining blood flow to essential arteries.

Case summary: An 88-year-old male with a history of chronic kidney disease (CKD) and previous right hepatic lobectomy for hepatocellular carcinoma was undergoing routine CT surveillance when an asymptomatic suprarenal abdominal aortic aneurysm (AAA) was incidentally discovered. Initially managed conservatively with regular outpatient monitoring, serial imaging demonstrated progressive enlargement of the aneurysm, ultimately reaching a maximal diameter of 74 mm. Given the substantial risk of rupture, the patient was admitted electively for endovascular aneurysm repair (EVAR). Considering his advanced age and underlying CKD, EVAR was chosen over open surgical repair.

Pre-procedural CT angiography was meticulously analyzed to delineate the detailed anatomical relationship between the abdominal aorta, renal arteries, and superior mesenteric artery (SMA). A customized fenestrated EVAR graft, precisely tailored with openings aligned to the ostia of both renal arteries and SMA, was manufactured accordingly. The procedure involved successful deployment of this fenestrated graft, followed by bridging stent insertions into each visceral artery. Completion angiography demonstrated excellent blood flow through all preserved visceral arteries without evidence of endoleak, stent malposition or vascular compromise.

Discussion:

Fenestrated EVAR grafts require precise alignment of fenestrations with the visceral artery ostia to maintain blood flow. However, simply aligning the fenestrations with visceral artery origins is not sufficient for ensuring long-term vessel patency. Bridging stents are routinely deployed to secure visceral artery perfusion, maintain graft alignment, and prevent potential complications such as endoleak, migration, or stent-graft thrombosis. Additionally, bridging stents promote stable, long-term incorporation between the main graft and the target arteries, significantly reducing the risk of visceral ischemia and subsequent end-organ damage.

While customized fenestrated EVAR demonstrates excellent initial technical success rates and provides a viable alternative for high-risk surgical patients, careful patient selection, detailed anatomical assessment, and procedural expertise remain critical. Moreover, close postoperative follow-up with serial imaging surveillance is essential for early detection of potential complications such as endoleaks, stent migration, bridging stent stenosis, or aneurysmal enlargement. The long-term durability and effectiveness of fenestrated EVAR largely depend on meticulous perioperative planning, precise procedural execution, and rigorous postoperative monitoring.