



Circumaortic Renal Vein Remodeling Following Abdominal Aortic Aneurysm Repair

MULTIMODALITY
MUSEUM IMAGES

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ABSTRACT

A circumaortic renal vein is a congenital vascular anomaly involving an additional renal vein that traverses posterior to the aorta in addition to the normal renal vein traversing anterior to the aorta.^{1,2} In aortic surgery, it is common to ligate the left renal vein (LRV) to aid in surgical exposure, which is typically inconsequential due to collateral venous channels. We report a case of a circumaortic LRV with the preaortic branch ligated during abdominal aortic aneurysm (AAA) surgery and, as a result, retroaortic LRV hypertrophy was observed during follow-up.

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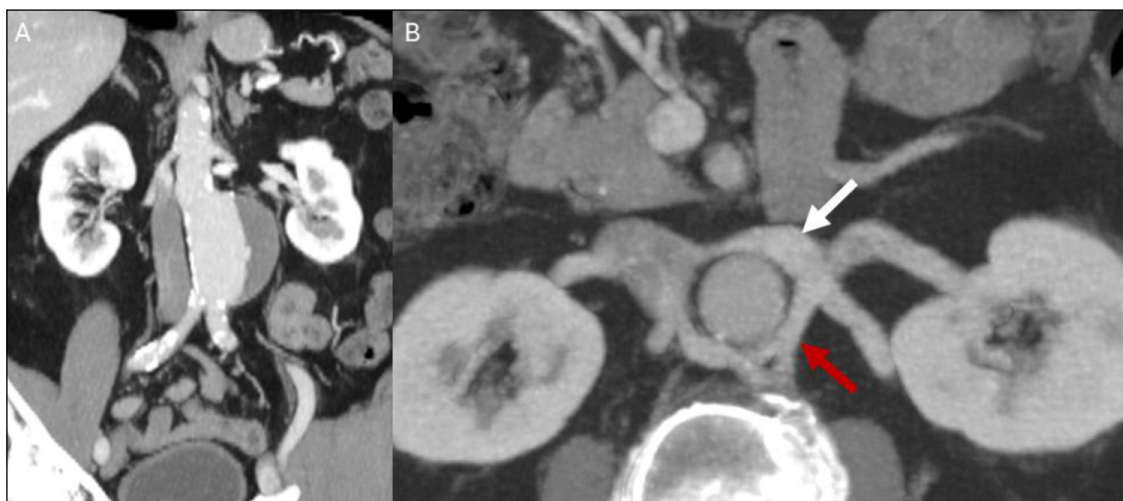


Figure 1 Preoperative computed tomography angiography of the patient. (A) Coronal maximum intensity projection (MIP) image shows a 6 cm infrarenal abdominal aortic aneurysm; (B) axial MIP image shows preaortic (white arrow) and retroaortic branches (red arrow) on the left renal vein.

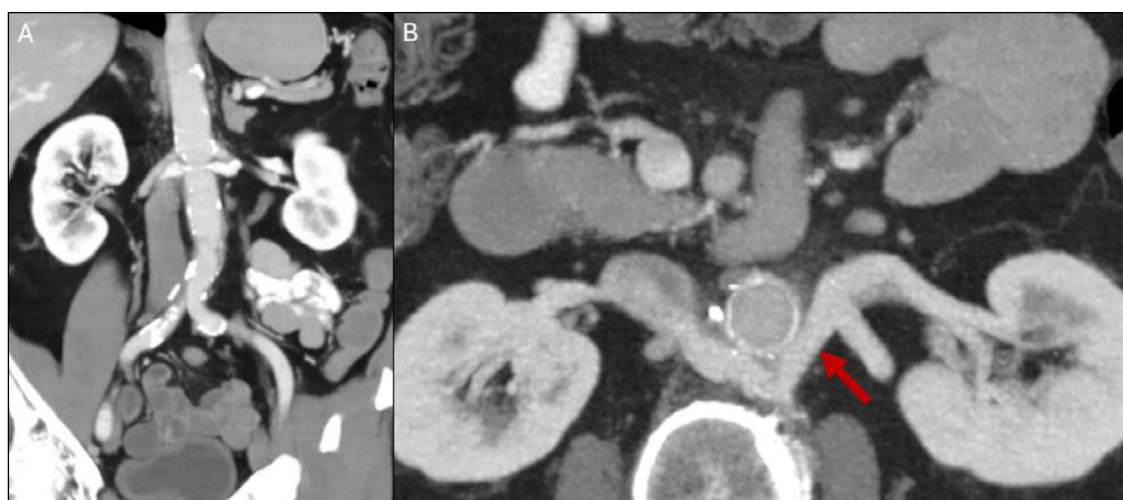
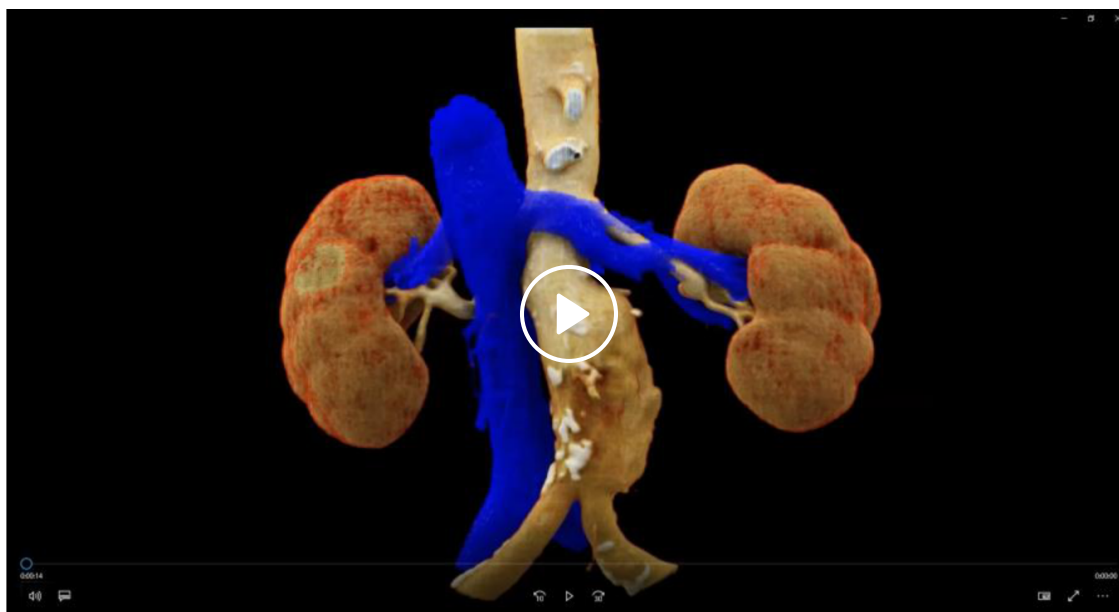


Figure 2 Eight-month follow-up computed tomography angiography of the patient. (A) Coronal abdominal aortic aneurysm image shows an 18 × 9 cm Gelweave bifurcated graft (Terumo) anastomosed from the infrarenal aorta to both iliac arteries; (B) axial maximum intensity projection image reveals the ligated preaortic branch and hypertrophied retroaortic branch of the left renal vein.

A 72-year-old man presented with left lower quadrant abdominal pain and was found to have a 6 cm infrarenal abdominal aortic aneurysm (AAA) (Figure 1 A). Computed tomographic angiography (CTA) of the patient revealed a type II variant of the circumaortic left renal vein (LRV), with two distinct preaortic and retroaortic branches (Figure 1 B, Video 1).³ The patient underwent an open repair of the AAA with an aorto-bi-iliac graft. Suprarenal control was required due to the poor quality of the infrarenal neck. The preaortic LRV was ligated with 5-0 Prolene sutures for better visualization of the suprarenal aorta and to gain control of the renal arteries. The suprarenal aorta was clamped after identifying the retroaortic LRV to prevent inadvertent

clamp injury to the vein. An end-to-end anastomosis of the infrarenal aorta was performed with the 18 × 9 mm Gelweave bifurcated graft (Terumo), followed by distal anastomosis of the graft with the iliac arteries. The patient had an uneventful postoperative course and was discharged on postoperative day 19. Eight-month follow-up CTA imaging revealed a satisfactory aneurysm repair and compensatory hypertrophy of the retroaortic LRV (Figure 2).

This case highlights the importance of preoperative identification of the circumaortic renal vein before open aortic surgery to prevent iatrogenic vascular injury. It also underscores the natural history of a partially ligated circumaortic LRV.



Video 1 Cinematic-rendered computed tomography angiography of the patient shows the preaortic and retroaortic branches of the circum-aortic left renal vein around the abdominal aorta; see also at <https://vimeo.com/1208141314>.

COMPETING INTERESTS

Dr. Ponraj Chinnadurai is a senior scientist at Occam Labs and an interventional consultant at Siemens Medical Solutions USA Inc. Dr. Alan B. Lumsden receives research support from W. L. Gore & Associates, consults with Boston Scientific, W.L. Gore & Associates, and Siemens, and is a shareholder in Hatch Medical, Egg Medical, and Brijjit. He is a member of the editorial board of the *Methodist DeBakey Cardiovascular Journal*, serving on a voluntary basis. The other authors have no competing interests to declare.

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