

SHORT REPORT

Rupture of Abdominal Aortic Aneurysm into Retro-aortic Left Renal Vein: A Case Report

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KEYWORDS

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Abstract We report a case of a 77-year-old man with a rupture of an abdominal aortic aneurysm (AAA) rupture in a retro-aortic left renal vein and in the retroperitoneum. Preoperative computed tomography (CT) assessment showed retroperitoneal bleeding from large AAA rupture into a retro-aortic left renal vein.

After arteriovenous fistula suture, the patient underwent a successful abdominal aorto-iliac repair with an uneventful postoperative course without renal complications.

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Retroperitoneal venous system anomalies are potential hazards during abdominal aortic surgery, because an injury to an unrecognised anomalous vein can lead to an unexpected severe bleeding.

The complex embryologic development of abdominal venous system may lead to four major anomalies: retro-aortic left renal vein, left side inferior cava vein (ICV), left renal vein collar and duplicity of ICV.

An accurate preoperative evaluation is useful to avoid massive haemorrhaging due to venous damage.

Report

A 77-year-old man, with a 2 days history of left flank pain, had gone to the emergency department of his city. An ultrasound examination revealed a large abdominal aortic aneurysm (AAA). He was immediately transferred to our department. He had a history of hypertension, but on admission his blood pressure was 90/60 mm Hg and the pulse rate was 120 beats per minute. He had haematuria. On physical examination, a continuous abdominal bruit was heard. His abdomen was distended and silent. Peripheral pulses were present, and there were no sign of ischaemia (Fig. 1).

Renal impairment was present: the serum creatinine level was 2.8 mg dl⁻¹. A massive left-to-right shunt,

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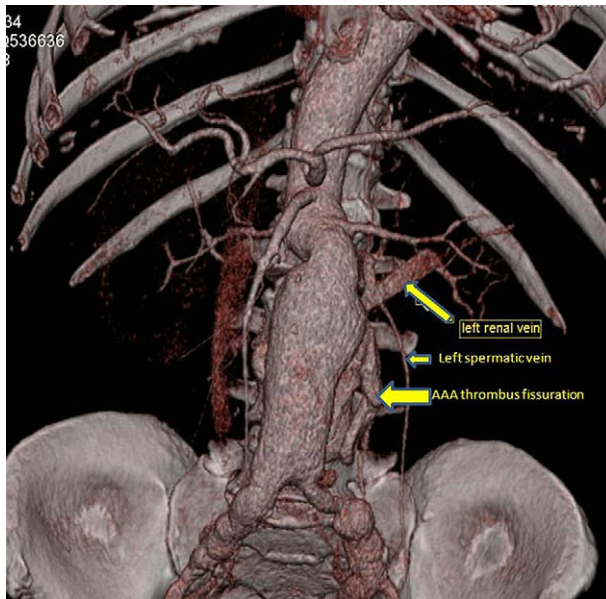


Figure 1 CT scan 3D arterial phase: the retro-aortic left renal vein (long arrow) that ending into the aortic aneurysm, arterial enhancement of the left spermatic vein (small arrow) and AAA thrombus fissuration (large arrow) can also be noticed.

resulting in acute high-output cardiac failure, was absent due to the aneurysm sac compression on left renal vein that reduced the arteriovenous shunt (Figs. 2 and 3).

Multi-slice computed tomography (CT) scan revealed a large AAA rupture in left retroperitoneal space, with an arteriovenous fistula in retro-aortic left renal vein.

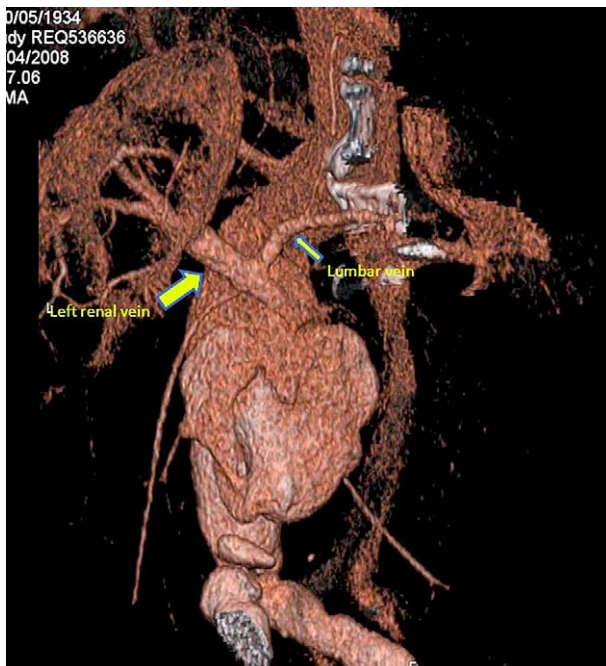


Figure 2 Left latero-posterior 3D CT scan view show the retro-aortic left renal vein fistula with the AAA posterior wall and arterial enhancement of the left lumbar vein.

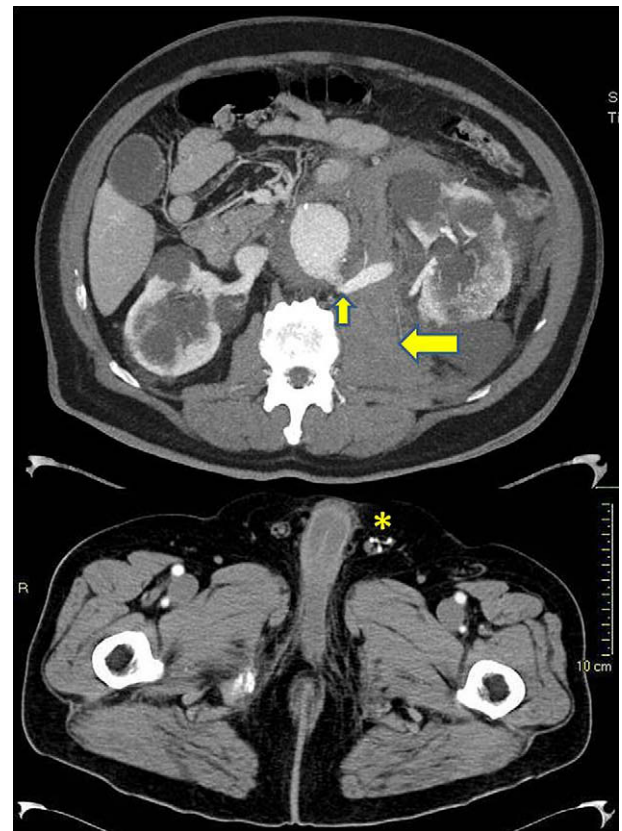


Figure 3 Axial section from a dynamically enhanced spiral CT scan at the level of the renal hila show a rupture of AAA with large haematomas (large arrow); an arteriovenous fistula is seen between the aorta and retro-aortic left renal vein (small arrow) and collateral circulation involving pampiniform plexi and external pudendal vessels (*).

Enhanced vascular structure from the left renal hilum to the posterior aneurysm wall with left spermatic vein involvement was suggestive of aorto-retro-aortic left renal vein fistula.

We performed a median laparotomy incision, and a transperitoneal approach revealed a rupture of the posterior aneurysm wall into the retroperitoneal space, with large haematoma and aorto-retro-aortic left renal vein fistula, 1 cm in diameter. After aortic infrarenal clamping and subsequent clamping of both iliac arteries, the aneurysm sac opening was followed by a massive dark-coloured bleeding from the posterior aortic wall. Using digital compression for control of venous bleeding, the fistula was closed with an interrupted polypropylene 2/0 within aneurysm to preserve spermatic and adrenal veins.

Aorto-iliac replacement was performed using a tube graft of 20 × 10 mm Dacron. Intra-operative blood losses exceeded 3000 ml, but autotransfusion with intra-operative blood recovery allowed significant sparing of heterologous blood units.

The patient was discharged from the hospital in 7 days; his serum creatinine level was 3.7 mg dl⁻¹ on postoperative day 3 and 1.3 mg dl⁻¹ at the time of discharge.

One month later, CT angiography control, showed complete retroaortic arterio-venous fistula resolution, with

normal enhancement of the left kidney and morphology of the aorto-iliac graft. At a 6 months follow-up the patient is asymptomatic.

Discussion

The association of AAA rupture and arteriovenous fistula with retro-aortic left renal vein is a rare event. An accurate review of literature shows 25 cases^{1–3} of arteriovenous fistula with left renal vein, and while in 90% the left renal vein was retro-aortic, only in three cases showed a frank AAA rupture was observed.

About 4% of the general population has an anatomical variant retro-aortic left renal vein.^{1,4}

Several variations of a left renal vein have been reported.⁵ These were renal collars, retro-aortic vein, additional veins and posterior primary tributary.

Retro-aortic left renal vein is caused by anteroposterior reversal of the involution pattern involving the circumaortic venous ring. Retro-aortic and collar left renal veins are generally isolated anomalies, without an associated caval abnormality. A collar left renal vein is caused by persistence of the anterior and posterior limbs of the circum-aortic venous ring.

In our case, the Mansour triad¹ was present: abdominal pain, haematuria and decreased enhancement of left kidney during radiological evaluation.

These findings depend on the size of AAA and arteriovenous shunt.

In contrast to the aorto-caval fistula syndrome,⁶ the sign of acute high-output cardiac failure was absent, maybe due to the aortic compression on the joint between the ICV and retro-aortic left renal vein that reduces the shunt itself.

The haematuria and renal impairment occurred for venous hypertension and recovered after fistula resolution.^{1,7}

An accurate preoperative assessment is mandatory to prevent torrential venous bleeding during aneurysm sac opening.⁸ Aneurysm rupture represents the first limit for further diagnostic assessment. Nonetheless, haematuria with continuous abdominal bruit suggests the presence of an arteriovenous fistula.

Anatomical anomalies can complicate abdominal aorta surgery and increase the mortality, especially when a pre-surgical assessment is not performed. Vascular surgeons should always consider the possibility of these anomalies to modify the surgical approach.

Conclusion

Abdominal aortic aneurysm with atypical signs at the onset should be carefully examined for evidences to understand the exact nature of the problem. Signs of renal venous hypertension (haematuria, proyeinuria and abnormal renal function tests) combined with a non-functioning left kidney should raise the suspicion of an aorta left renal vein fistula.

An accurate preoperative CT scan evaluation should be performed in all patients with AAA to avoid massive bleeding.

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