

Left renal vein as a graft for aortic reconstruction in a patient with primary aortoenteric fistula secondary to a mycotic aneurysm

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ABSTRACT

Description of the use of the left renal vein for aortic reconstruction in primary aortoenteric fistula secondary to a mycotic aneurysm has not been found in the literature. We report here a case of primary aortoenteric fistula secondary to a mycotic aneurysm with gross retroperitoneal contamination that was successfully treated by using a left renal vein graft for aortic reconstruction. (J Vasc Surg Cases and Innovative Techniques 2021;7:176-9.)

Keywords: Primary aortoenteric fistula; Mycotic aneurysm; Left renal vein graft; Omentum interposition; In situ aortic reconstruction

Primary aortoenteric fistula (PAEF) is defined as a communication between the native aorta and gastrointestinal tract.¹ Despite the higher incidence of infected abdominal aortic aneurysms in the Asian population as compared with that in the Western population (13.6% vs 1%-2%),^{2,3} PAEF secondary to a mycotic aneurysm has rarely been reported in the Asian literature.

In this report, we present the successful treatment of an urgent PAEF secondary to a mycotic aneurysm with gross retroperitoneal contamination by using a left renal vein (LRV) as an autogenous graft for aortic reconstruction. Patient consent for this publication was obtained before submission.

CASE PRESENTATION

A 48-year-old man was admitted in the emergency department for a severe hematochezia associated with a septic shock and a history of back pain, fever, and chills for several weeks. Two weeks before admission, he experienced two episodes of hematemesis and hematochezia at a local medical center but was discharged when the bleeding stopped.

At admission in our institution, the patient was in shock with a systolic arterial pressure of 80 mm Hg and a fever of 38.5°C. Laboratory findings demonstrated a hemoglobin level of 6.7 g/dL and a hyperleucocytemia of $25.5 \times 10^9/L$. Renal function was

deteriorated with a serum creatinine level of 1.89 mg/dL and estimated glomerular filtration rate (eGFR) of 41 mL/min/1.73 m². After quick resuscitation, a computed tomography angiography was carried out showing the extravasation of contrast media from a ruptured aneurysm of the infrarenal abdominal aorta in the duodenum and a gross purulent collection in the left paravertebral retroperitoneum (Fig 1). As the patient was unstable, he was brought immediately to the operating room.

At laparotomy, after infrarenal proximal clamping and distal control of the common iliac arteries, the aneurysm was opened and an aortoduodenal fistula was found in the third part of the duodenum (Fig 2, A). Gross pus in the paravertebral retroperitoneal region was aspirated, and a large debridement of all necrotic para-aortic tissue and infected retroperitoneal cavity was performed. The LRV was then harvested and used as a material for an end-to-end aortic bypass (Fig 2, B). The great omentum was used to wrap the LRV as well as the infrarenal abdominal aorta (Fig 2, C). The duodenum was closed in two layers in combination with a jejunostomy. Bacterial cultures were positive for *Burkholderia pseudomallei*, and an intravenous antibiotic treatment was introduced according to the results of the antibiogram. Nutrition was given via the jejunostomy together with parenteral way. Postoperative renal function improved with an estimated glomerular filtration rate of 148 mL/min/1.73 m². The patient was discharged from the hospital on the 28th postoperative day on oral antibiotic therapy. Regular follow-up visits were scheduled to monitor renal function and the LRV graft integrity. A computed tomography angiography performed 3 months after the operation showed a patent graft and both kidneys were well perfused (Fig 3). The renal function monitored by serum creatinine level and eGFR was constantly normal.

DISCUSSION

Management of PAEF is based on the emergency of the case and the severity of local infection at the time of surgery. In case of mild contamination, in situ replacement of the aorta with a prosthesis and repair of the associated

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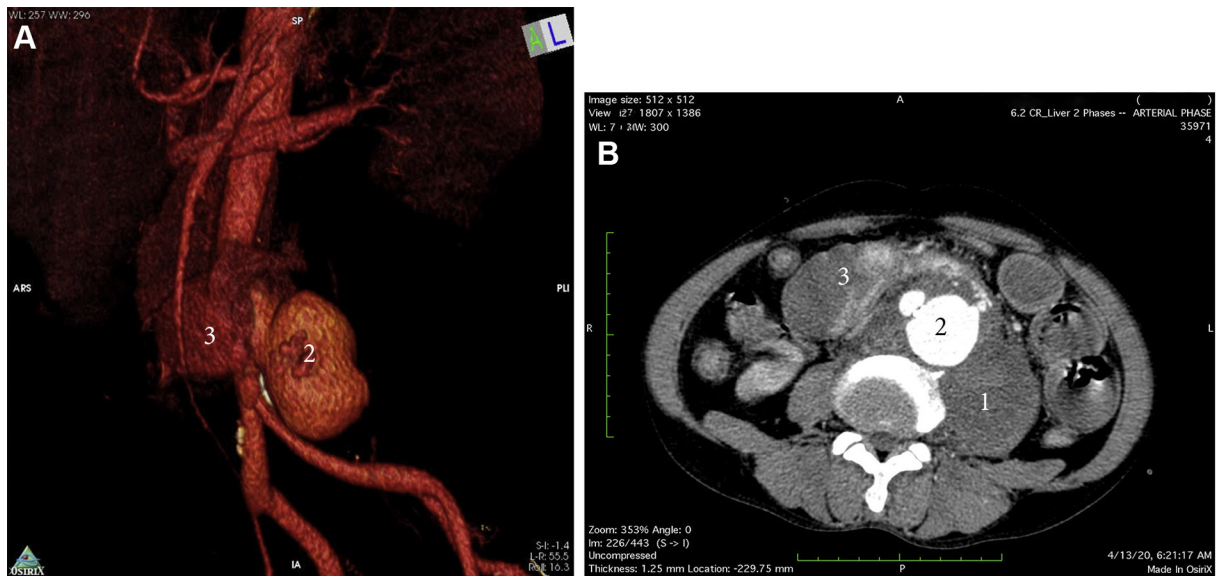


Fig 1. Three-dimensional reconstruction (A) and axial computed tomography imaging (B) of the mycotic aortic aneurysm with duodenal fistula. (1) Gross pus collection in the left paravertebral retroperitoneum, (2) aortic mycotic aneurysm, and (3) aortoduodenal fistula with extravasation of contrast media in the duodenum.

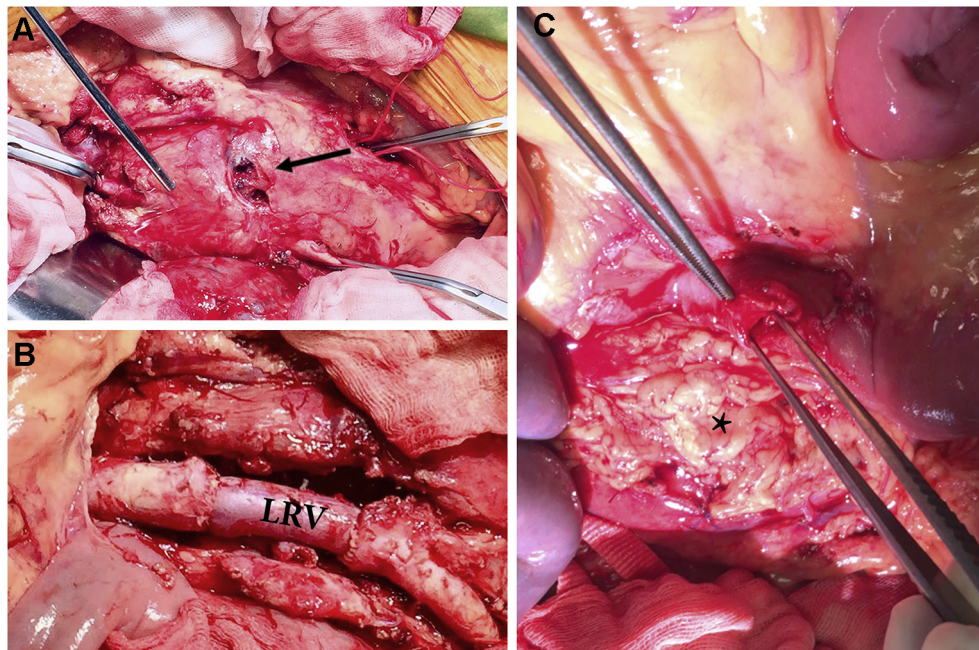


Fig 2. A, Intraoperative view of the aortic lesion and fistula. B, Aortic reconstruction with the left renal vein (LRV) showing perfect congruence between the diameter of the aorta and that of the LRV. C, Perforated lesion at the third portion of the duodenum exposed by DeBakey forceps' jaws and omentum coverage marked with an asterisk (*).

bowel lesion with local debridement followed by long-term antibiotic therapy has been considered.⁴ In a review of 118 cases by Sweeney and Gadacz,⁵ 33 patients were operated, with an operative mortality of 36%, and 19 of 22 survivors with a prosthetic aortic reconstruction

combined with duodenal repair experienced long-term survival. These results are consistent with another report of 35 cases.⁶

Though, in case of gross retroperitoneal contamination and sepsis, aneurysm resection, aortic suture below the

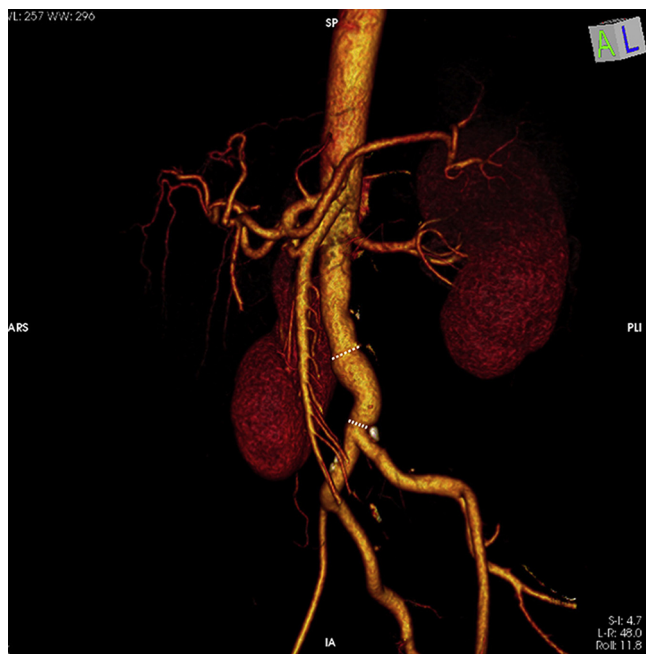


Fig 3. Computed tomography angiography at 3 months showing a patent left renal vein (LRV) graft of adequate diameter and two well-perfused kidneys. Note that the *dashed lines* represent the proximal and distal anastomoses. The LRV graft was estimated to be 3.48 cm in length, 16 mm in the largest diameter, and 12.5 mm in the smallest diameter.

renal arteries, omentoplasty, retroperitoneal debridement, and extra-anatomic bypass remained the preferred technique but with a significant postoperative mortality and a high risk of limb loss.^{4,7}

The use of an autologous femoral vein in the treatment of aortic graft infection has been reported in the literature, but not in case of primary infected aortic aneurysms with aorto-enteric fistula.^{8,9} In a series of 44 patients, Dubois et al¹⁰ treated five patients with mycotic aneurysms by using an autologous femoral vein. Two patients died in the early postoperative period, and three survive without signs of recurrent infection and a patent graft. The advantage of using a femoral vein is its resistance to infection and aneurysmal dilatation.^{8,9,11-13} However, removal of the femoral vein is time-consuming and not suitable in an emergency setting. Considering the circumstances, the operating team decided to use the LRV for an in situ aortic reconstruction because it provides an autogenous graft of sufficient length between 3 and 4 cm and of adequate caliber when harvested from the left gonadal vein proximally to its termination in the vena cava¹⁴ and its diameter matches well with that of a normal aorta. In addition, the LRV is easily accessible without any additional incision and without the need for an additional operating team. This saves time avoiding the risk of pelvic and lower limb ischemia due to long-lasting aortic clamping.

A potential drawback of removal of the LRV is the theoretical risk of renal failure. However, previous studies demonstrated that the functional capacity of the left kidney is most of the time preserved despite ligation of the LRV. McCullough et al¹⁵ reported that after a right nephrectomy and ligation of the LRV for malignancy, only one of three patients experienced transient renal insufficiency. In addition, the LRV has been used for portal vein reconstruction, and Miyazaki et al¹⁶ have shown in a series of 14 patients that renal function was maintained with only a transient rise of serum creatinine levels. Similar results were reported by Loveday et al,¹⁷ showing normal long-term renal function after the use of the LRV for portal or superior mesenteric vein reconstructions in 17 patients with advanced pancreatic and biliary resections. Comparable results were found by Smoot et al¹⁸ in nine patients.

Finally, in aortic surgery, it has been reported that simultaneous ligation and division of the LRV without reconstruction for open repair of complex aortic aneurysm do not result in renal failure.¹⁹⁻²¹ In our case, the LRV was resected with preservation of the renal-azygos drainage and of the gonadal vein.^{14,15,17,18,21}

Considering repair of the duodenal fistula, a recent review revealed lower rates of recurrent fistula after Roux-en-Y repair compared with simple closure of the duodenum. In this review, great omentum interposition between the bowel and the aorta was also associated with a lower postoperative mortality regardless of the technique used to close the duodenum.²² In our case, a simple closure of the duodenum was performed but in association with a T-tube jejunostomy that allows rapid enteral feeding, quite critical in an infected patient, and the great omentum was enfolded around the aorta separating it from the digestive tract.¹⁰

CONCLUSION

In our experience, the management of PAEF secondary to a mycotic aneurysm remains challenging, particularly in case of gross retroperitoneal contamination. The favorable evolution observed in this case suggests that the LRV can be a useful alternative for urgent aortic reconstruction, especially in the case of a mycotic aneurysm with aortic wall damage less than 4 cm in length.

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