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Ascending aorta-common hepatic artery bypass for mesenteric revascularization



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ABSTRACT

INTRODUCTION: Chronic aortic occlusion usually occurs from the infrarenal branch to the terminal aorta. We report the case of a patient with an occlusion that began at the suprarenal artery, and there was also occlusion of the superior mesenteric artery and extreme stenosis of the celiac artery. Antegrade bypass from the ascending aorta to the common hepatic artery was performed.

PRESENTATION OF CASE: A 59-year-old patient presented to our hospital with uremia due to acute anuric renal failure and anorexia. CT revealed long-segment occlusion of the thoracoabdominal aorta including the superior mesenteric artery and bilateral renal arteries. Additionally, there was high-grade stenosis in the celiac artery. We treated the patient using an antegrade bypass from the ascending aorta to the common hepatic artery. His recovery and postoperative course were uneventful. Antegrade bypass from the ascending aorta is an effective alternative for patients who have visceral ischemia.

DISCUSSION: A recent study showed that surgical revascularization for chronic mesenteric ischemia (CMI) provides good midterm patency and mortality. Descending aorta or the common iliac artery is usually used as an inflow. In our patient, we decided to use the ascending aorta to provide more absolute flow, and the CHA was used as an outflow because it was easy to expose. To our knowledge, there is no report of using the CHA as a revascularization outflow for patients with CMI.

CONCLUSION: In an extensively occluded aorta, the ascending aorta is an excellent alternate inflow for revascularization of the mesenteric artery.

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1. Introduction

Chronic aortic occlusion typically occurs from the infrarenal branch to the terminal aorta. Aortic occlusion from more proximal arteries is rare and patients with this type of occlusion are at risk of renal failure or mesenteric ischemia. We report the case of a patient who underwent hemodialysis because of a bilateral renal occlusion. His superior mesenteric artery (SMA) was also occluded and his celiac artery (CA) showed extreme stenosis. Thus, we performed an antegrade bypass from the ascending aorta to the common hepatic artery

2. Presentation of case

A 59-year-old male patient presented with an episode of back pain and anuria. One week later, he was hospitalized for the treatment of an acute anuric renal failure and anorexia. He had a diagnosis of chronic atrial fibrillation, but he had chosen to stop taking anticoagulant medicine 2 years prior to the episode. His medical history includes hypertension and previous myocardial infarction.

CT results showed occlusion of the thoracoabdominal aorta, with an extension of the thrombus from the abdominal aorta above the SMA to the aortic bifurcation. The origin of the SMA and both renal arteries was occluded in this patient, and he had high-grade stenosis of the CA (Fig. 1). The mesenteric circulation was supplied via retrograde flow through the gastroduodenal artery. He had no abdominal symptoms. His serum creatinine level and BNP increased to 21.98 mg/dl and 3889.6 pg/ml, respectively. With acute hemodialysis, his serum urea was normalized.

To avoid potential intestinal ischemia, a bypass was created between the ascending aorta and the common hepatic artery using the great saphenous vein (GSV). The ascending aorta was exposed

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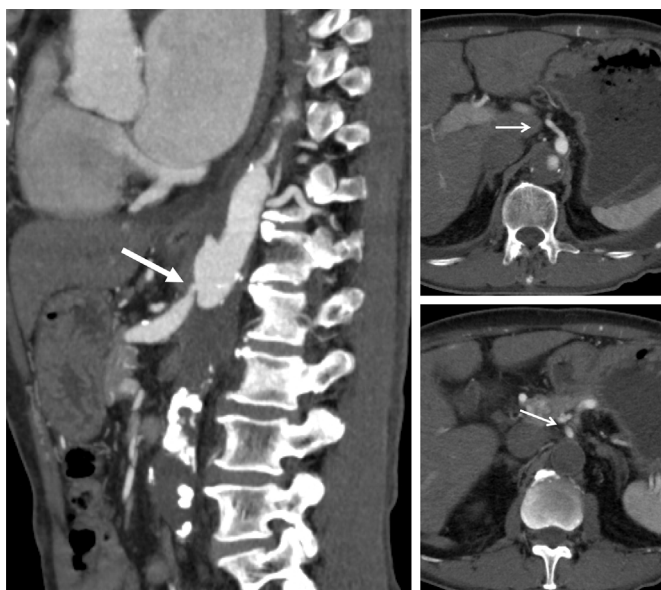


Fig. 1. Preoperative CT angiography shows extensive occlusion from the SMA to the bilateral iliac arteries. CA showed extreme stenosis and blood flow to the mesenteric artery was from the gastrooduodenal artery (large arrow and right side upper arrow, CA; right side lower arrow, SMA).

after median sternotomy, the abdomen was opened through a continued subcostal incision, and the common hepatic artery was exposed. The GSV was chosen as a bypass graft because it is expected to have long-term patency. A distal anastomosis was initially made in an end-to-side manner between the GSV and the common hepatic artery (CHA). To avoid graft twisting the left liver lobe was mobilized and the graft was passed through the diaphragm. An Enclose II aortic puncher was used to perform an aortotomy on the right side of the ascending aorta, and a proximal anastomosis was created in an end-to-side manner between the graft and the ascending aorta. The graft was placed in a C-shaped curve, which is the best position. The patient's postoperative course was uneventful. The aorto-CHA bypass remained patent 20 months after the procedure, and the patient was asymptomatic (Fig. 2).

3. Discussion

It has been reported that an extensively occluded aorta, for example in Leriche syndrome, generally begins at the infrarenal artery. However, aortic occlusion that includes the mesenteric branch has recently been recognized [1,2].

In this patient, the aorta was extensively and totally occluded from the SMA to the bilateral iliac artery, and the CA, which was the only patent mesenteric branch, showed extreme stenosis.

A recent study showed that surgical revascularization for chronic mesenteric ischemia (CMI) provides good midterm patency and mortality. The descending aorta is usually used as an inflow for antegrade bypass and the common iliac artery is used as an inflow for retrograde bypass [3,4].

In our patient, we decided to use the ascending aorta to provide more absolute flow to the mesenteric artery. Although it was possible to place the stent in the CA, we chose a bypass operation from the ascending aorta because extensive aortic complete occlusion and rapid worsening cause anxiety over long-term patency.

There are three reports where the subclavian artery was used as an inflow for the mesenteric artery [4–6]. This procedure can be performed less invasively for high-risk patients. Chiche et al. reported cases of patients who underwent bypass from the ascending aorta to the superior mesenteric artery or celiac artery, and they showed

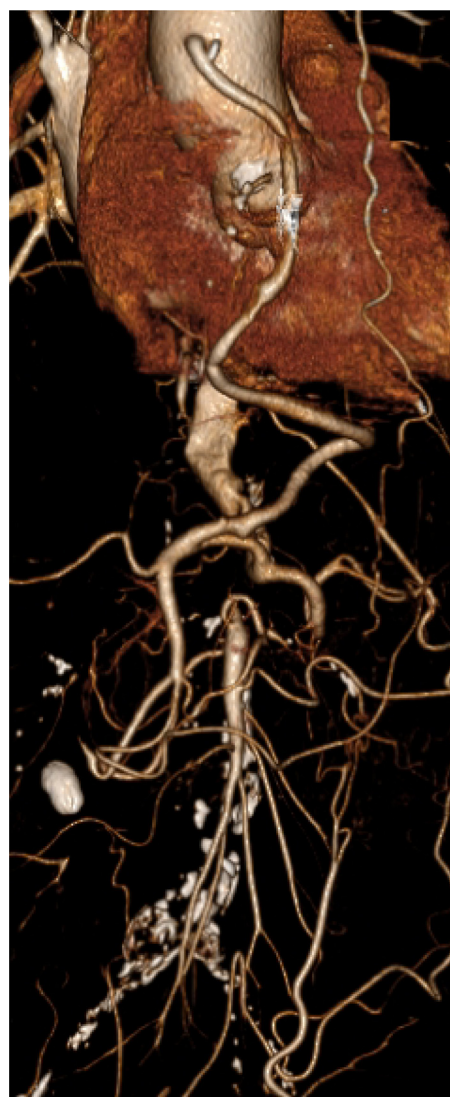


Fig. 2. Postoperative 3D CT angiography at 20 months shows a patent aorto-CHA bypass.

that the procedure provided good patency and mortality [3]. Kalangos et al. also reported the case of a patient who underwent bypass from the ascending aorta to treat CMI that was associated with chronic type B aortic dissection. [7]

The GSV or a polytetrafluoroethylene (PTFE) graft is usually used as a bypass graft. In this case, the GSV was chosen rather than PTFE because physicians expect a long duration of patency when the GSV is used. Some reports showed that GSV tends to be used as the first choice for bypass grafts. PTFE is usually used for high-risk patients because of a shorter operation time and its ease use [3,4,7].

In our patient, the CHA was used as an outflow because it was easy to expose. A preoperative CT scan showed that the gastrooduodenal artery was patent and blood flow to the SMA was supplied by the gastrooduodenal artery. To our knowledge, there is no report of using the CHA as a revascularization outflow for patients with CMI.

4. Conclusion

When the aorta is extensively occluded, the ascending aorta is an excellent alternative inflow for revascularization of the mesenteric artery instead of the descending aorta or iliac artery.

Conflicts of interest

No conflict of interest.

Funding

None.

Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Author contribution

The idea of the project was conceived by Naoki Toya. Tadashi Akiba supervised the project. Yuri Murakami performed the literature review. The paper was written by Yuri Murakami. Soichiro Fukushima participated in the operation. Eisaku Ito coordinated and helped to draft the manuscript. All authors contributed to the refinement of the case report and approved the final manuscript. Takao Ohki provided final approval of the version to be published.

Guarantor

Yuri Murakami and Naoki Toya are the guarantor of this paper.

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