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## Case Report

# A case report of Spontaneous celiac artery dissection treated by endovascular intervention ☆☆☆

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## ABSTRACT

Spontaneous celiac artery dissection is uncommon. Abdominal pain is a common clinical presentation. Conservative medical treatments, endovascular interventions, and open surgery are used to treat spontaneous celiac artery dissection. A 49-year-old male patient visited our hospital, with back and subxiphoid pain that had persisted for 11 hours. He has been smoking 40 cigarettes a day for 20 years. The blood pressure was 180/100mmHg. Aortic computed tomography angiography (CTA) images revealed dissection of the celiac artery, common hepatic artery, left hepatic artery, right hepatic artery, and splenic artery. Urapidil hydrochloride and isosorbide dinitrate were administered to lower the blood pressure to approximately 110/70 mmHg. However, the back and subxiphoid pain persisted without relief. Angiography was performed and a vascular stent (BARD, LIFE STENT, VASCULAR, 8 × 60) was implanted into the celiac artery without involving the branches. Pain was immediately relieved after interventional therapy. The patient was discharged after 4 days. A subsequent aortic CTA after 10 months confirmed that the celiac artery dissection had still not reoccurred.

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## Introduction

Spontaneous celiac artery dissection is uncommon and poses risks to human life [1]. Complications are ischemia, aneurysm formation, and rupture. Hypertension and smoking may also be involved in the development of this disease [2]. Abdominal pain is a common clinical presentation, and some patients may be asymptomatic. Conservative medical treatments, endovascular interventions, and open surgery are used to treat spontaneous celiac artery dissection [3]. The management strategies are guided by pain severity, the status of the patient's blood pressure, and the presence or absence of end-organ dysfunction or dissection progressing. Despite the increased recognition of this disease, there are no consensus guidelines on management of this condition. In addition, rarer still is spontaneous celiac and splenic artery dissection. Herein, we report a case of celiac trunk dissection extending to the splenic and hepatic arteries that was successfully treated with endovascular intervention using a stent, to provide reference for the diagnosis and treatment of this type of disease.

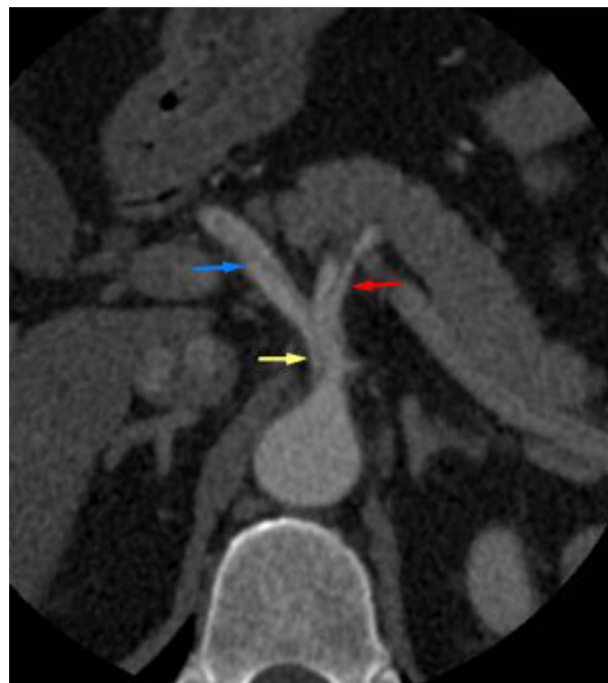
## Case presentation

A 49-year-old male patient visited our hospital on January 24, 2019, with back and subxiphoid pain that had persisted for 11 hours. He had no history of hypertension, hyper-lipidemia, stroke, diabetes mellitus, peripheral artery disease, coronary heart disease, autoimmune disease, or tumor disease, as well as no early family history of hypertension, diabetes mellitus, or arterial dissections. He has been smoking 40 cigarettes a day for 20 years.

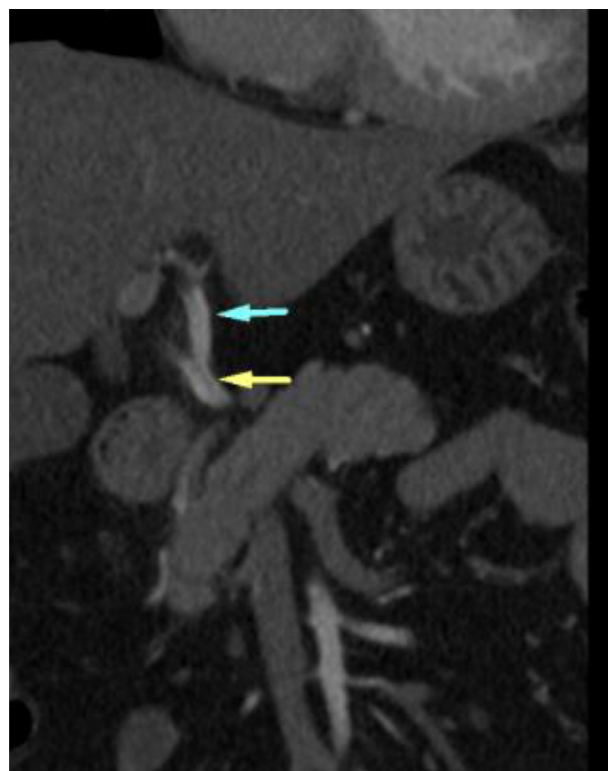
We performed laboratory tests and examinations of the patient immediately after admission to the hospital. Whole blood count analysis revealed a white blood cell count of  $9.8 \times 10^9/L$  (reference range  $3.5-9.5 \times 10^9/L$ ) with normal differentials, a hemoglobin level of 158 g/L (reference range 115-150 g/L), and a platelet count of  $233 \times 10^9/L$  (reference range  $125-350 \times 10^9/L$ ). The results of the coagulation examination showed a prothrombin time of 10.3 s (reference range 11-14 s) with normal D-dimer levels, activated partial thromboplastin time, and thrombin time. The results of electrolytes, urea, creatinine, and liver function tests were all normal. NT-proBNP levels, erythrocyte sedimentation rate, and hemoglobin A1c levels were normal. Further examination revealed normal levels of tumor markers and autoantibodies.

The blood pressure was 180/100 mmHg; hence, urapidil hydrochloride and isosorbide dinitrate were administered to lower the blood pressure to approximately 110/70 mmHg. Aortic computed tomography angiography (CTA) was performed to identify the cause of the pain. The CTA images revealed dissection of the celiac artery, common hepatic artery, left hepatic artery, right hepatic artery, and splenic artery (Figs. 1-3). Therefore, we concluded that the patient's pain was likely caused by these arterial dissections.

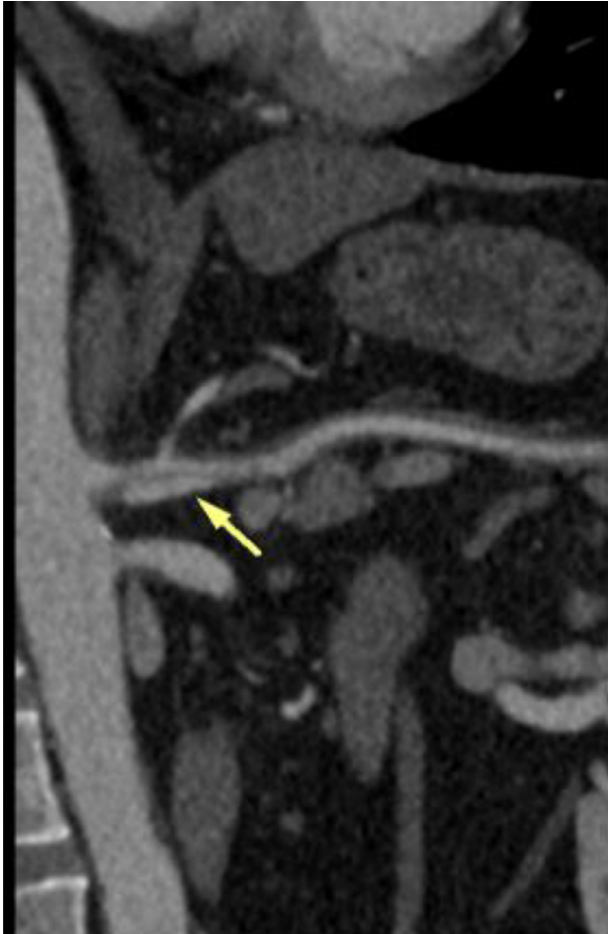
The back and subxiphoid pain persisted without relief. Angiography was performed on January 25, 2019, which confirmed the CTA results (Fig. 4). A vascular stent (BARD, LIFE



**Fig. 1** – Computed tomography angiography (CTA) showed celiac artery dissection (yellow arrow), common hepatic artery dissection (green arrow), splenic artery dissection (red arrow).



**Fig. 2** – Computed tomography angiography (CTA) showed common hepatic artery dissection (yellow arrow), left hepatic artery dissection (green arrow).



**Fig. 3 – Reconstructed computed tomography angiography (CTA) showed celiac artery dissection (yellow arrow).**

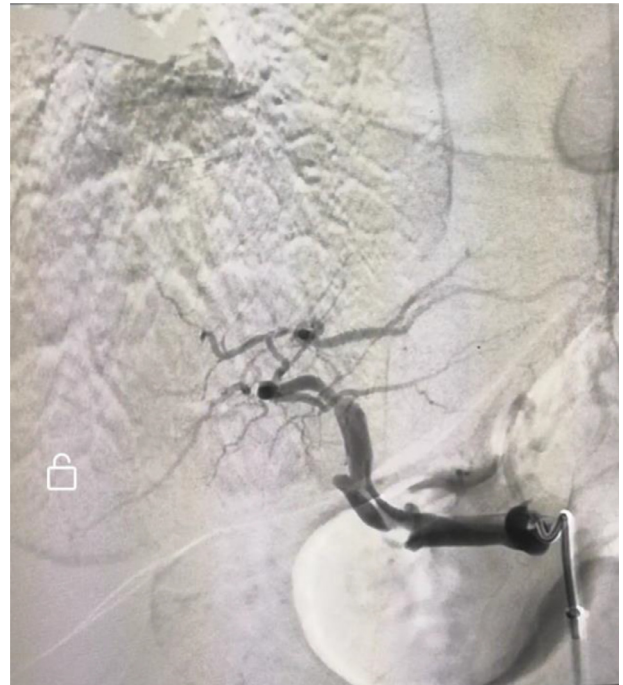
STENT, VASCULAR, 8 × 60) was implanted into the celiac artery without involving the branches (Fig. 5). Pain was immediately relieved after interventional therapy. The patient was discharged after 4 days.

An aortic CTA performed 3 months later (May 5, 2019) showed that the celiac artery dissection had resolved (Fig. 6). In addition, a subsequent aortic CTA after 10 months (December 13, 2019) confirmed that the celiac artery dissection had still not reoccurred (Fig. 7).

This study was exempt from the requirement for ethics committee approval because the patient received standard treatment, and the study constituted a retrospective review of his records.

## Discussion

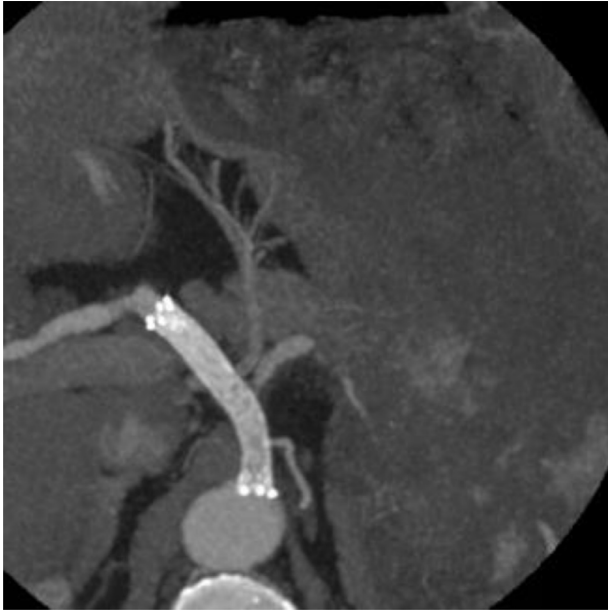
Spontaneous visceral artery dissection was first reported in 1947, and it occurred most frequently in the superior mesenteric artery and rarely in the celiac trunk [4,5]. D'Ambrosio found that spontaneous celiac artery dissection was more common in males (5:1), with an average age of approximately 55 years [6]. There are several reasons for celiac artery



**Fig. 4 – Angiographic imaging of celiac artery.**



**Fig. 5 – Vascular stent planted in the celiac artery (yellow arrow).**



**Fig. 6 – Reexamination of computed tomography angiography (CTA).**

dissection, such as hypertension, atherosclerotic disease, connective tissue disorders, pregnancy, and trauma; however, the exact etiology remains unclear [5,7]. A review found that the most commonly associated conditions were hypertension and smoking in 31% and 23% of the cases, respectively [8]. The present case patient had been smoking 40 cigarettes/day for 20 years, and the blood pressure was high when admitted to the hospital. Therefore, hypertension and smoking may have been involved in the development of the dissection in this patient.

Some patients with celiac artery dissection manifest with abdominal pain, while others are asymptomatic. Our patient experienced back and subxiphoid pain, similar to a previous report. This disease is fatal in humans and can present as an intimal flap, mural thrombus, or fat infiltration around the artery [9]. Complications associated with this disease include aneurysm formation, artery occlusion, rupture, and bleeding.

Technological methods can be employed to examine this disease to differentiate its diagnosis, such as conventional angiography, ultrasonography, contrast-enhanced CT scan, and MR angiography. However, the most sensitive imaging modality is contrast-enhanced abdominal CT with high-quality 3D reconstructions, allowing visualization of the dissected membrane. Jung demonstrated that enhanced CT and CT angiography are the diagnostic imaging modalities of choice for identifying visceral artery dissection, as detecting an intimal flap is crucial for diagnosis [10]. Aydin also reported a case of spontaneously isolated celiac and superior mesenteric artery dissection diagnosed using CTA [11].

Celiac artery dissection is rare but can be fatal. Treatment options include medical treatment, surgical treatment, and endovascular intervention [12]. Conservative management in-



**Fig. 7 – Reexamination of computed tomography angiography (CTA).**

cludes anticoagulation and antihypertensive drug regimens to prevent thrombotic complications, such as infarction and ischemia, and halt the progression of artery dissection [13,14]. In addition, controlling hypertension is necessary to prevent the progression of arterial dissection. DeCarlo reported 24 spontaneously isolated celiac artery dissection follow-ups for approximately 4 years and found that the majority of patients improved with medical therapy alone, and aneurysm dilatation was uncommon [15]. Another study showed that if the patient's general condition is stable, celiac artery dissection could be managed with careful conservative treatment, even in patients with associated retroperitoneal hemorrhage [16]. A retrospective study showed that conservative treatment could be successfully applied in most patients with symptomatic isolated celiac artery dissection, and some patients who failed conservative treatment recovered after surgical therapy [17]. Conservative treatment should be considered as first-line therapy in patients without any signs of bowel is-

chemia or rupture [18]. Our patient's blood pressure was high when admitted to the hospital, and urapidil hydrochloride and isosorbide dinitrate were used to lower the blood pressure to approximately 110/70 mmHg. However, the back and subxiphoid pain persisted without relief.

However, medical therapy alone is only suitable for patients with stable blood pressure. Surgical or endovascular interventions are recommended in patients with ischemia, uncontrollable blood pressure, and persistent pain [19]. Therefore, some researchers have suggested that surgical or endovascular management is only necessary if the patient is hemodynamically unstable, has persistent abdominal pain and aneurysm rupture, when medical therapy fails to control blood pressure, or when dissection is progressing [20]. Another review also showed that uncomplicated celiac artery dissection could be safely treated with conservative strategies, and surgical or endovascular repair was indicated when dissections were complicated, or the symptoms persisted despite adequate conservative treatment [21].

An early study demonstrated that conservative medical therapy was appropriate for most cases of celiac artery dissection in the absence of other serious complications; however, 45% of the cases that required endovascular or surgical repair were owing to aneurysm degeneration [22]. Sun showed that endovascular therapy could be used in high-risk patients with recurrent symptoms, visceral malperfusion, or aneurysms [23]. A retrospective search conducted by Galastri between 2009 and 2014 in 10 patients showed that initial conservative treatment was unsuccessful and that arterial stenting with coil embolization of the false lumen was performed when the dissection progressed to aneurysm dilatation [24]. DiMusto reported that some patients continued to experience abdominal pain and eventually underwent celiac artery stenting, and the pain improved after the intervention [1]. Therefore, this study suggests that if abdominal pain is persistent, an endovascular stent might stabilize or improve the pain, and surgical reconstruction could be performed for aneurysm degeneration or occlusion, both of which are unusual events. The pain persisted in our patient even after blood pressure control. Therefore, an endovascular stent was implanted in the celiac artery, and immediate pain relief was achieved.

However, there are no guidelines for the treatment of celiac artery dissection, and large prospective studies have not been conducted because of the rarity of this condition. Therefore, long-term follow-up is necessary owing to the risk of later progression to aneurysms.

In conclusion, spontaneous celiac trunk dissection can be initially treated with medical therapy, and endovascular therapy is an optional choice in cases of artery dissection progression or persistent pain.

### Patient consent

Informed consent has been obtained from the patient for publication of the case report.

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