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## Case Report

# A useful modality of CT angiography image to identify medical emergency in isolated celiac artery dissection type I: A case report with longest follow-up and literature review ☆☆☆

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## ABSTRACT

Symptomatic isolated celiac artery (CA) dissection (SICAD) is an extremely rare form of visceral artery dissection. It is diagnosed by a contrast abdominal computed tomography (CT) scan showing a CA dissection (CAD). There are 4 types of CAD: Type I-IV. Type I has entry and re-entry and no true luminal narrowing. All types other than type I have entry and re-entry. They have true lumen compression and true lumen constriction due to false lumen. We report a case with the longest follow-up, 120 months after symptom onset, without evidence of CAD exacerbation. A 56-year-old man presented with a sudden onset of abdominal and back pain. He had a past medical history of left pneumothorax, pulmonary tuberculosis at the age of 23, and hypertension on medication since the age of 46. On physical examination, he had mild muscle rebound tenderness in the epigastric region. The curved multiplanar reconstruction (MPR) of the urgent 3-dimensional contrast-enhanced abdominal computed tomography angiography (CTA) showed an isolated celiac artery dissection type I. Given the risk of emergency surgery for total occlusion of the CA, conservative management with analgesics during hospitalization resolved the abdominal pain, and the patient was discharged 3 days later. Subsequently, a total of 5 CTAs were performed over 120 months, but no worsening of CA arterial dissection and CA occlusion findings were observed. In type I SICAD cases, arterial dissection, and CA occlusion may progress, in which case emergency stenting or endovascular treatment may be indicated, and close follow-up such as CTA is required.

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## Introduction

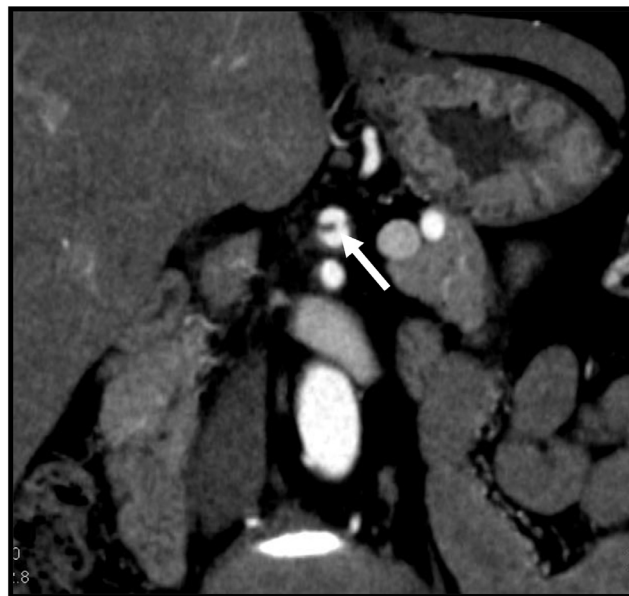
An arterial dissection is defined as a cleavage of the arterial wall by an intramural hematoma between 2 elastic layers [1]. Arterial dissections, which involve an abrupt tear in the wall of a major artery resulting in an intramural accumulation of blood, are a family of catastrophic disorders with serious, potentially fatal consequences. It has been reported that one of the causes of celiac artery dissection (CAD) is the result of Valsalva maneuver [2]. On the other hand, for isolated visceral artery dissection without aortic dissection, a systematic review shows that common characteristics of isolated CAD without associated aortic dissection cases include middle-aged males, hypertension, dyslipidemia, and smoking [3]. In symptomatic cases of symptomatic isolated CAD (SICAD), aggressive treatment such as endovascular treatment is indicated only when severe abdominal pain persists and is refractory to conservative treatment according to the treatment algorithm for patients with symptomatic SICAD [4]. Conversely, when abdominal pain is relieved by conservative treatment, no further treatment is indicated. In our case report, we report a case in which long-term conservative treatment is effective in asymptomatic SICAD cases with no change in CT findings during follow-up of conservative treatment for 120 months, which is the longest survival period to our knowledge.

## Case description

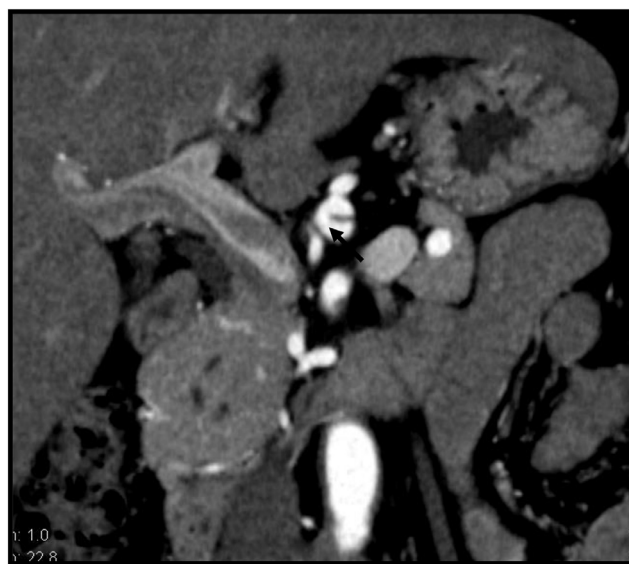
A 56-year-old man presented with a sudden onset of abdominal and back pain of 6 hours' duration. He had a history of left pneumothorax at age 18, pulmonary tuberculosis with left pneumothorax at age 23, and hypertension on medication since age 46. On physical examination, he had mild muscle rebound tenderness in the epigastric region. The curved multiplanar reconstruction (MPR) of the urgent contrast-enhanced abdominal computed tomography (CT) scan showed an isolated celiac artery dissection, type I (Supplementary Fig. 1) [5], in which the entry orifice was at the entry lesion and blood flow filled the false lumen to compress the true lumen, and the re-entry was at the common hepatic artery (Figs. 1–5), and diagnosed isolated celiac artery dissection (ICAD). Given the risk of emergency surgery for total occlusion of the CA, conservative management with analgesics during hospitalization resolved the abdominal pain, and the patient was discharged 3 days later. Subsequently, a total of 5 CTAs were performed over 120 months, but no worsening of CA arterial dissection and CA occlusion findings were observed. In addition, no specific CTA findings were found during the follow-up period.

## Discussion

To date, 2 systematic reviews or meta-analyses have addressed SICAD. Of these [6,7], the 2018 analysis identified 43 case series of dissection in which the visceral artery dissection included the celiac artery and SMA alone or both simultane-

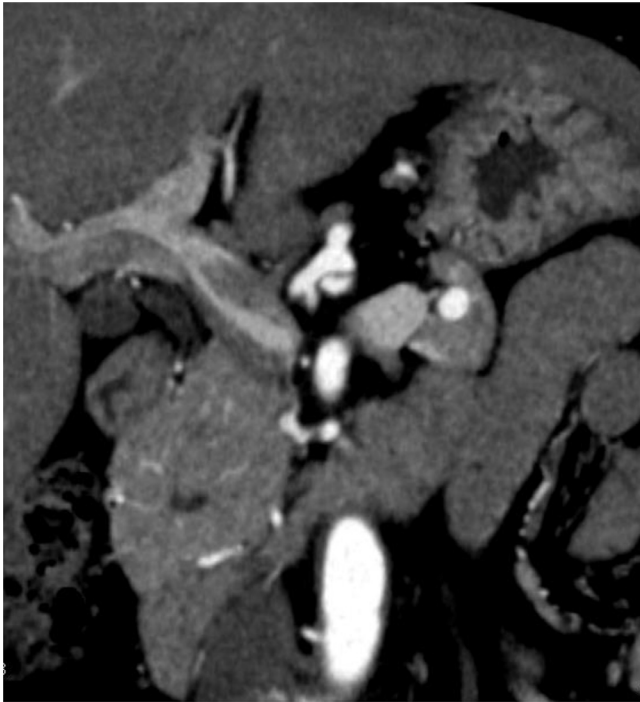


**Fig. 1** – The contrast medium-enhanced computed tomography angiography (CTA) of the celiac artery (CA): coronary section. Arterial dissection begins from the root of celiac artery and the entry site could be confirmed. A false lumen was observed on the left side (white arrow).



**Fig. 2** – The CTA image of the distal side of CA. The contrast medium seems re-enter the false lumen and the common hepatic artery (black arrow).

ously [6]. When these were analyzed, a total of 1136 cases were included in the analysis, excluding reports in which the number of cases was unknown. There were 164 cases of CA, 593 cases of SMA, and 379 cases of simultaneous dissection of CA and SMA, accounting for 14.4%, 52.2%, and 33.4% of the total, respectively. In addition, 90% of the SICAD reports came from Asia. Type I, II, III, IV, V, and VI accounted for 11%, 10%, 17%,



**Fig. 3 – The CTA image of the distal side of the common hepatic artery. The dorsal pancreatic artery branches dorsally from the common hepatic artery.**



**Fig. 4 – The sagittal section of the root of the celiac artery.**

24%, 36%, and 5% of the total, respectively. is the second lowest with 11% of all 2. In addition, 95% of all treatments were conservative. According to these 2 systematic review and meta-analysis papers, the longest follow-up of SICAD cases until 2023 was 118.9 months [8]. This meta-analysis clarifies the long-term specific duration of long-term follow-up and serves as a reference for the duration of follow-up.

### When should endovascular or surgical treatment options be chosen for cases of SICAD?

#### 1. Treatment options

At a median follow-up of 376 (165-602) days (13-50 months), all patients were alive without antiplatelet, anticoagulant, endovascular, or surgical treatment. However, there is no clear consensus on the management of symptomatic ICAD [9].

#### 2. Follow-up considerations



**Fig. 5 – The CTA of the entry, true lumen, and false lumen of celiac artery. (A): This showed the positional relationship between the entry site, true lumen, and false lumen clearly. (B): This CTA image confirmed that the re-entry site existed at a common hepatic artery.**

In a clinical study that followed 16 patients with symptomatic SICAD, 8 cases were treated surgically because of aneurysmal dilatation or distal hypoperfusion, progressive dissection, or failure to relieve symptoms. The remaining 8 cases were successfully managed conservatively [10]. Even when splenic infarction occurred in a patient with isolated symptomatic celiac artery dissection, the patient was successfully treated with conservative therapy [8].

### 3. The longest follow-up in the literature

In our case, except for the initial episode of abdominal pain, no symptoms occurred during the 120-month follow-up. However, if symptoms develop during this follow-up period, an endovascular or surgical option may be indicated to prevent life-threatening vascular events.

## Identify SICAD findings with CTA to prevent life-threatening adverse event

The clinical presentation of splenic artery dissection is variable, ranging from asymptomatic to life-threatening [11]. Symptoms in patients with splenic infarction vary from abdominal, flank, and back pain to nausea or vomiting and may be vague in identifying the primary diagnosis. This is one reason why splenic infarction is detected incidentally by CTA in patients with isolated celiac artery dissection. The management policy for arterial dissection in CA is surgical or conservative. However, for acute vascular emergencies, it is important to share a radiologic protocol that emphasizes the importance of tracking not only the arterial phase but also the portal phase for the timing of contrast imaging [12]. Spontaneous isolated celiac artery (CA) dissection SICAD is extremely rare among visceral artery dissections.

## Conclusion

The case of a 56-year-old man with SICAD is presented. The diagnosis of SICAD type I was made by CTA. We report a case with the longest follow-up, 120 months after symptom onset, without evidence of CAD exacerbation.

## Statement of ethics

There are no ethical conflicts to declare. Approval for the case presentation was obtained from the ethics committee of the studied hospital. The approval number given by the Ethics Committee is 3006.

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The authors have no funding relevant to their case report,

## Author contributions

The data of reported cases were collected by Dr SH and YF. The article was written by Dr SH and reviewed by Dr YF and TA. The final version of the written article was reviewed by Drs SH, YF, and TA.

## Patient consent

The author obtained written informed consent for this case report.

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.radcr.2023.09.004](https://doi.org/10.1016/j.radcr.2023.09.004).

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