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# Self-healing omental infarction diagnosed and followed-up using contrast-enhanced computed tomography: A case report and review of literature

Kyosuke Goda, Eiji Umegaki, Akiko Shiotani

## ABSTRACT

**Introduction:** Omental infarction is a relatively rare disease characterized by acute abdomen. Nonsevere cases may be successfully treated without antibiotics. Although adult cases often require surgical treatment, it remains unknown under what circumstances patients may be treated conservatively, including whether antibiotics are necessary. We report a case of self-healing omental infarction with a clinical course confirmed by contrast-enhanced computed tomography (CT). **Case Report:** A 53-year-old man presented to our emergency department with right lower abdominal pain. Contrast-enhanced CT scan revealed elevated fat density in the greater omentum and we diagnosed omental infarction based on these findings. The symptoms gradually improved with conservative treatment and we confirmed improvement using contrast-enhanced CT and blood tests. **Conclusion:** Omental infarction is a relatively rare disease characterized by acute abdomen. Nonsevere cases may be successfully treated without antibiotics. We conclude that contrast-enhanced CT is useful for the diagnosis and follow-up of omental infarction that is treated conservatively.

**Keywords:** Omental infarction, Conservative management, Contrast-enhanced computed tomography

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## INTRODUCTION

Omental infarction is a relatively rare disease that can present with acute abdominal pain and ascites [1–4]. The definition of omental infarction is necrosis of the greater omentum caused by thrombosis of omental veins, circulatory disturbances due to trauma, and other causes. It is often difficult to make a definitive diagnosis among diseases that can cause an acute abdomen [1]. In recent years, however, computed tomography (CT) has been reported to be useful for the diagnosis of omental infarction [5–7]. Although adult cases often require surgical treatment, the indications for conservative treatment, and whether to use antibiotics, are not clear. We believe this case is valuable because we tracked the patient's clinical course using contrast-enhanced CT. We also briefly review the literature.

## CASE REPORT

A 53-year-old man with no remarkable past medical history presented to our emergency department with a 24-hour history of worsening right lower abdominal pain. He reported daily beer consumption but denied smoking and had no history of allergies. He reported being prone

to constipation and was sometimes aware of abdominal fullness.

On admission, the patient was 162 cm tall, weighing 57 kg, and his body mass index (BMI) was 21.7 kg/m$^2$. His temperature was 36.5 °C and he was fully conscious with normal heart sounds. There was no hepatosplenomegaly, no obvious tenderness to palpation or rebound in the right lower abdomen, and no costovertebral angle tenderness. Murphy's sign was negative. Intestinal sounds were audible.

Laboratory findings revealed a white blood cell (WBC) count of 12,300/mm$^3$ and C-reactive protein (CRP) level of 1.87 mg/dL. Other blood test results were unremarkable. The abdominal ultrasound revealed an oval-shaped mild hyperechoic mass extending from the lower end of the inferior aspect of the liver to just below the abdominal wall, coinciding with point of maximal tenderness (Figure 1).

Contrast-enhanced CT revealed a mosaic-like elevated fat density slightly to the right of the midline of the abdomen, confined to an oval mass at the lower end of the inferior aspect of the liver and below the abdominal wall and the anterior aspect of the transverse colon. The inside had an irregular cord-like high absorption area. Ascites was not noted (Figure 2).

A diagnosis of omental infarction was made based on the imaging findings at the first visit. Because there were no symptoms suggestive of peritonitis on physical examination or blood tests, we followed him conservatively without the administration of antibiotics. His abdominal pain gradually improved, and blood tests performed one week after the initial examination showed an improvement in the inflammatory response, with the WBC count at 8720/mm$^3$ and CRP level at 0.18 mg/dL. Contrast-enhanced CT showed a decrease in the density of the fatty tissue of the greater omentum and a reduction in its range, with no clear signs of ascites (Figure 3). We considered that the omental infarction had been cured by conservative treatment; therefore, we decided on careful follow-up in the outpatient department. Informed consent was obtained from the patient prior to enrolment in the study.

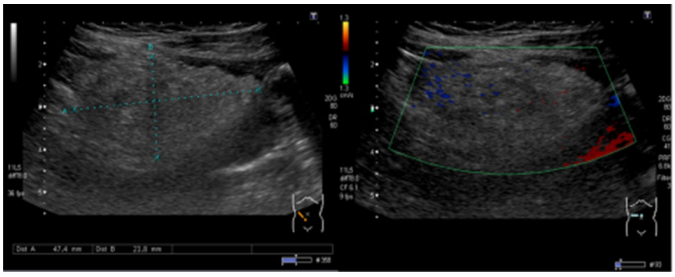

Figure 1: Abdominal ultrasound at the first examination. An obtuse oval-shaped mild hyperechoic mass was found extending from the lower end of the inferior aspect of the liver to just below the abdominal wall, coinciding with the point of maximal tenderness. The right side shows the color Doppler image. No blood flow could be detected inside the mass.

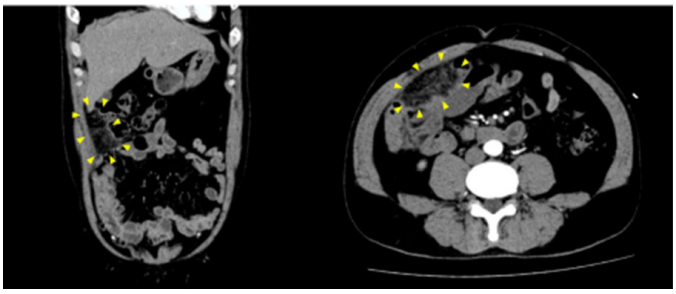

Figure 2: Contrast-enhanced CT at the first examination. The left side is a coronal slice image, and the right side is a horizontal image. Slightly to the right of the midline of the abdomen, a mosaic-like elevated fat density was observed, confined to an oval mass at the lower end of the inferior aspect of the liver, below the abdominal wall and in the anterior aspect of the transverse colon (yellow triangle). The inside had irregular cord-like high absorption area. Ascites was not found.

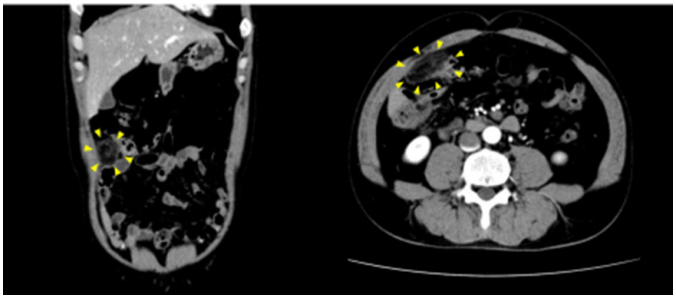

Figure 3: Contrast-enhanced CT scan one week after the first examination. The left side is a coronal slice image, and the right side is a horizontal image. Compared with the initial CT image, the density of the fat tissue in the mass had decreased and the range had diminished (yellow triangle). Ascites was not detected.

## DISCUSSION

We encountered a case of self-healing omental infarction whose clinical course was confirmed by contrast-enhanced CT. Since reports of such cases are considered rare, we will review the cases with other references. Omental infarction can be classified as idiopathic or secondary, with or without torsion, with or without trauma, and with or without thrombus and vascular involvement (Table 1) [7]. Causes of idiopathic omental infarction include elevation of intra-abdominal pressure, increased intestinal peristalsis, movement of the omentum with bodily movement, thrombus formation due to omental vein injury, and omental vein dilatation after hyperphagia. Our patient was diagnosed with idiopathic omental infarction because he was previously prone to constipation and there were no triggers, such as trauma or vascular lesions.

Saborido et al. [8] reported the clinical characteristics of 54 cases of omental infarction, including 39 men and 15 women, with an average age of 32.24 years (range 1–77

Table 1: Classification of omental infarction

| | |
|---|---|
| Torsion-related thrombosis | Nontorsion-related thrombosis |
| Primary (idiopathic) | Spontaneous infarction |
| Secondary to adhesions, hernias, or tumors | Hypercoagulable states |
| | Vascular abnormality |
| | Trauma |

years). The condition tended to be more common among young people. In 15 cases reported since 1992, 9 (60%) were diagnosed with omental infarction preoperatively; 8 were treated conservatively and 1 was treated surgically. Omental infarction, therefore, may be treated with observation, and surgery may be avoided. We searched case report articles from 2000 to 2019 with the keyword "omental infarction" in the Japan Medical Abstracts Society, and there were 12 cases reported in Japan, including the present case (Table 2) [9–19]. Nine of them were males which agree with the findings of Saborido et al. [8].

Because the greater omentum anatomically falls to the right in the abdominal cavity, blood flow stagnation, and therefore infarction, tends to occur more often on the right side of heavier omenta. A summary of reported cases reveals that 8 of 12 patients had a chief complaint of right-sided abdominal pain, which also was the site with this case [9, 12, 14, 15, 17–19]. Omental infarction was diagnosed using abdominal ultrasonography or CT in all reported cases, and these examinations were useful for differentiation of omental infarction from acute appendicitis and acute cholecystitis. Many reports included the CT image revealing a mass or cord-like form of unevenly rising fat density in a mosaic shape, limited to the right omentum. Because the normal omentum is composed of thin membranes and fat, it is a difficult part to recognize on CT. However, the inflammation and edema caused by the infarct cause changes to a mass-like form, accompanied by elevated fat density, making it possible to recognize the lesion on CT. There are no other features that characterize omental infarction, and it is likely that these findings would be overlooked unless the diagnosis is suspected. Considerable attention should be paid when making an imaging diagnosis.

In two out of three children, symptoms improved with conservative treatment, and they were discharged early within one week. One of them was a self-healing case that did not require antibiotics [10]. In addition, none experienced a relapse of their symptoms. However, in adult cases, although initially managed conservatively many patients underwent omental resection because their symptoms worsened. There was also no report of a spontaneous cure, such as in this case. Omental infarction is often treated conservatively if there is no omental torsion and the clinical course is likely to be good. In pediatric case reports, 6 out of 9 cases have been recovered by conservative treatment [20]. Therefore, we believe that there may have been selection bias, in which

Table 2: Reported cases of omental infarction in Japan

| Case | Author | Year | Age | Sex | Chief complaint | How diagnosed | Treatment |
|---|---|---|---|---|---|---|---|
| 1 | Okui et al. [9] | 2006 | 10 | Male | Right upper abdominal pain | AUS CT | Conservative (antibiotics) |
| 2 | Ohama et al. [10] | 2008 | 9 | Male | Abdominal pain | AUS CT | Conservative (self-healing) |
| 3 | Miyazawa [11] | 2010 | 48 | Female | Abdominal pain | CT | Surgery |
| 4 | Tochii et al. [12] | 2011 | 27 | Male | Right upper abdominal pain | CT | Surgery |
| 5 | Kurokawa et al. [13] | 2012 | 66 | Male | Abdominal pain | CT | Surgery |
| 6 | Mii et al. [14] | 2013 | 85 | Female | Right lower abdominal pain | CT | Surgery |
| 7 | Kaneko et al. [15] | 2013 | 39 | Male | Right lower abdominal pain | CT | Conservative (antibiotics) |
| 8 | Niwa et al. [16] | 2015 | 8 | Female | Abdominal pain | CT | Surgery |
| 9 | Akimoto et al. [17] | 2015 | 20s | Male | Right lower abdominal pain | CT | Surgery |
| 10 | Maeda et al. [18] | 2015 | 32 | Male | Right lower abdominal pain | CT | Surgery |
| 11 | Nishino et al. [19] | 2016 | 81 | Male | Right abdominal pain | CT | Surgery |
| 12 | Current case | 2019 | 53 | Male | Right lower abdominal pain | AUS CT | Conservative (self-healing) |

Abbreviations: AUS: Abdominal ultrasound, CT: Contrast-enhanced computed tomography (CT).

no conservatively treated mild cases were reported in the literature. Itenberg et al. [21] reported that conservative treatment with antibiotics was the first choice for omental infarction. However, they claim that laparoscopic surgery should be performed if symptoms continue between 24 and 48 hours. Although many of the patients treated with surgery had hemorrhagic infarctions, necrosis, and abscess formation, the symptoms were immediately improved by resection of the necrotic omentum in all cases [11–14, 16–19]. In patients where symptoms worsened with conservative treatment, the possibility of blood flow disorder and abscess formation caused by torsion were raised. In such cases, it is important to consider the indications for surgical treatment in the early stages. Omental necrosectomy reduces the duration of abdominal pain, speeding up a patient's discharge, and return to normal activity [22]. Although a lot of previous reports supported necrosectomy and the criteria for judging self-healing cases are still unclear, there are few reports of omental abscess formation following conservative treatment [23]. Therefore, despite few reported cases of self-healing, if there are no symptoms or signs of infection consistent with peritonitis, we can propose considering the practice of conservative treatment without antibiotics under careful follow-up. A high index of suspicion and the use of contrast-enhanced CT will help avoid unnecessary antimicrobial administration and surgical intervention in such cases.

## CONCLUSION

Contrast-enhanced CT is useful for the diagnosis of omental infarction, and nonsevere cases are likely to be successfully treated conservatively, without antibiotics. We believe this is a valuable case report because it confirms that clinical improvement can be tracked using CT.

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## Author Contributions

Kyosuke Goda – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Eiji Umegaki – Conception of the work, Design of the work, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Akiko Shiotani – Conception of the work, Design of the work, Drafting the work, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

## Guarantor of Submission

The corresponding author is the guarantor of submission.

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## Consent Statement

Written informed consent was obtained from the patient for publication of this article.

## Conflict of Interest

Authors declare no conflict of interest.

## Data Availability

All relevant data are within the paper and its Supporting Information files.