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Case Report

# Omental Necrosis and Mesenteric Ischemia Secondary to Hypercoagulability Due to COVID-19: A Case Report

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## Abstract

**Background:** Omentum necrosis is a rare cause of acute abdomen. Its main etiologies are torsion on its axis, hypercoagulability, and intra-abdominal infections. Its clinical diagnosis is difficult since its symptoms resemble other abdominal pathologies, so diagnostic confirmation when the pain is present in the right abdomen, which occurs most frequently, is usually intraoperative Surgical treatment is more effective than conservative management in reducing hospital stays and does not require follow-up.

**Case Report:** We present the case of a 45-year-old male suspected to be infected with SARS-CoV-2, which potentially triggered hypercoagulability with necrosis of the greater omentum and mesenteric ischemia, requiring multiple surgical interventions.

**Conclusion:** It is a rare cause of acute abdomen and to the best of our knowledge, the description of the first case of necrosis of the omentum secondary to COVID-19.

*Keywords: Necrosis, Omentum, COVID-19, hypercoagulability.*

## Introduction

Torsion and necrosis of the greater omentum is a rare cause of acute abdomen. The first publication dates from the year 1899 where they describe the case of a 45 year old miner with secondary torsion due to neoplasia [1]. As of now, a little more than 300 cases have been reported. Its incidence is uncommon between the fourth and sixth decades of life, with a prevalence in men of 61.1% with respect to women of 38.9% [2,3].

Its clinical diagnosis is difficult since its symptoms resemble other abdominal pathologies. Thus, diagnostic confirmation in the presence of pain in the right abdomen, which occurs most frequently, is usually intraoperative [2].

Imaging techniques especially abdominal computed axial tomograph, have shown to be effective given that its radiological signs are very clear such as the whirlwind sign which is produced when there is a clockwise rotation of the mesenteric vein and artery within the greater omentum (Figure 1) and the vascular pedicle sign, which shows drainage of the omental veins to a mass also of apparent omental origin (Figure 2) [2,4]. In this article, we present a case of omentum necrosis secondary to SARS-CoV-2 (COVID-19) as a possible intra-abdominal focus and associated with a hypercoagulability disorder triggered by the virus.

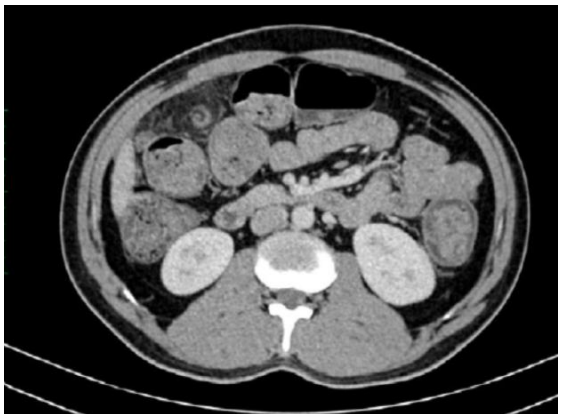

**Figure 1: Computed axial tomography image of the abdomen contrasted in axial section showing the whorl sign.**

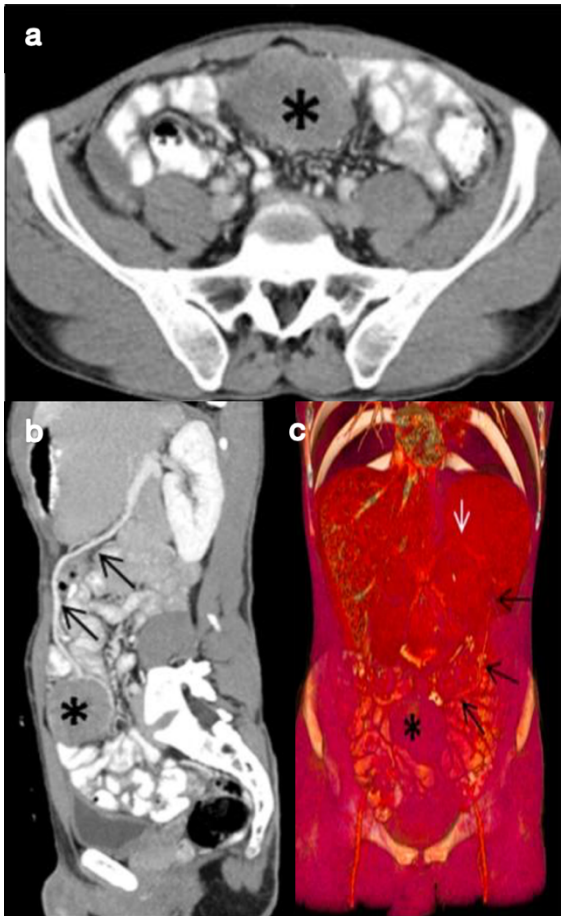


**Figure 2: (A), Axial computed tomography of the abdomen in axial section showing omental mass, (B), sagittal section of the tomography where the omental vein is observed reaching what would be the omental mass. (C), coronal section where it is observed that the omental vein drains to the splenic vein.**

## Case Presentation

A 45 year old patient with no relevant history presented to the emergency room of a tertiary care institution with diffuse abdominal pain progressing over eight days. He describes the pain as colic in type with a maximum intensity of 9/10. The pain was exacerbated by food intake, with no alleviating methods. It was also associated with diarrheal stools without mucus or blood, and multiple emetic episodes of food content. In the initial assessment, the patient was in a general condition, with oxygen saturation by pulse oximetry at 79%. On physical examination, decreased breath sounds with the absence of pulmonary aggregates were noted. The patient presented with a globular abdomen with

abundant adipose panniculus, increased frequency of bowel sounds in the four quadrants, no findings on percussion, and pain upon palpation predominantly in the right abdomen with signs of peritoneal irritation such as Blumberg and Rovsign signs. Given gastrointestinal symptoms and desaturation of unclear cause in time of the pandemic, the patient was considered a suspected case for COVID-19, and an evaluation was requested by the general surgery service who considered acute abdomen of apparent appendicular etiology. From the clinic, he was immediately taken for exploratory laparotomy without waiting for lab results. An exploratory laparotomy was performed with findings of hemoperitoneum of 1000 ml, necrohemorrhagic major omentum (Figure 3), and an omentectomy was performed from its proximal insertion.

**Figure 3: Anatomical specimen extracted via laparotomy, sent to pathology.**

During the intraoperative period, the patient suffered hypotension secondary to mixed septic and hemorrhagic shock of abdominal origin for which he received transfusions of three units of red blood cells and was started on empirical antibiotic management with ampicillin sulbactam 3 grams intravenous (IV) every 6 hours. The patient was then transferred to the intensive care unit (ICU) for the postoperative period. Admission paraclinical tests showed leukocytes in 22,084 10^3/uL, neutrophilia 86%, with the presence of severity criteria for COVID-19 given by C-Reactive Protein (CRP) of 240 mg/dl, dimer D of 6.21 ug/ml, lactate dehydrogenase of 905 U/L, arterial gases with moderate oxygenation disorder PA/FI 205 mmHg, and hyperlactatemia of 3.3 mmol/L. No areas of consolidation were seen on Chest X-Ray. During his hospital stay, a torpid progression occurred requiring vasopressor support with norepinephrine 0.05 ug/kg/min, and invasive mechanical ventilation. A report of positive respiratory film array for SARS COV 2 was received and due to the persistence of hypotension, a new laparotomy was performed 48 hours after the first intervention with the findings of hemoperitoneum port wine of 500 ml, and mesenteric ischemia with thrombosis of mesenteric veins of thin intestinal loops from the ligament of treitz of approximately 120 cm but still feasible. The abdomen was left open with a laparostomy bag in a lavage plan. 48 hours later, there was evidence of persistent ischemia but no necrosis.

Six days later, the last peritoneal lavage was performed. Ischemia was observed in 70 cm of thin loops with the improvement of perfusion thus, the cavity was closed with skin only with planned eventration and abdominal computed axial tomography report with portal and superior mesenteric venous. The patient was then treated with low molecular weight heparin at a dose of 1mg/kg every 12 hours. He required 26 days of monitoring in the ICU due to multiple thrombotic complications. Studies of antiphospholipid syndrome (APLS) and tumor markers were ordered to rule out other factors that could have predisposed the patient to thrombotic events. After ruling out neoplasia and APLS-related coagulopathy, a diagnosis of omentum necrosis secondary to infection by COVID-19 was established.

The patient was discharged 40 days after hospitalization with planned eventration postponing abdominal wall closure on an outpatient basis and use of an abdominal binder.

## Discussion

The etiology of omental necrosis is still

unclear. No consensus clearly shows the main reason behind such pathology. In most of the cases reported, some common triggering factors are described such as obesity or intra-abdominal infections, and mainly omental torsion when turning on its axis, or factors that favor thrombosis such as hypercoagulable states. When associated with torsion, they can be divided into primary, without clear causes, or secondary for intra-abdominal infectious foci, previous surgical interventions, tumors, hernias, or cysts [2]. in any of the two situations, ischemia, hemorrhage, necrosis, or adhesions can occur [3].

It has been identified that the SARS-CoV 2 virus triggers a series of prothrombotic cascades by activation of prothrombotic genes which provoke the release of Interleukin-8 (IL-8) and IL-17 by monocytes-macrophages, activating the coagulation cascade [5]. One of its severity criteria is the D-dimer due to its association with multiple complications including disseminated intravascular coagulation (DIC) and increased mortality [6], therefore the use of anticoagulation with low molecular weight heparins was described, which, apart from having a role in the prevention of thrombosis, also diminish the inflammatory cascade that provokes COVID-19 [7]. In prophylactic and extended doses and even with full empirical doses [8], there is evidence of improved mortality, but with results that are still under discussion since they may present a risk of major hemorrhage [6]. Its use has been described in patients with increased D-dimer, ferritin, severe diseases, and venous or arterial thrombosis so its benefits outweigh the risk involved in its use [8,9,10].

Based on the treatment of omentum necrosis, conservative management has been described with good success rates and is even preferred in some cases. This approach consists of analgesic, anti-inflammatory, intravenous liquid analgesic management, and in some cases antibiotic therapy. However, when this fails, a hospital stay may be prolonged [2,11,12], contrary to what would occur if surgical management is chosen from the beginning. In our case, due to the severity of the clinical condition, the signs of peritoneal irritation, and the paraclinical findings, surgical management was the appropriate option.

To the best of our knowledge, this is the first case where necrosis of the omentum is described due to intra-abdominal focus by SARS-CoV-2 and hypercoagulability secondary to the virus. The oxygen desaturation at admission made us suspect the diagnosis, but the chest x-ray did not report a typical pattern of viral pneumonia, which oriented our diagnosis towards a GI etiology, taking into account the mesenteric ischemia illustrated by thrombosis of the mesenteric veins which had already been described as a complication of COVID-19 [13,14].

## Conclusion

Necrosis of the omentum and its torsion are rare causes of abdominal pain and even more of acute abdomen. Its relation with infection by COVID-19, to our knowledge, is the first time it has been described, which is why there is a limitation in terms of the information found and a possible bias in suggesting a direct relationship. We recommend extending investigations in patients with COVID-19 and abdominal pain where the etiology is unclear, with contrasted abdominal tomography, but if their clinical condition warrants it, they should not wait for surgical revision. This differential diagnosis should be taken into account in times of pandemic and it is recommended that it be part of the surgeon's diagnostic arsenal when other causes of abdominal pain have already been ruled out. Regarding the use of heparins, we follow the experts' consensus to use it with an increase in D-dimer and documented venous or arterial thrombosis.

## References

1. Eitel GG. Rare Omental Torsion. New York Med Rec.1899;55:715.

2. Medina-Gallardo NA, Curbelo-Peña Y, Stickar T, et al. OMENTAL INFARCTION: SURGICAL or CONSERVATIVE TREATMENT? A CASE REPORTS and CASE SERIES SYSTEMATIC REVIEW. Ann Med Surg (Lond).

2020;56:186-193.
PMID:32642061.
https://doi.org/10.1016/j.amsu.2020.06.031

3. Breunung N, Strauss P. A diagnostic challenge: primary omental torsion and literature review - a case report. World J Emerg Surg. 2009;4:40. PMID: 19922627. https://doi.org/10.1186/1749-7922-4-40

4. Zaleta-Cruz JL, Rojas-Méndez J, Garza-Serna U, González-Ruvalcaba R, de Elguea-Lizarraga JO, Flores-Villalba E. Torsión de epiplón. Reporte de caso. Cirugía y Cirujanos, 2017;85(1):49-53. https://doi.org/10.1016/j.circir.2015.08.008.

5. Ng LF, Hibberd ML, Ooi EE, et al. A human in vitro model system for investigating genome-wide host responses to SARS coronavirus infection. BMC Infect Dis. 2004;4:34. Published 2004 Sep 9. PMID: 15357874. https://doi.org/10.1186/1471-2334-4-34

6. Chowdhury JF. Moores LK, Connors, JM. Anticoagulation in Hospitalized Patients with Covid-19.. NEJM. 2020; 383:1675-1678. New England Journal of Medicine October 22, 2020 383(17):1675. https://doi.org/10.1056/NEJMclde2028217

7. Shi C, Tingting W, Li JP, et al. Comprehensive Landscape of Heparin Therapy for COVID-19. Carbohydr Polym. 2021;254:117232. PMID: 33357843. https://doi.org/10.1016/j.carbpol.2020.117232

8. Vivas D, Roldán V, Esteve-Pastor MA, et al. Recomendaciones sobre el tratamiento antitrombótico durante la pandemia COVID-19. Posicionamiento del Grupo de Trabajo de Trombosis Cardiovascular de la Sociedad Española de Cardiología [Recommendations on antithrombotic treatment during the COVID-19 pandemic. Position statement of the Working Group on Cardiovascular Thrombosis of the Spanish Society of Cardiology]. Rev Esp Cardiol. 2020;73(9):749-757. PMID: 32327870. https://doi.org/10.1016%2Fj.recesp.2020.04.006

9. Drago F, Gozzo L, Li L, Stella A, Cosmi B. Use of Enoxaparin to Counteract COVID-19 Infection and Reduce Thromboembolic Venous Complications: A Review of the Current Evidence. Front Pharmacol. 2020;11:579886. PMID: 33041824. https://doi.org/10.3389/fphar.2020.579886

10. Nadeem R, Thomas SJ, Fathima Z, et al. Pattern of anticoagulation prescription for patients with Covid-19 acute respiratory distress syndrome admitted to ICU. Does it impact outcome?. Heart Lung. 2021;50(1):1-5. PMID: 33138975. https://doi.org/10.1016/j.hrtlng.2020.10.009

11. Karcaaltincaba M, Eldem G, Ozdeniz I, Akata D, Ozmen M, Akhan O. Omental vascular pedicle sign: Multidetector CT finding useful for diagnosis of an omental mass. European Journal of Radiology. 2012;81(2):166-169.
https://doi.org/10.1016/j.ejrad.2011.01.043.
http://www.sciencedirect.com/science/article/pii/S0720048X11000726

12. Yagnik VD. Primary omental torsion. ANZ J Surg. 2019;89(11):1515-1516. PMID: 30497099.
https://doi.org/10.1111/ans.14952

13. Helms J, Tacquard C, Severac F, et al. High risk of thrombosis in patients with severe SARS-CoV-2 infection: a multicenter prospective cohort study. Intensive Care Med. 2020;46(6):1089-1098. PMID: 3236717. https://doi.org/10.1007%2Fs00134-020-06062-x

14. Tang N, Bai H, Chen X, Gong J, Li D, Sun Z. Anticoagulant treatment is associated with decreased mortality in severe coronavirus disease 2019 patients with coagulopathy. J Thromb Haemost. 2020;18(5):1094-1099. PMID: 32220112. https://doi.org/10.1111/jth.14817