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Diagnosis of spontaneous isolated superior mesenteric artery dissection with ultrasound: A case report

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4

Abstract**BACKGROUND**

Spontaneous isolated superior mesenteric artery dissection (SISMAD) is a rare disease that originates from the superior mesenteric artery without the presence of aortic and other arterial dissections. Most cases are diagnosed using contrast-enhanced computed tomography (CECT), whereas the application of ultrasound is rather rare.

CASE SUMMARY

Herein, we reported a case of SISMAD with sudden epigastric pain that worsened as the main symptom after eating. She had a long-time history of hypertension with unknown blood pressure control. The patient did not have any history of smoking or drinking. This case was initially diagnosed using ultrasound and the results were later confirmed by CECT. After admission, the patient fasted, followed by parenteral nutrition support and fluid supplementation to maintain electrolyte and acid-base balance. Then, metoprolol succinate sustained-release tablets and aspirin were given as non-operative treatments. After one week, the symptoms improved, and the patient was discharged. During telephone follow-up, the patient did not develop similar symptoms.

CONCLUSION

Whether ultrasound can be used as a routine and noninvasive imaging method³ for the diagnosis of SISMAD needs further exploration.

INTRODUCTION

Spontaneous isolated superior mesenteric artery dissection (SISMAD), first reported in 1947, is a dissection disease arising from the superior mesenteric artery without aortic and other arterial dissections^[1].

Clinical manifestations of SISMAD are atypical. The most common symptoms include sudden persistent or paroxysmal severe abdominal pain, accompanied by other gastrointestinal symptoms. Also, some of the patients are asymptomatic. In addition, clinical and physical examinations was not reveal no specificity, and no laboratory indicators for SISMAD are currently available^[2,3]. SISMAD may directly lead to intestinal ischemia necrosis and arterial rupture, which endangers the life of patients if not treated in a timely manner^[4,5]. At present, the diagnosis of SISMAD is mainly dependent on imaging examinations, and contrast-enhanced computed tomography (CECT) and computed tomographyangiography (CTA) are most commonly used^[6,7]. Ultrasound is rarely used to diagnose SIDSMA. Herein, we reported a ultrasound-confirmed SISMAD case without dissecting aneurysm or thrombosis, suggesting that ultrasound could be used in the diagnosis of SISMAD.

¹CASE PRESENTATION

Chief complaints

A 64-year-old Chinese Han female patient was admitted to the First Affiliated Hospital of Chengdu Medical College on April 27, 2020, due to intermittent pain in the upper abdomen.

History of present illness

Epigastric pain became worse after eating for 3 days .

History of past illness

She had a history of hypertension for >10 years and was on antihypertensive medication, but her blood pressure control was unknown. The patient underwent a cardiac pacemaker implant 2 years ago, and was given dabigatran ester (capsules 110 mg bid) as long-term anticoagulant therapy after the surgery. She received cholecystectomy in the First Affiliated Hospital of Chengdu Medical College due to calculous cholecystitis on March 21, 2019.

1

Personal and family history

The patient did not have any history of smoking or drinking.

Physical examination

The blood pressure was 170/110 mmHg at admission.

Laboratory examinations

No other obvious abnormalities were detected based on physical examination and laboratory tests.

Imaging examinations

Abdominal ultrasound was routinely performed since the patient had superior abdominal pain. However, no obvious abnormalities in the liver, pancreas, and spleen were observed. Strip echoes were found in the lumen about 1.6 cm from the opening of the superior mesenteric artery distal to the main trunk of the superior mesenteric artery with stripped intima. The arterial lumen was divided into true lumen and false lumen by the exfoliated intima. Ventral false lumen had a large diameter, while that of the dorsal true lumen was small. Lumen sonopenetrability was normal, and no thrombosis was detected. Proximal to the exfoliated intima, a 3-mm wide rupture was observed (Figure 1). Color Doppler imaging showed blood flow passing through the incision. The blood flow in the ventral lumen was dark, while colored blood flow signals were

observed in the dorsal lumen. Pulse Doppler was used to assess blood flow velocity in the true lumen (Figure 2).

FINAL DIAGNOSIS

Ultrasonography of the abdominal aorta showed no shed intimal echo (Figure 1), suggesting isolated superior mesenteric artery dissection, which was later confirmed by CECT (Figure 3).

TREATMENT

After admission, the patient fasted, followed by parenteral nutrition support and fluid supplementation to maintain electrolyte and acid-base balance. Then, metoprolol succinate sustained-release tablets (47.5 mg/day) were given to lower her blood pressure, and aspirin (100 mg/day) was given as an antiplatelet treatment.

OUTCOME AND FOLLOW-UP

After one week, the symptoms improved, and the patient was discharged. During telephone follow-up at one-, three-, and six-month after discharge, the patient did not experience similar symptoms and did not visit any local medical facility for imaging re-examination.

DISCUSSION

Currently, the most commonly used imaging methods for the diagnosis of SISMAAD are CTA and CECT^[8], and only a few diagnosed cases have been confirmed by ultrasound^[9-12]. In this case report, ordinary grayscale ultrasound could detect the start and end points of the intimal exfoliation in the superior mesenteric artery, the location and number of ruptures, and whether there was thrombus in the lumen. Color Doppler ultrasonography was used to investigate the blood flow through the rupture sites, the blood flow velocity in the true and false lumen, and the filling defect areas caused by thrombus in real-time. Yun *et al* ^[13] classified SISMAAD into type I, type II (IIa and IIb),

and type III. In this case, a rupture was detected about 1.6 cm from the opening of the superior mesenteric artery, while its distal end was closed. No thrombosis was detected in either the true or false lumen, and the ultrasound finding was in line with a type IIa SISMAD.

Isolated superior mesenteric artery dissection is a rare disease with unknown etiology. It has been reported that male, smoking, atherosclerosis, hypertension, hyperlipidemia, cystic necrosis of the middle artery, and Asian population might be related to the pathogenesis of SISMAD^[14-16]. Among which hypertension plays a crucial role in the development of arterial dissection. In this case, the patient had a history of hypertension for > 10 years. Furthermore, SISMAD was a rare acute abdomen with no specific clinical manifestations. The primary symptoms were sudden and severe abdominal pains, mainly epigastric pain^[17,18]. Our patient had intermittent pain in the upper abdomen without any specific positive signs. Currently, conservative treatment, endovascular surgery, interventional radiology, and open surgery are therapeutic modalities for patients with SISMAD, but there are no clear recommendations for the treatment of SISMAD^[15,16,19,20]. According to current guidelines, SISMAD treatment strategies are designed to control clinical symptoms and prevent complications such as intestinal necrosis. Most studies recommend initial treatment based on clinical presentation at admission. If SISMAD is found accidentally during CTA in other settings, the patient can be carefully observed and treated conservatively^[6,21]. Asymptomatic patients receiving conservative treatments do not need secondary interventions^[22]. In symptomatic SISMAD patients, EVT may be performed before mesenteric ischemia progresses if clinical symptoms persist. The reconstruction of SMA was significantly improved after EVT, especially for patients with Yun's IIb phenotype^[23].

Although CTA or CECT could clearly display and classify the type of superior mesenteric artery dissection, especially small distal branch vessels, there was an issue of contrast agent allergy as patients received a large radiation dose^[24]. Ultrasound was simple and easy to perform, radiation-free, and repeatable, and could clearly observe

the echoes of exfoliated intima, the positions of the rupture and the thrombosis, and hemodynamic changes could be displayed using Doppler ultrasound. Also, bedside examination could be performed when necessary^[12, 25]. It has also been suggested that early transition to ultrasound imaging exam should be considered in the follow-up of SISMAD patients, which may help to reduce radiation, contrast, and associated costs [17].

CONCLUSION

Therefore, based on this case report, it was suggested that ultrasound was a non-invasive examination method for routine screening of SISMAD, which would provide a clinical management basis for the diagnosis and treatment of the disease.

CT (orange arrow).

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