Case Report

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Superior mesenteric artery syndrome misdiagnosed and preceded by *Helicobacter pylori*-induced gastritis: a rare diagnosis with misleading features

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Introduction and importance: Superior mesenteric artery (SMA) syndrome is a rare morbid vascular disorder that is defined as the decrease in the aortomesenteric angle and the compression of the third part of the duodenum. This disorder mainly affects young adult females, and severe weight loss represents a leading predisposing factor.

Case presentation: The authors report the case of a 19-year-old male who was admitted to our hospital with a 3-month history of epigastric pain, nausea, and weight loss. Two months earlier, the patient was diagnosed with *Helicobacter pylori*-induced gastritis. Nevertheless, with complaints of severe headache and epigastric pain, the patient was admitted to our hospital for further investigations. Computed tomography (CT) scan with intravenous contrast injection was performed, and interestingly, the aortomesenteric angle was 19° accompanied by a compression of the third part of the duodenum, and a mild gastric dilatation. Accordingly, the diagnosis was confirmed as superior mesenteric artery syndrome.

Clinical discussion: In the authors' case, the non-specific clinical symptoms correlated with histopathological examinations led to the initial diagnosis of *Helicobacter pylori*-induced gastritis. Surprisingly, the lack of improvements led to performing CT scan, which confirmed the diagnosis of SMA syndrome. Subsequently, HP gastritis played a significant role in misleading and delaying the diagnosis.

Conclusion: The authors report the first case report from Syria of s superior mesenteric artery syndrome that was misdiagnosed and preceded by HP-induced gastritis, highlighting the crucial role of detailed clinical and radiological examinations in the diagnosis of challenging cases with morbid complications.

Keywords: gastric dilatation, gastritis, superior mesenteric artery syndrome

Introduction

Superior mesenteric artery syndrome (SMAS) is defined as the compression of the third segment of the duodenum between the SMA and the aorta, mainly decreasing the aortomesenteric angle[1]. The first case of this entity was described by Von Rokitansky in 1842 followed by 75 detailed presentations by Wilkie in 1927[2,3]. This syndrome received several names over the years including Wilkie syndrome, aortomesenteric compass syndrome, duodenal ileus, and Cast syndrome[1]. This rare disorder is diagnosed in ~0.1–0.3% of population with a predominance in young females.

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HIGHLIGHTS

- Superior mesenteric artery (SMA) syndrome is a rare morbid vascular disorder.
- This rare disorder is diagnosed in ~0.1–0.3% of population.
- This case of SMA syndrome was preceded and misdiagnosed by *Helicobacter pylori*-induced gastritis.

Extreme weight loss due to anorexia and other eating disorders represents a major risk factor. Other risk factors include malignancy, malabsorption syndromes, trauma, and neurologic disorders[1,4]. The diagnosis of SMA syndrome represents a challenge due to the non-specific clinical symptoms including epigastric abdominal pain, nausea, vomiting, emesis, and weight loss, which are also reported in other gastrointestinal disorders including helicobacter-induced gastritis[5,6]. Herein, we report the first case report from Syria of a superior mesenteric artery syndrome that was preceded and misdiagnosed by *Helicobacter pylori*-induced gastritis and gastric dilatation.

Case presentation

We report the case of a 19-year-old male who presented to our hospital with a 3-month history of epigastric pain, nausea, and

weight loss. Medical and surgical history were unremarkable, whereas family history included gastric adenocarcinoma that was diagnosed in his grandfather. The patient was a smoker non-alcoholic with a BMI of 19. Two months earlier, the patient presented to another clinic where he was diagnosed with chronic bacterial infection according to the aforementioned symptoms, and antibiotics were prescribed for one month. However, no improvements were reported. Therefore, upper gastrointestinal endoscopy was performed, and histopathological examinations of the gastric biopsies confirmed the diagnosis of *Helicobacter pylori*. Subsequently, the patient was put on the treatment regimen for HP for 30 days. Nevertheless, with complaints of severe headache and epigastric pain, the patient was later admitted to our hospital for further investigations. Laboratory examinations were within normal limits. Abdominal computed tomography (CT) scan with intravenous contrast injection was conducted. Interestingly, CT scan demonstrated a severe narrowing between the axis of the abdominal aorta and the superior mesenteric artery, with an aortomesenteric angle of 19° (Fig. 1), and a shortening of the distance between the aorta and the SMA accompanied by a compression of the third part of the duodenum, and a mild gastric dilatation (Fig. 2). Accordingly, the diagnosis was confirmed as a superior mesenteric artery syndrome, and due to the mild symptoms, conservative treatment strategies were recommend, and the patient is currently gaining weight in order to remove the narrow angulation. Our work has been reported in line with the SCARE 2023 criteria[7].

Discussion

Superior mesenteric artery syndrome is a rare morbid vascular disorder that usually affects young adult females with a median age of 23 years old[1], whereas in our case it was diagnosed in a 19-year-old male. Massive perivascular fatty tissue reduction due to anorexia, malignancies, spine surgeries, trauma, burns, and eating disorders represents a major predisposing factor, as it results in the reduction of the angle between the aorta and the mesenteric artery to less than 22°[8]. In our case, the angle was 19° on CT scan in the absence of the aforementioned risk factors.

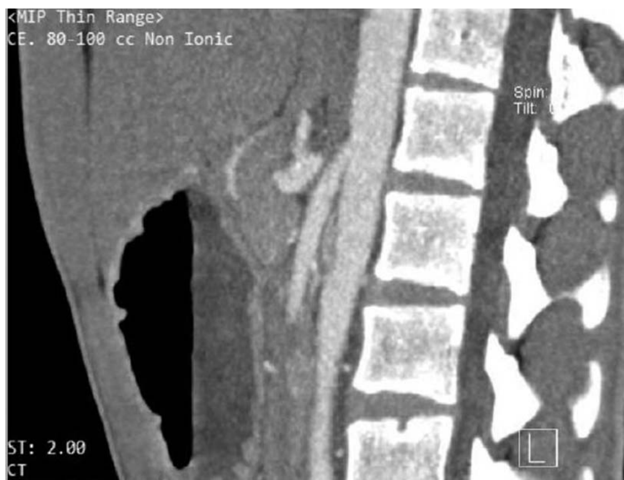

Figure 1. Computed tomography scan demonstrated a severe narrowing between the axis of the abdominal aorta and the superior mesenteric artery, with an aortomesenteric angle of 19°.

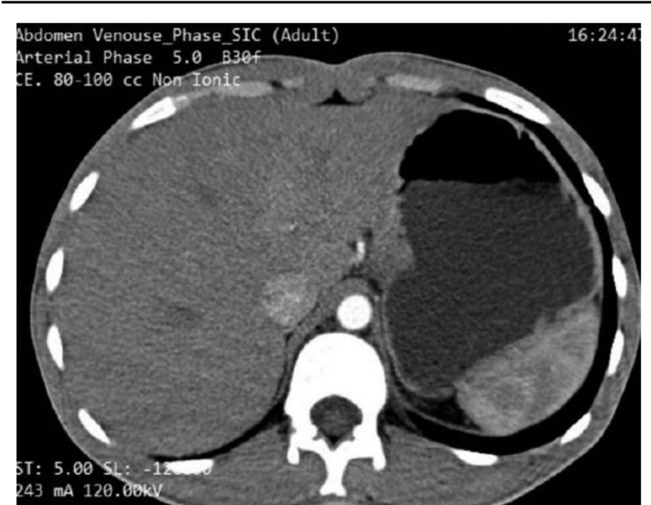

Figure 2. Computed tomography scan demonstrated a mild gastric dilatation.

Studies reported mild non-specific gastrointestinal symptoms in patients with SMA syndrome. These symptoms include epigastric pain that decreases in the lateral decubitus position, nausea, vomiting, weight loss, and abdominal distention. In more severe cases, the increased obstruction could result in morbid life-threating complications including severe gastric dilataion, acute pancreatitis, aspiration pneumonia, emphysema, arrhythmia, hypovolemic shock, and sudden death[1,8,9].

In our case, the primary diagnosis was *Helicobacter pylori*-induced gastritis according to clinical symptoms and histopathological examination of the gastric biopsies. Surprisingly, the lack of improvements despite treatment led to performing CT scan, which revealed the narrowing of the angulation between the aorta and mesenteric artery with an angle of ~19, accompanied by a compression of the fourth segment of the duodenum, and a mild gastric dilatation, confirming the diagnosis of SMA syndrome. Interestingly, although HP gastritis played a significant role in misleading and delaying the diagnosis of SMA syndrome, we couldn't confirm whether the gastric dilatation was a cause or a consequence

Limited studies have reported the association between SMA syndrome and massive gastric dilatation, mainly in patients with anorexia and eating disorders[10–13]. However, in our case, the gastric dilatation was mild in a patient with no predisposing factors. In 2008, Hashimoto *et al.*[14] described the first case report of a 14-year-old male who developed SMA syndrome after gastric dilatation induced by HP gastritis, and similar to our case —which represents to our knowledge the first case report from Syria and the second case report in general- the researchers couldn't confirm whether the dilatation was a cause or a consequence of SMA syndrome. However, in the aforementioned case, the patient also developed bilious vomiting, referring to a possible role of SMA syndrome in compressing and dilating the stomach and duodenum[14,15].

Radiologic examination plays a significant role in the diagnosis of SMA syndrome, mainly in the presence of misleading clinical symptoms. Examinations include abdominal X-ray that demonstrates gastroduodenal distention, abdominal ultrasound, CT scan, endoscopic ultrasonography (EUS), and MRI. CT scan possesses a high sensitivity in measuring the aortomesenteric angle, which ranges between 35 and 66°, in addition to assessing

the distance between SMA and the aorta, which should be less than 8mm to confirm the diagnosis of SMA syndrome[1,4,6].

Conservative management is the standard initial treatment modality in most patients with SMA syndrome. Management strategies include decompression of the duodenum and the stomach through medications, nasal gastric tube suction, and sitting in the left lateral position. Also, gaining weight has demonstrated promising results in increasing the aortomesenteric angle and decreasing the compression. In severe cases, patients could be scheduled for surgical treatment including gastroduodenostomy, EUS-guided gastrojejunostomy, anterior transposition of the third duodenal segment, division of Treitz ligament, and duodenal lowering[1,4].

Conclusion

We aimed to report the first case report from Syria of s superior mesenteric artery syndrome that was misdiagnosed and preceded by HP-induced gastritis, highlighting the crucial role of detailed clinical and radiological examinations in the diagnosis of challenging cases with morbid complications.

Ethical approval

Not required for case reports.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Not applicable.

Author contribution

All authors participated in drafting the article.

Conflicts of interest disclosure

The authors declare no conflict of interest.

Research registration unique identifying number (UIN)

Not applicable.

Guarantor

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Data availability statement

Datasets generated during and/or analyzed during the current study are available upon reasonable request.

Provenance and peer review

Not commissioned, externally peer-reviewed.

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