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Superior Mesenteric Artery Syndrome in a Young Military Basic Trainee

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ABSTRACT We report the case of a 19-year-old military trainee that presented to the emergency department with a 3-week history of diffuse abdominal pain, 1 to 2 hours postprandially. The timing, onset, quality, and location of her pain was concerning for intestinal angina. Her serum chemistry, hematology, and liver function tests were normal. The radiologist's interpretation of the computed tomography angiogram of the abdomen was an abnormally narrow takeoff angle of the superior mesenteric artery (SMA) from the aorta near the third portion of the duodenum. She was diagnosed with SMA syndrome and received additional evaluation and treatment by her gastroenterologist and surgeon. SMA syndrome is rare and can cause bowel obstruction, perforation, gastric wall pneumatosis, and portal venous gas formation. Computed tomography angiography can be used to promptly diagnose this syndrome in the emergency department.

INTRODUCTION

Superior mesenteric artery (SMA) syndrome is a rare disease with only 400 documented cases in the English literature since 1980.[1] In most individuals, the SMA branches from the abdominal aorta at an angle of 38° to 56°. The third portion of the duodenum passes between the SMA and the abdominal aorta.[2] The angle of SMA takeoff can be decreased by loss of retroperitoneal fat, resulting in obstruction at the level of the third portion of duodenum as it is distended by food.[3] It most commonly occurs in young, thin individuals.[4] There have been few reports of this syndrome in the emergency department (ED), and if undiagnosed, weight loss, loss of appetite, vomiting, abdominal pain, loss of activity, bowel obstruction, and possible perforation can happen.[5] There appears to be very few reports of SMA syndrome diagnosed in the ED, and only 3 cases were reported in military trainees.[6,7] We report the case of a young military trainee with SMA syndrome diagnosed in the ED.

CASE REPORT

A 19-year-old female military trainee was presented to the ED with intermittent dull, diffuse (although lower quadrants greater than upper), postprandial abdominal pain onset 1 hour after meals and lasting approximately 30 to 60 minutes per episode for the preceding 2 to 3 weeks that had acutely worsened and become associated with nausea and vomiting during physical training. She lived a sedentary lifestyle before entering basic training. During the initial 2 weeks of training, she had a 20-lb weight loss. She then developed postprandial pain, which progressively led to an additional 15-lb weight loss. She had previously attempted several over-the-counter antacid therapies. A recent gall bladder ultrasound was normal. On arrival to the ED, her vital signs were normal and she was not having acute distress. On physical examination, she had tenderness to palpation of the epigastric and periumbilical regions. The rest of her physical examination was normal. She was administered oral liquid aluminum hydroxide/magnesium hydroxide/simethicone mixed with viscous lidocaine and oral ranitidine, which did not relieve her nausea or pain.

Her serum renal function panel, complete blood count, and liver enzymes were normal. Her chest radiograph was interpreted as normal. Her clinical history of discomfort out of proportion to exam was concerning for intestinal angina. We obtained a computed tomography (CT) angiogram of the abdomen and surgical consultation. The CT demonstrated a narrow aortomesenteric angle (Fig. 1) and occlusion of the third portion of the duodenum, with proximal gastric and duodenal dilatation consistent with SMA syndrome.

On re-examination, she was improved and in consultation with the surgeon, she was discharged from the ED with nutritional supplementation. She was instructed to consume meals in the prone position to offload pressure from the SMA. Gastroenterology performed an esophagogastroduodenoscopy with no notable findings. However, she continued to experience pain, food avoidance, and weight loss and was referred to both bariatric and vascular surgery specialists for consideration of operative repair. She declined operative intervention and was discharged from the military after 6 months.

DISCUSSION

SMA syndrome is often misdiagnosed, and delays in diagnosis can lead to significant morbidity. One case report noted severe bowel obstruction, bezoar formation, gastric wall pneumatosis, and portal venous gas formation because of delay in diagnosis.[5] Our patient demonstrated morbidity associated with delays in diagnosis including continued weight loss, loss of appetite, vomiting, abdominal pain, loss of activity tolerance, and removal from training. Multiple evaluations by primary care providers with continued worsening of symptoms coupled with improper therapy led to

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FIGURE 1. CT abdomen/pelvis angiogram demonstrating narrow aortomesenteric angle of 14.4° (normal = 38–56°) and compression of the third portion of the duodenum.

further cycles of food avoidance, weight loss, and increased discomfort. SMA syndrome has an unknown incidence. It most commonly appears in young, thin individuals.[1,2,8] The lack of retroperitoneal fat leads to an abnormally acute angle of takeoff of the SMA from the aorta, resulting in compression and obstruction of the duodenum between the SMA and the abdominal aorta because of distention by food after eating.[9] The normal aortomesenteric angle is 38° to 56°; our patient was noted to have a takeoff of <15°, likely caused by her recent, sudden weight loss. Transient cases of SMA syndrome occur in patients with severe anorexia nervosa.[10] Severe cases may require surgery or parenteral feeding because of food avoidance leading to further loss of retroperitoneal fat. Treatment is usually conservative, via nutritional supplementation.[11] Positional eating techniques may be effective and include eating food in the prone, knee-chest, or lateral decubitus position to offload pressure of the SMA from the duodenum. Some case studies describe improvement of symptoms with promotility agents, such as metoclopramide.[3]

Limitations are that of a typical case report. Our patient's pain may have been because of another, undiagnosed disease. However, we obtained the diagnosis by CT scan, her symptoms were consistent with SMA syndrome, and after several months no other disorder was diagnosed.

In conclusion, SMA syndrome is rare and should be considered in the ED patients with recent rapid weight loss (including basic military trainees), who present with postprandial abdominal pain. Abdominal CT angiography is useful to diagnose this disorder.

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