

Superior Mesenteric Artery Syndrome in Patients with Snake Bites

✉ Nguyen Dang Duc¹, ✉ Nguyen Phuong Sinh², ✉ Lam Nguyen Hong Anh²

¹Bach Mai Hospital, Poison Control Center, Hanoi, Vietnam

²Thai Nguyen University of Medicine and Pharmacy, Department of Vice Director, Thai Nguyen, Vietnam

Abstract

Superior mesenteric artery (SMA) syndrome is a rare cause of high section intestinal obstruction. SMA syndrome is characterized by compression of the 3rd duodenum segment due to a narrowing of the distance between the SMA and abdominal aorta. The main clinical signs of SMA syndrome are high intestinal obstruction, such as postprandial vomiting, epigastric pain, early abdominal fullness, and indigestion. Abdominal computed tomography plays an important role in diagnosis. There are two main methods of treating SMA syndrome: conservative and surgical treatment. We report a clinical case of a 18-year-old male patient admitted to the hospital because of a Bungarus bite in the second hour. On the 12th day of treatment, the patient developed diarrhea that lasted until the 24th day of treatment. On the 25th day of treatment, the patient lost 16 kg (from 56 down to 40). The patient had symptoms of vomiting after eating, indigestion, and epigastric pain. On abdominal computed tomography, the angle created by the SMA and the abdominal aorta was 17 degrees, and the distance between the two arteries was 3.8 m. Light dilation and stagnation of the D1 and D2 segments of the duodenum with gas and watery levels inside segments D3 and D4 of the duodenum were observed, and this segment was constricted. This patient was diagnosed with SMA syndrome due to Bungarus snake bites. Currently, the patients are treated with intravenous feeding through a jejunal tube to each other. Finally, the patient was discharged and returned to his home on the 45th day of treatment. We reported this clinical case to introduce the clinical and paraclinical signs, diagnoses, and treatment methods for Patients with SMA syndrome.

Keywords: Superior mesenteric artery syndrome, Bungarus snake bites, weight loss

Introduction

Superior Mesenteric Artery (SMA) syndrome is a rare condition that causes constriction of the third segment of the duodenum because it is clamped between the SMA and abdominal aorta. SMA syndrome was first described by Carl Freiherr von Rokitansky in 1842 and was first published by Wilkie; thus, it was also known as Wilkie syndrome (1,2). Anatomically, the 3rd segment of the duodenum passes between the SMA and abdominal aorta. The SMA is surrounded by fatty and lymphatic tissue. Normally, the angle between the SMA and aorta is 38-65 degrees, and the distance between these two arteries is usually 10-28 mm. In SMA, the angle between the SMA and the aorta is narrow less than 20 degree, which can potentially cause duodenal compression. SMA syndrome is often found in groups of patients with significant weight loss, such as those with spinal injuries, paraplegia, prolonged bed immobilization, and burns, which will lead to the

loss of fat layer of the mesentery, or in groups of patients with abnormal anatomy (congenital or acquired). Clinically, the patient will have symptoms of high intestinal obstruction, which may be acute or gradually progressive (3). Patients with mild obstruction may only experience epigastric pain after meals and early feeling of abdominal fullness, whereas patients with severe obstruction may experience vomiting of bile, epigastric pain, indigestion, and severe weight loss. Abdominal computed tomography is the most important paraclinical test that can be used to diagnose SMA syndrome. On abdominal computed tomography, duodenal obstruction can be observed in segment D3, and the angle between the aorta and SMA is less than 25 degree, And the distance between these two arteries is less than 8 mm (3). There are two main methods to treat SMA syndrome: conservative and surgical. Method of conservative treatment include decompression of the gastrointestinal tract, electrolyte balance, and nutritional support. Nutritional support will provide nutrition through a



Corresponding Author: Nguyen Phuong Sinh, Thai Nguyen University of Medicine and Pharmacy, Department of Vice Director, Thai Nguyen, Vietnam
Phone: +0911596888 **E-mail:** sinhnnp.y@gmail.com **ORCID ID:** orcid.org/0009-0005-4200-0134

Cite this article as: Duc ND, Sinh NP, Anh LNH. Superior Mesenteric Artery Syndrome in Patients with Snake Bites. Eurasian J Emerg Med.

Received: 24.07.2024
Accepted: 16.09.2024



©Copyright 2024 The Emergency Physicians Association of Turkey / Eurasian Journal of Emergency Medicine published by Galenos Publishing House.
Licenced by Creative Commons Attribution-NonCommercial-NoDerivatives (CC BY-NC-ND) 4.0 International License.

jejunal tube and intravenous nutrition. There are many surgical treatment options for SMA syndrome if conservative treatment is not effective. When the surgical treatment method is indicated for treatment. Surgical treatment consists of strong's surgery, gastrojejunostomy, and anastomosis surgery of the duodenum jejunum. In this clinical case, an 18-year-old male patient was diagnosed with SMA syndrome after bite of Bungarus snakes. This patient had clinical and paraclinical signs that conform with the characteristic of SMA syndrome.

Case Report

An 18-year-old male patient with a strong medical history was admitted to the poison Control Center of Bach Mai Hospital, Hanoi, Vietnam because of a Bungarus snake bite in the second hour with clinical manifestations of ptosis. The pupils of the two besides were dilated 5 mm and did not have a light reflex. Quadrapedal weakness with muscle strength 0 per 5. the patient was treated with an endotracheal tube and mechanical ventilation. From the first day to the eleventh day of treatment, upper limb muscle strength improved from 0 per 5 to 2 per 5 and lower limb muscle strength improved from 0 per 5 to 3 per 5. From the 12th day to 24th of treatment, upper limb muscle strength improved from 2 per 5 to 3 per 5 and lower limb muscle strength improved from 2 per 5 to 4 per 5. The patient presented with diarrhea (up to 10 times per day) at the 12th day of treatment, and his weight dropped from 56 kg (when he admitted to the hospital) to 40 kg at the 24th day of treatment. At the 25th day of treatment, the patient had epigastric pain after eating, vomiting bile, indigestion, and a lot of residual stomach fluid. Clinical signs of the patient who was bitten by Bungarus snake that were improved clearly. When we thought to SMA syndrome and the patient was taken computed tomography of the abdomen with contrast injection, the result of the patient was detected having images of SMA syndrome with angle between the SMA and the abdominal aorta was about 17 degrees, the distance between these two arteries was 3.8 millimeter (Figure 1), mild dilation, fluid retention in the stomach and the D1, D2 segment of duodenum, the D3, D4 segment of duodenum had water and gas inside each other constriction moreover the D3, D4 segment of duodenum didn't have wall thickening or fat infiltration (Figure 2). The patient was treated conservatively with jejunal tube feeding and intravenous nutrition. Currently, on the 38th day of treatment, upper and lower limb muscle strength of the patient was 5 per 5, finished ptosis, and the pupils of the two besides were dilated 4 mm. and did not have a light reflex. The patient was still fed through a jejunal tube with relieved vomiting and epigastric pain, and ate well every meal but weight of the patient still had not improved (from 40 kg down to 38.6 kg). The patient was treated continuously one weak. On the 45th day of treatment,

the weight of the patient improved to 41 kg, and the patient was discharged and returned to his house.

Discussion

SMA syndrome is characterized by high-section intestinal obstruction caused by compression of the third segment of the duodenum between the SMA and aorta. The most common risk factor of SMA syndrome is weight loss, but SMA syndrome can also occur in patients with abnormal anatomy (congenital or acquired). The diagnosis of SMA syndrome is difficult because SMA syndrome is rare in clinics, its symptoms do not always correlate well with anatomical abnormalities on radiography, and their symptoms may not be completely resolved after treatment (3,4). Furthermore, the diagnosis of SMA syndrome may be confused with motility disorders of the intestine or

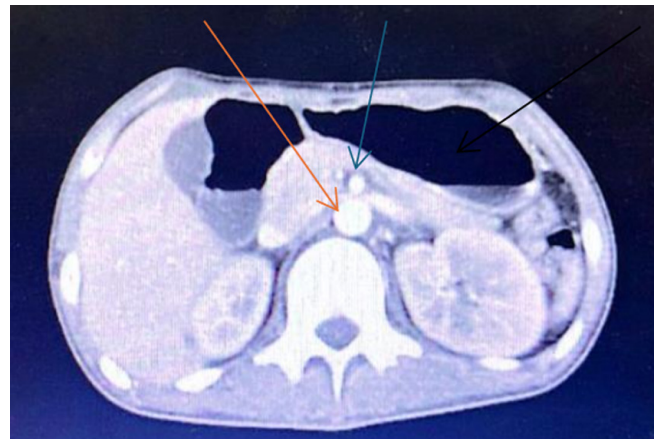


Figure 1. Computed tomography image of the abdomen of superior mesenteric artery syndrome in patient with snake bites

Red Arrow is Abdominal Aorta, Blue Arrow is Superior Mesenteric Artery, Black Arrow is Stomach Dilated



Figure 2. Computed tomography image of the abdomen of superior mesenteric artery syndrome in patient with snake bites

Red Arrow is Abdominal Aorta, Blue Arrow is Superior Mesenteric Artery, Black Arrow is Stomach Dilated

anatomical abnormalities of the duodenum (5). A diagnosis of SMA syndrome is thought and made paraclinical test to definitive diagnosis when the patient has clinical features suggesting high intestinal obstruction and on images of abdominal computed tomography showing narrowing of the angle between the SMA and the aorta and distance between those two arteries. Methods for treating SMA syndrome include conservative or surgical methods. Conservative treatment helps reduce gastrointestinal pressure, correct electrolyte disorders, and provide nutritional support. If conservative method is failure when surgical method is indicated to treatment. There are many different surgical methods for treating SMA syndrome, but currently, there are 3 main methods that consist of the strong method, gastrojejunostomy, and duodenojejunostomy. Our patient had risk factors which can be considered to the SMA syndrome, Such as prolonged bed immobilization, significant weight loss (losing 16 kg in 24 days of treatment), and clinical symptoms were highly suggested of SMA syndrome, such as vomiting bile, severe epigastric pain after eating, indigestion, images of abdominal computed tomography for SMA syndrome, such as angle between the SMA and the abdominal aorta was 17 degrees, the distance between these two arteries was 3.8 mm, and images of water and gas level in segment D1, D2 Of the duodenum, and segments D3 and D4 were constricted (6,7). Currently, the patient is being treated with the conservative method by feeding through a jejunal tube and intravenous nutrition. His clinical condition has improved at the 38th day of treatment, such as relief from vomiting, relief from abdominal pain, and ability to digest every meal. However, the weight of the patient did not improve at this time. It must come to the forty-fifth day of treatment, the weight of the patient was improved to 41 kg, and the patient was discharged and returned home.

Conclusion

SMA syndrome is a rare disease that is difficult to diagnose because its clinical symptoms are non-specific and sometimes do not match those of lesions on imaging (8). Abdominal computed tomography has value in determining diagnosis. Early diagnosis of SMA syndrome will help patients avoid complications, such as electrolyte disorders, gastric perforation, exhaustion, and death.

Methods of treatment can include conservative and surgical methods in which the surgical method is considered in the treatment if the conservative method fails.

This is an interesting and the first clinical case of SMA syndrome recorded in a patient who was bitten by a Bungarus snake in vietnam.

Footnote

Informed Consent: Consent form was filled out by all participants.

Authorship Contributions

Surgical and Medical Practices: N.D.D., Concept: L.N.H.A, Design: N.P.S., Data Collection or Processing: L.N.H.A, Analysis or Interpretation: N.P.S., Literature Search: N.D.D., Writing: N.D.D.

Conflict of Interest: no conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Dorph MH. The cast syndrome; review of the literature and report of a case. *N Engl J Med*. 2013;243:440-2.
2. Wilkie DP. Chronic duodenal ileus. *Br J Surg*. 1921;9:204. https://www.researchgate.net/publication/228036468_Chronic_duodenal_ileus
3. Cohen LB, Field SP, Sachar DB. The superior mesenteric artery syndrome. The disease that isn't, or is it? *J Clin Gastroenterol*. 1985;7:113-6.
4. Ylinen P, Kinnunen J, Höckerstedt K. Superior mesenteric artery syndrome. A follow-up study of 16 operated patients. *J Clin Gastrpenterol* 2011;11:386-91.
5. Hines JR, Gore RM, Ballantyne GH. Superior mesenteric artery syndrome. Diagnostic criteria and therapeutic approaches. *Am J Surg. Am J Surg*. 1984;148:630-2.
6. Merrett ND, Wilson RB, Cosman P, Biankin AV. Superior mesenteric artery syndrome: diagnosis and treatment strategies. *J Gastrointest Surg*. 2009;13:287-92.
7. Ozkurt H, Cenker MM, Bas N, Erturk SM, Basak M. Measurement of the distance and angle between the aorta and superior mesenteric artery: normal values in different BMI categories. *Surg Radiol Anat*. 2007;29:595-9.
8. Sapkas G, O'Brien JP. Vascular compression of the duodenum (cast syndrome) associated with the treatment of spinal deformities. A report of six cases. *Arch Orthop Trauma Surg* (1978). 1981;98:7-11.