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| Case Report |
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Superior mesenteric artery syndrome caused by maintaining anteflexion posture—a case report

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Abstract

A 24-year-old man complained post-prandial nausea and vomiting. The symptoms appeared after he started his work to develop computer games and he tended to slouch or lean forward to view work the monitor. Radiological and ultrasonic findings showed duodenal obstruction due to narrowing of the angle between the superior mesenteric artery (SMA) and the aorta, and a diagnosis of SMA syndrome was made. His habit to sit in an anteflexion posture for a long time was noticeable as a major trigger. Compression against the outside of the abdominal wall by the waistband was considered to be involved in the pathogenesis.

(Key words: superior mesenteric artery syndrome, duodenal obstruction, high intestinal obstruction, anteflexion)

Introduction

Superior mesenteric artery syndrome (SMAS) is caused by vascular compression of the third part of the duodenum between the superior mesenteric artery (SMA) and the aorta. The mechanism of occurrence is a vicious circle. When those who have a predisposition of narrow SMA-aorta angle suffer from further decrease in the angle, duodenal obstruction is caused. Oral intake becomes less and the fat around the aorta is lost. This induces further decrease in the SMA-aorta angle, resulting in advanced duodenal obstruction¹⁻³. One of the known triggers of SMAS is marked weight loss associated with severe wasting diseases such as cancer, burns, severe injuries, dietary disorders and postoperative states. The other typical triggers are deformity of the spine and application of body casts in the treatment of scoliosis or vertebral fracture^{2,4,6}. Subjective symptoms of SMAS are early fullness, nausea and vomiting which are aggravated by eating and relieved by bending forward or lying on the left side¹⁻³. Although SMAS is a rare disease, failure in recognition results in malnutrition and, in the worst case, the disease is fatal due to massive aspiration of gastric reflux³⁻⁵. The early diagnosis of the disease with identification of the triggers is essential. This is the report on a patient with SMAS caused by maintaining anteflexion posture.

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Case report

A 24-year-old man suffered from post-prandial nausea and vomiting for 4 weeks and visited our hospital. He stated that the onset of the symptoms was sudden, and that they recurred but were relieved after vomiting. The initial diagnosis was gastritis and the patient was recommended liquid diet with a prescription of Metoclopramide. It brought a temporary relief but immediately after he started normal diet, the symptoms recurred and he was hospitalized. He lost 7kg of body weight after the symptoms first appeared, until then he had not experienced weight loss. A few days before the beginning of the symptoms, he began to work to develop computer software games. He continued working in a slouchy posture resting his elbows on his knees for 8-10 hours per day. There were no changes in his dietary habits. He had no past history of the similar symptoms or eating disorders before. He preferred to fasten his belt tightly.

The patient's weight was 49kg and height 175cm (body mass index 19). He had no spinal deformity. There were no abnormal findings in laboratory data. Abdominal X-ray demonstrated 'double bubble sign' which means air bubbles both in the stomach and in the right half of the duodenum, indicating high intestinal obstruction. Gastrointestinal cineradiography using meglumine sodium amidotrizoate showed to-and-fro movement and duodenal dilatation proximal to the straight-line obstruction of the third part of the duodenum (Fig.1). The media was found remaining in the stomach in X-ray examination on the following day. In abdominal ultrasonography (US), a measurement of the SMA-aorta angle was 8° (Fig.2). A contrast-enhanced computed tomography (CT) scan demonstrated the distance between the SMA and the aorta at the third portion of the duodenum of 3mm. Upper gastrointestinal endoscopy and enhanced CT showed no mass lesion in the duodenum.

On the basis of these findings, a diagnosis of SMAS was established. After fasting for a week, a mild obstruction was seen in cineradiography but passage of the contrast media was smooth. He started liquid diet and was recommended to rest lying on his left side after meals. The clinical course was favorable after that. As maintaining the anteflexion posture and the tight



Fig.1 Upper gastrointestinal cineradiography. There is a vertical cutoff of contrast media flow in the third part of the duodenum with the dilatation of the proximal duodenum.

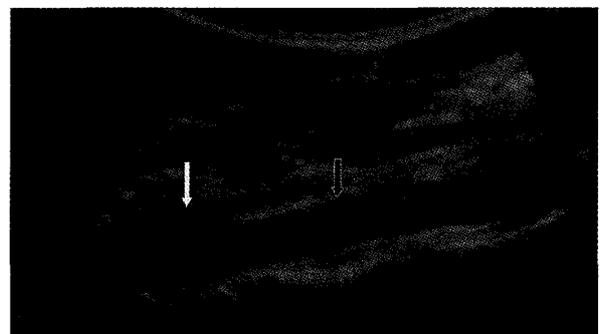


Fig.2 Abdominal ultrasonography. Note the narrow angle (8°) between the superior mesenteric artery (white arrow) and the abdominal aorta (black arrow).

waist belt were considered to be the primary triggers, we advised him to change the habit. No problem has been reported for 6 months since he left the hospital.

Discussion

In order to prevent the recurrence of SMAS, it is important to determine and eliminate triggers of the disease. In the present case, working in the poor posture for prolonged periods of time was considered to be the key factor. Symptoms of SMAS are generally improved by an anteflexion posture, lying prone or on the left side, because those positions can release the narrowing of the SMA-aorta angle¹⁻³. It should be noted, however, that there are isolated examples; one patient got symptoms worse in anteflexion³, and another patient had a relief of duodenal obstruction in the right decubitus that was observed in cineradiography⁷. The occurrence of SMAS in our particular case can be attributed to the compression against the outside of the abdominal wall by the waist belt. The patient used to fasten his belt tightly and, when he bent down during his work, the abdominal wall was strongly pressed. Thus the narrowing of the SMA-aorta angle was induced.

With regard to SMAS, there is a report on over-diagnosis of this disease¹. To make a diagnosis of SMAS, upper gastrointestinal cineradiography is an established diagnostic technique. The criteria in the above report for diagnosis were as follows: a) dilatation of the first and second part of the duodenum with or without gastric dilatation; b) abrupt vertical and oblique compression of the third part of the duodenum; c) antiperistaltic waves of barium proximal to the obstruction; d) delay in gastrointestinal transit; and e) relief of obstruction after postural changes. The report described that when data of SMAS patients were reviewed on the basis of these strict criteria, only 6 of 44 patients fulfilled them. As a result of our review, data on the present case fulfilled all of the above criteria and the accuracy of diagnosis was confirmed.

Findings obtained by abdominal US and CT are of major diagnostic value. Measurements of the SMA-aorta angle and distance in healthy people were 25°-60° and 10-28mm, respectively, whereas in patients with SMAS, both parameters were significantly smaller; 6°-15° and 2-8mm⁸. Angiographic findings were equivalent to them in evaluating the angle⁶. The measured values in our patient were 8° and 3mm and again the appropriateness of the diagnosis was confirmed.

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長時間の前傾姿勢が契機となり発症した 上腸間膜動脈症候群の1例

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要 約

症例は24歳男性。食後の嘔気、嘔吐を主訴として受診した。それらの症状はゲームソフト開発会社に就職し、モニターを見ながら行なう長時間の前屈姿勢での作業をするようになってから出現した。上部消化管造影では上腸間膜動脈と腹部大動脈の分岐部と思われる部位での十二指腸水平脚の直線状な途絶、造影剤の逆蠕動などの所見を認め、上腸間膜動脈症候群と診断した。腹部超音波検査では腹部大動脈と上腸間膜動脈の角度は8°と狭小化しており、その診断の

裏づけとなった。本症例では元々ズボンのベルトをきつく巻く習慣があった。前屈姿勢ではベルトによる腹壁への圧迫が更に強くなり、その状態が長時間持続したことが本症を発症した契機となったと思われた。絶食、補液で症状は消失し、食事再開後も再燃はなかった。長時間の前屈姿勢を止めるように指導したところ、6ヶ月経過した現在でも本症の再燃は認めていない。

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