Diagnosis and treatment of superior mesenteric artery compression syndrome complicated with gastroesophageal reflux disease

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To the Editor: Superior mesenteric artery compression syndrome (SMAS) is a relatively rare disease caused by the narrowing of the angle between the abdominal aorta and the superior mesenteric artery, thus compressing the third segment of the duodenum.[1] SMAS is mainly characterized by post-prandial epigastric pain, abdominal distention, nausea, vomiting, anorexia, and weight loss. Conservative approaches, including nutritional support, are effective, although approximately 75% of patients still require surgical treatment.[2]

Gastroesophageal reflux disease (GERD) is a chronic gastrointestinal disease, which involves the excessive stomach and duodenal contents being expressed into the esophagus, causing a series of esophageal and extraesophageal symptoms, as well as other complications, including reflux esophagitis, Barrett esophagus, and reflux cough.[3] SMAS is closely related to GERD. Our previous studies have shown that in some cases, SMAS causes cardia reflux esophagitis in 11 cases, of which seven cases were reflux gastritis in 16 cases and bile reflux gastritis in 11 cases, of which seven cases were complicated with reflux esophagitis. Among the 30 cases that underwent an X-ray barium meal examination of the digestive tract, all cases exhibited a “pencil-shaped” indentation of the horizontal segment of the duodenum in the supine position, delayed passage of barium through the duodenum, dilation of the proximal intestinal tube, and “pendulum” peristalsis [Figure 1A]. Eighteen cases also exhibited gastropathy. Abdominal computed tomography-enhanced scanning showed that the angle between the abdominal aorta and the superior mesenteric artery was between 10° and 22° [Supplementary Figure 2, http://links.lww.com/CM9/A489].

Twelve patients who received only drug treatment (gastrointestinal motility drugs, gastric mucosal protectants) and nutritional support demonstrated relief from their symptoms. Laparoscopic Toupet fundoplication combined with the ligament of Treitz release (LOTTR) was performed in the remaining 18 patients [Supplementary Figure 3, http://links.lww.com/CM9/A490]. The surgery duration was 65.0 min (45.0, 100.0 min), 1 8c a s e s , h e a r t b u r ni n 1 7 c a s e s , a n d a c i dr e g u r g i t a t i o ni n 1 4p a t i e nt s h o w e d a c i dr e

1.3 mmHg (∼17.0, 12.8 mmHg) and an average LES resting pressure of 4.7 mmHg (∼11.2, 17.3 mmHg). Gastroscopy revealed reflux esophagitis in 16 cases and bile reflux gastritis in 11 cases, of which seven cases were complicated with reflux esophagitis. Among the 30 cases that underwent an X-ray barium meal examination of the digestive tract, all cases exhibited a “pencil-shaped” indentation of the horizontal segment of the duodenum in the supine position, delayed passage of barium through the duodenum, dilation of the proximal intestinal tube, and “pendulum” peristalsis [Figure 1A]. Eighteen cases also exhibited gastropathy. Abdominal computed tomography-enhanced scanning showed that the angle between the abdominal aorta and the superior mesenteric artery was between 10° and 22° [Supplementary Figure 2, http://links.lww.com/CM9/A489].

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and the intra-operative blood loss was 38.0 mL (26.0, 40.0 mL). No complications occurred during the surgeries, such as subphrenic abscess, shock, or death. The post-operative hospital stay was 7.0 days (5.0, 19.0 days). After 2 years of follow-up, the patients' BMIs were significantly increased to an average of 20.8 kg/m² (18.0, 24.7 kg/m²).

Following surgery, the X-ray barium meal examination of the digestive tract revealed normal passage of barium through the duodenum. (Figure 1B). The scores for anorexia, heartburn, acid regurgitation, abdominal distension, nausea, vomiting, and belching were significantly lower than the scores taken before surgery (P < 0.05, respectively; Supplementary Table 3, http://links.lww.com/CM9/A491). According to the curative effect evaluation criteria,[4] the total effective rate was 100%, with 17 cases (57%) that were cured and 13 cases (43%) determined to be effective.

The possible mechanisms of GERD caused by SMAS are as follows: First, duodenal obstruction caused by SMAS results in food retention and frequent reverse peristalsis in the proximal intestine. Consequently, there is a gradual increase in the pressure inside the duodenum, stomach, neutralizing gastric acid, and promoting weak acid reflux. The suggested treatment strategies for SMAS combined with GERD are as follows: Drug therapy and other non-invasive approaches are the first choices, especially for patients with mild symptoms. The treatment methods include diet adjustment, posture changes, the use of proton pump inhibitors, and the use of gastric mucosal protectants along with nutritional support. When such conservative treatments prove ineffective, surgical options are warranted, based on the individual patient’s clinical situation. The commonly used surgical methods that achieve favorable therapeutic outcomes include open or laparoscopic gastrojejunostomy, duodenojejunostomy, duodenoejunostomy combined with LOTR, LOTR, and duodenal vascular anterior transposition. However, gastrojejunostomy, duodenoejunostomy, and duodenal vascular anterior transposition can cause significant trauma, which results in further complications.[5] On the other hand, LOTR can relieve duodenal compression without changing the digestive tract structure, which is relatively safe and has fewer complications.[6] Therefore, LOTR was selected for use in this study. However, for patients with SMAS complicated with GERD and who exhibit obviously decreased LES, LOTR alone might not be enough for therapeutic effect. Since Toupet 270 degrees fundoplication is commonly recommended for patients with GERD, LOTR combined with fundoplication could simultaneously resolve SMAS and GERD. The efficacy of the combined surgery was verified in this study where clinical symptoms were significantly relieved or disappeared after surgery, and patient’s weights were significantly increased.

In summary, SMAS combined with GERD seriously affects an individual’s quality of life. Thus, appropriate treatments should be selected based on each patient’s clinical characteristics. Favorable results obtained after laparoscopic Toupet fundoplication combined with LOTR has confirmed this to be an appropriate and effective surgical method for SMAS combined with GERD.
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Conflicts of interest

None.

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Corrigendum

Corrigendum: Comparison of Efficacy and Safety between First and Second Generation Drug-eluting Stents in Patients with Stable Coronary Artery Disease: A Single-center Retrospective Study

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In the article “Comparison of Efficacy and Safety between First and Second Generation Drug-eluting Stents in Patients with Stable Coronary Artery Disease: A Single-center Retrospective Study” which appeared in vol.130, issue 14, page 1655 of Chinese Medical Journal,[1] “G1–DES included sirolimus–eluting stents (Partner, Lepu Medical, China; Firebird, MicroPort Medical, China), paclitaxel–eluting stents (Taxus and Taxus Liberté, Boston Scientific, USA). G2–DES included zotarolimus–eluting stents (Endeavor and Endeavor Resolute, Medtronic Vascular, USA), everolimus–eluting stents (Xience V and Xience Prime, Abbott Vascular, USA; Promus and Promus Element, Boston Scientific, USA), and domestic sirolimus–eluting stents (Firebird2, MicroPort Medical, China).” should be corrected as “G1–DES included sirolimus–eluting stents (Partner, Lepu Medical, China; Firebird and Firebird2, MicroPort Medical, China), paclitaxel–eluting stents (Taxus and Taxus Liberté, Boston Scientific, USA). G2–DES included zotarolimus–eluting stents (Endeavor and Endeavor Resolute, Medtronic Vascular, USA), everolimus–eluting stents (Xience V and Xience Prime, Abbott Vascular, USA; Promus and Promus Element, Boston Scientific, USA).” The original results and conclusions are not affected.

Reference

1. Liu R, Xiong F, Wen Y, Ma YL, Yao Y, Gao Z, et al. Comparison of Efficacy and Safety between First and Second Generation Drug-eluting Stents in Patients with Stable Coronary Artery Disease: A Single-center Retrospective Study. Chin Med J 2017;130:1654–1661. doi: 10.4103/0366-6999.209904.