Research Article

Laparoscopic Roux-en-Y reconstruction in a patient with afferent loop syndrome and peptic ulcers of gastroenteroanastomosis - A first experience

Maksim A. Evseev[1], Alexey L. Vladykin[1]*, Vladimir D. Lutsenko[2], Tatyana N. Tatyanenko[2]

ABSTRACT

This paper is devoted to the description of a currently rare clinical observation of the surgical treatment of a patient with post-gastroresection syndrome (afferent loop syndrome and peptic ulcers of gastroenteroanastomosis) - resection of the stomach stump with laparoscopic Roux-en-Y reconstruction.

KEY WORDS: Afferent loop syndrome and peptic ulcers of gastroenteroanastomosis, Biliopancreatic and alimentary loops of the small intestine, Reconstructive surgery performed for post-gastroresection syndrome by laparoscopic access, Roux-en-Y reconstruction of the digestive tube

INTRODUCTION

Today, distal gastric resection is a standardized treatment procedure with predictable and, in most cases, favorable immediate and long-term results. Nevertheless, both a century ago and now, the terms "postgastrectomy syndromes" and "post-gastroresection syndrome" have a full right to exist in the clinic, since dyspeptic disorders generalized by these terms occur according to different estimates in 10–25% of patients who underwent stomach resection or gastrectomy.[1-8] At the same time, it is still commonly accepted that the most frequent diseases of the operated stomach occur in patients who undergo various modifications of the distal gastrectomy according to the Billroth-II method.[1,3,5,7,9-13]

Conventionally, post-gastroresection syndromes are divided into functional and organic. It is quite obvious that, if functional impairments, by definition, can and should be corrected by conservative measures, then organic impairments can be leveled out only with the help of surgery. The most frequent organic disorders in the group of diseases of the operated stomach - afferent loop syndrome and peptic ulcers of gastroenteroanastomosis - are well known in their own etiopathogenesis, clinical manifestations, methods of surgical treatment, and possible prevention methods during primary surgery. In this regard, it is necessary to recognize the correctness of the authors who categorically assert that the cause of post-gastroresection syndromes of organic nature is exclusively technical defects that occurred during the initial gastrectomy.[1,3-5,7,8,13-15]

For several decades of the development of surgical gastroenterology, at least several dozens of different reconstructive interventions have been proposed and tested for the operative correction of the post-gastroresection syndrome. Nevertheless, today, almost all authors are unanimous that the Roux-en-Y reconstruction of the digestive tube is practically the only acceptable method of repeated intervention for diseases of the operated stomach. The formation of biliopancreatic and alimentary intestinal loops joined by the Roux-en-Y type eliminates the refluxes of digestive juices and chyme and prevents the stomach stump from going up, and the accelerated passage of the chyme is promptly compensated.[1,3,4,8,10,12-14,16-18] The anti-reflux properties of the alimentary loop and, accordingly, the prevention of reflux gastritis and esophagitis are provided with a length of at least 40 cm.[1,2,5,8,12,14,17]

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[1]Clinical Hospital No. 1 (Volyn) of the Office of the President of the Russian Federation, Moscow, Russia, [2]Department of General Surgery, Belgorod State University, Belgorod, Russia

***Corresponding author:** Alexey L. Vladykin, Clinical hospital No. 1 (Volyn) of the Office of the President of the Russian Federation: 121352, Starovolynskaya Street, 10, Moscow, Russia. E-mail: vl07011964@yandex.ru

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A well-known negative aspect of Roux-en-Y resection is the potential for the Roux stasis syndrome. At present, it is considered that the leading role in the pathogenesis of this syndrome is played by the intersection of the fibers of the intramural nerve plexuses of the first loop of the small intestine, leading to a violation of the spread of the activating effect of the duodenal pacemaker on the small intestine and the development of its paresis. Although, during primary Roux-en-Y resections of the stomach, no more than 8% of patients showed proven occurrence of Roux stasis syndrome, this circumstance formally gave rise to quenching surgical vanity by introducing the "new" technique of the so-called "uncut Roux-en-Y" - Roux stomach resection without intersection of the small intestine.[6,15] We cannot fail to note in this connection that, to preserve historical priorities, it still makes sense to compare this "new" uncut Roux-en-Y technique with the long-time academic method of reconstruction by Billroth II modified by Braun-Balfour with a plug on loop by Shalimov and Sayenko.[3] In comparative studies, a faster evacuation from the stomach stump after uncut Roux-en-Y was shown after standard Roux-en-Y resection, without entailing, however, a significant improvement in the long-term results of surgical treatment.

More than a quarter of a century has passed since the introduction of laparoscopic access technique into surgical gastroenterology. Separate reports describe reconstructive laparoscopic operations after previously performed bariatric interventions and laparoscopic operations performed after postgastrectomy complications of the immediate post-operative period.[6,7,21] However, reports of repeated reconstructive surgeries for post-gastroresection syndrome performed by laparoscopy are not available in the available literature (PubMed, eMedicine, and e-library). In this regard, we considered it possible to share our first experience of reconstructive surgery performed on the post-gastroresection syndrome with laparoscopic access.

CLINICAL OBSERVATION

Patient Aleksandr, 67 years old, was urgently admitted to the Department of Abdominal Surgery of the Clinical Hospital No. 1 (Volynskaya) of the RF UDP on April 17, 2018, with a clinical signs of recurrent gastric bleeding: Periodic (once every 2–3 days) vomiting contents such as "coffee grounds" and repeated episodes of melena. In addition to complaints of general weakness and dizziness, the patient pointed to the possibility of taking only liquid food in small quantities. The use of semi-liquid food in a standard volume was limited by the inevitable appearance of discomfort, a feeling of heaviness and pain in the epigastrium after eating, accompanied by belching and occasional vomiting of food eaten. As we found out from the history, about 20 years ago, the patient underwent a distal resection of the stomach for a bleeding ulcer. A year after the intervention, the patient began to feel discomfort and heaviness in the epigastrium after eating, supplemented further with periodic epigastric pain, belching, and vomiting of food eaten. He had vomiting in the form of "coffee grounds" and episodes of melena 2 weeks before the actual hospitalization.

The initial examination established a moderately severe state (APACHE II 12 points). The The patient with reduced nutrition, body mass index - 16.7 kg/m², is asthenized. Indicators of external respiration and hemodynamics were within the reference values. During the physical examination of the abdomen, the scar after the upper-midline laparotomy without the formation of a hernia is determined, and the volume lesions are not palpable. Rectal examination revealed traces of melena. Laboratory tests revealed hemoglobin 82 g/l, leukocytes 9.1 × 10^9, total protein 51 g/l, and albumin 29 g/l.

An emergency esophagogastroduodenoscopy revealed the signs of Billroth-II operated stomach with a medium-sized stump, traversed by gastroenteroanastomosis, and the presence of enlarged and diverted segments of the small intestine (containing bile). Mucous stomach stump with symptoms of acute inflammation and multiple minor erosions. 0.5 cm from the anastomosis line in the small intestine abutment segment there are two acute ulcers up to 0.5 cm in diameter with fixed blood clots on their bottom (Forrest IIB). A preventive endohemostasis was performed by argon plasma coagulation. A nasointestinal nutritional probe is installed in the abduction segment of the small intestine.

X-ray examination of the stomach with contrasting barium suspension determined the stump of the Hofmeister-Finsterer-modified Billroth-II stomach, corresponding in size to the performed hemigastrectomy. The contrast medium with little or no deposit in the stomach enters the enlarged loop of the small intestine and then enters the duodenum dilated up to 5 cm. The length leading to the gastroenteroanastomosis of the small intestinal loop is 12 cm. When the afferent loop and the duodenum are completely filled, a reflux of the contrast medium into the stomach and delayed evacuation to the small intestine discharge loop is observed [Figure 1].

Based on the survey, the clinical diagnosis was as follows: Operated gastric syndrome (condition after distal Hofmeister-Finsterer-modified Billroth II stomach resection in 1998), peptic ulcers of gastroenteroanastomosis, complicated by recurrent bleeding, afferent loop syndrome, chronic pancreatitis, chronic post-hemorrhagic anemia, nutritional deficiency

syndrome, and state post preventive endohemostasis due to bleeding from ulcers of gastroenteroanastomosis (Forrest IIB).

Given the obvious futility of a conservative correction of dyspepsia caused by the afferent loop syndrome and the continuing threat of recurrent bleeding from gastroenteric anastomotic ulcers, indications for urgent surgery were established. The estimated scope of the intervention is resection of the gastric stump with Roux-en-Y reconstruction. Subject to the presence of an ultrashort adductor loop in the patient, for adequate decompression of the duodenum and prevention of the duodenal reflux, it was decided to lengthen the biliopancreatic loop with a 50-cm small intestinal insert, followed by the formation of the Y-shaped anastomosis between the biliopancreatic and alimentary loops. Taking into account the presence in the patient of the syndrome of nutritional insufficiency of alimentary genesis, the intervention was decided to be postponed for the period necessary for intensive correction of the nutritional status.

Nutritional support included the introduction of Nutricomp® Energy balanced enteral mixtures into the nasointestinal probe and parenteral nutrition using the three-in-one Nutriflex Lipid® 70/180 system. The total daily calorie consumption was 3450 kcal/day and the amount of protein injected - 90 g/day. Simultaneously, a single red blood cell transfusion, compensation of water and electrolyte disorders, and prolonged infusion of esomeprazole at a dose of 160 mg/day were carried out. Laboratory parameters in the outcome of pre-operative preparation formally characterized the compensation of the patient's nutritional status: Hemoglobin 112 g/l, leukocytes 6.1 × 10^9, total protein 71 g/l, and albumin 39 g/l.

The patient was operated on the 6th day after hospitalization under combined endotracheal anesthesia with epidural anesthesia. Surgical intervention was orderly performed: Laparoscopic resection of the gastric stump with Roux-en-Y reconstruction and lengthening of the biliopancreatic loop with the isoperistaltic small intestinal segment.

Six trocars were inserted into the abdominal cavity: In the paraumbilical area, three 5-mm trocars in the hypochondria and bone angle, and two 12-mm trocars in the lateral areas. During the revision in the upper floor of the abdominal cavity, there is a massive scar-adhesive process involving the parietal peritoneum of the anterior abdominal wall, the greater omentum, the transverse colon and mesocolon, and the visceral and diaphragmatic surfaces of the left lobe of the liver and the stomach stump. Using the Harmonic® dissector and LigaSure® coagulator, adhesiolysis was performed, and the transverse colon, mesocolon, visceral surface of the left hepatic lobe, and the anterior and posterior walls of the stomach stump (the stump of the stomach corresponds to the previously performed hemigastrectomy) were separated from adhesions and scars. It was established that the reconstructive stage of the primary operation was performed according to the Hofmeister-Finsterer technique on an ultrashort (up to 12 cm) afferent loop, carried out retrocolically. Subject to the pre-operative examination and the operating finding (an ultrashort afferent loop), the decision on the amount of operational benefit corresponded to the pre-operative concept: Roux-en-Y resection of the stomach stump with lengthening the biliopancreatic loop with a small isoperistaltically located intestine segment. [Figure 2].

The gastroenteroanastomosis zone with the presenting loops of the small intestine is isolated from mesocolon tissue; the stump of the stomach is mobilized along the anterior and posterior walls; and the minor and greater curvature is up to the level of subtotal resection (subcardia - the spleen gate). The stomach is crossed at the level of mobilization

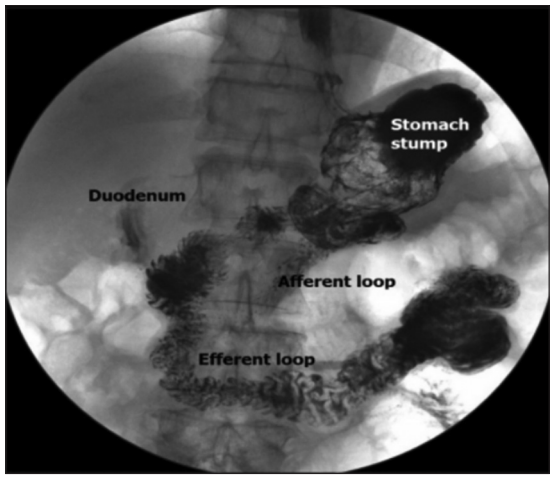

Figure 1: Fluoroscopy of the stomach with contrast barium suspension. State post-Billroth II resection. The afferent loop syndrome with the reflux of the contrast medium into the duodenum

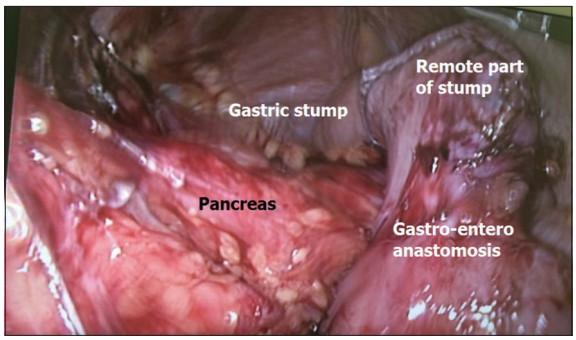

Figure 2: Intraoperative picture after crossing the stomach stump; a gastroenteroanastomosis zone was mobilized with afferent and efferent segments of the small intestine

using the EchelonFlex®60 device. The formation of a functional side-by-side anastomosis was made between the afferent and efferent small intestine loops with a single-step intersection of the small intestine afferent loop 2 cm proximal and the efferent loop 6 cm distal to the gastroenteroanastomosis using the EchelonFlex®60 device. The surgical specimen - the distal part of the stomach stump with a section of the afferent and efferent small intestine - is placed in a container. 50 cm distal to the formed functional anastomosis, the small intestine is crossed by the EchelonFlex®60 device. Thus, at the intersection of the small intestine, the biliopancreatic and alimentary loops were formed. The alimentary loop of the small intestine is lined to the stump of the stomach retrocolically through an already existing opening to the mesocolon. On the alimentary loop, a posterior longitudinal "side-to-side" gastroenteroanastomosis is formed with the EchelonFlex®60 device. 40 cm distal to the gastroenteroanastomosis, the alimentary loop is joined to the biliopancreatic loop (Y-shaped Roux-en-Y reconstruction) by forming the interintestinal "side-by-side" anastomosis with the EndoGia®45 apparatus. The process holes of the anastomoses are sutured with a continuous suture with Biosyn 3/0 thread; anastomoses are sealed. Through the left-sided transrectalminilaparotomy access, the surgical specimen is removed into a container; a tubular drainage is installed into the trocar wound in the right hypochondrium under the left lobe of the liver [Figure 3].

The duration of surgery was 3 h and 10 min; total blood loss is up to 100 ml. The patient is extruded on the operating table and transferred to the surgical resuscitation unit on spontaneous breathing.

The early post-operative period in patient passed on the accelerated post-operative rehabilitation program. Physical activation of the patient and oral administration of water in small portions started 6 h after the intervention.

Post-operative monitoring of peristaltic activity was carried out on a selective polygraph of the gastrointestinal tract with the possibility of correction of motor-evacuation disorders by transcutaneous resonance stimulation (RF patent 2648819). The selective polygraph of the gastrointestinal tract showed a physiological rhythm of the peristaltic activity curve with an increase in amplitude to normal values (14-18 μV) starting from the 4th h after surgery. Based on the analysis of the curves and the self-restoration of peristalsis, a decision was made on the inexpediency of electrophysiological stimulation.[16]

Peristaltic noise began to be auscultated after 8 h, the discharge of gases began after 20 h, and the first stool - 36 h after the surgery. On the 2nd day of the post-operative period, the patient was transferred to the surgical department for prolonged epidural analgesia, the patient's physical activity in the absence of pain was fully restored, and the drainage was removed from the abdominal cavity. Oral administration of balanced mixtures for siping Nutricomp® Drink Plus was started, with the continuation of parenteral nutrition using the three-in-one Nutriflex Lipid® 70/180 system.

On the 3rd day of the post-operative period, a control X-ray of the stomach with contrasting barium suspension was performed. Free passage of contrast through the esophagus, filling of the stomach stump, corresponding to the volume of subtotal resection, batch timely delivery of contrast through the gastroenteroanastomosis to the small intestine, and further free passage of contrast through it are

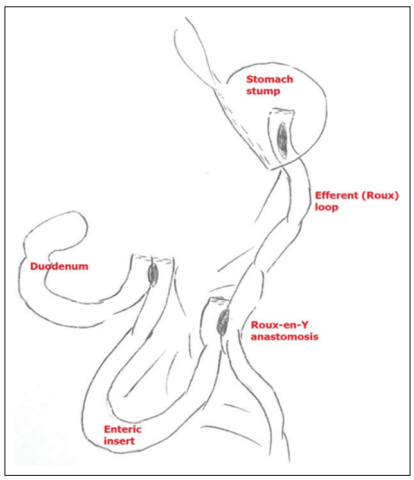

Figure 3: A diagram of the reconstructive phase of the operation. Formation of Roux-en-Y gastroenteroanastomosis with lengthening of the biliopancreatic loop by the isoperistaltic segment of the small intestine

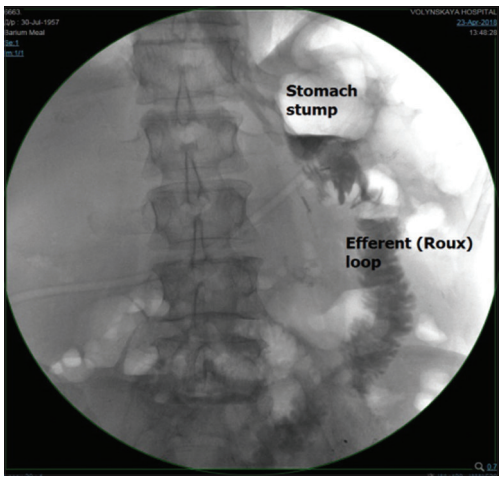

Figure 4: Fluoroscopy of the stomach with contrast barium suspension on the 3rd day of the post-operative period. Free and timely evacuation of contrast medium along the alimentary loop without reflux into the biliopancreatic loop

determined. Reflux of the contrast medium in the biliopancreatic loop was not detected [Figure 4].

Subject to the smooth course of the immediate postoperative period, the absence of pain and dyspepsia when taking liquid and semi-liquid foods, the patient was discharged for further outpatient rehabilitation under the supervision of a gastroenterologist. Over the next 3 months, the patient noted the possibility of expanding the diet without dyspepsia, having a strong tendency to gain in weight and no need to take any medication.

CONCLUSION

The above clinical observation allows us to make several conclusions. First of all, this observation once again confirms the validity of the proposition that the Roux-en-Y reconstruction of the digestive tube is the best way to treat patients with postgastrectomy syndromes requiring surgical correction - the afferent loop syndrome and peptic ulcers of gastroenteroanastomosis. The reconstruction with the formation of biliopancreatic and alimentary intestinal loops joined by Roux-en-Y type excludes refluxes of the digestive juices and prevents the rapid emptying of the stomach stump and the accelerated passage of the chyme. These circumstances, in turn, determine the possibility of rapid compensation of post-gastroresection disorders of the digestive system after resection of the stomach stump with Roux-en-Y reconstruction. Indeed, already in the 1st week of the post-operative period, the patient had the opportunity to nutrition in the context of a therapeutic diet without the slightest symptoms of dyspepsia. The jejunum during the reconstructive surgery was crossed only 10 cm from the duodenojejunal junction, which according to popular in foreign literature opinion should have led to the isolation of the duodenal intestinal peristalsis and almost obligatory occurrence of small intestinal paresis with impaired evacuation from the stomach stump. However, no clinically significant and radiographically proven disturbance of evacuation from the stomach was found after the intervention, which indicates the categorical assertions made by a number of authors about the necessity of obligatory preservation of the continuity of intramural nerve plexuses with the help of a new uncut Roux-en-Y technique. An additional element of the surgery - lengthening the biliopancreatic loop with an isoperistaltic small bowel insert - on the one hand, completely eliminated the possibility of recurrent afferent loop syndrome and, on the other, by reducing intraduodenal pressure, created the prerequisites for resolving the phenomena of chronic pancreatitis.[19,20]

The results of this observation illustrate the technical possibility of performing repeated, including reconstructive operations on the stomach using laparoscopic techniques. In turn, the low invasiveness of laparoscopic surgery made it absolutely realistic to manage the patient as part of an accelerated post-operative rehabilitation program with early physical activation and early onset of oral ingestion of food substances. In addition to the above nuances of surgical techniques and tactics, this clinical example was a vivid illustration of the need for a targeted pre-operative and post-operative correction of the patient's nutritional status. It is obvious that the compensation of initially existing nutritional disorders and subsequent post-operative catabolism has largely determined the smooth course of the immediate post-operative period. The successful experience of laparoscopic resection of the gastric stump with the Roux-en-Y reconstruction became an important milestone for our clinic in the development of laparoscopic techniques in abdominal surgery and a logical basis for further development in the field of reconstructive surgery of the digestive tract.

REFERENCES

1. Volkov SV. Patologicheskiye Sindromy Posle Gastrektomii. Cheboksary: Chuvash University Publishing House; 1998. p. 208.
2. Petrov VP, Badurov BS, Khaburzaniya AK. RezektsiyazheludkapoRu. Miscow: PIK VINITI; 1998. p. 212.
3. Shalimov AA, Sayenko VF. Khirurgiya Zheludka. Kiyev: Dvenadtsatiperstnoy kishki; 1972. p. 355.
4. Eagon JC, Miedema BW, Kelly KA. Postgastrectomy syndromes. Surg Clin North Am 1992;72:445-65.
5. Inokuchi M, Kojima K, Yamada H, Kato K, Hayashi M, Motoyama K, *et al.* Long-term outcomes of roux-en-Y and billroth-I reconstruction after laparoscopic distal gastrectomy. Gastric Cancer 2013;16:67-73.
6. Ma JJ, Zang L, Yang A, Hu WG, Feng B, Dong F, *et al.* A modified uncut roux-en-Y anastomosis in totally laparoscopic distal gastrectomy: Preliminary results and initial experience. Surg Endosc 2017;31:4749-55.
7. Martin RF. Surgical management of ulcer diseases. Surg Clin N Am 2005;85:907-29.
8. Takahashi M, Terashima M, Kawahira H, Nagai E, Uenosono Y, Kinami S, *et al.* Quality of life after total *vs* distal gastrectomy with roux-en-Y reconstruction: Use of the postgastrectomy syndrome assessment scale-45. World J Gastroenterol 2017;23:2068-76.
9. Ablassmaier B, Gellert K, Tanzella U, Müller JM. Laparoscopic billroth-II gastrectomy. J Laparoendosc Surg 1996;6:319-24.
10. Miwa K, Kinami S, Sahara H, Matsumoto H, Segawa M, Michiwa Y, *et al.* Jejunal pouch interposition and distal gastrectomy. Nihon Geka Gakkai Zasshi 1997;98:560-4.
11. Soper NJ, Brunt LM, Brewer JD, Meininger TA. Laparoscopic billroth II gastrectomy in the canine model. Surg Endosc 1994;8:1395-8.
12. He Z, Zang L. Reconstruction after laparoscopic assisted distal gastrectomy: Technical tips and pitfalls. Transl Gastroenterol Hepatol 2017;2:66.
13. Zornig C, Emmermann A, Blöchle C, Jäckle S. Laparoscopic 2/3 resection of the stomach with intracorporal roux-en-Y anastomosis. Chirurg 1998;69:467-70.
14. Kawano F, Tashiro K, Nakao H, Fujii Y, Ikeda T, Takeno S, *et al.* Jejunogastric intussusception after distal gastrectomy with roux-en-Y reconstruction: A case report. Int J Surg Case Rep 2018;44:105-9.
15. Uyama I, Sakurai Y, Komori Y, Nakamura Y, Syoji M,

Tonomura S, *et al.* Laparoscopy-assisted uncut roux-en-Y operation after distal gastrectomy for gastric cancer. Gastric Cancer 2005;8:253-7.
16. Evseev MA, Fomin VS, Vladykin AL, Klishin IM, Nikitin VY. The use of complex conservative treatment of paresis of the gastrointestinal tract after surgical intervention of large volume. Annaly Khirurgii 2018;23:188-95.
17. Tanaka T, Kusunoki M, Fujiwara Y, Nakagawa K, Utsunomiya J. Jejunal pouch length influences metabolism after total gastrectomy. Hepatogastroenterology 1997;44:891-6.
18. Yeon-Ju H, Joo-Ho L. The advances of laparoscopic gastrectomy for gastric cancer. Gastroenterol Res Pract 2017;3:9278469.
19. Dapri G, Cadière GB, Himpens J. Laparoscopic reconversion of roux-en-Y gastric bypass to original anatomy: Technique and preliminary outcomes. Obes Surg 2011;21:1289-95.
20. Kim DJ, Kim W. Role of laparoscopic management for postgastrectomy complications. J Laparoendosc Adv Surg Tech A 2017;28:402-7.
21. Zurita ML, Tabari M., Hong D. Laparoscopic conversion of laparoscopic roux-en-Y gastric bypass to laparoscopic sleeve gastrectomy for intractable dumping syndrome and excessive weight loss. Surg Obes Relat Dis 2013;9:34-7.

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