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Direct Outcomes of Nonrefluxing Enteroenterostomy Technique after Gastrectomy

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Abstract

In this study, we evaluate the direct outcomes of nonrefluxing enteroenterostomy technique after gastrectomy in patients with stomach cancer. Application of nonrefluxing enteroenterostomy technique after gastrectomy in patients with stomach cancer allows to eliminate the risk of adducent loop syndrome (ALS) development and reduce risk of postoperative pancreatitis by 3.3%. IJBM 2011; 1(4):213-216.
Key words: *stomach cancer, enteroenterostomy, gastrectomy, adducent loop syndrome, acute pancreatitis.*

Introduction

By frequency of occurrence, stomach cancer ranks second, being one of the most important medical and social problems [1-4]. Currently, the radical treatment of stomach cancer is surgery; in which gastrectomy is one of the main places [3-5]. However, the majority of high volume operations of stomach cancer are associated with a high risk of early postoperative complications. Its occurrence, according to various authors, varies considerably; however, the absolute "leaders" in this respect are postoperative pancreatitis and pancreonecrosis (27%), adducent loop syndrome, anastomosis sutures failure with peritonitis (52%) and pneumonia (21%) requiring medical treatment, and frequently reoperation [6, 7].

Aim of this study is to develop a technique of enteroenterostomy performed after gastrectomy, which could be eliminate risk of adducent loop syndrome (ALS) and acute pancreatitis development.

Material and methods

Between 1992 and 2009, 559 gastrectomies were performed for stomach cancer in Surgical Department of the Regional Oncology Center, Penza. The indications for surgery treatment were:

- a spread tumor in the middle and upper thirds of the stomach, and subtotal and total organ defect;
- multifocal lesions of the organ;
- situations in which the volume and location of the lesion make gastric resection is technically feasible, but necessary lymphadenectomy requires the complete removal of the organ.

In all patients a standard D2 dissection was performed.

We performed a comparative analysis of the gastrectomy outcomes in 72 patients with stomach cancer. In all cases, gastrectomy with esophagoenterostomy performed by Segal. The average age of the patients in both groups was 61.2±8.7 years. 42.3% of patients were women and 57.7% were men. After morphological investigation of tumors, the prevalence of adenocarcinoma with varying degrees of differentiation was noted in 86.2% of cases.

Patients were divided into two groups based on the technique of enteroenterostomy performed after gastrectomy: 1st group consisted of 42 patients with traditional surgical technique and enteroenterostomy by Braun and in 2nd group, 30 patients were operated using the new technique of enteroenterostomy after gastrectomy *(New technique of enteroenterostomy after gastrectomy / AL Charyshkin, VY Gudoshnikov. The application for the*

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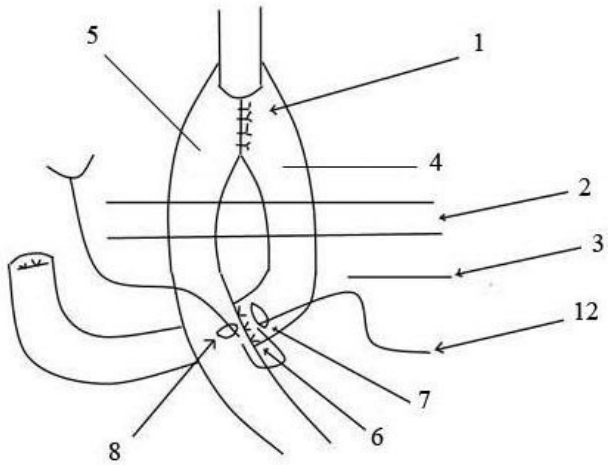
invention #2010154844, priority of 31.12.10, developed in the Department of Faculty Surgery, Institute of Medicine, Ecology and Physical Education, Ulyanovsk State University (USU IMEPE). The USU IMEPE Ethics Committee Decision on 11.12.2009). All patients gave informed consent to surgical interventions. Gastrectomy was performed with the imposition of a retrocolic esophagoenteroanastomosis (1) by Segal (Fig. 1).

Figure 1
Formation of eneroenteroanastomosis:



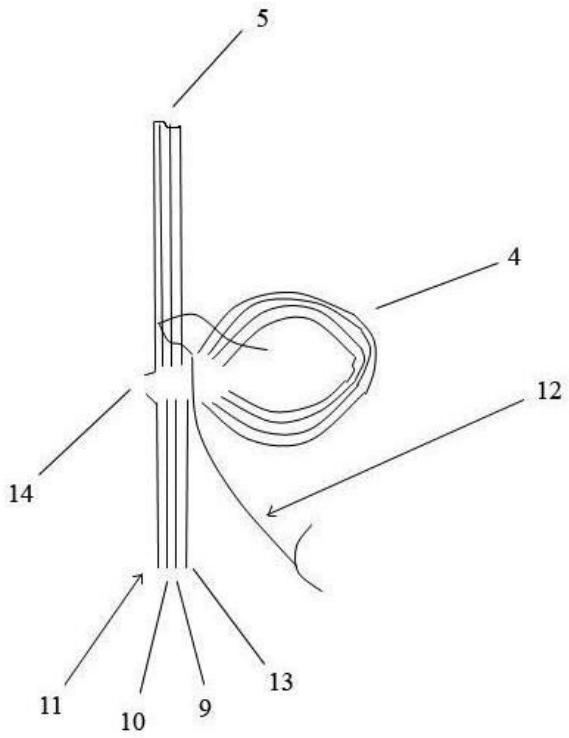
1 – esophagoenteroanastomosis; 2 – transverse colon; 3 – ligament of Treitz ; 4 – adducent loop of the small intestine; 5 – abducent loop of the small intestine; 6 – outer suture raw of posterior lip of the enteroenteroanastomosis; 7 – anastomotic hole in the transverse direction on the adducent loop; 8 – anastomotic hole in the transverse direction on the abducent loop.

Under the transverse colon mesentery (2), at a distance of approximately 60 cm from the esophagoenteroanastomosis (1), below the 3-4 cm from ligament of Treitz (3), the sero-muscular sutures were overlapped using the nonabsorbable material between adducent (4) and abducent loop (5) of the small intestine, at a distance of 3.5-4.0 cm, forming an outer suture raw (6) of posterior lip of the enteroenteroanastomosis.

Then, moving back to 0.5 cm from the outer suture row (6) of the posterior lip of enteroenteroanastomosis the serosa dissect transversely to the length of the small intestine at a distance of 18–20 mm both on the adducent loop (4) and the abducent loop (5) of the small intestine. Muscular (9), submucosal (10), and mucosal (11) layers of the abducent loop (5) (Fig. 2) of the small intestine are dissected by punction with the size of 2-3 mm, with the mucosa layer (11), are being extended by long, curved clamp in a direction perpendicular to the to the length of the small intestine to 18-20 mm, forming holes (7) and (8) in the transverse direction on the adducent loop (4) and the abducent loop (5) of the of the small intestine. The long, curved clamp does not damage the bowel muscles.

Next, the inner raw of the front and rear lip of enteroenteroanastomosis were formed. An atraumatic needle with a synthetic absorbable thread (12) of diameter 4/0, stick into the wall of the adducent loop (4) of small intestine from inside out stepping down to 2.0-2.5 mm from the edge of the formed anastomotic hole (7) on the adducent loop (4) of the small intestine. The atraumatic needle with a synthetic absorbable thread (12) was carried through the entire thickness of the intestine, exiting the serosa of the anastomotic hole formed (7) on the adducent loop (4) of the small intestine.

Figure 2
Formation of the inner row of the nonrefluxing enteroenteroanastomosis:



9 – muscular layer of the abducent loop (5) of the small intestine; 10 – submucosal layer of the abducent loop (5) of the small intestine; 11 – mucosa layer of the abducent loop (5) of the small intestine; 12 – synthetic absorbable thread; 13 – serosa of the abducent loop (5) of the small intestine; 14 – nonrefluxing valve flaps.

At a distance of 4.0-4.5 mm from the edge of the hole formed (8) on the abducent loop (5) of the small intestine from serosa (13), an atraumatic needle with a synthetic absorbable thread (12) was passed through the serosa (13), muscular (9), and submucosal (10) layers not capturing the mucosa 11 (Fig. 2), and exits from serosa (13) at point 3.0-3.5 mm distant from the edge of the hole formed (8) on the abducent loop (5) of the small intestine. Then the ends of the synthetic absorbable suture (12) overlapping each other were stretched, Excess of mucosal (11) and submucosal (10) layers of the abducent loop (5) of the small intestine twisted outward, are tucked inside, forming the nonrefluxing valve flaps (14) (Fig. 2), and

serous membranes of the adducent loop (4) and abducent loop (5) of the small intestine are accurately and reliably positioned alongside each other, providing the anastomosis leak proof. Similarly, threads were imposed for closing the inner row of the front and rear margins of the enteroenteroanastomosis.

After completion of this step, sero-muscular sutures of nonabsorbable material were imposed between the adducent loop (4) and the abducent loop (5) of the small intestine, forming an outer raw (15) of enteroentero anastomosis front margin. The obtained results of the formed nonrefluxing enteroenteroanastomosis were ivestigated by ultrasound, endoscopic, and x-ray methods.

When compared the obtained results, we used paired Student's t-test for independent samples, and a χ^2-test.

Results and Discussion

In the 2nd group, intestinal paresis was observed in 3 (10%) patients, whereas in the 1st group in 26 (61.9%) patients. Intestinal paresis significantly more common occurred in the 1st group and ceased after the 7.4±0.4 days of postoperative period, whereas in the 2nd group after the 3.5±0.3 days. Nausea and vomiting ceased after the 4.8±0.5 days in the 1st group in compare with 2nd group where such symptoms ceased after 2.3±0.3 days. Dyspeptic symptoms also disappeared significantly earlier in the 2nd group.

An increased blood amylase level was noted in 13 (30.9%) patients in the 1st group, and in 1 (3.3%) patient in the 2nd group. Amylase levels decreased to normal after 6.5±0.3 days in the 1st group and after 3 days in the 2nd group.

Complications occurred more frequently in the 1st group: adducent loop syndrome occurred in 3 (7.1%) patients; acute pancreatitis in 10 (23.8%) patients; pancreonecrosis in 3 (7.1%) patients; and pneumonia in 3 (7.1%) patients. On X-ray examination in patients with ALS, we observed the reflux of radiocontrast agent (barium sulfate) from the abducent loop into the adducent one (Fig. 3).

In all cases of pancreonecrosis were performed relaparotomy, cholecystostomy, sanation, and drainage of the abdominal cavity. ALS was not occurred in patients of the 2nd group and pneumonia was noted in 1 (3.3%) patient. On X-ray examination, reflux of radiocontrast agent (barium sulfate) from the abducent loop into the adducent one was not observed in patients of the 2nd group.

Septic complications occurred in 9 (21.4%) patients (wound suppuration, abscesses of the abdominal cavity) in the 1st group, and in 3 (10%) patients in the 2nd group. Postoperative mortality in the 1st group was 7.1%. Causes of postoperative mortality were acute cardiovascular failure in 2 (4.7%) patients; and pancreonecrosis in 1 (2.4%) patient. Postoperative mortality was not observed in the 2nd group. We consider that in the majority of cases, the violation of the evacuation from the adducent loop after gastrectomy in patients with enteroenterostomy by Braun in the postoperative period were functional caused by changes in the neurogenic and humoral stimulation of the duodenum and jejunum, violations of their coordinated activities and reflux of the intestinal content from abducent loop into the adducent one. These violations led to a decrease in intestinal peristalsis until its complete absence and development of evacuation disorders.

Thus, the formation of the nonrefluxinging enteroenteroanastomosis in patients after gastrectomy eliminates the risk of development of adducent loop syndrome and reduces the risk of early postoperative complications.

Figure 3
Roentgenogram of a patient of the 1st group with reflux of radiocontrast agent (barium sulfate) from the abducent loop into the adducent one.

Conclusions

Implementation of the nonrefluxinging enteroenterostomy technique after gastrectomy in patients with stomach cancer made possible to eliminate the risk of adducent loop syndrome developing.

Use of the nonrefluxinging enteroenterostomy technique after gastrectomy in patients with stomach c cancer allowed to reduce the incidence of postoperative pancreatitis up to 3.3% and suppurative complications decreased twice.

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