Gastrostomy and Oesophagoplasty With a Flap From the Greater Curvature of the Stomach as Stages of Surgical and Combined Treatment of Cancer of the Thoracic Oesophagus

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Four-hundred fifty-eight patients with cancer of the oesophagus were subjected to revisional laparotomy. Metastases into subphrenic lymph nodes were registered in 24% of the cases with a tumor in the bronchial segment; 42% with tumor in the subbronchial segment; 48% with tumor in the retropericardial segment; 71% with tumors in the sub-, intra-, and suprophrenic segments of the oesophagus. In 345 cases, laparotomy was followed by tube gastrostomy (Beck—Carrel method) with two operative deaths. Fifty-six patients in good condition with a small tumor in the middle part of the oesophagus (<5 cm) without any abdominal metastases were subjected to primary oesophagoplasty: a 30–32-cm tube was formed out of the greater curvature of the stomach and placed retrosternally; gastrostomy was performed on the level of the thyroid cartilage (without any operative deaths). In two weeks, extirpation of the thoracic part of the oesophagus (with preoperative irradiation) was performed on patients with no abdominal metastases. Then the patients with primary oesophagoplasty were subjected to oesophago-gastrostomy of the neck. From six to 12 months following the combined treatment, the gastrostomy tube of 45 patients was lengthened to 30–32 cm and used for retrosternal oesophagoplasty (six operative deaths). Oesophagoplasty was performed on 14 patients during the extirpation of the oesophagus (six operative deaths).

Key words: oesophageal cancer, combined treatment, tube gastrostomy, oesophagoplasty

INTRODUCTION

The aim of the combined (irradiation plus surgery) treatment of oesophageal cancer is both to increase operability and to improve the effectiveness of oesophageal tumor removal by applying preoperative irradiation. Irradiation before a vast radical extirpation of

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the thoracic segment of the oesophagus, with natural increase in surgical risks, leads to regression of the tumor and decrease of paraoesophageal inflammation as well as a considerably favourable effect on the general condition of the patient.

To minimize the operational trauma, surgery is divided into separate stages, the number and succession of which depend on the patient’s condition, localization and duration of oesophagus damage, as well as the size of the tumor. That is why surgery, and especially combined treatment, should be preceded by a thorough examination of the patient, usually followed by laparotomy with revision of paracardial and retroperitoneal lymph nodes, as well as liver. With most patients, laparotomy is followed by the formation of a stomach fistula and is the first abdominal stage of combined and surgical treatment of oesophageal cancer. Where radical surgery is impossible, gastrostomy is the only answer.

MATERIALS AND METHODS

Revisional laparotomy was performed on 458 patients with oesophageal cancer. Our findings suggest that tube-gastrostomy from the greater curvature of the stomach (Fig. 1) is the most effective method, as it does not call for a permanent rubber tube and it remains functionally secure for a long period. Tube-gastrostomy techniques suggested by C. Beck and A. Carrel in 1905 had a number of shortcomings, as tube-formation meant opening of the stomach and possible pollution of the abdominal cavity. The tube itself was not long enough (2–4 cm) to avoid stomach deformation when the tube was fixed on the anterior abdominal wall; the canal between the stomach and the anterior abdominal wall was not long enough to guarantee the normal function of the gastrostoma.

Since then, tube-gastrostomy from the greater curvature of the stomach has been greatly improved. The mechanical suture apparatus simplified tube-formation techniques, and cutting of the stomach wall between two rows of mechanical sutures eliminates the...
possibility of perforating the stomach. However, the gastro-intestino-raphino-tome (GIRT) [15], a model of the apparatus for resection and suture of the gastrointestinal tract, now in use, is too big and complicated, and if the UKL-40, UKL-60 apparatus, which was designed for use in suturing lung tissue [16] is used, the suture line is too rough and tends to deform the stomach.

The tube-gastrostomy technique used in the Hertzen Oncological Institute since 1968, and later in the Oncological Scientific Centre as well, is characterized by a somewhat longer gastrostomy tube (8–10 cm) formed with the help of the NZhKA-60 gastrointestinal anastomosis apparatus. Operational techniques imply cutting of the serous and muscle layers according to the form and length of the gastrostomy tube, with mechanical suture of submucosa and mucosa only, followed by restoration of serous and muscle layers with interrupted sutures. That operation was performed on 391 patients [for details, see reference 41]. Here, however, we find it necessary to note the following precautionary operative procedures:

1) Tube-formation must not be closer than 5 cm to the pylorus.

2) The width of the tube must strictly conform with the size of the stomach; ie, branches of the NZhKA-60 apparatus must be applied in the area of subserous branches of arteria gastroepiploica, and the tube must be no less than 2 cm wide but no more than 1/3 of the stomach width in the tube-formation area.

3) The body and branches of the arteria gastroepiploica must be preserved during the suturing, because only then can the formed tube later be used for oesophagoplasty; also, the possibility of immediate postoperative complications due to vascularization is eliminated.

4) The gastrostomy tube must be no shorter than 7–8 cm; otherwise, the formation of the gastrostomy leads to stomach deformation. On plain films such a deformed stomach has the appearance of an hourglass with two levels of liquid and a narrow isthmus between them; in pronounced stomach deformation slower entrance of a barium mass from the upper to the lower level can be observed.

5) The combination of gastrostomy with pyloromyotomy appears to be necessary, as the Dobromyslov-Torek operation can lead to impairment of the emptying function of the stomach.

6) The opening in the abdominal wall through which the tube is drawn must be big enough not to impair the function of the tube and the supplying vessels.

If the patients’ condition was satisfactory, if the damage was fairly limited (5–6 cm), and if no metastases were found in the lymph nodes of the abdominal cavity and liver, the improved operative techniques permitted us during laparotomy to increase the length of the antiperistaltic gastrostomy tube to 30–32 cm and to place it retrosternally, bringing the gastrostoma onto the neck of the patient. Thus, 56 patients were subjected to primary oesophagoplasty at the abdominal stage (Fig. 2). Two weeks after surgery, the patients were irradiated, and then operation for extirpation of the thoracic section of the oesophagus was performed.

Although forming a longer gastrostomy tube and bringing the gastrostoma onto the neck somewhat extends the abdominal stage, it also gives significant advantages; ie, it shortens the treatment period and makes repeat laparotomy unnecessary in case of postponed oesophagoplasty. Primary oesophagoplasty does not complicate irradiation
treatment or the thoracic stage of surgery — i.e., extirpation of the oesophagus according to the Dobromyslov-Torek technique. The psychological effect is also striking: patients with completed primary oesophagoplasty more willingly agree to all subsequent stages of combined treatment.

To achieve the desired length of the gastrostomy tube, the NZhKA-60 apparatus was applied four times after cutting the serous and muscle layers of the stomach wall. The 118 operations of oesophagoplasty from the greater curvature of the stomach performed in the present study lead us to the conclusion that mobilizing of the tail of the pancreas and splenectomy, suggested by D. Garriliu, are not necessary, as upper-middle laparotomy is sufficient. Important for oesophagoplasty is covering of the suture row on the stomach by a flap of major epiploon 4–5 cm wide. A retrosternal canal is formed according to generally accepted techniques \[17\]. The mouth of the gastrostomy (artificial oesophagus) is formed on the level of the thyroid cartilage close to m. sternocleidomastoideus.

At the Hertzen Oncological Institute, conditions indicating such operations in cases of oesophageal cancer were worked out by I.Kh. Omarov \[29\]. While clinical data are still being acquired, they can be performed on patients without metastases in lymph nodes below the diaphragm, producing only limited damage to the oesophagus (not more than 5 cm), little disphagy (I, II stages) and no significant reduction in body weight.

In the present study, a different variant of gastrostomy tube from the greater curvature of the stomach was also used for oesophagoplasty. Six to 12 months after the combined treatment (abdominal stage with tube gastrostomy, irradiation and Dobromyslov-Torek operation), 45 patients were subjected to relaparotomy with revision of possible metastatic areas. If no metastases were found, the gastrostomy tube was extracted from the abdominal adhesion, its mouth was cut, together with the adjoining skin (1–1.5 cm wide), and the defect of the abdominal wall thus formed was sutured. After that the greater curvature of the stomach was mobilized down to the lower spleen pole, a strip of major epiploon not less than 5 cm was left, and a. gastroepiploica and a.a. gastrica brevis were preserved; lig. colico-diaphragmaticum was dissected. After the mobilization was completed, serous and muscle layers of the front and back stomach walls were cut along the
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greater curvator of the stomach was moved down to the lower spleen pole, a strip of major epiploon not less than 5 cm was left, and a gastroepiploica and a. a. gastrica brevis were preserved; lig colico-diaphragmaticum was dissected. After the transposition was completed, serous and muscle layers of the front and back stomach walls were cut along the greater curvature of the stomach, and the remaining layers were suture-cut three times with the NZhKA-60 apparatus; the tube was then lengthened to 32 cm. The line of mechanical suture was covered with serous-muscle suture in addition to the strip of major epiploon. The gastrostomy tube was brought onto the neck through the retrosternal canal in the mediastinum anterior, and the gastrostomy was formed a few centimeters above the mouth of the oesophagostoma. Such delayed oesophagoplasty is undoubtedly more painful than primary treatment, but when performed on cured patients with no evidence of tumor relapse or metastases, it is more successful.

During the extirpation of the thoracic part of the oesophagus of the 14 patients thus treated, the gastrostomy tube was placed in the mediastinum posterior to the point where the oesophagus had been.

DISCUSSION

The first stage of any treatment of cancer of the middle and lower thirds of the oesophagus is abdominal surgery. During laparotomy, the size and severity of the damage is established and an artificial gastrostoma formed.

The artificially formed gastrostoma creates better conditions for irradiation treatment because it removes food pressure on the tumor during oesophageal irradiation [30]. That produces a significant immediate effect, making better preparation of the patient for surgery possible, and it shortens the duration of the operation. Feeding of the patients through the artificial gastrostoma begins on the second day after extraction of the oesophagus.

Primary oesophagoplasty of cancer has been performed by various investigators [14, 17–21, 23, 31].

However, although the employment of primary oesophagoplasty in surgical treatment of oesophageal tumors appears a doubtful approach, it often may be expedient in the combined treatment of cancer of the thoracic segment of the oesophagus [24–27].

RESULTS

Of 458 cases of oesophageal cancer subjected to the abdominal stage of treatment, metastases in lymph nodes, the diaphragm, and the liver were found in 146 (31.9%) cases. These were metastases from cancer of the bronchial segment of the oesophagus in 24%; the subbronchial segment in 42%; the retropericardial segment in 48%; and the supradiaphragmatic segments in 71% of cases. In 98 patients (21.3%), lymph nodes affected by metastases had the form of immobile conglomerates intimately attached to the abdominal wall, retroperitoneal space, abdominal aorta, or pancreas. No metastases in lymph nodes and organs below the diaphragm have been detected in cases of cancer of the tracheal and aortic segments of the oesophagus.

At the beginning of our study, nine patients (2.4%) had complications of tube gastrostomy: infringed stomach evacuation in five (1.4%), necrosis of the upper part of the tube in four (1.0%). Death following tube gastrostomy is rare. Of 391 patients, only two (0.5%) died (one of thromboembolism of the arteria pulmonis, and one of peritonitis). In 21 patients, function of the gastrostoma was impaired to some degree. In 18 patients, the
discharge of gastric secretions onto the skin of the abdomen led to dermatitis and skin maceration around the gastrostoma. None of the 56 patients subjected to primary oesophagoplasty out of the greater curvature of the stomach died or had complications that delayed the beginning of irradiation treatment. Of 45 patients who underwent postponed oesophagoplasty, six died from infections. The use of an antiperistaltic stomach tube during the simultaneous extraction and plasty of the oesophagus, which seemed to be expedient, proved in fact to be rather risky. Six of 14 patients subjected to such operations died of various complications in the immediate postoperative period.

CONCLUSIONS

1) The high rate of metastasis of cancer of the middle and lower thoracic segments of the oesophagus into the lymph nodes below the diaphragm suggests the need for laparotomy, with revision of metastatic areas, as the final diagnostic stage. Gastrostomy or primary oesophagoplasty are therefore the first stages of treatment of patients with oesophageal cancer.

2) Tube gastrostomy has a number of advantages over the generally accepted techniques of stomach fistula formation; ie, it is functionally more secure, and can be used for a longer time with a lower complication rate.

3) In combined treatment of oesophageal cancer in patients with limited damage and no metastases in lymph nodes and organs below the diaphragm, an antiperistaltic tube from the greater curvature of the stomach can be used for primary oesophagoplasty.

4) An antiperistaltic tube from the greater curvature of the stomach formed into a gastrostoma on the abdominal wall can be used to form an artificial oesophagus. By this means, oesophagoplasty can be delayed until radiation treatment has been given.

REFERENCES
