Introduction

Substernal gastric tube reconstruction is now a standard reconstructive procedure after esophagectomy for esophageal cancer. However, since some patients can suffer cardiovascular events postoperatively, it is important to plan the surgical strategy carefully. We had to perform emergency coronary artery bypass grafting (CABG) on a 67-year-old man who had undergone substernal gastric tube interposition due to esophageal cancer. Since preoperative examination showed the feeding arteries of the gastric tube were in contact with the left internal mammary artery. Therefore, we felt harvesting this artery could be dangerous and decided to perform a median sternotomy, approaching from the right side of the gastric tube. The pericardium was easily and safely reached. We undertook on-pump cardiac arrest single coronary artery bypass grafting of the left anterior descending artery with a saphenous vein graft. The postoperative course was uneventful without mediastinitis. Cardiac surgery after esophageal cancer is often performed from a left thoracotomy. But, we recommend a median sternotomy be performed as an option. Preoperative contrast-enhanced CT should be considered as it may indicate the need for a significant revision such as a median sternotomy.

Keywords: cardiac surgery after esophageal cancer, median sternotomy, coronary artery bypass grafting, substernal gastric tube interposition

Case Report

A 67-year-old man who had undergone substernal gastric tube interposition due to esophageal cancer showed ST changes on electrocardiography. Diagnosis was severe stenosis of the left anterior descending branch that required emergency coronary artery bypass grafting. Preoperative computed tomography (CT) showed the feeding arteries of the gastric tube were in contact with the left internal mammary artery. Therefore, we felt harvesting this artery could be dangerous and decided to perform a median sternotomy. The pericardium was easily and safely reached. We undertook on-pump cardiac arrest single coronary artery bypass grafting of the left anterior descending artery with a saphenous vein graft. The postoperative course was uneventful without mediastinitis. Cardiac surgery after esophageal cancer is often performed from a left thoracotomy. But, we recommend a median sternotomy be performed as an option. Preoperative contrast-enhanced CT should be considered as it may indicate the need for a significant revision such as a median sternotomy.

A 67-year-old man who had undergone substernal gastric tube interposition due to esophageal cancer and was admitted to our hospital for coronary angiography (CAG). He had previously undergone substernal gastric tube interposition due to esophageal cancer at age 58. Coronary risk factors included diabetes mellitus and smoking. CAG showed left anterior descending coronary artery (LAD) stenosis (99% with delay) in the proximal portion (Fig. 1), and the left main trunk diameter differed from that of the...
LAD. The difference between left main trunk (LMT) and proximal LAD diameter was more than 2 mm (5 mm in LMT and 3 mm in LAD), and which seems to be difficult to deploy stent and have a potential risk of stent thrombosis. Therefore, stenting was considered difficult and surgery was needed. Preoperative contrast-enhanced computed tomography (CT) showed the feeding arteries of the gastric tube were in contact with the LIMA (Fig. 2). Therefore, we considered that harvesting the LIMA would be dangerous and decided to perform a median sternotomy, approaching from the right side of the gastric tube, and grafting with the great saphenous vein. Median sternotomy was performed with an oscillator saw. We stayed left of the gastric tube, and after reaching the pleura next to the pericardium, peeled adhesions from the right side of the mediastinum. After pericardial incision, extracorporeal circulation was established from the right atrium to the ascending aorta. Under cardiac arrest using cold crystalloid cardioplegic solution, CABG of the LAD with a saphenous vein graft was performed. Aortic cross-clamp time was 20 min and extracorporeal circulation time was 62 min. The patient’s postoperative course was excellent, without fever or infection. After CT coronary angiography, the graft was confirmed to be patent (Fig. 3) and the patient was discharged on postoperative day 15.

Discussion

In open heart surgery after substernal gastric tube reconstruction, left thoracotomy is a standard procedure.1–3) When the target vessel is the LAD or circumflex artery, a left thoracotomy is useful for off-pump CABG and conventional CABG. For the right coronary artery, however, it is difficult to perform off-pump CABG. In the case of a left thoracotomy, a proximal anastomosis might be needed for the descending thoracic aorta, but harvesting of the LIMA is a much better option. In the case of a median sternotomy, however, the LIMA should be used as a free graft. The current strategy for ischemic heart disease is off-pump CABG. Usually, the gastric tube is fed by the gastroepiploic artery which runs to the left of the gastric tube. If the feeding arteries of the gastric tube are continuous with the LIMA, an arterial graft would inhibit gastric blood flow and lead to necrosis. Moreover, damage to the feeding vessels would result in more damage to the gastric tube than caused by harvesting. Therefore, the management strategy must be considered carefully. We recommend that contrast-enhanced CT be carried out prior to surgery. In the present case, it enabled us to see that a median sternotomy was the better course of action. Although the gastric tube appeared to be contact with the sternum, we considered it was possible to avoid injury to it by performing a median sternotomy because it seemed already to have become relatively thick. Moreover, the gastric tube is relatively strong and rupture is rare because little damage is caused by harvesting, but naturally this must be done with care. Managing adhesions on the left side of the sternum, which is more vascular, needs only a few centimeters for the sternal retractor, while for the right side it has to proceed into the right pleural space, entering
the space between the right pleura and the gastric tube. In our patient, the pericardium was reached relatively safely. After pericardiotomy, the gastric tube was drawn to the left side of the mediastinum with a pericardium board, and became deeper for off-pump CABG. The LIMA could not reach the coronary arteries, and therefore could not be used. To avoid mediastinitis in cases of substernal gastric tube interposition, the standard procedure is left thoracotomy. We performed conventional cardiac arrest CABG safely and promptly, and the postoperative

Fig. 2 Preoperative computed tomography shows the feeding arteries of gastric tube were in contact with the left internal mammary artery.
course was uneventful. We recommend a median sternotomy be performed as an option in patients who have had substernal gastric tube interposition. In such cases, preoperative CT will be necessary to select the optimal approach.

Disclosure Statement

The authors have no conflicts of interest to disclose with respect to this work.

References