Effect of Venous Superdrainage on Colon Interposition for Esophageal Reconstruction

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Abstract: When performing esophageal reconstruction, a colonic pedicle graft is chosen as the next candidate to the stomach because of complications arising from the operation time and vascular anastomosis. Vascular anastomosis is not necessarily required for pedicle grafts, but it is necessary to perform additional vascular anastomosis in some cases. We herein report a case of superdrainage in which anastomosis of the colonic vein and the right internal thoracic vein was effective against congestion. A 68-year-old man with thoracic esophageal cancer and pyloric antrum gastric cancer was referred to our hospital. Complete resection was performed with subtotal esophageal resection and total gastrectomy. We added superdrainage (right internal thoracic vein – ileocolic vein) to the colonic pedicle graft, which showed congestion, and performed esophageal reconstruction. Venous superdrainage using a colonic pedicle graft is effective for esophageal reconstruction.

Keywords: superdrainage, colonic pedicle graft, esophageal cancer.

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Background

Unlike abdominal surgery, which can be orthotopically reconstructed by gastrointestinal mobilization, esophageal reconstruction requires the digestive tract to be raised to the neck. The stomach is the first choice for reconstruction, but after gastrectomy, in cases such as simultaneous gastric cancer, free grafts or pedicled grafts, such as from the colon and small intestine, are used. When a free graft is used, the surgeon secures the length necessary for reconstruction, and vessels are transplanted. In a pedicled graft, on the other hand, the length is restricted but the nutrition vessels are maintained. Therefore, a colonic pedicle graft is chosen in esophageal reconstruction as the next candidate to the stomach because of complications arising from the operation time and vascular anastomosis. Although vascular anastomosis is not necessarily required when placing a pedicled graft [1, 2], it is necessary to add vascular anastomosis in some cases because of the high rates of suture failure and graft necrosis in comparison to reconstruction using the stomach [3, 4]. In the present case, we chose a colonic pedicle graft for the esophageal reconstruction, which involved the performance of subtotal resection of the esophagus and total gastrectomy for esophageal cancer and stomach cancer. Because congestion was observed at the graft tip at the time of reconstruction, we performed superdrainage with anastomosis of the ileocolic vein and the right internal thoracic vein. Superdrainage is an excellent technique for preventing blood flow failure, and we herein report a case of recovering blood flow...
in anastomosis by venous superdrainage in esophageal reconstruction.

Case Report

A 68-year-old man was referred to our hospital for resection of the esophagus after treatment for thoracic esophageal cancer and pyloric antrum gastric cancer (Figure 1). As there were no signs of distant metastases in positron emission tomography-computed tomography (PET-CT) (Figure 2A), we planned subtotal esophageal resection and total gastrectomy, and we examined the colon for use in the reconstruction of the esophagus (Figure 2B). The patient had no lesions other than the lesions in the esophagus and stomach; thus, we decided to resect both lesions.

We achieved complete resection in the thoracic esophageal cancer and pyloric antrum gastric cancer. Reconstruction was performed using an ileocolic pedicle graft, with the graft preserving the middle colic ves-

Figure 1. Endoscopic and upper gastrointestinal series findings. A: A type 2 tumor in the middle of the thoracic esophagus. B: The extent of the cancer was approximately 6 cm. C: Two lesions were observed in the posterior wall of the antrum and in the lesser curvature of the pylorus. D: Irregular lesions with a shallow recess.

Figure 2. Positron emission tomography-computed tomography (PET-CT) and barium enema. A: Results of the full body examination. We confirmed that there was no distant metastasis. Black arrows indicate esophageal and gastric cancer. B: No lesions were found in the colon used for reconstruction of the esophagus.

Figure 3. Surgical findings and postoperative computed tomography (CT)-angiography. A: Congestion was found in the esophago-ileostomy (black arrow). The right internal thoracic vein (yellow arrow) and the ileocolic vein (white arrow) were anastomosed. Congestion was not immediately confirmed. B: Postoperative computed tomography (CT) confirmed patency and blood flow.

Figure 4. Resected specimens. A: Well differentiated squamous cell carcinoma of the esophagus. Pathological stage III. B: Poorly differentiated adenocarcinoma of the stomach. Pathological stage III. C: Moderately differentiated adenocarcinoma of the stomach. Pathological stage III.
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The right colon was mobilized by cutting the ileocolic vein and artery, and the graft was anastomosed to the neck by the posterior sternal pathway. At this point, congestion was observed at the anastomotic site of the ileum, so the right fourth rib cartilage was resected, the right internal thoracic vein was exposed, and anastomosis was performed on the ileocolic vein – the right internal thoracic vein – to improve the congestion (Figure 3A). We confirmed that the congestion improved and that the blood flow in the marginal artery was good at the ileostomy (Figure 3B). The patient was discharged at 16 days after surgery. The final pathological diagnosis was advanced well-differentiated squamous cell carcinoma of the esophagus, and advanced poorly-differentiated adenocarcinoma/moderately-differentiated adenocarcinoma of the stomach (Figure 4).

The patient was well with no signs of recurrence at the two-year follow-up examination.

Discussion

We herein presented a case of superdrainage of the ileocolic vein to the right internal thoracic vein by a colonic pedicle graft in which good results were obtained. Although the stomach is the first choice for esophageal reconstruction, there are cases in which the stomach cannot be used due to a history of gastrectomy or simultaneous gastric carcinoma. Colonic pedicle grafts have been used as a second choice. Although vascular anastomosis is not necessarily required when placing a pedicle graft, the probability of complications is higher when using the colon than when the stomach is used for reconstruction [4–7]. Causes of suture failure and graft necrosis include ischemia due to arterial blood flow failure, and congestion due to venous perfusion failure. Arterial anastomosis (supercharge) and intravenous anastomosis (superdrainage) are added to reduce complications caused by circulatory disorders of reconstructed organs [3]. There is no consensus, however, on the approach that should be applied; these techniques are currently selected at the surgeon’s discretion [2]. Some groups have previously reported that superdrainage improved graft survival in comparison to supercharge in experimental animals [8–10]. This is evidence of the effectiveness of superdrainage in graft transplantation. Thus, in cases of suspected disorders of organ circulation, super drainage should be positively considered as a preventive from the viewpoint of graft survival.

Conclusion

Superdrainage contributes to esophageal reconstruction when using a colonic pedicle graft.

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Conflict of Interest

The authors declare no conflicts of interest in association with the present study.

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