

# Pericardial devascularization combined with preservation of Latarjet's nerves trunk in treatment of patients with portal hypertension

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**OBJECTIVE:** To investigate the effect of pericardial devascularization combined with preservation of Latarjet's innervation on portal hypertension.

**METHODS:** Sixty-two patients (57 men and 5 women) have been undergone pericardial devascularization combined with Latarjet's innervation since 1984. Clinical results and postoperative complications were evaluated.

**RESULTS:** The incidence of upper-digestive tract bleeding was 3.2% (2 patients) within 1 month after operation. Four patients (6.5%) died within 1 month after operation (3 patients received emergency operation and 1 selective operation). Among them, 3 patients died from hepatic failure, and one patient from sepsis due to subphrenic infection. Among these deaths, 3 were evaluated Child's C. After operation, the number of patients with abdominal distension, sudden diarrhea and gastric retention was 7 (11.3%), 3 (4.8%) and 0, respectively.

**CONCLUSION:** Pericardial devascularization combined with Latarjet's innervation can preserve the normal function of gastric emptying, prevent acute lesion of the gastric mucosa, and reduce the incidence of esophageal varices rebleeding after operation.

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**Key words:** vagus; nerve; hypertension; portal

## Introduction

There are various ways to treat hemorrhage from esophageal varices due to portal hypertension; however, effective, ideal methods are not available. Pericardial devascularization has been proved to be superior to other methods because of its moderate damage to liver function, satisfactory liver blood infusion, and lower incidence of rebleeding after operation,<sup>[1]</sup> yet the disorder of postoperative gastric emptying is likely to occur owing to the damage of the Latarjet's trunk. According to our experi-

ence in pericardial devascularization (PD), we have combined PD with Latarjet's innervation (PDLI) in the treatment of 62 patients since 1984.<sup>[2,3]</sup>

## Methods

### Patients

Sixty-two patients (57 men and 5 women) aged from 27 to 64 years were treated by PDLI. These patients suffered from varices bleeding (spitting blood and dark stool), which happened twice in 36 patients (58.1%). Fourty-five patients (72.6%) had moderate esophageal varices.

### Liver function

Among the 62 patients, 26 (41.9%) belonged to Child's A, 30 (48.4%) to B, and 6

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(9.7%) to C.

### Operative classification

Emergency and selective operations were performed on 16 (25.8%) and 46 patients (74.2%), respectively.

### Operative procedures

After splenectomy, the anterior leaves of the lesser omentum including the nerves and vessels in the gastric wall were dissected to the gastric wall proximal to the "crow's foot" upward to His angle, leaving 5 to 7 cm of the distal stomach intact to preserve its vagal innervation. The proximal end of the disconnected tissues was sutured and the distal end in the gastric wall was sutured in 8-shape.

From the right gastroepiploic vessels, the gastrotocolic ligament and gastric brevia were dissected proximally close to the gastric wall upward to the left cardia. After turning the stomach over, the tissues and vessels between the posterior wall of the stomach and pancreas were thoroughly disconnected including the posterior gastric vein.

The distal esophagus was mobilized completely for 5 to 7 cm till the lamina muscularis was clearly exposed, and the peritoneum and the anteroposterior vagus nerves were dissociated and pulled to the posterior. The upper esophageal vessels were entirely disconnected.

The dissected lesser and greater curvatures were reperitonealized. A drainage tube was placed in the splenic bed. Pyloroplasty was not necessary.

### Results

#### Portal vein pressure

Portal vein pressure was measured through the right gastroepiploic vein. The average pressure was 38.5 cm H<sub>2</sub>O before disconnecting the portal vein and pericardial devascularization. After the devascularization, the portal pressure went up in 34 patients (54.8%), dropped in 25 (40.4%), and unchanged in 3 (4.8%).

#### PDLI effect

Two patients (3.2%) had bleeding within 1 month after operation. Among 4 deaths (6.5%) within 1 month after operation, 3 (4.9%) received emergent operation and 1 (1.6%) selective operation. Their death was due to hepatocellular failure (3 patients) and sepsis caused by subphrenic infection (1). Three of the 4 deaths belonged to Child's C. After operation, sudden diarrhea and gastric retention were seen in 7 patients (11.3%), 3 (4.8%) and 0, respectively. All the patients were followed up for 6 months to 15 years (average, 6.2 years). The 3- and 5-year survival rates were 91.2% and 86.3%, respectively.

### Discussion

Pericardial devascularization is effective in controlling hemorrhage from esophageal varices; however, the resultant damage of the Latarjet's trunk may lead to the disorder of gastric emptying including abdominal distension, gastric retention, and sudden diarrhea.

#### Causes of rebleeding after PD

The reported rebleeding rate after pericardial devascularization (PD) is about 9.8%–17%.<sup>[4,5]</sup> Most surgeons considered that the rebleeding after pericardial devascularization is due to incomplete devascularization. Recent studies, however, showed that the damage to the gastric mucosa contributes to the rebleeding (5.5%–65.5%). Because of the gastric vessels are severed in the lesser and greater curvature, the distal esophagus, and the Latarjet's nerves trunk, gastric emptying turns to be abnormal, resulting in gastric hypoximia, hypoperistalsis, and delayed evacuation. Once gastric retention and evacuative disturbance occur, blood flow is reduced in the gastric mucosa and the extreme gastric dilatation increases the tension of the vascular bed. Further, abnormal microcirculation results in insufficient supply of oxygen and nutrition and weakens the defensive function of the gastric mucosa. This may be a leading cause for early hemorrhagic gastritis after operation.<sup>[6,7]</sup> In our patients, rebleeding after operation was not due to incomplete devascularization but to acute gastric

mucosal lesion. Hence, proper management of early acute gastric mucosal lesion is essential to the control of early hemorrhage.

### Significance of PDLI

The preserved Latarjet's nerve trunk, the "crow's foot" and the normal function of gastric emptying after PDLI can prevent the occurrence of gastric retention, which is good for the recovery of the damaged gastric mucosa due to insufficient microcirculation. In our group, the rebleeding rate and operative mortality after operation were only 3.2% and 6.5%, respectively, which are obviously lower than those after pericardial devascularization (10.5% and 12.3%, respectively).<sup>[2]</sup> These results indicate that PDLI that can prevent the rebleeding and reduce the operative mortality is meaningful to improve the life quality of patients.

### Some important steps of PDLI procedures

Most patients with liver cirrhosis have fat or fatty deposition in the omentum. The coronary veins usually show such characteristics as thickness, tortuosity, dilatation or thin wall. When disconnected they are easy to bleed. The preservation of the Latarjet's nerve trunk and thorough devascularization are necessary to disconnect as close as possible the nerves and vessels in the gastric wall along the wall of the lesser curvature and the distal end in the gastric wall is sutured in 8-shape. When the distal esophagus is mobilized for 5 to 7 cm, the esophageal peritoneum or the esophageal peritoneum with the anteroposterior vagus nerves trunk is pushed to the right. In the meantime, the upper esophageal vein branch should be ligated closely with the esophageal wall. Because the blood supply to the 2 cm gastric tissues in the anteroposterior wall of the lesser curvature originates from the terminal branch of the right and left gastric arteries, ischemic area exists in the lesser curvature itself.

After vagotomy and devascularization, the muscular layer is exposed along with disconnection of the vessels and rapid reduction of the blood flow of the gastric mucosa, so ischemic necrotic perforation occurs easily in the gastric wall of the lesser curvature.<sup>[8]</sup> Therefore, it is important to suture the nulled seromuscular layer in the lesser and greater curvatures by embedding method so that ischemic necrotic perforation of the gastric wall can be avoided.

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