Chapter 14
Endoscopic Varicealography During Endoscopic Injection Sclerotherapy (EVIS)

Fumio Chikamori and Yasuhiro Takase

Abstract Endoscopic varicealography (or varicography) during endoscopic injection sclerotherapy is a retrograde venography as described in Chap. 23 "Takase method" of endoscopic injection sclerotherapy for esophagogastric varices. Excessive injection of 5% ethanolamine oleate with iopamidol (5%EOI) causes portal thrombosis, renal dysfunction, or lung congestion. The flow of the sclerosant is monitored by varicealography. The amount of 5% EOI can be controlled either by visualizing the filling of supply route or visualizing paraesophageal, inferior phrenic, or mediastinal veins.

Keywords Endoscopic varicealography during endoscopic injection sclerotherapy Esophagogastric varices

14.1 Introduction

Contrast radiography for portal collateral pathways is divided into two types: antegrade and retrograde venography.

Percutaneous transhepatic portography (PTP) [1] is an antegrade venography, which provides the most precise information about portal collaterals. However, it is invasive for the patients with liver cirrhosis. On the other hand, arterial portography is safe and less invasive but less precise than PTP. Endoscopic varicealography (or varicography) during endoscopic injection sclerotherapy (EVIS) is a retrograde venography as described in Chap. 23 "Takase method" of endoscopic injection sclerotherapy (EIS) for esophagogastric varices [2].

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14.2 Vascular Map of the Portal System

Based upon the findings of PTP in 75 patients with esophagogastric varices, we constructed a vascular map of the portal system (Fig. 14.1) [3].

The blood supply routes of esophageal varices are divided into two systems: a major supply route comprised mainly of the left gastric vein (LGV) and a minor supply route comprised of the short gastric vein (SGV). Each of them constitutes a separate system of blood flow, which is independent of the other. The LGV system consists

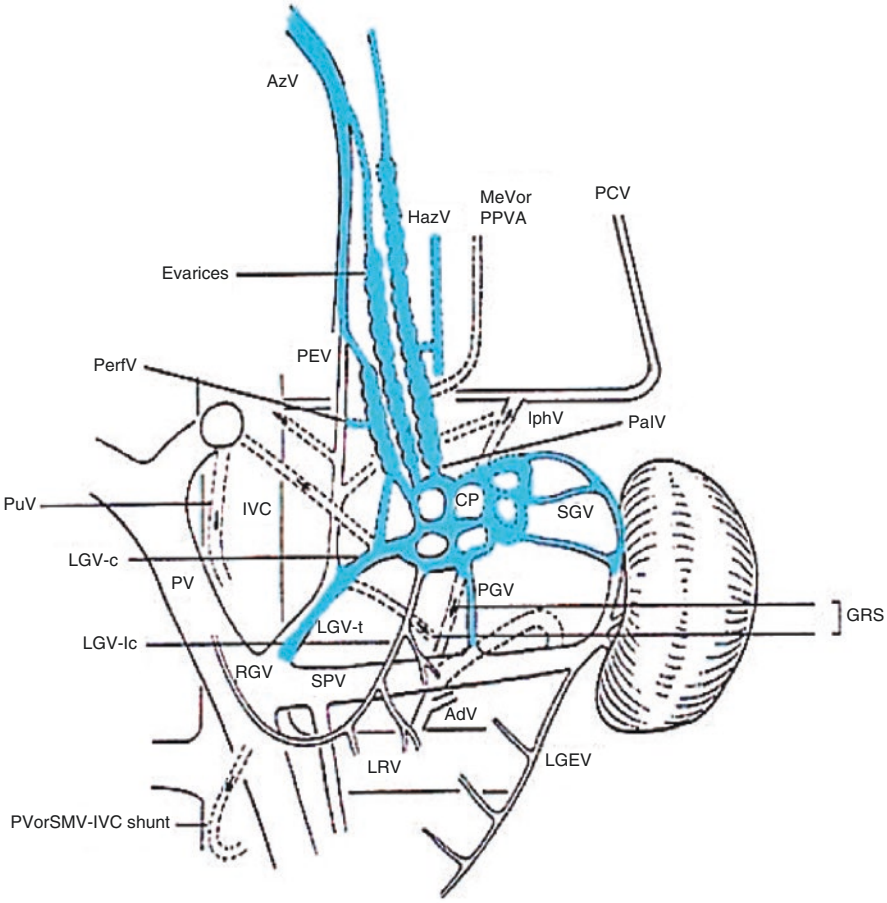

Fig. 14.1 Vascular map for treating esophagogastric varices. *PV* portal vein, *SPV* splenic vein, *IVC* inferior vena cava, *LGV-t* trunk of the left gastric vein, *LGV-c* cardiac branch of the left gastric vein, *LGVlc* lesser curvature branch of the left gastric vein, *PGV* posterior gastric vein, *SGV* short gastric vein, *RGV* right gastric vein, *LGEV* left gastroepiploic vein, *CP* cardiac venous plexus, *PalV* palisade vein, *Evarices* esophageal varices, *PEV* paraesophageal vein, *PerfV* perforating vein, *AzV* azygos vein, *HazV* hemiazygos vein, *MeV or PPVA* mediastinal vein or portopulmonary venous anastomosis, *AdV* adrenal vein, *LRV* left renal vein, *PuV* paraumbilical vein, *IphV* inferior phrenic vein, *GRS* gastrorenal shunt, *PCV* pericardial vein, *PV or SMV-IVC shunt* portal vein or superior mesenteric vein-IVC shunt

of the trunk, cardiac branch and lesser curvature branch of the LGV, and the cardiac venous plexus (CP). The number of trunks in the LGV is sometimes two or more. The SGV system consisted of trunks, the fundic branch of the SGV, and the posterior gastric vein and communicates with the CP. The lesser curvature branch of the LGV communicates with the right gastric vein and the left gastroepiploic vein. The paraesophageal and the inferior phrenic veins are the other blood drainage routes of the LGV.

14.3 Analysis of Blood Supply Routes of Esophageal Varices Comparing EVIS and PTP

14.3.1 Blood Supply Routes of Primary Esophageal Varices

The blood supply routes of primary and recurrent varices in 11 cases of recurrent esophageal varices were analyzed by comparing the EVIS images obtained at EIS using the Takase method initial and repeat EIS with PTP images before and after initial EIS [4].

EVIS at initial EIS [4] showed the vessels of the LGV system, such as the cardiac branch and the CP in all 11 cases with primary esophageal varices. The trunk of the LGV was visible in 73% (8/11) and the posterior gastric vein in 18% (2/11) cases (Figs. 14.2 and 14.3).

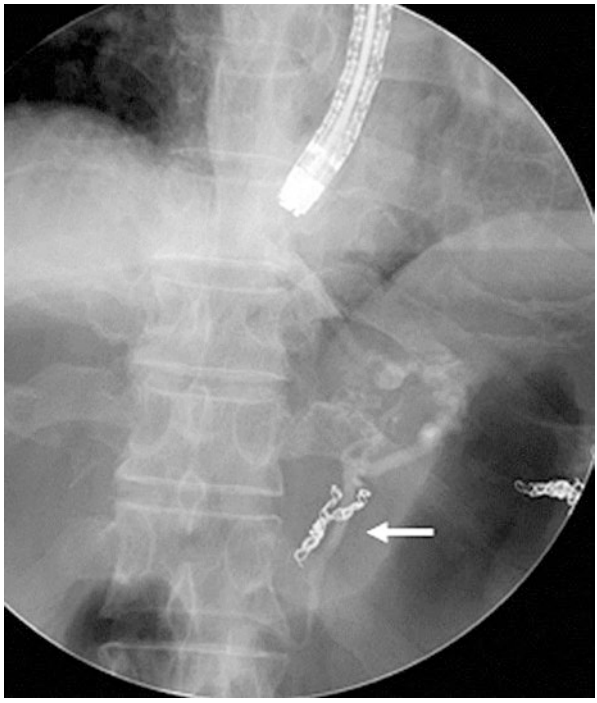

Fig. 14.2 LGV. EVIS showing that the esophageal varices are supplied by the LGV (*arrow*)

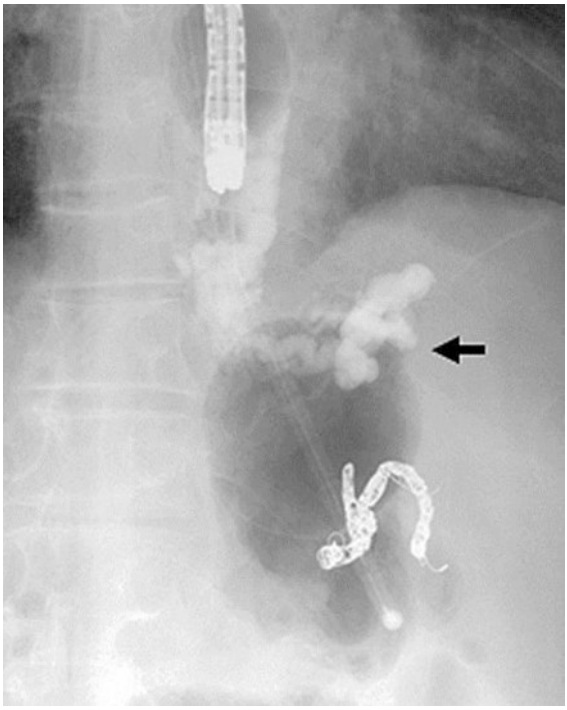

Fig. 14.3 Gastroesophageal varices. EVIS showing esophagogastric varices (*arrow*)

14.3.2 Blood Supply Routes of Recurrent Esophageal Varices After EIS

The blood supply routes of recurrent varices, demonstrated by EVIS, are the vessels of the SGV system, such as the fundic branch of the SGV (Fig. 14.4) or the posterior gastric vein in 82% (9/11) of cases and the partially reformed fine CP in 27% (3/11) of cases [4].

14.3.3 Blood Supply Routes of Esophageal Varices After Total Gastrectomy

Esophagojejunal varices after total gastrectomy are supplied by the branches of the jejunal vein of the arcade of the ascending jejunal limb (Fig. 14.5) [5].

Fig. 14.4 SGV. EVIS showing that the recurrent varices are supplied by the fundic branch of the SGV (*arrow*)

14.4 Usefulness of EVIS

14.4.1 Technical Aspects of EVIS

At the time of EIS, excessive injection of 5% EOI causes portal thrombosis, renal dysfunction, or lung congestion. Therefore, in order to prevent excessive injection of 5% EOI, the flow of the sclerosant is closely monitored by varicealography. The amount of 5% EOI can be controlled either by visualizing the filling of supply routes or by visualizing the paraesophageal (Fig. 14.6), inferior phrenic, or mediastinal veins (Fig. 14.7) [6].

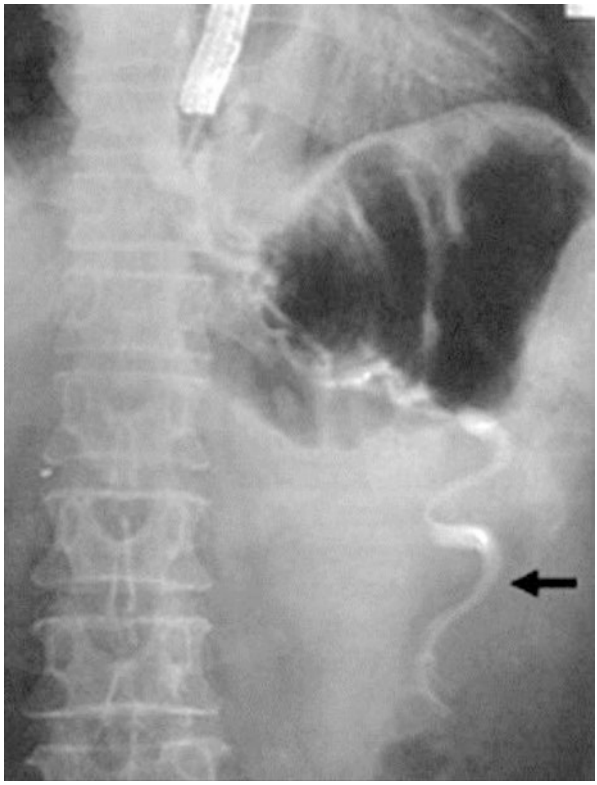

Fig. 14.5 Jejunal vein. EVIS showing that esophageal varices after total gastrectomy are supplied by branches of the jejunal vein of the arcade of the ascending jejunal limb (*arrow*)

14.4.2 Visualization Rate by EVIS for Each Collateral Pathway

Portal collaterals were evaluated using the Takase method in 126 patients with esophageal varices [7]. Analysis of EVIS showed that 52% of collaterals could be visualized for LGV, 48% for CP, 9% for SGV, and 14% for extraesophageal blood drainage routes.

According to our results, we believe that in EIS, a necessary injection dose must be established according to the volume of these visualized blood supply routes varicealography.

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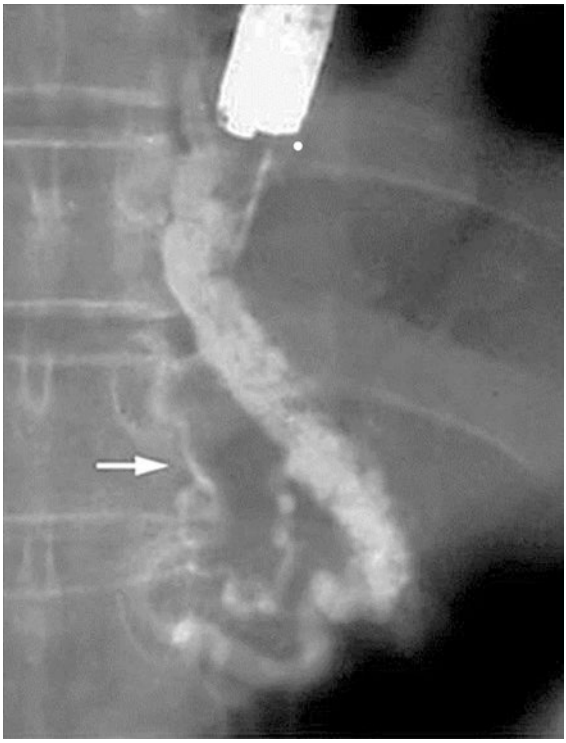

Fig. 14.6 Paraesophageal vein. EVIS showing esophageal varices, cardiac branch of the LGV, and paraesophageal vein (*arrow*)

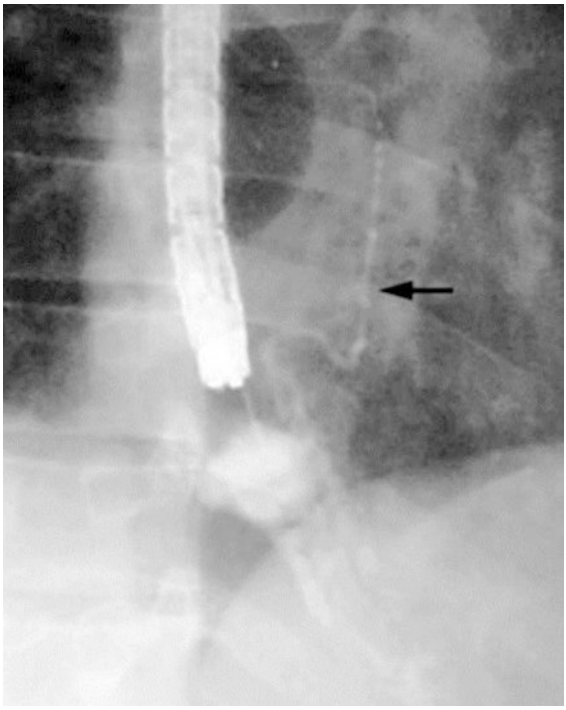

Fig. 14.7 Mediastinal vein. EVIS showing esophageal varices and mediastinal vein (*arrow*)

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