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Evaluation of portosystemic collaterals by MDCT-MPR imaging for management of hemorrhagic esophageal varices

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ABSTRACT

Objective: To study the correlation between changes in portosystemic collaterals, evaluated by multidetector-row computed tomography imaging using multiplanar reconstruction (MDCT-MPR), and prognosis in patients with hemorrhagic esophageal varices (EV) after endoscopic treatment.
Methods: Forty-nine patients with primary hemostasis for variceal bleeding received radical endoscopic treatment: endoscopic injection sclerotherapy (EIS) or endoscopic variceal ligation (EVL). Patients were classified according to the rate of reduction in feeding vessel diameter on MDCT-MPR images, into the narrowing ($n = 24$) and no-change ($n = 25$) groups. We evaluated changes in portosystemic collaterals by MDCT-MPR before and after treatment, and determined rebleeding and survival rates.
Results: The left gastric and paraesophageal (PEV) veins were recognized as portosystemic collaterals in 100 and 80%, respectively, of patients with EV on MDCT-MPR images. The rebleeding rates at 1, 2, 3, and 5 years after endoscopic treatment were 10, 15, 23, and 23%, respectively, for the narrowing group, and 17, 24, 35, and 67%, respectively, for the no-change group ($P = 0.068$). Among no-change group, the rebleeding rate in patients with large PEV was significantly lower than that with small PEV ($P = 0.027$). The rebleeding rate in patients with small PEV of the no-change group was significantly higher than that in the narrowing group ($P = 0.018$). There was no significant difference in rebleeding rates between the no-change group with a large PEV and narrowing group ($P = 0.435$).
Conclusion: Changes in portosystemic collaterals evaluated by MDCT-MPR imaging correlate with rebleeding rate. Evaluation of portosystemic collaterals in this manner would provide useful information for the management of hemorrhagic EV.

1. Introduction

Variceal bleeding is a serious adverse event in patients with liver cirrhosis. Patients surviving the first episode of variceal bleeding have a greater than 60% risk of recurrent hemorrhage within 1 year of the initial episode [1]. All patients surviving a variceal bleed should therefore receive radical treatment to prevent rebleeding. The combination therapy of pharmacological treatment and endoscopic variceal ligation (EVL) is generally considered to prevent variceal rebleeding [2–4]. However, some studies showed that narrowing of feeding vessels by embolization with endoscopic injection sclerotherapy (EIS) reduced the recurrence of esophageal varices (EV) [5–7].

Although some studies suggested a close relationship between changes to feeding vessels and EV recurrence after endoscopic therapy [8], little is known about the portosystemic collaterals and their association with rebleeding of hemorrhagic EV. New endoscopic methods to treat and monitor the treatment effect in these patients are clearly needed. The portal venous system has been evaluated by invasive methods such as angiography and percutaneous transhepatic portography (PTP). However, advances in computed tomography (CT) for diagnostic imaging allow useful information about portosystemic collaterals to be obtained by multidetector-row CT imaging (MDCT). Previous evaluation by MDCT-multiplanar reconstruction (MPR) imaging before and after endoscopic treatment showed a close relationship

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between changes in feeding vessels and prognosis after endoscopic therapy [9].

The present retrospective study was designed to determine the relationship between portosystemic collaterals and prognosis of hemorrhagic EV using MDCT-MPR imaging.

2. Materials and methods

2.1. Patients

Sixty consecutive patients with hemorrhaged EV were admitted to our institution from January 2000 to March 2007. Two patients died of hemorrhagic shock while 58 patients underwent emergency endoscopic examination after reaching a stable condition. Active bleeding was detected in 40 patients and in the remaining 18 patients spontaneous hemostasis was evaluated as a red plug in 4 patients and as a white plug in 14 patients. As a rule, primary hemostasis was induced at the bleeding point by endoscopic variceal ligation (EVL). All 40 patients treated by EVL achieved primary hemostasis. However, 2 refused radical treatment, one underwent liver transplantation after endoscopic hemostasis, and 6 patients died of liver failure. Thus, 49 patients (18 with spontaneous hemostasis and 31 with primary hemostasis) underwent radical treatment (Fig. 1). Radical endoscopic treatment was performed after estimating the general condition of the patient, liver function, renal function, portosystemic collaterals, and hepatocellular carcinoma (HCC) by MDCT-MPR imaging. Endoscopic injection sclerotherapy (EIS), in which the sclerosant (5% ethanolamine oleate) is injected into the varices, was generally used as the radical treatment. However, EVL was selected for patients with progressive HCC, poor liver function, poor renal function, and narrow EVs. Consequently, EIS was performed in 37 patients while EVL in 12 patients. MDCT-MPR imaging was also used to evaluate the effect of endoscopic treatment. None of the 49 patients was on β-blocker medication during the follow-up period. Fig. 1 shows the algorithm for selection of patients with acute variceal bleeding for treatment. Fig. 2 shows examples of variceal bleeding and hemostasis with EVL.

Table 1 lists the clinical characteristics of patients. Endoscopic findings of the EVs were evaluated according to the classifica-

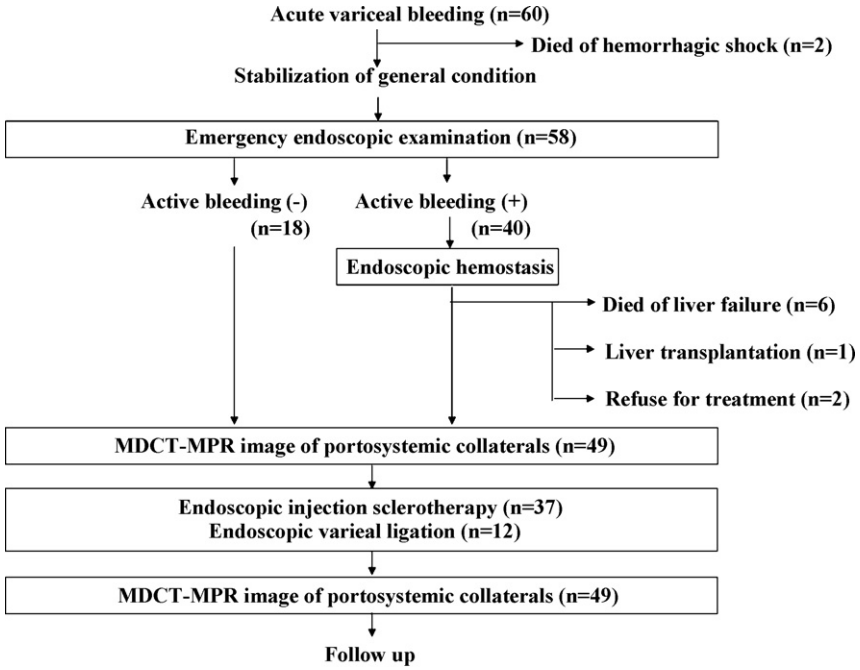

Fig. 1. Algorithm for selection of patients with acute variceal bleeding for treatment.

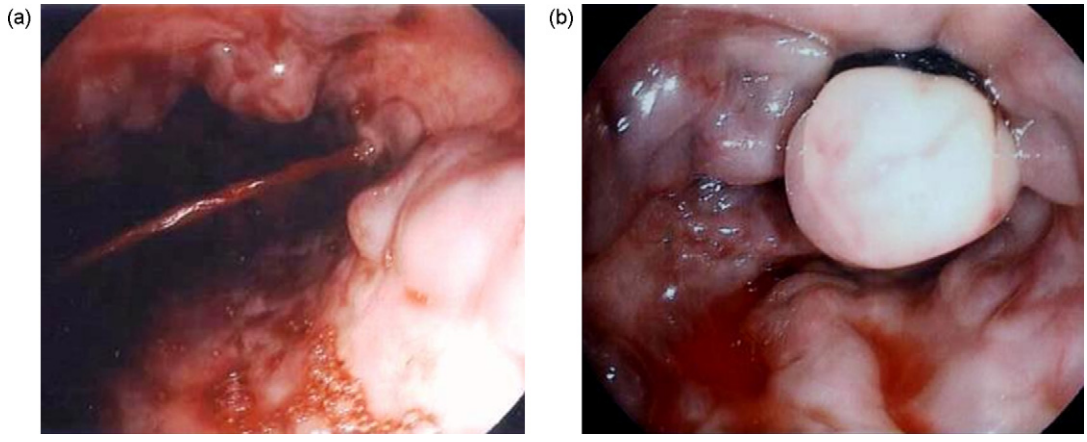

Fig. 2. Endoscopic findings of hemorrhagic esophageal varices. (a) spurting bleeding and (b) endoscopic variceal ligation.