Endoscopic injection sclerotherapy (EIS) is currently one choice in primary treatment for patients who present with esophageal variceal bleeding. EIS has been proved effective in controlling acute variceal hemorrhage in both alcoholic and non-alcoholic cirrhotic patients. Both local and systemic complications after EIS have been documented. Reports on the development of esophageal cancer after EIS are rare. In our hospital, patients with EIS for esophageal varices are followed by endoscopy, and esophageal cancer has occurred in two male patients. The relationship between EIS and development of esophageal cancer is not well-documented.

We reported two cases of squamous cell carcinoma of the esophagus following endoscopic injection sclerotherapy (EIS) for esophageal varices. Both patients were current smokers and had a long history of alcohol abuse. HBsAg and Anti-HCV were negative, and Anti-HBs was positive in one of the patients. They were diagnosed as alcoholic cirrhosis with esophageal varices and received EIS treatment. So-tradecol was utilized as the sclerosant with a mean total volume of around 30 ml. Patients developed dysphagia at 5 and 48 months following EIS, respectively. Endoscopic examination showed stenosis and ulcerative mass at the lower portion of the esophagus. Biopsy revealed well- to moderately differentiated squamous cell carcinoma of the esophagus. We conclude that endoscopic follow-up is essential and carcinoma of the esophagus should be included in the differential diagnosis for esophageal ulceration and dysphagia following EIS, particularly in those patients with risk factors for developing esophageal cancer.

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cm in the right middleacular line on percussion. Spleen was not palpable. Abdominal sonography revealed liver cirrhosis with splenomegaly, gall bladder stones and ascites. Endoscopy revealed multiple large esophageal varices with hematocystic spots. There was no evidence of gastric varices. EIS was performed shortly after admission. Sotradecol (sodium tetradecyl sulfate) was utilized as the sclerosant. A total of four sessions of EIS were given. Approximately 6-8 ml of Sotradecol was injected in divided doses during each session. The general condition was well with out serious complications following EIS. All esophageal varices were eradicated. In October 1993, the patient came to our OPD with a chief complaint of dysphagia and was admitted for further evaluation. Endoscopy at this time showed no signs of esophagus and a neoplastic mass found proximal to the stenotic area (Fig. 1 and 2). Biopsy revealed a moderately differentiated squamous cell carcinoma of the esophagus. The patient has been lost to follow-up since then.

Case 2

In May 1996, a 53-year-old male presented to emergency room with a chief complaint of shortness of breath and passage of tarry stool. He was a heavy drinker with intake of 4 bottles of Shaoxing wine (16% vol.) per day for more than 10 years and smoked 2-3 packs of cigarettes daily. He had a history of pulmonary TB and traffic accident with rib fracture. On examination, there was hepatomegaly of 2 finger breadths below the right costal margin. The spleen tip was palpable. Abdominal sonography revealed liver cirrhosis with splenomegaly. Endoscopic examination showed esophageal varices with hematocystic spots. Endoscopic injection sclerotherapy with Sotradecol was given. Totally, 30 ml of Sotradecol was given in 6 sessions. All esophageal varices were eradicated. On September 23, 1996, the patient suffered from difficulty in swallowing and loss of appetite and was then readmitted for investigation. Panendoscopic examination revealed an infiltrative ulceration over the lower portion of the esophagus (Fig. 3). Biopsy was taken and the pathological result was well-differentiated squamous cell carcinoma of the esophagus. Esophagram showed an irregular stricture at the lower third of the esophagus (Fig. 4). Resection of the lower portion of the esophagus with end to end anastomosis (esophag-
ogastrostomy) was done on the thirteenth hospital day. The pathological report was a well-differentiated squamous cell carcinoma of esophagus with soft tissue invasion and periesophageal lymph nodes metastasis. After the first course of postoperative chemotherapy with 5FU 1000 mg and cisplatin 25 mg, the patient refused further treatment. He became cachectic and expired on April 3, 1997.

**Discussion**

Endoscopic injection sclerotherapy (EIS) was first described by Crafoord and Frenckner in 1939. It has been widely used to treat patients with bleeding esophageal varices. Complications associated with EIS vary in type and frequency. Some common complications following sclerotherapy include esophageal ulcer, bronchopneumonia, pleural effusion and mediastinitis. Squamous cell carcinoma of the esophagus is not yet considered as a complication of EIS. The first report was by Umekita in 1985. The relationship between esophageal carcinoma and EIS is not completely understood. To our knowledge, there are only 20 cases of esophageal cancer after EIS in the English literature. It is possible that during injection of sclerosant into esophageal varices, some of the sclerosant extravasates into esophageal mucosa and submucosa, where it may act as a carcinogen. In our two cases, the site of cancer development did not correspond to the location of EIS. Furthermore, Salaman reported that ethanolamine oleate had no carcinogenic effect and the site of cancer occurrence did not correspond to the area of injection. In autopsy, Evans et al. have used sodium tetradecyl sulfate as the sclerosant and injected into the varices. They found thrombosed vessels and fibrosis in the esophageal wall with out evidence of cell dysplasia or malignancy in those patients who had died over 60 days after the last injection.

Chronic mucosal inflammation associated with achalasia and corrosive ingestion has been shown to increase incidence of squamous cell carcinoma. Injection of sclerosant into the esophagus leads to cicatricial constriction and stricture formation. Manometric studies have shown that impaired esophageal motility and decreased relaxation of the lower esophageal sphincter after EIS. Failures of the cardia to relax results in stagnation and chronic inflammation of...
esophageal mucosa. Rake postulated that esophageal cancer could result from progresion of esophagitis, shallowness of ulcers, epithelial hyperplasia and benign papilloma that even then usually became malignant. It is conceivable that, at the time of EIS, the shortest latent period of onset of esophageal cancer may be extremely long. According to our cases and reports, the latent period of onset of esophageal cancer was from 4 to 77 months. In addition, Takase et al. examined the esophageal wall of 14 patients following EIS. They found the same results as Ouyang and at first there was a thrombosis formation then gradual release of endothelium covering varices and close endoscopic follow-up, is essential and the differential diagnosis for the development of esophageal cancer is easily obscured by prominent varices and blood clots during the first endoscopic examination. Since esophageal cancer can be seen as a common complication of cancer and ulceration are common complications following EIS and in the absence of suspicion of malignantancy, biopsies and cytology are usually not performed during the procedure. The progression of cancer can continue after EIS, and the site of injection should be alerting the endoscopist to the potential for development of esophageal cancer as associated with EIS. How- ever, it is reasonable to suggest that endoscopic follow-up is essential in all cases as well as in ours, these fac tors were present.

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