CASE REPORT

Eosinophilic pleural effusion after gastric variceal obliteration with cyanoacrylate

Viboon Boonsarngsuka,∗, Thitiporn Suwatanapongchedb

aDivision of Pulmonary and Critical Care Medicine, Department of Medicine, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok 10400, Thailand
bDivision of Diagnostic Radiology, Department of Radiology, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Thailand

Received 29 July 2006; accepted 14 August 2006

KEYWORDS
Pleural effusion; Endoscopic injection sclerotherapy; n-butyl-2-cyanoacrylate; Ethiodized oil; Gastric varices

Summary
Pleuropulmonary complications after endoscopic injection sclerotherapy for treatment of esophagogastric varices are not uncommon but are usually mild and self-limited. Herein we report a male patient with liver cirrhosis who underwent endoscopic injection sclerotherapy, using a mixture of n-butyl-2-cyanoacrylate and ethiodized oil for obliteration of gastric varices. After the procedure, he developed moderate amount of left pleural effusion that persisted for a period of time and required thoracentesis and medical treatment. We believed that the inadvertent retrograde reflux of the embolized glue and ethiodized oil via the portosystemic venous collateral into the left pleura might be the possible mechanism for the development of left pleural effusion as the droplets of ethiodized oil were seen along the left pleura on the imaging studies.

© 2006 Elsevier Ltd. All rights reserved.

Introduction

Because of its efficacy and safety, endoscopic injection sclerotherapy (EIS) has now become the treatment of choice for obliteration of esophagogastric varices.1,2 Satisfactory hemostasis in cases of acute variceal bleeding can be achieved by injection of various agents including the tissue adhesive n-butyl-2-cyanoacrylate (NBCA), ethanolamine oleate, polidocanol, ethanol, sodium tetradecyl sulfate, and sodium morrhuate.3 However, NBCA is now considered the best sclerosing agent for EIS for obliteration of bleeding gastric varices.4–6 Undiluted cyanoacrylate almost immediately polymerizes after contact with blood, resulting in rapid coagulation and vascular occlusion. Because of the risk of gluing of the needle in the varix, a mixture of NBCA and ethiodized oil is used to delay polymerization of NBCA and to help fluoroscopic monitoring.7,8 Nevertheless,
the delayed polymerization of the NBCA-ethiodized oil mixture may increase the risk of distal glue embolization or reflux into other systemic vessels.9–11

Pleural effusion is not an unusual complication following EIS but is usually mild and self-limited. It may occur in association with pulmonary artery embolization and parenchymal infarction after EIS.7,12 To our knowledge, however, other possible mechanism for the development of pleural effusion after EIS has neither been proposed nor demonstrated by the imaging studies. Herein we report a patient who developed left pleural effusion after EIS for obliteration of gastric varices. We believed that we were the first to be able to demonstrate the deposition of ethiodized oil along the left pleura in the chest radiograph and computed tomography (CT). The mechanism responsible for the development of left pleural effusion was also discussed.

Case report

A 43-year-old man with known hepatitis B-related liver cirrhosis and diabetes mellitus was admitted to our hospital because of low-grade fever, dry cough and left-sided pleuritic chest pain. Three weeks prior to admission, he had upper gastrointestinal bleeding and went to a private hospital. Esophageal and gastric varices were found on endoscopic examination. EIS was then performed by an experienced gastroenterologist for obliteration of gastric varices, using a mixture of 0.5 mL n-butyl-2-cyanoacrylate (Histoacryl; B-Braun Surgical GmbH, Melsungen, Germany) and 0.7 mL ethiodized oil (Lipiodol; Laboratoire Guerbet, Aulnay-Sous-Bois, France). The procedure was successfully done without any complication. One week after the procedure, however, he developed a new session of upper gastrointestinal hemorrhage that was successfully controlled by balloon tamponade and continuous intravenous administration of sandostatin. Initial chest radiograph obtained after the balloon insertion revealed multiple radiopaque materials in both hemithoraces and at the gastric fundus (Fig. 1). During that time, he had no fever or respiratory symptoms.

On admission, the patient was in no distress but was febrile with body temperature of 38.8°C. Physical examination revealed decreased breath sound and dullness on percussion at the left hemithorax. Other physical findings were unremarkable. Oxygen saturation, as detected by pulse oximeter at room air, was 95%.

Complete blood count showed a hematocrit of 32%, white blood cell count of 9400 cells/mm³ with 78% neutrophils, 17% lymphocytes, 15% monocytes and a platelet count of 127,000 cells/mm³. Blood sugar was 441 mg/dL. Serum lactate dehydrogenase (LDH) was 422 U/L (range, 100–190). Serum protein was 78 g/L and serum amylase was 54 U/L. Other blood chemistry and coagulation tests were within normal limits.

Initial chest radiograph revealed a moderate amount of left pleural effusion and a tiny radiopaque density overlying the right upper hemithorax (Fig. 2). Thoracocentesis was then performed and yielded straw-colored pleural fluid that was composed of a white blood cell count of 2010 cells/mm³, with 45% neutrophils, 40% lymphocytes, and 15% eosinophils. The pleural fluid had a glucose level of 394 mg/dL, LDH of 1000 U/L, protein of 43 g/L, adenosine deaminase (ADA) of 52 U/L, and amylase of 19 U/L. Microscopic examination of pleural fluid was negative for gram and acid-fast bacilli. Moreover, there was no organism growth on pleural fluid culture. Pleural fluid cytology revealed only inflammatory cells. Amoxicillin-clavulanate was then given
intravenously. Fever and pleuritic chest pain persisted. Follow-up chest radiograph performed 3 days later showed progressive increase in the amount of the left pleural effusion. A repeat thoracentesis was then performed. The pleural fluid was found to be composed of a white blood cell count of 7700 cells/mm³, with 54% neutrophils, 34% lymphocytes, and 12% eosinophils. The pleural fluid had a glucose level of 261 mg/dL, LDH of 728 U/L, protein of 43 g/L, and ADA of 34 U/L. No organism was found. Lung perfusion scintigraphy was performed but showed no perfusion defect.

The patient was treated conservatively with oral rofecoxib and oral amoxicillin-clavulanate. One day after the therapy, fever was ceased and respiratory symptoms were markedly improved. He was discharged 5 days after hospitalization despite the still persistent left pleural effusion.

The follow-up chest radiograph obtained 45 days after EIS showed significant decrease in the amount of the left pleural effusion. CT of the chest was performed and revealed a small amount of residual left pleural effusion. There were multiple small radiopaque foreign bodies in the left pleural cavity, likely along the left posterior costal pleura (Fig. 3). Multiple small radiopaque foreign bodies were also seen at the right anterosuperior chest wall, left posterior chest wall, and left anterior abdominal wall. These radiopaque foreign bodies were likely to represent droplets of Lipiodol. There was no evidence of pulmonary artery embolism or pariental pleural inflammation, as the glue can induce an intense inflammatory reaction and the metabolized ethiodized oil, in the form of inorganic iodine and fatty acid, can also induce eosinophilic inflammation.

The follow-up chest radiograph performed 3 days later showed a significant decrease in the amount of the left pleural effusion. CT of the chest was performed and revealed a small amount of residual left pleural effusion. There were multiple small radiopaque foreign bodies in the left pleural cavity, likely along the left posterior costal pleura (Fig. 3). Multiple small radiopaque foreign bodies were also seen at the right anterosuperior chest wall, left posterior chest wall, and left anterior abdominal wall. These radiopaque foreign bodies were likely to represent droplets of Lipiodol. There was no evidence of pulmonary artery embolism or pulmonary parenchymal abnormality. The follow-up chest radiograph obtained 2 months after EIS demonstrated almost complete resolution of the left pleural effusion.

Discussion

Acute upper gastrointestinal hemorrhage secondary to variceal bleeding is one of the main causes of death in patients with liver cirrhosis and portal hypertension. Various treatment modalities have been performed to control variceal bleeding. EIS with NBCA-ethiodized mixture has become the treatment of choice for obliteration of esophagogastric varices with satisfactory hemostasis. The complications of this intervention are not uncommon and vary in severity. These include chest pain, odynophagia, pyrexia, acute gastric dilatation, bacteremia, aspiration, esophageal perforation, mediastinitis, esophageal ulcers, esophageal stricture, bacterial peritonitis, and distal glue embolization.

Pleural effusions developed after EIS using NBCA–lipiodol mixture have been reported and may also occur in association with pulmonary artery embolization and parenchymal infarction. In the present case, there was no evidence of pulmonary artery embolization as confirmed by CT scan and perfusion scintigraphy of the lungs. Pleural fluid analysis revealed exudative fluid with high eosinophilic white blood cells. The CT images also revealed small radiopaque densities deposited along the left lower parietal pleura, the right anterosuperior chest wall, the left posterior chest wall, and the left anterior abdominal wall. This should be secondary to inadvertent reflux of the sclerosing agents into other parts of the body via the extensive network of the portosystemic venous collaterals. In the present case, the portophrenic and splenoazygos venous collaterals might be the possible pathway. The glue and ethiodized oil deposited along the left pleura then induced parietal pleural inflammation, as the glue can induce an intense inflammatory reaction and the metabolized ethiodized oil, in the form of inorganic iodine and fatty acid, can also induce eosinophilic inflammation.

The risk of reflux or systemic embolization of NBCA–ethiodized oil mixture may also increase when the injected volume of the embolized material is increased.

Treatment guidelines for symptomatic pleuropulmonary complications of glue embolization are primarily conservative, using analgesia and oxygen as required. Anti-inflammatory medication may decrease tissue response to NBCA and may be useful for pain control in the affected patients, and so was our patient.

In summary, we believed that this is the first case report of eosinophilic pleural effusion developed after EIS that appeared to be caused by the inadvertent reflux of embolized materials into the pleura via the portosystemic venous collaterals. Knowledge of vascular anatomy and drainage pathways of gastroesophageal varices in patients with portal hypertension is therefore clinically relevant as it provides a vascular map for the procedure. Awareness of these unusual collateral pathways should help prevent undesirable or serious complications that may occur after EIS.

Acknowledgment

The authors thank Dr. Amnuay Thitapandha and Dr. Sith Phongkitkarun for constructive suggestions and English editing.

References


