Percutaneous Sclerotherapy for Giant Symptomatic Liver Hemangiomas: A Pilot Study

Niloofar Ayoobi Yazdi, MD, Habibollah Dashti, MD, Nasim Batavani, MD, MPH, Ali Borhani, MD, Majid Shakiba, MD, and Hadi Rokni Yazdi, MD

ABSTRACT

This single-center prospective trial evaluated the safety and efficacy of percutaneous sclerotherapy for liver hemangiomas in 5 patients (1 man, 4 women; mean age 41.2 y) between 2016 and 2017. All patients were symptomatic (4 abdominal pain; 1 early satiety) and refused surgery. A single session of sclerotherapy with 20 cc mixture of 45 IU. Bleomycin in 10 cc distilled water and 10 cc Lipiodol (Ultra Fluide, Guerbet, France) was performed in all patients, achieving a 45.6%–71.1% lesion volume reduction and a 12.9%–41% reduction in the largest diameter of the lesion. Symptoms subsided in all patients during the 5-month follow-up period. Adverse events included a self-limited intraperitoneal hemorrhage in 1 patient.

ABBREVIATIONS

ALP = alkaline phosphatase, AST = aspartate transaminase, ALT = alanine transaminase, RF = radiofrequency, TAE = transcatheter arterial embolization, VAS = Visual Analogue Scale

INTRODUCTION

Giant hepatic hemangiomas, also known as giant hepatic venous malformations (1), are non-neoplastic low-flow vascular malformations of liver. They are a potential source of abdominal pain, early satiety, heart failure, or consumptive thrombocytopenia (2). Spontaneous or traumatic rupture and ensuing hemoperitoneum is a life-threatening complication of these lesions (2). These complications might necessitate treatment either by surgical resection or less invasive alternatives such as transcatheter arterial embolization (TAE), percutaneous radiofrequency (RF) ablation, or medical treatment with monoclonal antibodies against vascular endothelial growth factor (2).

Percutaneous sclerotherapy with intralesional bleomycin injection is currently a widely used treatment for subcutaneous low-flow vascular malformations (3). Direct percutaneous puncture of hepatic hemangiomas is not considered an absolute contradiction, with a low risk of hemorrhage even if large needles are used (4). Therefore, this prospective trial study aimed to assess the safety and efficacy of percutaneous sclerotherapy with intralesional bleomycin injection after direct puncture of hepatic hemangiomas

MATERIALS AND METHODS

Patient Selection

Institutional review board and ethics committee approval were granted before conducting this study. Between April 2016 and April 2017, 5 adult patients (1 man, 4 women; mean age = 41.2 years; age range, 30–49 years) with giant symptomatic liver hemangiomas were recruited. The inclusion criteria for this study included single symptomatic giant liver hemangioma with well-defined margins, platelet count more than 100,000 and International Normalized Ratio less than 1.5. Patients with hepatic or renal impairment were excluded. The diagnosis of hemangioma was made based on characteristic discontinuous, nodular, peripheral enhancement in triphasic liver computed tomography (CT)-scan;

From the Department of Radiology (N.A.Y., N.B., A.B.) and Department of General Surgery (H.D.), Advanced Diagnostic and Interventional Radiology Research Center (M.S., H.R.Y.), Tehran University of Medical Sciences, Tehran, Iran. Received July 12, 2017; final revision received October 8, 2017; accepted October 9, 2017. **Address correspondence to** H.R.Y.; E-mail: rokniyaz@tums.ac.ir

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tissue diagnosis was deemed unnecessary. Four hemangiomas were located in the right liver lobe, and 1 was located in the left liver lobe. Indication for treatment was abdominal pain in 4 patients and early satiety and abdominal discomfort in 1 patient. Three patients had a history of unsuccessful previous TAE with polyvinyl alcohol 1.5–2.5 years earlier.

Study Design

All 5 patients completed the written informed consent before enrollment in the study. Volumetry of liver hemangioma was conducted before intervention using dedicated CT workstation-software (Advantage Workstation, AW4.3_05, GE Healthcare). All patients had normal baseline liver enzymes and bilirubin levels. Abdominal pain severity was recorded according to the Visual Analogue Scale (VAS). Baseline liver function tests (aspartate transaminase [AST], alanine transaminase [ALT], alkaline phosphatase [ALP], and total and direct bilirubin) were also conducted. All patients had normal baseline liver enzymes and bilirubin levels.

The procedure was performed in an outpatient setting. Patients received a single dose of corticosteroid (1 vial of bethamethasone L.A; 40 mg/ml of depomedrol, intramuscular) and prophylactic antibiotic (1 g of cefazoline, intravenous) 10–30 minutes before the intervention to minimize potential allergic reactions to bleomycin and infection, respectively. Local anesthesia was achieved with 10 cc lidocaine 2%, and conscious sedation was performed with 1 mg midazolam and 100 μg fentanyl as induction and 5 mg ketamine and 10 mg propofol as maintenance during the procedure. Hemangioma was accessed via normal liver parenchyma where possible, with a 22-gauge Chiba needle under ultrasound guidance. Then under fluoroscopy, 10–20 cc of contrast agent (Visipaque; GE Healthcare, Cork, Ireland) was slowly injected into the center of the lesion to assess possible communication of the lesion with venous, portal, or biliary systems; the needle was relocated if any of such communications were seen. Next, 45 IU bleomycin (Bleocin-S; Korea United Pharm Inc., South Korea) was diluted in 10 cc distilled water and mixed with 10 cc Lipiodol (Ultra Fluide, Guerbet, France) via a stopcock connecting 2 20-cc syringes. Then, the prepared bleomycin-Lipiodol mixture was slowly injected intralesionally under fluoroscopy over 20–30 seconds.

After the procedure, patients were monitored for 6 hours for signs of early complications, particularly intraperitoneal bleeding and potential bleomycin-induced-pneumonitis or allergic reactions. If vital signs were stable, no severe pain or pulmonary symptoms were reported, and ultrasound for intra-abdominal free fluid or hematoma was negative, the patient was discharged. The day after the procedure, liver function tests, including AST, ALT, ALP, and bilirubin, were evaluated in all patients. Five months later, patients were asked if they were experiencing any related abdominal symptoms as well as any respiratory symptoms concerning bleomycin. Lung injury and liver function tests were repeated to evaluate potential treatment-induced hepatic injury.

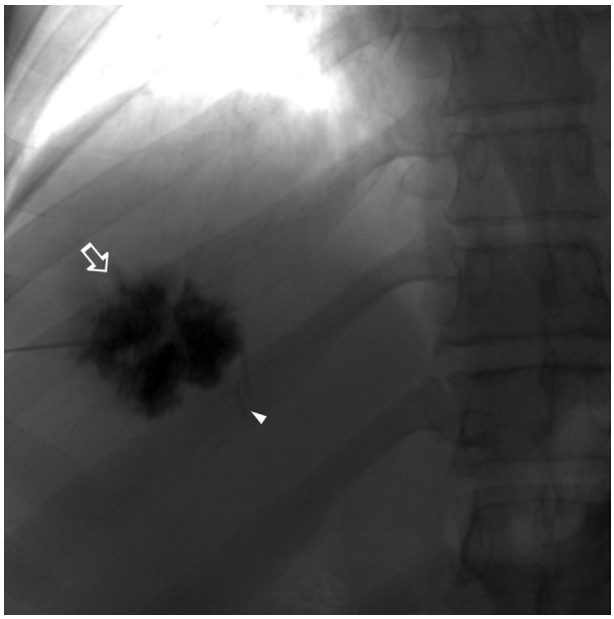

Figure 1. Fluoroscopic image of direct percutaneous sclerotherapy in a 44-year-old woman with a giant symptomatic hemangioma in the right liver lobe shows mixture of bleomycin with iodinated oil in the central part of the lesion (arrow). Faint spreading of the mixture into peripheral small vessels is depicted (arrowhead).

Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistics software for Windows, version 20 (IBM Corp., Armonk, New York). Wilcoxon signed-rank and paired t-tests were used. *P* values less than .05 were considered statistically significant.

RESULTS

All patients tolerated this outpatient procedure well. No contrast leakage to the hepatic veins or biliary tract was noted, but 2 patients showed contrast leakage to subsegmental portal vein branches adjacent to hemangioma in post-procedure fluoroscopy (Fig 1). Three patients showed a delayed (5 minutes after the injection) small amount of leakage of the bleomycin-Lipiodol mixture around the liver surface, causing severe pain in 1 patient and mild-to-moderate pain in 2 patients for a few minutes after needle extraction. Adverse reactions to the bleomycin-Lipiodol mixture were not encountered during the procedure or in follow-up. Liver function tests (AST, ALT, ALP, and bilirubin) revealed no abnormalities 1 day after the treatment and in the 5-month session. Intraperitoneal hemorrhage was encountered in 1 patient and was conservatively managed. One patient reported residual pain in the following first month, which spontaneously subsided afterwards. Subsequently, all patients reported that their abdominal pain or discomfort had been lessened (Table). Pre- and post-treatment CT scans revealed shrinkage of hemangiomas in all 5 patients, with a mean drop of 59% (range,