Case Report

Transarterial embolization of a post-biopsy portal vein pseudoaneurysm using N-butyl cyanoacrylate

Ji Hoon Shin,1,* Do Hyun Park,2 Hyun-Ki Yoon1

Abstract

We report the case of a 71-year-old man with hemobilia after a postbiopsy portal vein pseudoaneurysm in segment VI of the liver, which was treated with successful transarterial embolization. Because an arterioportal fistulous tract was visible using fluoroscopic imaging, N-butyl cyanoacrylate (NBCA) was successfully injected from the hepatic artery into the portal vein, with subsequent exclusion of the pseudoaneurysm. Follow-up computed tomography scans obtained 2 days after embolization showed an NBCA cast within the portal vein and no further opacification of the pseudoaneurysm.

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Introduction

Portal venous pseudoaneurysms have rarely been described in the medical literature.1-4 Unlike an aneurysm, which has three intact layers in the vascular wall, a pseudoaneurysm is a pulsatile hematoma caused by blood leaks through a tear or disruption in the vessel wall. As with arterial pseudoaneurysms, portal venous pseudoaneurysms have the potential to rupture and thus cause severe bleeding; therefore, they should be considered an imminent cause of hemorrhage.

Treatment of impending or ongoing portal venous hemorrhage depends on the clinical status, associated vascular injury or abnormality, sites of bleeding, and availability of clinical specialists. Among the reported cases of post-traumatic, intrahepatic portal vein pseudoaneurysms, one case of portal vein embolization through the ileocecal vein and under laparotomy has been reported.2 We report a case of successful transarterial embolization of an intrahepatic portal vein pseudoaneurysm following percutaneous biopsy. N-Butyl cyanoacrylate (NBCA) was successfully injected through an arteriportal shunt, from the hepatic artery into the portal vein, excluding the pseudoaneurysm.

Case report

A 71-year-old male had been diagnosed with a dysplastic nodule in segment VI of the liver 7 years previously, for which he had undergone one session of transarterial chemoembolization and four sessions of radiofrequency ablation. At the time of the last magnetic resonance follow-up session, a biopsy was recommended as the diameter of the nodule had increased from 2 cm to 2.4 cm. The patient underwent an uneventful percutaneous ultrasound-guided biopsy of the nodule, but 2 days after the biopsy he experienced a sudden onset of epigastric pain for which he was seen in our emergency room.

Pre- and postcontrast computed tomography (CT) scans obtained 3 days after the biopsy showed a pseudoaneurysm within the biopsied nodule and hematoma within the biliary tree. Hemobilia was confirmed and removed on endoscopic retrograde cholangiopancreatography performed on the same day. There was no change in the patient’s hemoglobin level. As the pseudoaneurysm seemed to have originated from the portal vein and the patient’s epigastric pain had resolved, conservative management was used. However, as dynamic CT scans obtained 10 days after the biopsy showed an increase in diameter of the pseudoaneurysm from 10 mm to 13 mm (Fig. 1), it was decided to treat the pseudoaneurysm, since although it was apparently attached to the adjacent portal vein, a possible hepatic artery origin had to be ruled out.

Hepatic arteriograms showed an arteriportal shunt with pseudoaneurysm opacification and a probable fistulous tract connecting the hepatic artery and the portal vein (Fig. 2A and B). The micro-guidewire could be passed through the tract, although a microcather (2.0 Fr Progreat; Terumo, Tokyo, Japan) could not (Fig. 2C). The tip of the microcather lay at the entrance of the fistulous tract, and a test contrast injection showed visualization of
the portal vein and the pseudoaneurysm. Liquid embolic material, such as NBCA, was considered for use in this microcatheter-inaccessible embolization.

NBCA (Histoacryl; B. Braun, Melsungen, Germany) was mixed with iodized oil (Lipiodol; Andre Guerbet, Aulnay-Sous-Bois, France) in a 1:2 ratio, and dextrose 5% in water solution was used to flush the microcatheter to prevent premature polymerization of the mixture with residual blood or saline inside the microcatheter before injecting the NBCA mixture. The NBCA mixture was then injected using a 1-mL syringe guided by fluoroscopic monitoring to

Fig. 1. Axial (A) and coronal (B) arterial-phase computed tomography scans obtained 10 days after biopsy of the mass in segment VI of the liver, showing early opacification of the right posterior inferior branch of the portal vein and a pseudoaneurysm (arrows) attached to the adjacent portal vein (arrowheads).

Fig. 2. Selective right hepatic arteriogram (A) and spot radiograph (B) showing an arterioporal shunt with pseudoaneurysm opacification. A probable fistulous tract is also visualized (arrowheads in B). A spot radiograph (C) shows passage of the micro-guidewire through the probable fistulous tract (arrowheads). However, the microcatheter could not be advanced, perhaps due to the tightness of the tract. A spot radiograph (D) obtained after N-butyl cyanoacrylate (NBCA) embolization shows an NBCA cast filling the fistulous tract (arrowheads) as well as the adjacent hepatic artery (arrows) and portal vein (long arrows). A completion arteriogram (E) shows no further visualization of the portal vein or the pseudoaneurysm.
seal off the fistula and pseudoaneurysm (Fig. 2D). A hepatic arteriogram obtained upon completion of the procedure showed complete exclusion of the pseudoaneurysm (Fig. 2E).

Liver-related enzymes such as aspartate transaminase, alanine transaminase, and bilirubin did not increase after embolization. Follow-up CT scans obtained 2 days following embolization showed an NBCA cast within the portal vein and no further opacification of the pseudoaneurysm (Fig. 3). The patient was in a good condition at the time of writing this report, 10 months following embolization.

Discussion

Percutaneous transhepatic procedures and trauma can produce arteriportal fistulas, and traumatic portal venous pseudoaneurysms are also possible, although they have rarely been reported. Locating a portal vein pseudoaneurysm or the area where it is bleeding is very important. When it is extrahepatic, it is usually fatal, and stenting with embolization of the pseudoaneurysm or surgery have both been reported. However, when it is an intrahepatic pseudoaneurysm, conservative management or successful direct portal vein embolization using the ileocecal vein approach under laparotomy have both been applied.

The therapeutic options have evolved from surgical management to an endovascular, less invasive approach for treating vascular pseudoaneurysms, which has dramatically decreased the morbidity and mortality rates.

Interventional radiologists can access the portal vein using a direct, percutaneous approach to the portal vein or the transjugular intrahepatic portosystemic shunt (TIPS) tract via the jugular vein if there is no communication between the portal vein and the hepatic artery. In our patient, the arteriportal fistulous tract was visible using fluoroscopic imaging, enabling embolization of the portal vein pseudoaneurysm through the fistulous tract from the hepatic artery. This unique approach has not been previously reported. If there is suspected communication between the portal vein and the hepatic artery, for example early opacification of the portal vein, the arterial approach should be used first to determine possible accessible communication between the two vessels and to search for associated hepatic arterial injury. If the arterial approach is not possible, the direct percutaneous approach would be the next option.

NBCA is advantageous for its high accessibility to the target site, even to the distal small branches where access with a microcatheter is difficult because of its conformable nature. NBCA also offers immediate occlusion of the vessel compared to the more commonly used microcoils. In our patient, the fistulous tract was too tight to permit advancement of the microcatheter. In all practicality, secure embolization of the pseudoaneurysm arising from the portal vein could not be performed with microcoils or gelfoam particles.

In summary, we present a case of successful transarterial embolization of an intrahepatic portal vein pseudoaneurysm following percutaneous biopsy. A hepatic arterial approach and use of NBCA should, therefore, be considered as a treatment option when there is communication between the portal vein and the hepatic artery.

Conflict of interest

None of the authors have identified a potential conflict of interest.

References