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Ischemic Stroke Post-Transradial Chemoembolization

Almamoon I. Justaniah[1] Mohamed A. Omar[2] Abdulaziz M. Tashkandi[3]

[1] Vascular & Interventional Radiologist, Radiology Department, King Faisal Specialist Hospital & Research Center – Jeddah, Saudi Arabia
[2] Vascular & Interventional Radiologist, Department of Medical Imaging, King Abdullah Medical City, Saudi Arabia
[3] Gastroenterology & Hepatology, Digestive & Liver Health Center, King Abdullah Medical City, Saudi Arabia

Address for correspondence Almamoon I. Justaniah, MD, Vascular & Interventional Radiologist, Radiology Department, King Faisal Specialist Hospital & Research Center – Jeddah, 21499 Jeddah, Saudi Arabia (e-mail: ajustaniah@kfshrc.edu.sa).

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Abstract

Transarterial chemoembolization is one of the approved locoregional treatment options for hepatocellular carcinoma. The procedure is safe; however, stroke may happen as one of the rarest complications. Our patient is a 68-year-old male who underwent transradial chemoembolization to treat hepatocellular carcinoma, who then developed ischemic stroke on postoperative day 1. The possible causes of stroke in our patient will be presented with review of the literature. Although rare, stroke post-chemoembolization can happen. The presence of intratumoral shunt or inadvertent injection of air bubbles in a coexisting right-to-left shun or the use of transradial approach can increase the risk of stroke.

Keywords

- hepatocellular carcinoma
- TACE
- chemoembolization
- pulmonary sequestration
- stroke
- infarction
- intracranial embolism
- transradial

Introduction

Transcatheter arterial chemoembolization (TACE) has been widely used to treat patients with unresectable hepatocellular carcinoma (HCC).[1] Although TACE is generally safe, major complications such as tumor rupture, liver abscess, bile leak, hepatic failure, gastrointestinal hemorrhage/ulceration, and pulmonary embolism can occur at a rate of 2.1 to2.5%, with a mortality rate up to 16.7%.[2]

Stroke post-transarterial chemoembolization (TACE) is a very rare complication. No reports of stroke post-TACE using drug-eluting beads (DEB) could be found in the English literature. We present a case of ischemic stroke post-transradial DEB-TACE while treating HCC. Approval and consent waiver were obtained from the Institutional Review Board (21-822).

Case Presentation

A 68-year-old male with neurofibromatosis and Child-Pugh A liver cirrhosis secondary to hepatitis B virus (HBV) referred to our institution with a 7 × 7.5 cm left HCC (►**Fig. 1**). He had no ascites or portal vein thrombosis. His HBV viral load was 8,99,000 IU/mL, total bilirubin 0.93 mg/dL, platelets 148,000, prothrombin time 13.1, albumin 3.52 g/dL, alanine aminotransferase 63 U/L, aspartate aminotransferase 169 U/L, and alfa fetoprotein 7,92,055 ng/mL. The case was discussed at the HCC tumor board with a consensus to proceed with TACE.

Under local anesthesia, a celiac arteriogram via a left transradial approach was performed using a 5F Ultimate 2 catheter (Merit Medical System, Utah, South Jordan) demonstrating a large right phrenic artery from the celiac trunk, supplying a right lung base mass with hypervascularity and

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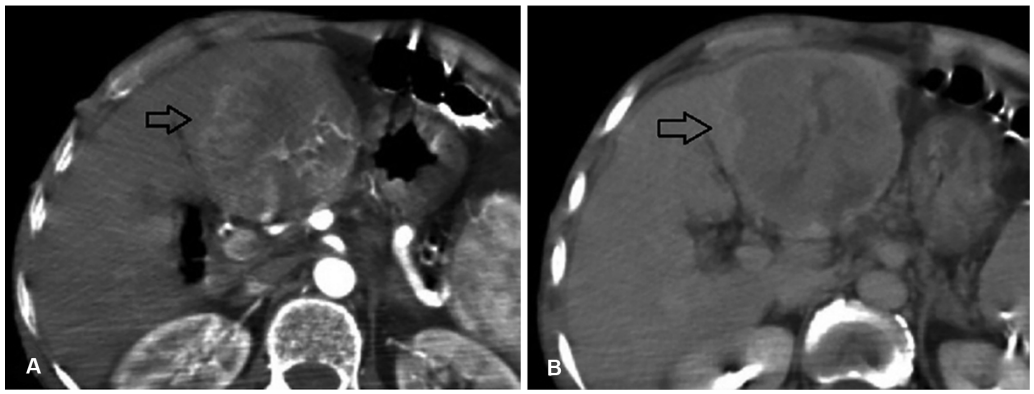

Fig. 1 Triphasic computed tomography of the liver demonstrating a left lobe mass (arrow) with arterial enhancement (**A**), and delayed washout (**B**) consistent with hepatocellular carcinoma.

immediate drainage into the pulmonary vein (►**Fig. 2A**), consistent with intralobar pulmonary sequestration. Selective left hepatic arteriogram was performed from a microcatheter demonstrating no shunt or pulmonary communication (►**Fig. 2B**). Therefore, TACE was performed using 70 to 150 µg LC Bead LUMI (Boston Scientific, Marlborough, Massachusetts, United States) loaded with 50mg doxorubicin, followed by half a vial of 150 to 250 µg contour Polyvinyl Alcohol (PVA) embolization particles (Boston Scientific, Marlborough, Massachusetts, United States) to achieve stasis, without intraprocedural complications.

On postoperative day 1, the patient started to become confused with mild swallowing impairment and slurred speech; his Glasgow Coma Scale declined to 14/15. Brain magnetic resonance imaging was obtained after neurology evaluation demonstrating supra and infratentorial punctuate foci of restricted diffusion, with high T2/fluid-attenuated inversion recovery signal intensities involving the peripheral cortical, subcortical, and deep ganglionic regions along with the brain stem and cerebellar hemispheres, consistent with acute infarctions from showering emboli (►**Fig. 3**). Subsequently, the patient was transferred to the neurology department for further management and physiotherapy. Ten days later, the patient developed severe bilateral pneumonia for which he was transferred to the intensive care unit where he passed away 3 days later due to acute respiratory distress syndrome.

Discussion

Stroke is a very rare complication post-TACE or transradial interventions. The etiology of stroke can be attributed to many factors. Although very rare, cases of stroke post-transradial interventions have been reported due to catheter manipulation near the carotid artery or the atherosclerotic aortic arch.[2] This may induce showering of atheromatous plaques into the intracranial arteries and may lead to focal infarction. Although the catheter passed smoothly to the descending aorta, in addition to the unusual infarction distribution that was multifocal, supra and infratentorial as opposed to focal or unilateral, showering emboli remains a possible etiology.

Another etiology could be related to inadvertent injection of air bubbles into the phrenic artery supplying the sequestered lung during celiac arteriography causing microemboli.

Reflux of embolic materials into the phrenic artery during TACE is unlikely, given that it was performed selectively from the left hepatic artery (►**Fig. 2B**).

Fig. 2 (**A**) Celiac arteriogram from a left radial approach demonstrating a large right phrenic artery (arrow) supplying a hypervascular right lower lung mass with drainage into the pulmonary vein (arrowhead) consistent with pulmonary sequestration. (**B**) Selective left hepatic arteriogram from the microcatheter demonstrating no discernable intratumoral shunting or pulmonary communication (arrow).

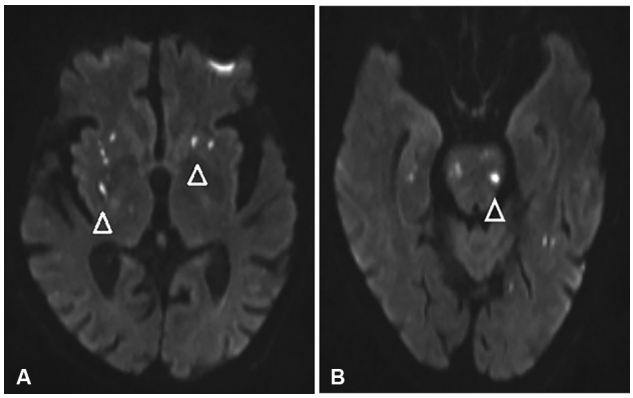

Fig. 3 Magnetic resonance diffusion-weighted images of the brain 24 hours post-transcatheter arterial chemoembolization demonstrating foci of diffusion restriction (arrowheads) in the deep ganglionic region (**A**) and brain stem (**B**) consistent with acute infarcts.

Other authors reported cases of lipiodol-associated embolic stroke following TACE.[3,4] Lipiodol can penetrate through the tumor into the hepatic veins and cause stroke in patients with right-to-left shunt. In our case, the DEB-TACE and the PVA particles were more than 75 µg, with a very low likelihood of penetration into the hepatic veins given the lack of discernable intratumoral shunts; unless there was an undetectable one, which has an incidence of 2.4%.[3] In addition, there was no proven right-to-left shunt.

The likelihood of this being an incidental event is a remote possibility. Computed tomography of the brain may have differentiated between LUMI particles and air/atheromatous emboli, but unfortunately, was not performed. Hence, we remain uncertain of the of the exact etiology. Nevertheless, the transradial approach remains the culprit.

Conclusion

Although stroke post-TACE is uncommon, care should be taken when using lipiodol in patients with known intratumoral/right-to-left shunt, or when selecting a transradial approach; and alternative therapies should be considered.

Conflict of Interest
None declared.

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