

Non Target Shunting of Tc-99m Macroaggregates of Albumin and Radiolabeled Yttrium-90 Microspheres into Hepatic Falciform Artery - Less Observed Arterial Variant not to be Overlooked

Abstract

Identification of nontarget arteries is crucial prior to Yttrium-90 microspheres radioembolization. We present a case where an uncommon nontarget artery, the hepatic falciform artery was identified during work up for radioembolization and necessary preventive measures were taken to minimize the complications.

Keywords: *Extrahepatic perfusion, hepatic falciform artery, MAA lung perfusion scan, nontarget artery, radioembolization*

An 82 year-old frail male with multiple comorbidities and postoperative case of Grade II, Stage IIIB adenocarcinoma sigmoid colon with progressive liver metastases was evaluated for transarterial radioembolization (TARE). Whole body F18 Fluorodeoxyglucose (F18 FDG) positron emission tomography/computed tomography (PET/CT) maximum intensity projection and transaxial images [Figure 1a and b] show FDG avid nodular lesions in segments VI, IV, and II/III (arrows) with no extrahepatic lesions. Pre-TARE planning hepatic angiography and intraarterial Tc-99m macroaggregates of albumin (MAA) lung shunt planar imaging reveals increased tumour perfusion in liver lesions with no significant lung shunting. There was, however, an unexpected curvilinear extra hepatic tracer uptake (solid arrow) visualized in the anterior abdomen [Figure 2a]. Reconstructed single-photon emission CT (SPECT) co-registered to contrast-enhanced CT (SPECT/CT) localized the extrahepatic tracer uptake to the hepatic falciform artery (HFA) as shown by solid arrows in Figures 2b-d and 3a and b. This thin caliber artery was not visualized on hepatic angiography [Figure 4a and b] or intra-procedural cone-beam CT (CBCT) and therefore was not feasible for coil

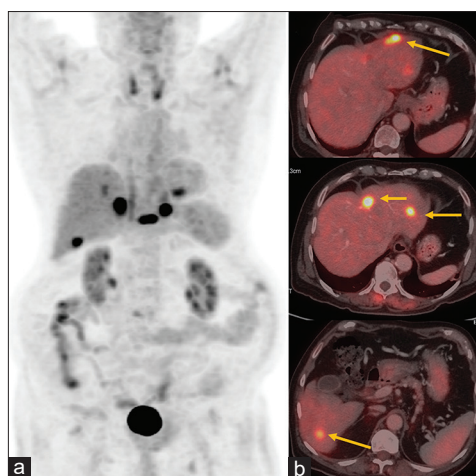


Figure 1: Maximum intensity projected image (a) and axial-fused positron emission tomography/computed tomography (b) images show focal FDG avid nodular lesions in both lobes of liver (arrows) involving segments VI, IV, and II/III suggesting liver metastases. No extrahepatic lesions were identified. FDG: Fluorodeoxyglucose

embolization. However, faint opacification of the artery was retrospectively visible on CBCT [Figure 5a and b]. He subsequently underwent TARE by superselective segmental hepatic arterial infusion of Y-90 microspheres. Ice packs were prophylactically placed on the anterior mid abdomen during the procedure to induce cutaneous vasoconstriction to reduce uptake in this region. He complained of mild epigastric

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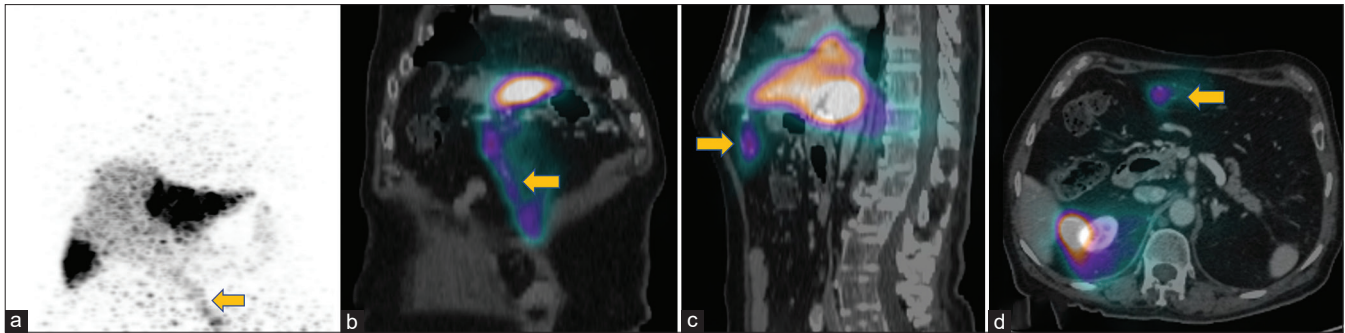


Figure 2: (a) Reconstructed single photon emission computed tomography (SPECT) in transaxial (d), sagittal (c) and coronal (b) views co-registered to corresponding contrast enhanced computed tomography (SPECT/CT) localizes the extrahepatic tracer uptake to the hepatic falciform artery (solid arrows)

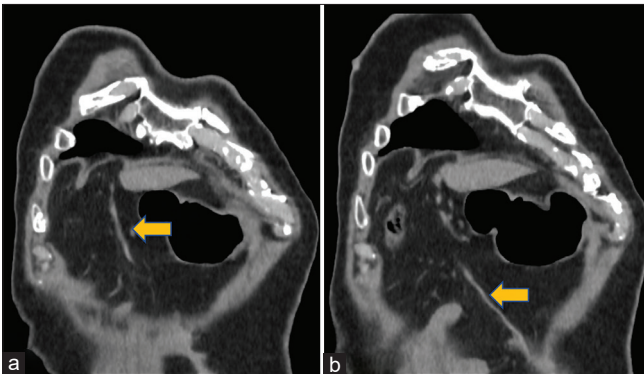


Figure 3: Contrast-enhanced computed tomography images in coronal sections (a and b) show the course of hepatic falciform artery extending from the falciform ligament up to the anterior abdominal wall (solid arrows)

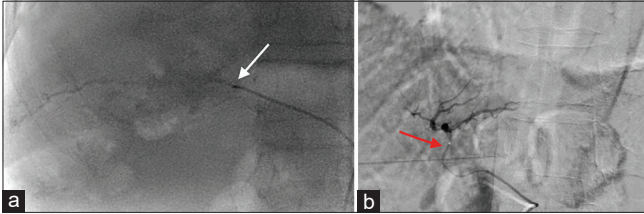


Figure 4: Hepatic angiographic images via superselective segmental hepatic arterial prior TARE in segments II/III (a, white arrow) and VI (b, red arrow) does not opacify the extrahepatic falciform artery. TARE: Transarterial radioembolization

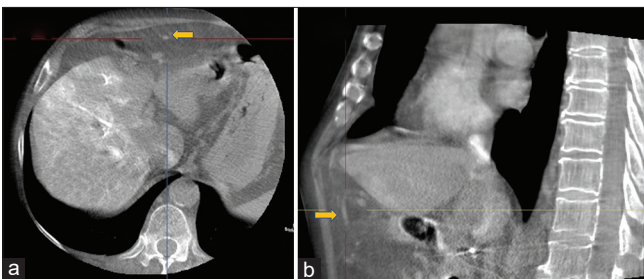


Figure 5: Axial (a) and sagittal (b) sections of intra-procedural cone beam computed tomography shows subtle proximal HFA contrast enhancement (arrows). HFA: Hepatic falciform artery

pain postprocedure, although was hemodynamically stable. Post-TARE PET/CT revealed mild deposition of the microspheres in the subcutaneous tissues along the HFA [Figure 6a-f]. Except for localized alopecia

over the periumbilical region, he had an uneventful post treatment period. Nontarget shunting of Tc-99m MAA and Y-90 microspheres into a patent HFA has been described.^[1,2] It is an uncommon vascular anatomic variant arising from the left or middle hepatic artery that runs extrahepatically in the falciform ligament^[1-3] and supplies the peri umbilical anterior abdominal wall. It is infrequently detected during angiography with an incidence of 2%–25% of population.^[1] Tc-99m MAA planar images helped us to identify the extrahepatic uptake and SPECT/CT images helped in localizing it to HFA. Inadvertent embolisation of Y-90 microspheres may result in complications such as supraumbilical abdominal pain, radiation dermatitis or skin ulcerations.^[4-7] Although prophylactic coil embolization is recommended, it may not be feasible in all cases.^[8,9] Moreover, negligible deposition of the microspheres through small shunt vessels may at instances, not be clinically relevant as seen in our patient. Patent HFA is not an absolute contraindication to TARE, although it is pertinent to be aware and recognize shunting through it on the planning study to minimize any risk of major complications.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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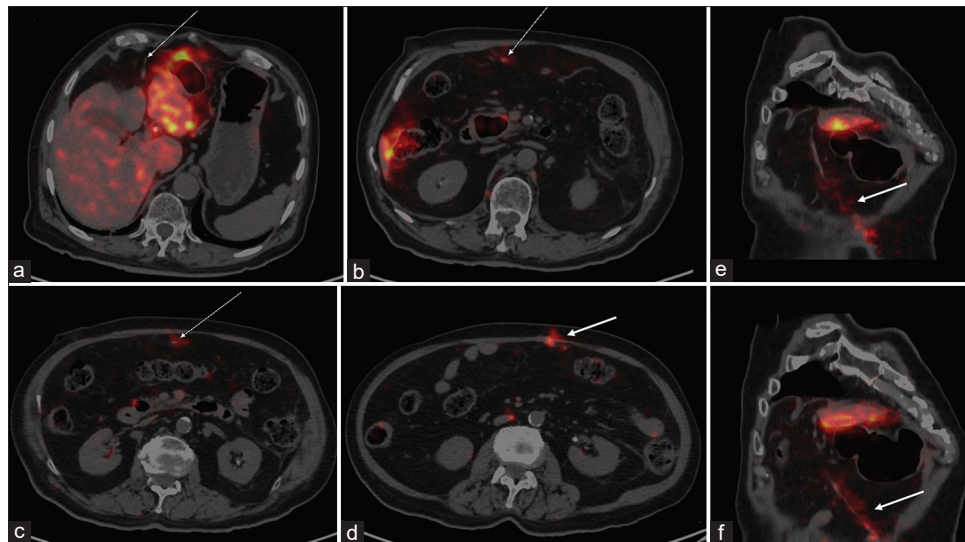


Figure 6: Post-TARE reconstructed PET/CT images in transaxial (a-d) and coronal (e and f) sections reveal mild deposition of Y-90 microspheres in the hepatic falciform artery (white arrows). TARE: Transarterial radioembolization, PET/CT: Positron emission tomography/computed tomography

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