Published in final edited form as:

J Clin Gastroenterol. 2016 July ; 50(6): 524–525. doi:10.1097/MCG.0000000000000524.

An unexpected pulmonary complication following transcatheter arterial chemoembolization of a small hepatocellular carcinoma

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To the Editor

Hepatocellular carcinoma (HCC) is one of the leading causes of cancer-related death worldwide [1]. Transcatheter arterial chemoembolization (TACE) is now a widely accepted palliative intervention for HCC. Lipiodol, an iodized poppy seed oil used in TACE, accumulates selectively in the tumor and its neovasculature, causing a transient embolization of the HCC. Conventional TACE uses an emulsion of Lipiodol-chemotherapeutic agent, whereas TACE with drug-eluting beads (DEB-TACE) uses beads loaded with a chemotherapeutic agent such as doxorubicin. TACE can sometimes cause local hepatobiliary injury and acute lung injury (ALI) or acute respiratory distress syndrome (ARDS) [2, 3]. Post-TACE pulmonary oil embolism, albeit rare, is a frequently reported pulmonary complication of TACE [4]. The injected ethiodized oil or chemotherapeutic agent is thought to migrate to the lung vasculature via arteriovenous (AV) shunts within the hyper-vascular HCC tumors, causing chemical injury. The known risk factors associated with post-TACE pulmonary complications include a large hyper-vascular HCC (>10 cm) with AV shunts, large-volume Lipiodol infusion (>14.5 mL), and trans-inferior phrenic artery embolization.

We encountered an unexpected pulmonary complication in a patient who underwent a DEB-TACE procedure for a small HCC. A 62-year-old Caucasian male with hepatitis C cirrhosis, complicated by a new HCC and mild portopulmonary hypertension, underwent his first DEB-TACE for a 3.9-cm right hepatic lobe HCC. The right hepatic arteries were

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Disclosures None

Conflicts of interest None

chemoembolized with LC beads (100-300 μ m) loaded with 125 mg Doxorubicin, followed by 3 ml of Lipiodol. The patient tolerated this initial procedure without complications. There was initially a reduction in tumor size; however, seven months later, the patient developed a recurrence, with a rising AFP at 18 ng/ml and recurrent enhancement in the mass. The patient underwent a second DEB-TACE with 5 ml of LC beads (100-300 μ m) loaded with 40 mg Doxorubicin, followed by 1 ml of Lipiodol. Immediately after the procedure, the patient developed hypoxemia (SpO₂ 88% – 91%), requiring 3 L of oxygen via nasal cannula. Chest CT angiogram was negative for pulmonary embolism; however, there were multiple bilateral large areas of ground-glass opacities with central and peripheral distribution, centered along the bronchovascular bundles. Transthoracic echocardiogram showed a hyperdynamic left ventricle with LVEF of 75%; mild RV enlargement with moderate decreased function; elevated pulmonary artery pressure at 127 mmHg from 58 mmHg previously; and moderate-severe tricuspid regurgitation. The patient developed worsening respiratory distress, requiring high flow oxygen and ICU admission on hospital day 3. The patient was treated empirically with broad-spectrum antibiotics initially. Work up for infectious causes of acute hypoxemic respiratory failure was negative. Methylprednisolone was initiated on hospital day 7 for post-TACE ALI. Hypoxemia resolved two days later, and the patient was transferred out of the ICU. He underwent a successful orthotopic liver transplant several weeks later. Post-transplant, his respiratory function has completely normalized, but he continues to have significant pulmonary hypertension requiring medical therapy.

Careful evaluation of the patient's overall health status, HCC characteristics and tumor vascularity minimizes the complication rate. However, the absence of known risk factors is not a guarantee against serious complication, as evidenced by our patient's post-TACE ALI, making his complication an unexpected event. The acute hypoxemic respiratory failure following DEB-TACE in our patient may have resulted from pulmonary migration of doxorubicin-eluting beads and/or Lipiodol. Careful monitoring of the patient perioperatively and an astute awareness of the potential post-TACE pulmonary complications should expedite appropriate therapeutic interventions and increase potential for good recovery in these patients.

Acknowledgments

Funding None

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