Thalamic and midbrain infarct during Transarterial Chemoembolization of hepatocellular carcinoma

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Abstract

Transarterial chemoembolization (TACE) is a well accepted and a relatively safe procedure, however certain rare and serious complications may occur during or after the procedure with profound morbidity and mortality. Only a few cases have been reported describing cerebral embolization during the procedure. We are reporting a case in which cerebral lipiodal embolization occurred in the second session of TACE, during the procedure and without any evidence of pulmonary embolism causing midbrain and thalamic infarct. The possible explanation could be an aberrant connection between the hepatic and pulmonary vessels which might have developed due to the involvement of the diaphragm, pleura and pulmonary vessels after the first session of TACE.

Keywords: Transarterial chemoembolization, Cerebral lipiodal embolization, Pulmonary embolism, Pleura.

Introduction

Transarterial chemoembolisation (TACE) for unresectable hepatocellular carcinoma (HCC) is a well accepted treatment modality and generally considered a safe procedure. However certain serious, though rare, complications such as liver abcess, liver infarction, acute hepatic aneurysm, hepatic artery occlusion, splenic infarction and pulmonary embolism or infarction have been reported in large case series.[1,2] Even more rare are the reports of cerebral embolization (CE) causing focal neurological deficit. Only a few cases of CE following TACE have been reported so far.[3,4] We are reporting a case of thalamic and mid brain infarct during second session of TACE.

Case Report

A 54 years old man was evaluated for a five month history of right upper quadrant pain and low grade fever. He was found to be positive for HBsAg, HBeAg and HBV DNA. The blood counts, renal functions, electrolytes and LFTs were normal. Triphasic Computed tomography (CT) scan with delayed images showed multiple solid masses in segment VII and VIII measuring 6.6 x 6.0 x 4.0 cm. Showing enhancement on arterial phase and wash out on venous and delayed phases. Basal atelectasis along with irregularity of right diaphragm margins adjacent to the segment VIII noted (Figure-1). Alpha-fetoprotein was 2.17ng /ml. Liver biopsy showed moderately differentiated hepatocellular carcinoma. The patient underwent Transarterial chemotherapy (TAC) using mixture of 15 ml of lipiodal and 100 mg of epirubicin after cannulation of coeliac trunk and supraselective cannulation of right hepatic artery supplying the lesions. Post procedure course was uneventful and the patient was discharged on 3rd post procedure day.

On follow up six weeks repeat CT scan showed multiple partial lipiodal filled lesions in segment VII and VIII without a significant reduction in the size. This time TACE was performed using a mixture of the same amount of lipiodal and epirubicin which were injected super-selectivity into the right hepatic artery followed by embolization using a gel foam.

The patient became drowsy and confused towards the

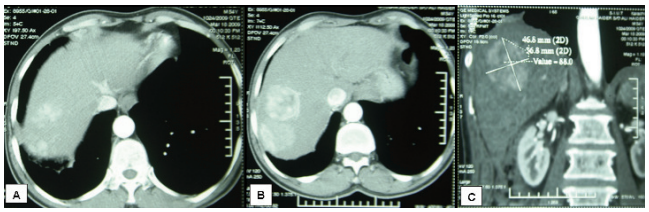

Figure-1: CT axial images and reconstructed coronal image showing enhancing mass lesion in segment VIII. Note the diaphragmatic margin irregularity and basal atelectasis.

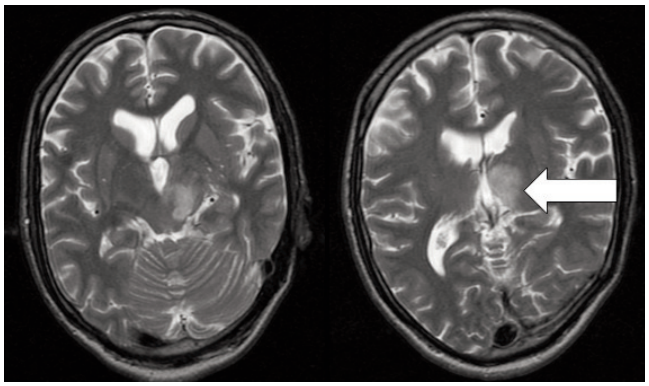

Figure-2: T2 weighted images showing hyperintense signal in left mid brain and thalamus.

end of the procedure, but without any focal neurological deficit. The blood sugar was only 08mg/dl which was corrected immediately using 100 ml of 25 % dextrose. However no improvement was observed in patient's condition even after correction of blood sugar level. Meanwhile the procedure was completed. In the recovery area the patient's condition deteriorated further. He became drowsier and developed dysphasia, left lateral gaze, bilaterally pin point pupils, right sided facial weakness, right sided hemiparasis with power of 2/5 and up going right planter reflex. Patient's vitals remained stable during and after procedure. He did not develop any chest symptoms such as dyspnoea, cough or pain, oxygen saturation was normal.

Three hours later CT scan brain with contrast showed possible infarct in the region of left thalamus and left midbrain. Magnetic Resonance Imaging (MRI) brain with contrast was performed about 24 hours post procedure and it showed abnormal signals involving the left thalamus and left midbrain which were isointense on T1 weighted images hyperintense on T2 and fluid-attenuated inversion recovery (FLAIR) images (Figure-2) while hyperintense signals on diffusion weighted images. Slight mass effect was seen with bulging of the lateral wall of the third ventricle. Interestingly no evidence of lipoidal deposition was seen on either of CT or MRI brain imaging.

Patient's condition started improving on the third day. On discharge, one week after TACE he was able to walk with support. Power on right side was 4/5 but the rest of the neurological examination was normal.

Discussion

TACE is generally considered a safe procedure. However, certain serious complications have been reported in large studies.[1,2] To our knowledge, the first study that has reported CLE associated with TACE was published in 2004 by Yoo et al. in which three cases of CLE followed by proven or suspected pulmonary embolism (PE) were noted.[3] Multiple possible mechanism of CLE following PE were described, like fat globules Less than seven micrometer, can pass directly through the pulmonary arterial network (i.e. trans-pulmonary shunt)into the cerebral cortex, resulting in multiple ischaemic lesions, however none of these have shown diagnostic density expected of lipiodal. The resulting lesion most likely reflects secondary vasogenic and cytotoxic ischaemic changes from lipiodal emboli.[4,5] So intracardiac shunt may not be necessarily present to explain CLE following PE.

According to Wu et al[6] PE can occur either by presence of adhesive pleura or tumor invasion into the thoracic cavity. The lipiodal injected through the inferior phrenic artery may enter pulmonary circulation and then enter systemic circulation via link between systemic and pulmonary vessels resulting in cerebral lipiodal embolism. Large dose of lipiodal is associated with CLE.[7,8] Wu JJ et al[9] described that large tumours invade the diaphragm and make a communication between the tumour feeding artery and right pulmonary artery which result in pulmonary embolism, in first session of TACE. The CLE occuring in second session of TAC was probably the result of an intra pulmonary arterio-venous shunt which developed after the first session of TACE possibly because of increasing pulmonary artery pressure or hypoxia.

In all the previous studies, as mentioned above, CLE occurred after PE. However in our case, the patient did not have any respiratory signs or symptoms of pulmonary involvement. Arterial blood gases (ABGs) and chest X-ray, were also negative for pulmonary lipiodal embolization. As neurological symptoms started toward the end of procedure and worsened immediately post procedure, this suggests a direct cerebral involvement. A confusing factor was the detection of hypoglycaemia at the same time as the start of neurological symptoms. The initial symptoms of confusion, drowsiness and restlessness could be explained by hypoglycaemia but as these symptoms persisted even after the immediate correction of hypoglycaemia, rather than progression. Thus signifying possible cerebral infarct which was later confirmed by both CT scan and MRI imaging.

It appears that embolization had occurred directly through the hepatic artery and pulmonary vein communication which was possibly formed after the first session of TACE. There was possible infiltration of diaphragm and pleura on CT scan, however absence of PE or CLE in first session suggested that there was no communication between hepatic artery and pulmonary vessels at that time. Later, over the three months period, a shunt might have been formed because of disease progression and further aggravated by previous session of TACE which might have caused hypoxia and tumour necrosis. The presence of intra cardiac shunt was excluded by transthorasic echocardiography.

In our case, the evidence of lipiodal deposition was not found in brain tissue on both the imaging modalities. Probably grade of shunting was so small that only a scanty amount of lipiodal was passed through it and, as suggested by Parizel PM,[10] it was undetectable on imaging due to overshadowing caused by adjacent larger ischaemic changes. Our case report highlights the importance of looking for the presence of arterio-venous shunting in large HCCs, especially if the patient is due for a repeated procedure, so that chances of PE or CLE could have been minimized. Moreover it also demonstrates that CLE may occur in the absence of PE as well.

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