Case Report

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Unusual Presentation of Lung Cancer as Solitary Hemorrhagic Brain Metastasis

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Abstract

Tumor related intracerebral hemorrhage (ICH) is relatively uncommon and lung cancer is fourth amongst all tumor related ICH in term of frequency. Hemorrhagic brain metastasis due to lung cancer are multiple. We report a case of solitary hemorrhagic metastasis due to lung cancer.

A 48 year old lady was admitted with features of raised ICP for 20 days and altered sensorium for 1 day. NCCT head showed an ill definedhyperdense lesion in the right temporal region with adjacent parenchymal edema and mass effect. CEMRI (contrast enhanced magnetic resonance imaging) brain showed a vascular lesion in right temporal lobe. MR venography of brain was normal and MR brain angiography suggested a vascular lesion. Working diagnosis was a vascular lesion. Intraoperatively reddish brown, firm, moderately vascular tumor was seen in right temporal region with areas of hemorrhage. Total excision was done and temporal dura was seen and was coagulated. Post operative period was uneventful. Microscopic and IHC (immuno histochemistry) examination was suggestive of metastatic adenocarcinoma. PET CT showed left lung lesion with no residual disease in brain. The patient received chemotherapy for lung lesion and radiotherapy for brain and it was asymptomatic 6 months after surgery.

Keywords: Tumor, brain metastasis, intracerebral hemorrhage, lung cancer.

INTRODUCTION

The common causes of spontaneous intracerebral hemorrhage are hypertension, advanced age, renal failure, use of anticoagulant drugs, cerebral amyloid angiopathy and brain tumor.[1]

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Tumor is an uncommon cause for spontaneous haemorrhage in brain. The leading causes of tumor related ICH are metastasis of extracranial origin (36%), followed by glioblastoma multiforme (30%).[2] For hemorrhagic brain metastasis primary are from melanoma, choriocarcinoma, renal cell carcinoma, and bronchogenic carcinoma in order of frequency.[3,1] Fast growing and highly vascularized neoplasms with an irregular and fragile vascular\ architecture are most frequently associated with ICH.[4,5,6] Metastatic tumors or malignant gliomas are the most common type of these tumors. Lung cancer generally presents with multiple brain metastasis.[1,7,8] It is rare that hemorrhage occurs in a solitary BM (Brain Metastasis) from lung carcinoma.[9,10]

We describe here a case of lung cancer with solitary hemorrhagic brain metastasis which is extremely rare, resembling a vascular lesion.

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CASE REPORT

A 48 year old lady was admitted with complaints of headache and vomiting for 20 days and altered sensorium for 1 day. No past significant history was present. On examination vitals were stable. GCS was E4V4M6, pupils were bilateral equal and reacting. On fundus examination papilledema was present. NCCT head showed an ill definedhyperdense lesion in right temporal region with surrounding hypodensity and mass effect. CEMRI brain showed a lesion in right temporal lobe which was hypo to hyperintese on T_1 images, heterogeneously hyperintense on T_2 images with flow voids with surrounding hyperintensity with mass effect and midline shift. On post contrast images the lesion showed heterogenous enhancement . These features suggested a vascular lesion. MR venography of brain showed no venous anomaly. (Figure 1) MR brain angiography suggested a vascular lesion with few prominent vessels suggestive of a vascular pathology/ Metastasis.

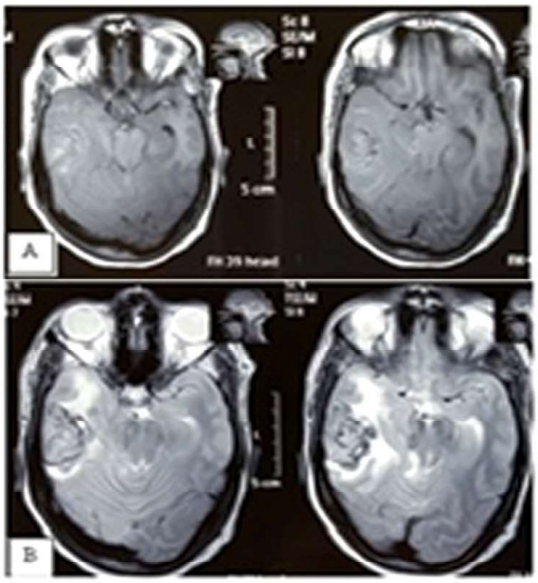


Fig. 1: (A) MRI T1 image showing a hyper to hypointenseheterogenous mass lesion in right temporal lobe with mass effect, the same lesion is hypo to hyperintense on T2 images (B) with flow voids.

(Figure 2) X-ray chest didn't reveal any lesion grossly. Patient was operated and right fronto temporo parietal craniotomy was done. Dura was tense. On durotomy brain was slight bulging. Reddish brown tumor was seen in right posterior temporal region arising from dura with infiltration of piameter. Tumor was moderately vascular, firm in consistency and had areas of hemorrhage. Total excision was done and temporal dura was coagulated.

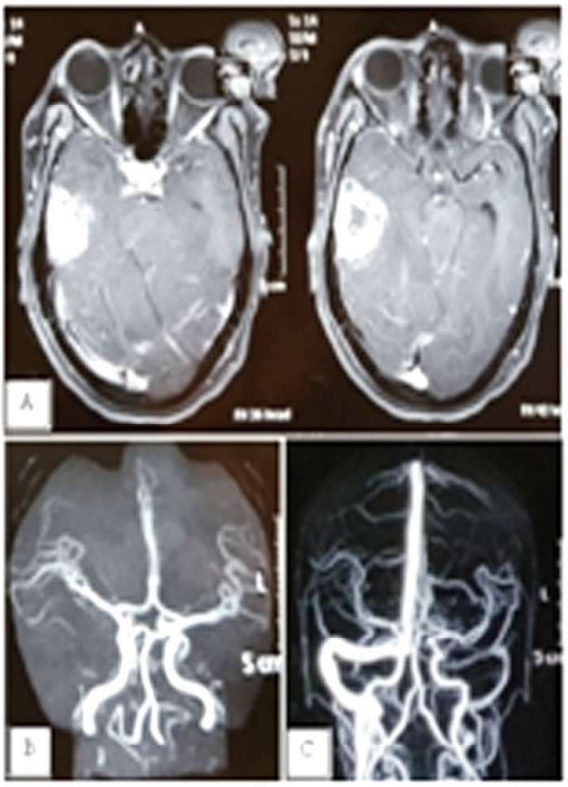


Fig. 2: (A) MRI T1 contrast image showing enhancing lesion in right temporal lobe, (B) MR angio showing few prominent vessels in the mass lesion. (C) MR venography suggestive of normal study

(Figure 3) Post operative CT scan showed no residual lesion.

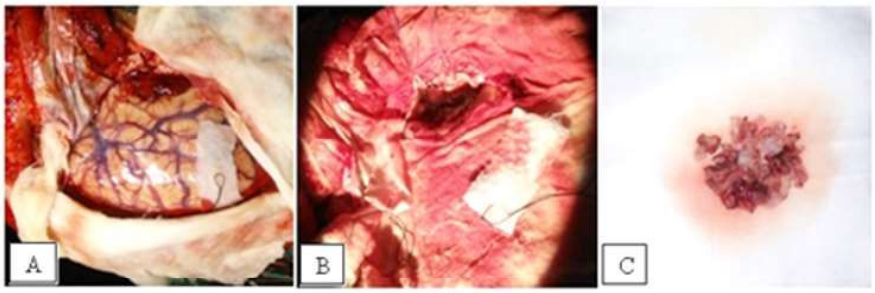


Fig. 3: Intraoperative photograph showing (A) Tumor in temoral region, (B) Temporal dura after tumor removal (C) Tumor tissue

Histopathology Microscopic examination showed glandular formation. On IHC examination tumor cells were positive for EMA, Vimentin (focal positive), PanCK, BerEP4, CK7, TTF1, Napsin A and were negative for GFAP, S100, CK20. These features were suggestive of metastatic adenocarcinoma. (Figure 4) Post operative period was uneventful. Post op NCCT head showed post op changes with no residual lesion.(Figure 5)

Work up for metastasis was done. CECT chest showed left middle lung heterogenous enhancing nodular area with ipsilateralhilarenlarged nodes.

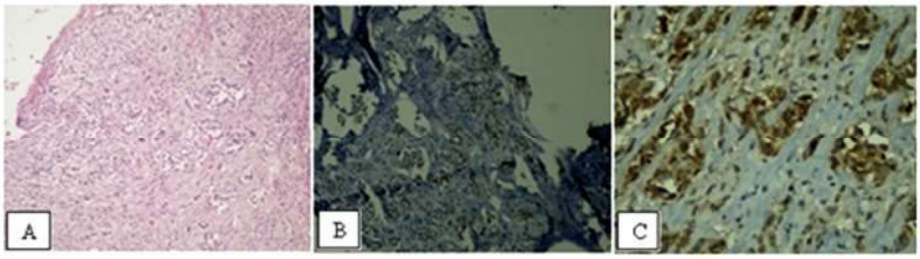


Fig. 4: (A) Photomicrograph showing glandular formations (H & E, 100X), (B) IHC showing TTF1 nuclear positivity(100X) (C) IHC showing NAPSIN cytoplasmic positivity (400X)

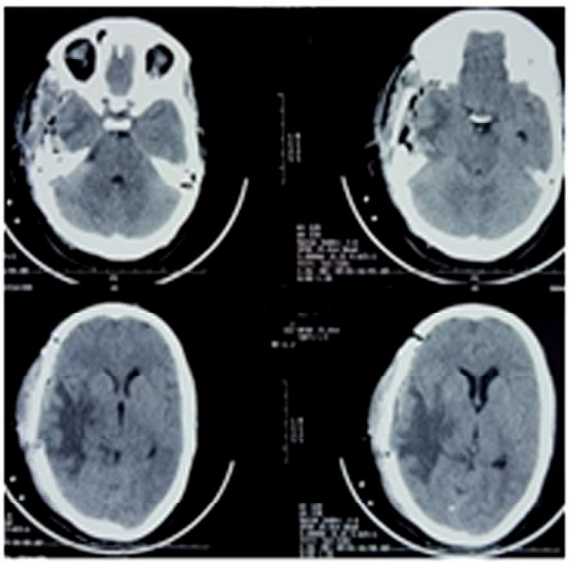


Fig. 5: Post op NCCT Brain showing post op changes with brain edema

(Figure 6). FNAC was done from left lung lesion which confirmed lung adenocarcinoma. PET CT showed left lung lesion with no other lesion in body. (Figure 7, 8) The patient received paclitaxel and carboplatin based chemotherapy and whole brain radiotherapy and is asymptomatic after 6 months of surgery.



Fig. 6: CECT chest showing left middle lung heterogenous enhancing nodular area with ipsilateralhilar enlarged nodes.

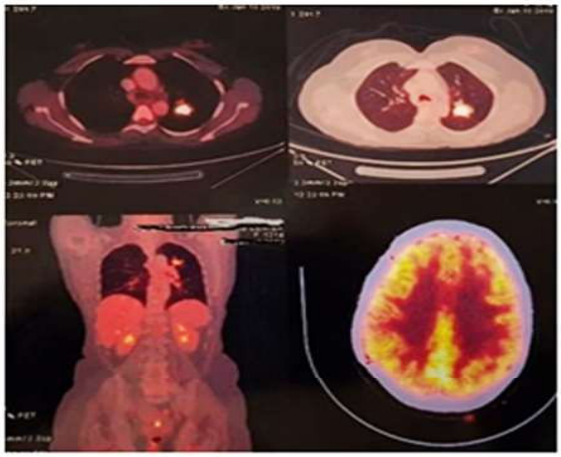


Fig. 7: PET CT showing left lung lesion

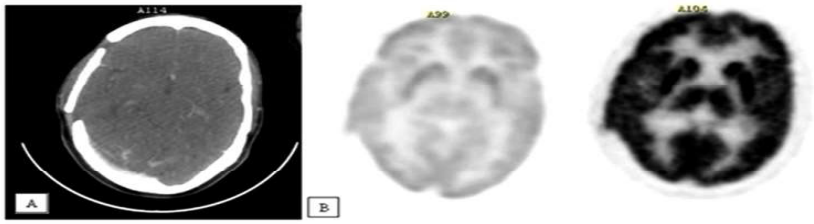


Fig. 8: (A) CECT brain showing no residual lesion (B) PET CT brain showing no residual lesion in brain.

DISCUSSION

Tumor-related ICH is relatively uncommon. The frequency of ICH in patients with intracranial neoplasms is 2-3%.[2] The frequency of ICH as the initial clinical presentation of intracranial neoplasms has been reported to be between 9% and 42%.[2] Brain metastasis usually occurs at the gray and white matter junction or in the vascular border zone regions. This supports the notion that metastatic emboli tend to lodge in areas of reduced blood flow, such as those with sudden reduction of vascular caliber (gray/white matter junction) or areas of the most distal vascular field (border zone).[11]

By location most common site of brain metastasis is posterior to the Sylvian fissure near the junction of temporal, parietal, and occipital lobes (presumably due to embolic spread to terminal MCA branches).[12] Tumor related ICH is often found in an atypical location, e.g., subcortical region, regions close to dural membranes such as the falx or the tentorium, or regions close to major cerebral veins or sinuses.[3]

Tumor related ICH shows distinct characteristics in image studies. It should be suspected if the ICH has surrounding edema, an enhanced solid mass within or near the ICH, a high or low density neoplastic core, or small, multifocal clots usually at the margin of the tumor.[2,13] The goal of surgery for brain metastases is local disease control that results in stabilization or improvement of clinical symptoms.

Various theories for the etiology of intra-tumoralhemorrhage have been proposed previously. These include endothelial proliferation with vascular obliteration, vessel compression and/or distortion due to rapid tumor growth, vessel necrosis, invasion of vessel walls by the tumor, and increased venous pressure associated with increased intracranial pressure.[5,6]

Common histological features of tumors that bleed include tumor necrosis as well as the vascular changes of vessel wall hyalinization, degeneration or necrosis of vessel walls, thrombosis, the presence of many thin walled vessels, and ruptured vessels.[14] Vascular endothelial growth factor and matrix metalloproteinases also have a pathophysiological role in metastatic brain tumor associated intracerebralhemorrhage.[15,16] The most common reasons for hemorrhagic brain metastasis include melanoma, choriocarcinoma, renal cell carcinoma, and bronchogenic carcinoma.[1,3]

Lung cancer can be classified into two types: small-cell lung carcinoma and non-small-cell lung carcinoma (NSCLC). The three main subtypes of NSCLC are adenocarcinoma, squamous cell carcinoma, and large cell carcinoma. Small cell lung cancer and lung adenocarcinoma tend to metastasize to the brain more frequently than other types of lung cancer.

Previous studies have suggest geftinib based chemotherapy and tumor size more than or equal to 2 cm as risk factors for haemorrhage in brain metastasis due to non small cell lung cancer.[17,18] Brain metastasis from lung cancer are often synchronous at diagnosis. It is rare that hemorrhage occurs in a solitary BM from lung carcinoma. Hemorrhagic brain metastasis (BM) from lung cancer manifests as multiple lesions with large edema and an irregular shape.[9]

The goal of surgery for brain metastases is local disease control that results in stabilization or improvement of clinical symptoms. The median survival time for untreated BM patients is 1 to 2 months, which may be extended to 6 months with radiotherapyand chemotherapy.[6,19,20,21]

The present case emphasizes the need to consider lung cancer as a differential diagnosis in patients presenting with solitary hemorrhagic lesion whose location is uncommon with atypical features on imaging. Therefore early diagnosis and active treatment are vital to improve prognosis and survival.

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