

## Hemorrhagic Subdural Collection Secondary to Dural Based Invasive Mammary Carcinoma with Lymphatic Involvement: Case Report

Kazim Mohammed<sup>1</sup>, Ahmed Shaaban<sup>1</sup>, Ghanem Al-Sulaiti<sup>1</sup>, Mohab Abozed<sup>1</sup>, Ahmed Elsotouhy<sup>2</sup>, Issam Al-Bozom<sup>3</sup> and Ali Raza<sup>1\*</sup>

<sup>1</sup>Department of Neurosurgery, Hamad General Hospital, Doha, Qatar

<sup>2</sup>Department of Radiology, Hamad General Hospital, Doha, Qatar

<sup>3</sup>Department of Pathology, Hamad General Hospital, Doha, Qatar

\*Corresponding Author: Ali Raza, Consultant, Department of Neurosurgery, Hamad General Hospital, Doha, Qatar.

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### Abstract

**Background:** Dural metastasis from breast carcinoma, prostate and lung carcinoma have been reported, but presentation of Dural metastasis as subdural hematoma is extremely rare. In literature, only few cases have been reported, most of them being adenocarcinoma from breast, lung and gastric cancer [1-3]. We present an uncommon case of Dural based mammary carcinoma with lymphatic involvement presenting as incidental subacute subdural hematoma in an asymptomatic patient who was diagnosed on her work up for breast carcinoma. We would like to mention the importance of MRI and Dural biopsy in such cases as the treatment and management of these cases would change based on the result of Dural biopsy.

**Case Description:** 61 years old female, known case of breast carcinoma, post mastectomy and adjuvant chemoradiotherapy, with no previously diagnosed intracranial metastasis presented with subdural collection on follow up PET scan. MRI showed dural enhancement suggestive of dural base metastasis. Dural biopsy showed invasive mammary carcinoma with lymphatic involvement.

**Conclusion:** We would like to state the importance of Dura and subdural membranes biopsy in cases of subdural hematoma with positive MRI findings as further management depends upon histopathological evidence of malignant spread to these membranes.

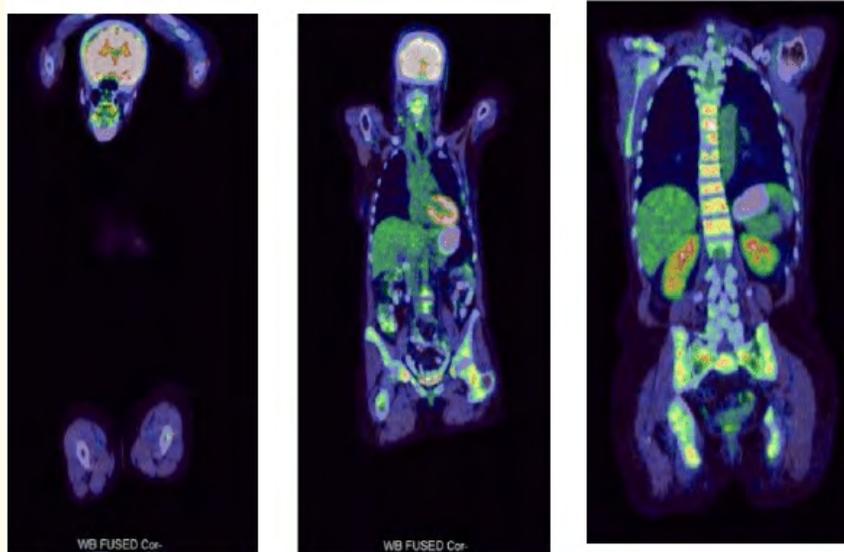
**Keywords:** Dural Metastasis; Breast Carcinoma; Lymphatics; Subdural Collection; MRI

### Introduction

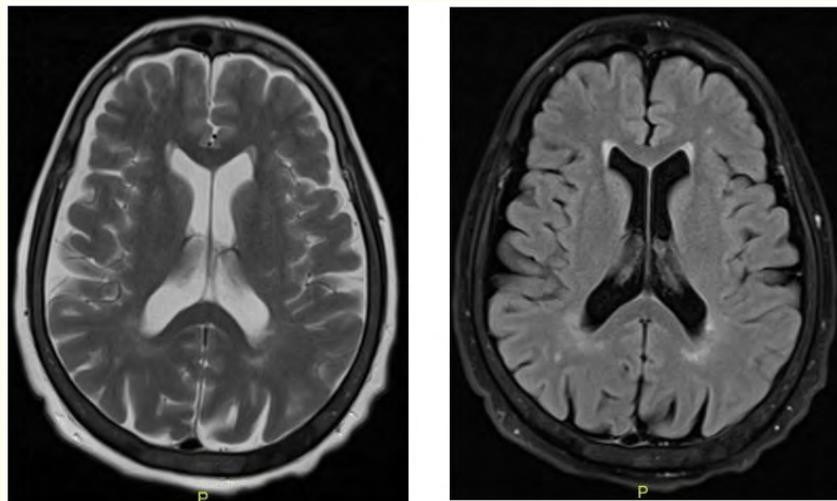
Dural metastases are reported in about 8 - 9% of autopsied advanced systemic cancer patients [3,4]. They mostly present with symptoms like increased intracranial pressure, neurological deficits, seizures, coma or may be even asymptomatic [3]. Subdural hematoma as a presentation of Dural metastasis is relatively rare especially acute and subacute subtypes [1-8]. There are about 55 cases reported in literature [4]. Herein, we discuss a case of known case of breast carcinoma who was referred from the oncology after the PET-scan being done as part of her work up to look for secondary which showed an incidental subdural collection. The patient was asymptomatic with a misleading history of trauma about 2 - 4 months earlier but MRI showed Dural enhancement and a Dural biopsy was planned showing invasive mammary carcinoma with lymphatic spaces (lymphatic carcinomatosis) without overlying bone involvement.

### Case Presentation

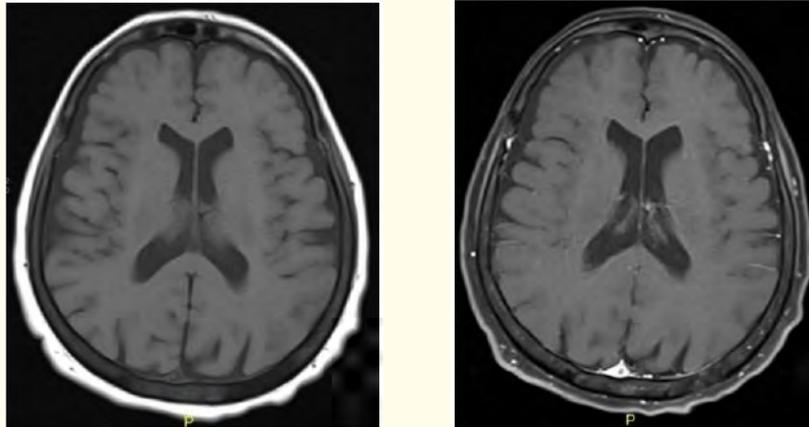
A 61 years old female patient presented to our emergency department after a follow up PET scan for metastatic breast cancer indicating progressive disease and incidental findings of newly developed brain midline shift to the left secondary to right sub-dural collection, multiple newly developed sclerotic bone lesions, left lung atelectasis and pleural thickening mostly as an inflammatory process (Figure 1). She had no history of brain metastases before this presentation and MRI done at the time of diagnosis of breast carcinoma was also negative (Figure 2a and 2b).



**Figure 1 (a-c):** FDG PET CT Scan on 01/11/2016 showing avid meningeal uptake confirming the meningeal metastatic deposits as well as multiple osseous metastatic deposits primarily along the axial skeleton.



**Figure 2A:** Unenhanced MRI on 18/08/2015 Axial T2 and FLAIR weighted images showing mild brain involution changes with peri-ventricular leukoencephalopathy but no intracranial mass lesions noted.



**Figure 2B:** Axial T1 weighted MR Images before and after IV Gadolinium based contrast administration showing no abnormal intracranial enhancing lesions.

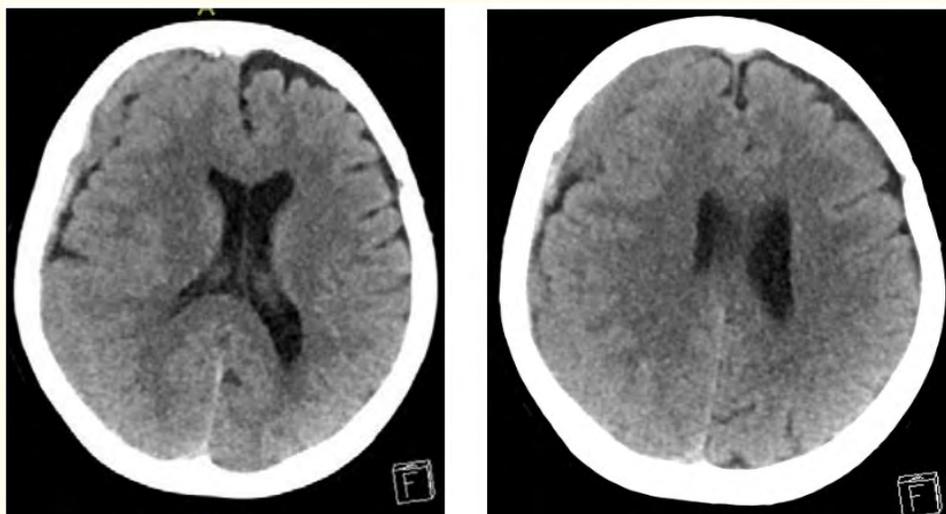
The patient was asymptomatic except for 2 weeks of occasional headache not consistent with increased intracranial pressure and the patient herself relating it to the toothache. She had a history of fall twice 4 months and 2 months earlier.

She denied any loss of consciousness, vomiting, seizure, confusion or coma. There was no history of diabetes, antiplatelet therapy, or coagulation disorders. On examination, the patient was conscious oriented, Glasgow Coma Scale 15/15, with no cranial nerves or neurological deficits.

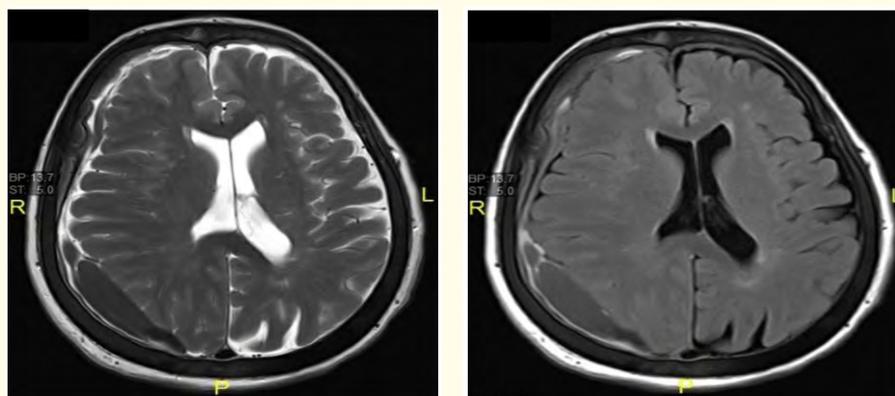
About 16 months earlier, the patient was diagnosed with left sided breast cancer (invasive ductal carcinoma NST with left axillary lymph nodes metastases and bone metastases involving left occipital skull bone, right orbit, ribs on both sides, multiple levels of seventh right can, dorsal, lumbar spine). Hormonal profile was negative for oestrogen receptors, progesterone receptors, Her2 neu and positive for E-cadherin, Ki67 3%). Her cancer was classified as grade 2, stage T3N1M1. She received 4 cycles of Docetaxel followed by 4 cycles of FEC protocol.

Her post-surgical pathological specimen showed invasive mammary carcinoma. Thereafter, the patient was on regular follow-up and Denosumab for about 8 months until her last PET scan. The PET scan showed a right sided subdural collection- suggestive of hematoma with midline shift. She was referred to the Neurosurgery department for urgent care.

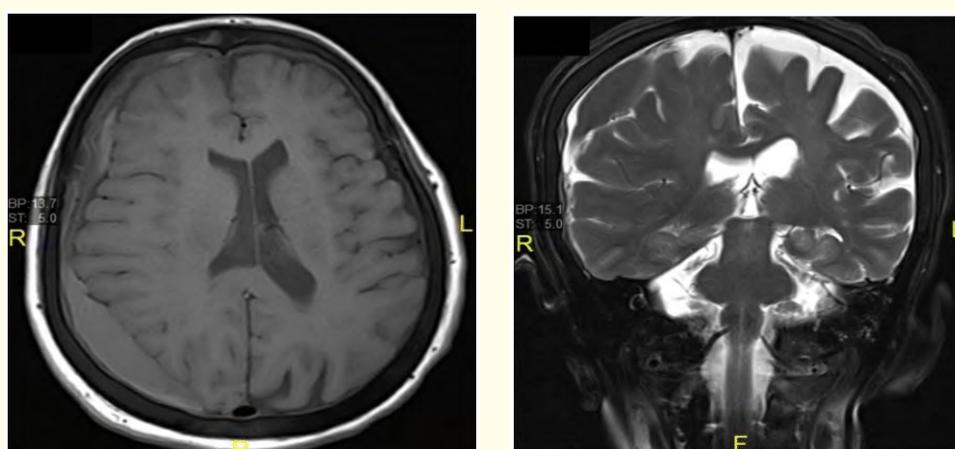
NCCT was performed which showed crescentic extra-axial iso dense subacute subdural bleed along right cerebral convexity maximum thickness 26 mm with mass effect in the form of effacement of adjacent sulci, frontal horn, trigone, occipital horn of right lateral ventricle and midline shift 8 mm (Figure 3). MRI was done which showed right frontoparietal subdural hematoma with mass effect overlying right frontoparietal area with irregular dural thickening and right frontal inner table periosteal new bone formation, diffuse calvarial sclerosis, focal areas of left frontal and parietal dural thickening, mostly metastases necessitating dural biopsy (Figure 4a-c). No brain metastases were detected. Retrospective review of the CT-scan showed thickening of the dura. So a decision of evacuation of the subdural hematoma along with Dural biopsy was planned and discussed with the patient.



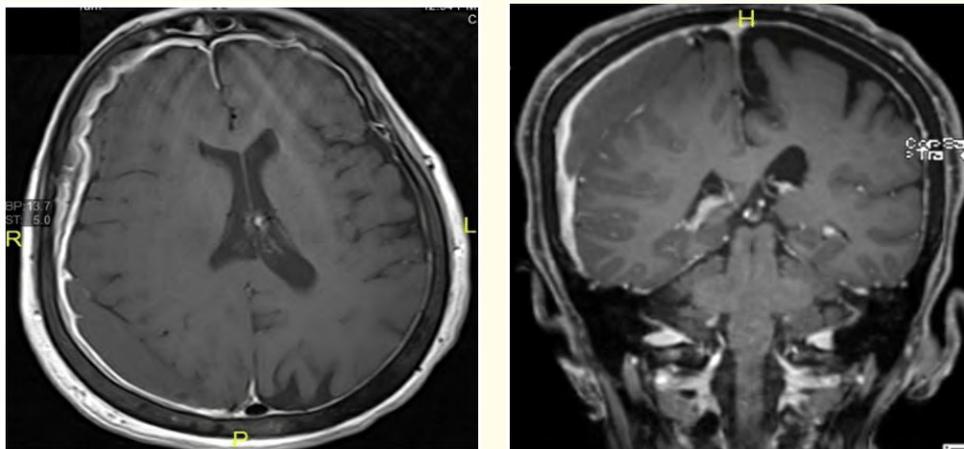
**Figure 3:** Unenhanced CT scan on 01/11/2016 showing right sided intracranial extra-axial subdural hyper dense collection wit associated with effect and mild shift of the midline structures suggestive of subdural hematoma.



**Figure 4A:** MRI Brain on 02/11/2016 Axial T2 and FLAIR -weighted images re-demonstrating the right sided subdural hematoma associated with diffuse nodular meningeal thickening with mild mass effect and midline shift to the left side.



**Figure 4B:** Axial T1 and Coronal T2- weighted images re-demonstrating the right sided sub-acute subdural hematoma collection and the associated mass effect and midline shift.



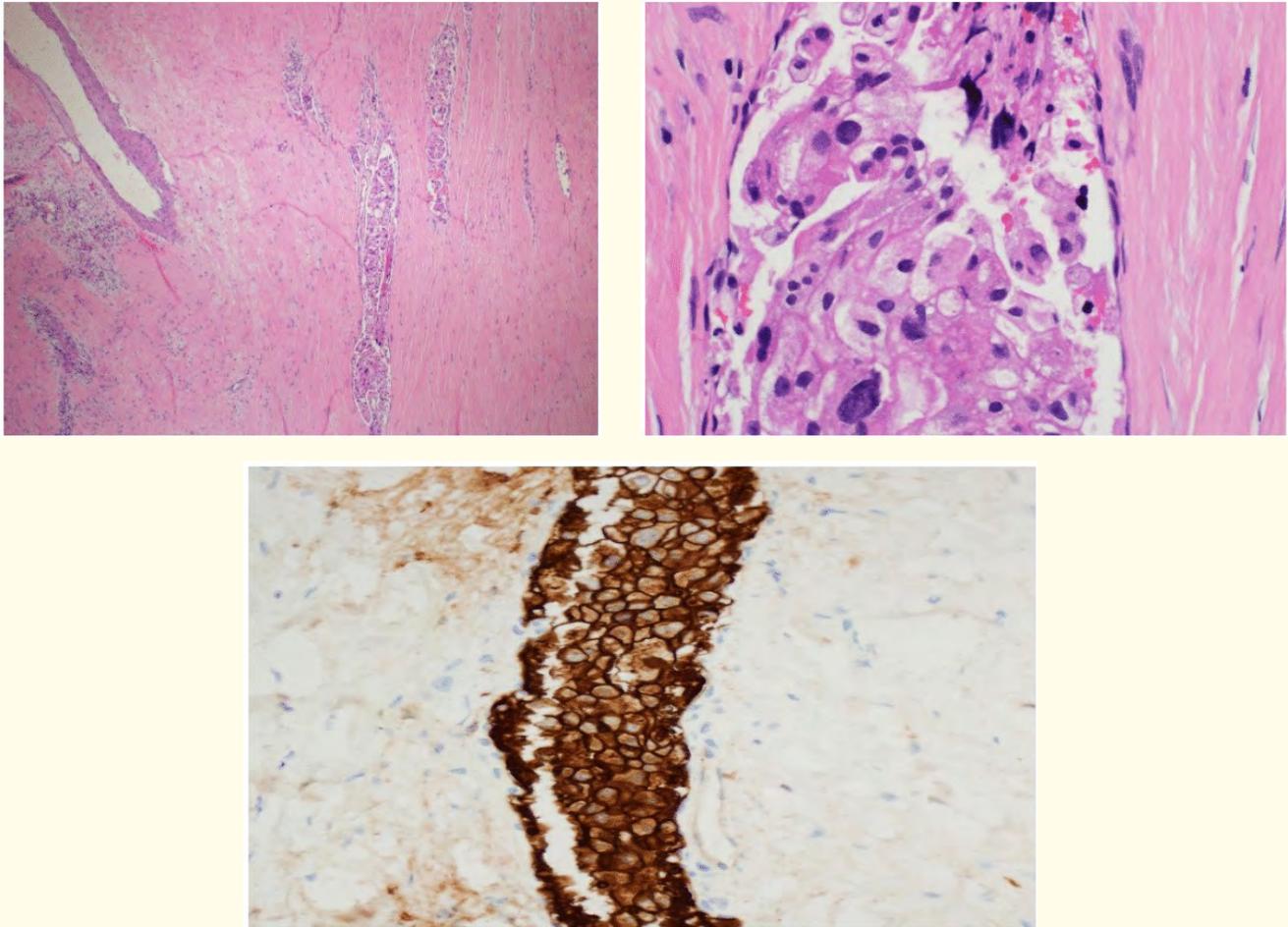
**Figure 4C:** Axial and Coronal T1- weighted gadolinium based contrast enhanced MR images showing the diffuse nodular meningeal thickening displaying intense enhancement pattern impressive of meningeal metastatic deposits of a Known patient with breast carcinoma.

Right parietal mini craniotomy and evacuation of right subacute subdural hematoma and Dural biopsy was performed. Dura, subdural membranes, bone samples sent for histopathology and dark blood sent for cytology.

Follow up plain CT head after the operation (Figure 5a-c) was consistent with improvement of preoperative subacute subdural hematoma and the patient was discharged for outpatient follow up. Histopathology report was consistent with invasive mammary carcinoma within lymphatic spaces (lymphatic carcinomatosis) without overlying bone involvement (Figure 6a-c). The cytology of the subdural fluid was negative for any malignant cells.



**Figure 5a-c:** Post-operative CT after multiple meningeal biopsies as well as external drainage tube through right parietal bur-hole showing evident regression of the right sided subdural hematoma and associated mass effect.



**Figure 6a-c:** a. Low power view shows thick vessel in the left side and thin wall vessel in the middle(?lymphatic) .  
b. High power view showing tumor embolus within a thin walled vascular structure devoid of muscle coat (lymphatic vessel)  
c. CK immunohistochemistry highlighting the tumor cells in the lymphatic space.

The case was discussed in MDT, and it was suggested to start the patient on palliative chemotherapy with Denosumab and xeloda.

## Discussion

Intracranial metastasis is common and can present as intracranial, intraventricular, dural and leptomeningeal. Dural metastasis is differentiated from leptomeningeal metastatic disease in that the later affects the pia and arachnoid only and can be seen to follow the gyral convolutions on MRI, compared to the former [6]. Prostrate, breast, lung and stomach carcinoma are the most common tumors involved in dural mets whereas the breast carcinoma followed by lung, melanoma, lymphoma and leukemia present as leptomeningeal carcinomatosis. Retrograde seeding by the valveless vertebral venous system (Batson's plexus) has been advocated in prostate cancer to explain the high frequency of skull and Dural metastases [7].

Chronic SDH originally termed as pachymening its hemorrhagic internal by Virchow in 1857 [8], occurs mostly in elderly. Only 50% of the pt with CSDH have a history of trivial trauma. Presence of coagulopathy mostly due to anticoagulant intake is important risk factor. The common practice of management for chronic subdural is to drain it with burr hole based on the Ct findings, with MRI rarely done in these cases. Doing MRI may be important especially in the case where a patient is already suffering from a primary tumour elsewhere in the body or in cases without any other risk factors predisposing the patient in development of the CSDH. A high index of suspicion for dural metastasis should be raised under these circumstances and if MRI shows Dural enhancement, the necessity of taking intra-operative dural biopsy should be added on to simple drainage.

PET-CT scan may not be efficient tool in identifying the Dural mets, as in our case where it only showed the hematoma with midline shift with normal FDG uptake, which was misleading with the history of head trauma. It was the MRI imaging study which gave a clear picture of possible dural metastasis, later confirmed on histopathology.

Review of literature have shown breast carcinoma being a primary in few cases of dural mets, however our case is unique as the histopathology was mammary carcinoma, which is not reported in literature.

Invasive mammary carcinoma, also known as infiltrating mammary carcinoma, is a mixture of invasive ductal and lobular carcinomas, meaning the cancer grows at the junction of the duct and the lobule. It spreads mainly by the lymphatics. The h/p showed the blood vessels and lymphatic spaces of these 2 tissues having clusters of abnormal epithelial cells with hyperchromatic nuclei and prominent nucleoli suggestive of mammary carcinoma. But borders of dura were intact and not infiltrate by abnormal cell probably the reason why the cytology fluid was free of malignant cells. Also the bony tissue didn't show any invasion by the tumour.

The presence of Dural mets in case of CSDH worsen the prognosis, even though the presentation is very rare. Additional presence of coagulopathy has very poor outcome in case of CSDH with dural mets, with many cases developing coagulopathy and DIC due to malignancy or invasion of bone marrow by tumour cells.

### Conclusions

Majority of chronic subdurals are of simple nature however Subdural hematoma may be the only presenting feature of dural metastases in certain cases. MRI is an important tool for diagnosing the dural based metastasis which might not be picked up on PET-scan imaging.

We would like to state the importance of Dural and subdural membranes biopsy in cases of subdural hematoma with positive MRI findings as further management depends upon histopathological evidence of malignant spread to these membranes.

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