RESEARCH PAPER

Breast Carcinoma Presenting with Brain Metastasis Mimicking Lacunar Infarcts – A Diagnostic Challenge A Case Report.

Dr. Aaron Wilson*[1], Professor Gopalan Muralidharan [2], Dr. Charu Hasini [3] and Dr. Tamma Sai Pavan Reddy [4]

[1]University of Sri Balaji Vidyapeeth, Junior resident-II of general surgery, Shri Satya Sai medical college and Research institute, Department of General Surgery, chengalpattu, Chennai, India
[2]University of Sri Balaji Vidyapeeth, Head of Department of general surgery, Shri Satya Sai medical college and Research institute, Department of General Surgery, chengalpattu, Chennai, India
[3]University of Sri Balaji Vidyapeeth, Senior Resident of general surgery, Shri Satya Sai medical college and Research institute, Department of General Surgery, chengalpattu, Chennai, India
[4]University of Sri Balaji Vidyapeeth, Junior resident-III of general surgery, Shri Satya Sai medical college and Research institute, Department of General Surgery, chengalpattu, Chennai, India
[1]aaronwils29@outlook.com, [2]mmcmad81@gmail.com, [3]charuhasini3777@gmail.com and [4]saipavan.tamma2@gmail.com
***Corresponding Author:** aaronwils29@outlook.com*

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ABSTRACT
To report an unusual presentation of a INFILTRATING DUCTAL CARCINOMA OF LEFT BREAST with axillary lymph node metastasis, B/L lung metastasis (T4dN2bM1), and to highlight the importance of recognising atypical neurological presentations in patients with history of malignancies

A 56-year-old postmenopausal woman, known case of systemic hypertension diagnosed two months ago and quadriparesis for the past eight years following Ayurvedic treatment for past three years, being treated with amlodipine 5mg tablets once daily, known case Patient came to OPD with Complaints of lump in left breast for 2 weeks and complaints of new onset tremors of bilateral hands and slurring of speech.

MRI brain was performed, which revealed multiple small, ring-enhancing lesions in the bilateral gangliocapsular region, right thalamus and left cerebellar hemisphere regions with surrounding oedema., suggestive of metastatic deposits rather than ischemic lesions.

Doctors should consider metastatic disease in patients with previous malignancy and atypical neurological presentations. Early MRI and multiple systemic evaluation are important for proper management and better outcomes.

Keywords: breast carcinoma, CNS metastasis, brain infarct, lacunar infarct.

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2. INTRODUCTION

Brain metastases from breast carcinoma are not uncommon in advanced disease; however, presentation as multiple lacunar infarct-like lesions is exceedingly rare and may delay diagnosis and treatment [1,2,3].

We report a 56-year-old postmenopausal woman with a known history of infiltrating ductal carcinoma of the left breast who presented with acute-onset right-sided weakness and slurred speech [3].

Neuroimaging initially suggested multiple lacunar infarcts [4].

Further evaluation, including MRI brain, revealed multiple enhancing lesions with perilesional edema consistent with metastatic deposits [4].

Breast carcinoma metastasis can rarely mimic lacunar infarcts on neuroimaging [4].

A high degree of suspicion and advanced imaging are essential for accurate diagnosis and timely oncologic management [1,4].

3. REVIEW OF LITERATURE

Breast carcinoma is one of the most common malignancies in women, and the brain is a frequent site of distant metastasis, especially in advanced or triple-negative

Author for Correspondence: aaronwils29@outlook.com

subtypes. However, metastases that mimic cerebrovascular infarcts are rare and often misdiagnosed as ischemic stroke, especially when lesions are small and non-hemorrhagic. Differentiating metastatic disease from vascular pathology has crucial implications for treatment and prognosis. This case highlights the importance of considering metastatic disease in cancer patients presenting with neurological symptoms.

4. MATERIALS AND METHODS

4.1. Study design
Case report

4.2.Patient Presentation and observation

History and chief complaints:
A 56-year-old postmenopausal woman, known case of systemic hypertension diagnosed two months ago and quadriparesis for the past eight years following Ayurvedic treatment for past three years, being treated with amlodipine 5mg tablets once daily, known case. No history of breast cancer or or any other neoplastic history in family. There was no history of trauma.

Patient came to OPD with Complaints of lump in left breast for 2 weeks noticed by attender while changing dress, and complaints of new onset tremors of bilateral hands and slurring of speech.

Clinical findings and presentation:
Patient attender noticed a swelling in the left breast 2 weeks prior while changing dress, which was initially small and gradually increased to reach presenting size. Lump is associated with pain, which is pricking type, on & off, non radiating, nonpulsatile, pain intense on moving shoulder/ moving head & relieves on its own.

No known history of breast carcinoma or history of any other malignancy in family.

There was weight loss in the last 6 months and loss of appetite in the last 6 months.

No history of fever, cough, cold, nipple discharge, back pain, backache, jaundice, difficulty in breathing, headache, blurring of vision, swelling anywhere else in the body

4.3. Examination:
The patient was conscious, oriented, and hemodynamically stable. Neurological examination showed right upper limb power of 3/5 and right lower limb power of 4/5 with mild facial deviation. No sensory deficit or cerebellar signs were noted.

4.3.1 Vitals:
Pulse 82/min;

BP 110/70 mmHg;

RR 17/min;

Temp 98.3°F

4.3.2. LOCAL EXAMINATION:

INSPECTION:

Right breast:
Right breast looks normal. No scars, sinus, dilated veins

Nipple areolar complex:
2*2cms, centrally placed, brown in colour, round, no retraction, no visible scars, sinus, fissures, visible pulsations

Nipple:
1*1 cms, centrally placed, no retraction, no visible scars, sinus, fissures, pulsations.

Left breast:
Left breast looks enlarged than right breast.

Swelling of size 3*3 cms over upper outer quadrant.

Ill defined, skin discolouration was seen over the breast, dimpling is present.

Peau'd orange over lower inner quadrant

No sinus, scar, fissure, visible pulsations

Nipple areolar complex:
2*2cms, centrally placed, brown in colour, round, dimpling+, no visible scars, sinus, fissures, visible pulsations, no discharge

Nipple:
1*1 cms, centrally placed, no retraction, no scars, sinus, fissures, pulsations, bleed, discharge

Bending forward, raising hand, hands at hip can't be done

Arms and Thorax: No oedema, no visible nodules

Axilla: No visible nodules

Supra clavicular fossa: No visible nodules

4.3.3. PALPATION
Right breast:
No warmth, Non tender, no mass felt, no pulsations

NAC:
No discharge, no warmth, no tenderness, no mass felt, no pulsations.

Nipple:
No discharge, no warmth, non tender, no mass felt.

LEFT BREAST
Warmth+ over upper outer, lower outer, lower inner quadrants. Single lump of size 4×3cm, firm in consistency, irregular in shape, located in upper outer quadrants, skin is attached to the swelling, surface irregular, margin ill defined. Lump not fixed to the chest wall, mobile along with the muscle plane

NAC: No warmth, no tenderness, no mass felt, no discharge on palpation

Nipple: No warmth, no tenderness, no discharge, no mass felt

Left axillary area:
Swelling of size 2×2 cm noted in the left axilla, firm in consistency, irregular in shape, margins ill defined, skin

over swelling is normal, surface looks normal, swelling is attached to the underlying surface.

Right axillary area:
No mass, no warmth, no tenderness

Supraclavicular area:
No mass, no warmth, no tenderness

Arms and thorax:
No mass, no warmth, non tender, no pulsations felt

Auscultation over breast:
No bruit or hum heard

4.3.4. SYSTEMIC EXAMINATION:
Per Abdomen: Soft, non tender, scar of size over suprapubic region, No warmth, non tender, Bowel sound+

CVS: S1S2+, no murmur

RS: B/L AE, no added sounds

4.4.Timeline of current episode:
8 years Prior

- Patient developed sudden onset quadriparesis and slurred speech folowing a generalised tonic clonic seizure of 4mins
- Performance status stable.

Day 0 – Acute Presentation.

- No history of trauma, fever, or loss of consciousness.
- Developed bilateral tremors of upper limbs.
- Brought to emergency department.

Emergency Evaluation (Day 0)

- Vitals stable; neurologic examination showed bilateral motor deficit.
- Initial CT brain:
  - Showed multiple small hypodense lesions, interpreted as possible lacunar infarcts.

Day 1–2 – Further Diagnostic Workup

- Due to atypical distribution and patient's cancer history, MRI was ordered.
- MRI Brain with contrast:
  - Revealed multiple enhancing lesions in bilateral gangliocapsular region, right thalamus, and left cerebellar hemisphere.
  - Perilesional edema present.
  - Imaging now consistent with metastatic deposits, not infarcts.

Day 2–4 – Specialist Consultation

- Neurology and oncology joint review.
- Differential diagnosis revised to CNS metastases from breast carcinoma.
- Stroke pathway discontinued.
- Plan for steroid therapy for edema, and evaluation for radiation therapy/systemic therapy.

Day 4–7 – Initiation of Treatment

- Dexamethasone started → symptomatic improvement.
- Patient evaluated for:
  - Whole brain radiotherapy (WBRT) or stereotactic radiosurgery (SRS)
  - Systemic therapy options depending on receptor status (HER2 / ER / PR)

Follow-Up (Week 2–4)

- Strength gradually improved.
- Tremors reduced.

5. DIAGNOSTIC ASSESSMENT AND INVESTIGATIONS:

5.1. Laboratory investigations

5.1.2. CBC: Hb 13.6 g/dL; platelets 2.63 lakh/cu.mm; WBC 6950/cu.mm

5.1.3. LFT: Total bilirubin 0.5 mg/dL; direct bilirubin 0.2 mg/dL; total protein 6.8 g/dL;

albumin 4.3 g/dL; globulin 2.5 g/dL

5.1.4. Urine: pH 5.0; protein nil; glucose nil; nitrite negative; ketones negative; RBC

absent; bile negative; casts negative

5.1.5. Electrolytes: Na 143 mEq/L; K 3.8 mEq/L; Cl 105 mEq/L

5.1.6. RFT: Urea 18 mg/dL; creatinine 0.7 mg/dL

5.1.7. Serology: HIV negative; HBsAg negative; HCV negative

Test	Results/Units	Reference Range
Fine needle aspiration cytology	.	-

Aspirated blood mixed material;Multiple cytosmears studied from left axillary lymph node are cellular showing tumor cells arranged in sheets,clusters and scattered singly.Individual cells are pleomorphic having high N:C ratio,moderate eosinophilic cytoplasm,round to oval hyperchromatic nuclei.Atypical mitosis also seen.Some cells are plasmacytoid.Background shows lymphoid population,stromal fragments and hemorrhage.

IMPRESSION:
Left axillary lymph node - Suspicious for secondary metastatic deposit from carcinoma.
Advised confirmation with biopsy and immunohistochemistry.

Note: This is an electronically generated report.

Test	Results/Units
**HISTOPATHOLOGY-SMAL	
BIOPSY NO.	605/25
CLINICAL DIAGNOSIS	?Left Breast Carcinoma.
NATURE OF SPECIMEN	Core needle biopsy of Left Breast.
GROSS	Received multiple (8) linear cores, longest measuring 1.2cm and shortest measures 0.7cm. A/E.
MICROSCOPY	Sections studied from the left breast core needle biopsy shows invasive tumour with tumor cells arranged in nests, cords, sheets and scattered singly. The individual cells are pleomorphic with increased nuclear to cytoplasmic ratio, enlarged hyperchromatic nucleus with inconspicuous nucleoli with moderate amount of eosinophilic cytoplasm. 1-2/10HPF mitosis noted.
IMPRESSION	Core needle biopsy of Left Breast - Features are suggestive of Infiltrating Ductal Carcinoma, NOS.
REMARKS	-

Note: This is an electronically generated report.

Routine haematological and biochemical parameters were normal. Non-contrast CT brain showed small hypo dense areas in the left basal ganglia and corona radiata, interpreted as multiple lacunar infarcts. The patient was started on anti platelets and statins.

However, due to poor improvement after 5 days, an MRI brain was performed, which revealed multiple small, ring-enhancing lesions in the bilateral gangliocapsular region, right thalamus and left cerebellar hemisphere regions with surrounding oedema., suggestive of metastatic deposits rather than ischemic lesions.

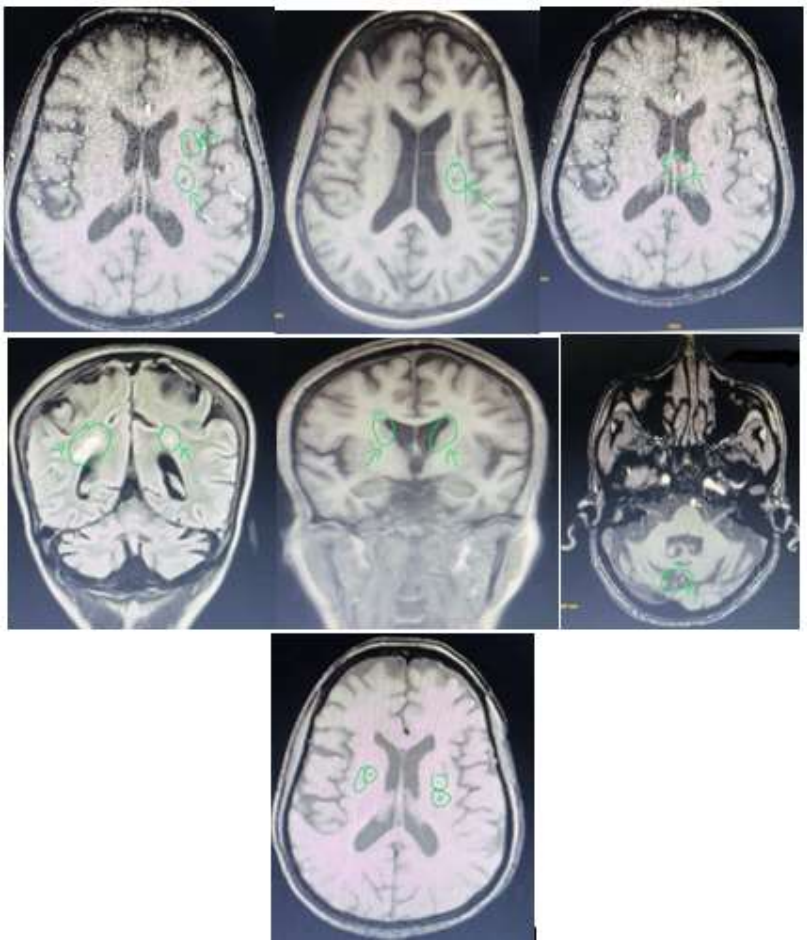
5.1.8. MRI BRAIN:
Multiple subcentimetric T2 hyper intense, FLAIR central hypo intense peripheral hyper intense areas / lesions noted in bilateral gangliocapsular region, right thalamus and left cerebellar hemisphere with surrounding oedema.

- Suggestive of Multiple chronic lacunar infarcts or metastatic deposits .

Few punctate subcentimetric blooming seen in the right gangliocapsular region, left centrum semiovale, right corona radiata, subcortical white matter involving the right occipital and left temporal lobe which on magnitude and filtered phase of SWI sequence represents areas of micro haemorrhages - likely s/o hypertensive microangiopathy/ micro bleed.

III defined T2/FLAIR hyper intensities seen in bilateral periventricular white matter-Suggestive of bilateral small vessel ischemic changes (Fazekas grade I).

Mild prominence of sulcal and cisternal space is seen-s/o age related cortical atrophy.



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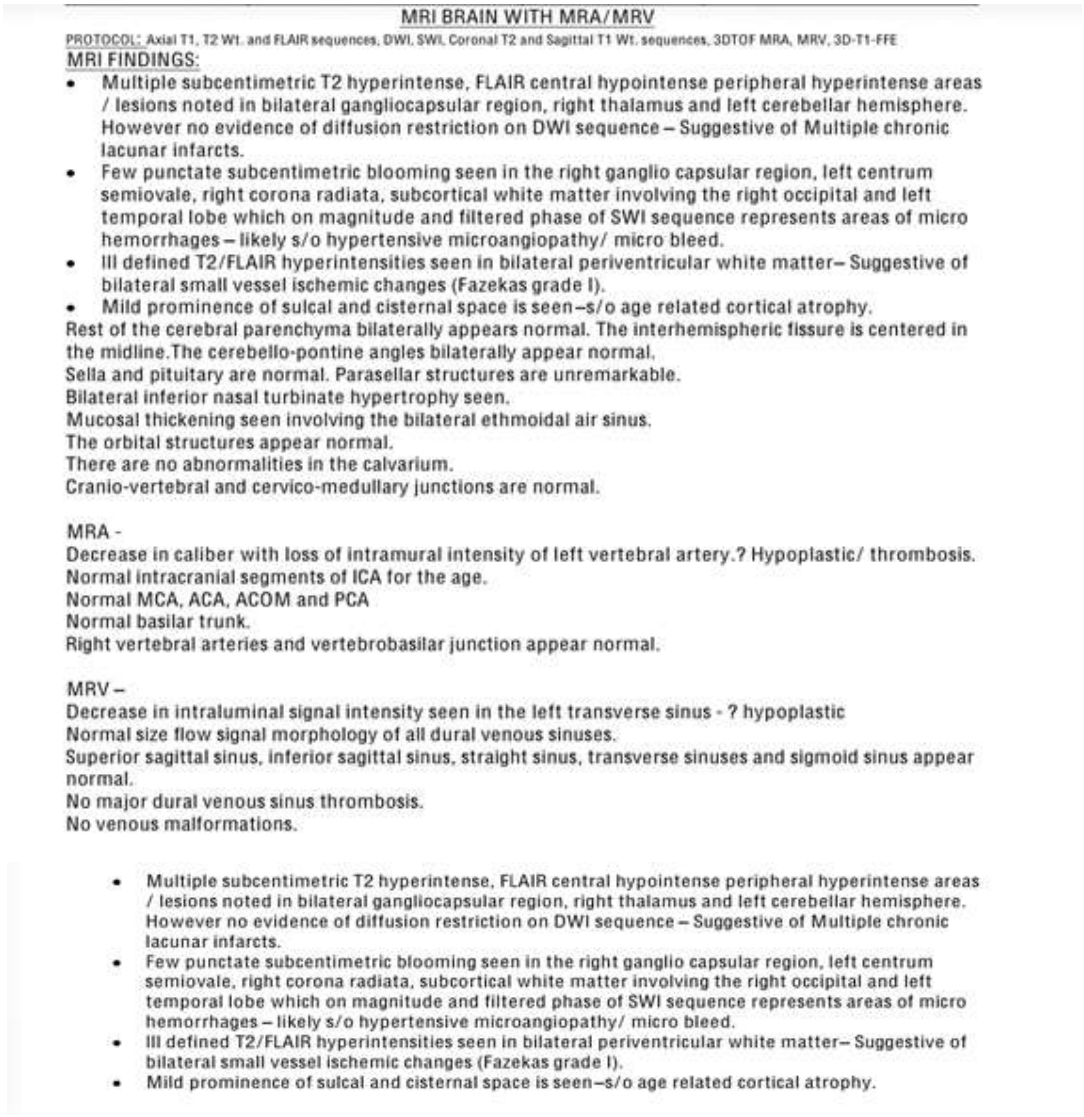

MRI BRAIN WITH MRA/MRV

PROTOCOL: Axial T1, T2 Wt. and FLAIR sequences, DWI, SWI, Coronal T2 and Sagittal T1 Wt. sequences, 3DTOF MRA, MRV, 3D-T1-FFE

MRI FINDINGS:

- Multiple subcentimetric T2 hyperintense, FLAIR central hypointense peripheral hyperintense areas / lesions noted in bilateral gangliocapsular region, right thalamus and left cerebellar hemisphere. However no evidence of diffusion restriction on DWI sequence – Suggestive of Multiple chronic lacunar infarcts.
- Few punctate subcentimetric blooming seen in the right ganglio capsular region, left centrum semiovale, right corona radiata, subcortical white matter involving the right occipital and left temporal lobe which on magnitude and filtered phase of SWI sequence represents areas of micro hemorrhages – likely s/o hypertensive microangiopathy/ micro bleed.
- Ill defined T2/FLAIR hyperintensities seen in bilateral periventricular white matter– Suggestive of bilateral small vessel ischemic changes (Fazekas grade I).
- Mild prominence of sulcal and cisternal space is seen–s/o age related cortical atrophy.

Rest of the cerebral parenchyma bilaterally appears normal. The interhemispheric fissure is centered in the midline.The cerebello-pontine angles bilaterally appear normal.
Sella and pituitary are normal. Parasellar structures are unremarkable.
Bilateral inferior nasal turbinate hypertrophy seen.
Mucosal thickening seen involving the bilateral ethmoidal air sinus.
The orbital structures appear normal.
There are no abnormalities in the calvarium.
Cranio-vertebral and cervico-medullary junctions are normal.

MRA -
Decrease in caliber with loss of intramural intensity of left vertebral artery.? Hypoplastic/ thrombosis.
Normal intracranial segments of ICA for the age.
Normal MCA, ACA, ACOM and PCA
Normal basilar trunk.
Right vertebral arteries and vertebrobasilar junction appear normal.

MRV –
Decrease in intraluminal signal intensity seen in the left transverse sinus - ? hypoplastic
Normal size flow signal morphology of all dural venous sinuses.
Superior sagittal sinus, inferior sagittal sinus, straight sinus, transverse sinuses and sigmoid sinus appear normal.
No major dural venous sinus thrombosis.
No venous malformations.

- Multiple subcentimetric T2 hyperintense, FLAIR central hypointense peripheral hyperintense areas / lesions noted in bilateral gangliocapsular region, right thalamus and left cerebellar hemisphere. However no evidence of diffusion restriction on DWI sequence – Suggestive of Multiple chronic lacunar infarcts.
- Few punctate subcentimetric blooming seen in the right ganglio capsular region, left centrum semiovale, right corona radiata, subcortical white matter involving the right occipital and left temporal lobe which on magnitude and filtered phase of SWI sequence represents areas of micro hemorrhages – likely s/o hypertensive microangiopathy/ micro bleed.
- Ill defined T2/FLAIR hyperintensities seen in bilateral periventricular white matter– Suggestive of bilateral small vessel ischemic changes (Fazekas grade I).
- Mild prominence of sulcal and cisternal space is seen–s/o age related cortical atrophy.

6. RESULTS

Diagnosis: INFILTRATING DUCTAL CARCINOMA OF LEFT BREAST with axillary lymph node metastasis, B/L lung metastasis (T4dN2bM1) / S.HTN

Diagnostic challenge: limited access to testing due to limited technological platforms and infrastructure, Financial status of the patient being of the lower socioeconomic strata.

6.1.Management:

The patient was started on

TAB.TAXIM 200mg PO BD

TAB.PARA 650mg PO TDS

TAB.PAN 40mg PO OD

TAB.VIT C 500mg PO OD

TAB.EVEON PO OD

TAB.AMLONG 5mg PO BD

6.2. Outcome:

The patient was discharged in stable condition with regular oncology follow-up.

7.Patient perspective: these were collected from the patient attender as the patient suffered from a cerebral vascular accident 8 years ago.

*"When my patient symptoms started suddenly, I believed she was having a stroke. I was frightened because I had no previous experience or knowledge about such a situation with regard to caring for an already ill patient. When I came to know that the scans showed small strokes it was worrying, but when the doctors explained that the real cause was cancer spreading to my brain, I felt extremely overwhelmed.

What helped me the most was the team acting quickly and clearly explaining each and every step — why we needed to do more tests, and what the MRI scan showed, and how the treatment would help reduce the swelling and control

the disease and help us going forward. Once the medications began working, I felt better, and that gave me hope while still being worried about the cancer diagnosis.

This experience taught me that cancer can come in any different way, but early recognition and proper care make a big difference. I am grateful for the attention and reassurance I received during a very difficult time."*

7.1. Informed written consent: this case report is done with the informed consent of the participating patient.

7.2. Ethical considerations
Informed consent obtained. No patient identifiers included.

8. RESULTS

➢ Successful identification of lesions noted in bilateral gangliocapsular region, right thalamus and left cerebellar hemisphere with surrounding oedema.

shown in Figure

➢ Patient discharged in stable condition after 5 days.

DISCUSSION

Brain metastases occur in approximately 10–15% of patients with breast carcinoma, usually in the setting of disseminated disease. The common sites are the cerebellum, frontal and parietal lobes, and metastases often present with seizures, headache, or focal neurological deficits.

This case is unique because the radiological appearance mimicked lacunar infarcts, which are small (<15 mm) ischemic lesions usually due to occlusion of small penetrating arteries. Such radiologic confusion can arise because small metastases, particularly in the basal ganglia or thalamus, may appear as hypo dense areas on CT and lack mass effect early on.

MRI with contrast and MR spectroscopy are crucial in distinguishing metastases from infarcts. Metastatic lesions typically show ring enhancement, vasogenic oedema, and increased choline peaks, unlike true infarcts

The unavailability of MR Spectroscopy is a limitation that hasn't allowed us to further evaluate and detect features that would have helped in distinguishing metastasis from infarcts sooner.

Early differentiation is essential because management differs greatly with infarcts being treated with anti platelets, whereas metastases require corticosteroids, radiotherapy, and systemic therapy.

This case shows the importance of maintaining a high degree of suspicion in cancer survivors presenting with neurological symptoms, even when imaging initially suggests a vascular cause.

CONCLUSION

As per the reference articles and the number of similar cases presented in the literature according to them, Breast carcinoma metastasis can rarely present as lacunar infarct lesions on imaging, leading to delay in diagnosis. Doctors should consider metastatic disease in patients with previous malignancy and atypical neurological presentations. Early MRI and multiple systemic evaluation are important for proper management and better outcomes.

LEARNING POINTS

- Metastatic brain lesions from breast carcinoma can mimic ischemic lacunar infarcts in radiological investigations.
- Contrast-enhanced MRI and MR spectroscopy are important differentiating investigations.
- Metastatic presentation and recurrence should always be considered as part of differential diagnosis in patients with a history of malignancy presenting with focal neurological deficits.
- Early diagnosis changes the management and prognosis significantly.

Author contributions

Declaration of interests

☒ The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

☐ The authors declare the following financial interests/personal relationships which may be considered as potential competing interest

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