Case Report

Anti-Yo positive paraneoplastic cerebellar degeneration unmasking occult right breast malignancy: A case report

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ABSTRACT

Paraneoplastic cerebellar degeneration is a rare autoimmune neurological syndrome associated with breast carcinoma and anti-Yo antibodies. Neurological symptoms often precede the diagnosis of the underlying malignancy. A 48-year-old woman presented with progressive swaying while walking for 3 months, slurred speech for 2 months, vomiting, and diplopia. She had a prior transient episode of acute cerebellar ataxia that improved after intravenous methylprednisolone. Examination revealed truncal and gait ataxia, gaze-evoked nystagmus, scanning speech, dysdiadochokinesia, and a firm right retroareolar breast lump. Magnetic resonance imaging brain showed blooming in the bilateral dentate nuclei and crus cerebri, likely due to mineral deposition. Mammography and ultrasonography revealed suspicious bilateral breast nodules and a suspicious right axillary lymph node. Core biopsy of the right breast lesion showed features suspicious for malignancy (B4). Anti-PCA-1/anti-Yo antibody was positive. The case highlights the importance of considering paraneoplastic syndromes in patients with unexplained progressive cerebellar dysfunction and the role of multimodality imaging in detecting occult breast malignancy.

Key words: Anti-Yo antibody, Breast malignancy, Cerebellar ataxia, Mammography, Magnetic resonance imaging brain, Paraneoplastic cerebellar degeneration

Paraneoplastic cerebellar degeneration (PCD) is an uncommon immune-mediated neurological syndrome caused by an autoimmune response against antigens shared by the tumor and cerebellar Purkinje cells [1]. It is most commonly associated with breast and gynecological malignancies and small-cell lung carcinoma [2]. Patients typically present with subacute or progressive cerebellar symptoms, such as gait instability, dysarthria, nystagmus, and limb incoordination. In many cases, neurological symptoms precede the diagnosis of the underlying malignancy by weeks to months [3]. Anti-Yo antibodies are strongly associated with breast cancer-related PCD [4]. Early recognition is important because it can lead to the timely detection of an occult tumor and prompt oncologic evaluation [5].

Although PCD is a recognized paraneoplastic neurological syndrome, its presentation as the initial manifestation of an underlying breast malignancy remains uncommon and poses a diagnostic challenge. This case is reported to emphasize the importance of early radiological recognition, multimodality imaging, and clinicopathological correlation in identifying an occult breast malignancy in patients presenting with unexplained progressive cerebellar dysfunction [1].

Access this article online	
Received - 10 June 2026 Initial Review - 30 June 2026 Accepted - 01 August 2026	Quick Response code
DOI: ***	

CASE REPORT

A 48-year-old woman presented with complaints of swaying while walking for 3 months. The swaying had progressively worsened over time, with a reeling sensation on standing and walking to either side, and she became unable to walk without support. She also had slurring of speech for 2 months, vomiting for 3 months, and diplopia in both directions for 3 months. There was no history of fever, headache, head trauma, involuntary movements, or bladder or bowel incontinence. She had a similar episode in July 2025 with acute-onset cerebellar ataxia, diplopia, and bilateral gaze-evoked nystagmus, for which she was treated with intravenous methylprednisolone for 5 days and improved temporarily. She had a history of hysterectomy 5 years earlier and was known to have uncontrolled type 2 diabetes mellitus. She had also received intravenous immunoglobulin therapy.

General physical examination revealed a firm-to-hard right retroareolar breast lump measuring 2–3 cm.

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Neurological examination showed psychomotor slowing, horizontal diplopia, normal power in all limbs, brisk deep tendon reflexes bilaterally, withdrawal plantar, truncal ataxia, stance and gait ataxia, bilateral horizontal gaze-evoked nystagmus, scanning speech, and dysdiadochokinesia. Given the relapsing-remitting cerebellar ataxia followed by chronic progression, along with the breast lump, a paraneoplastic etiology was suspected.

Magnetic resonance imaging (MRI) brain showed a few areas of blooming in the bilateral dentate nuclei and bilateral crus cerebri, likely due to mineral deposition (Fig. 1). Mammography of both breasts was suboptimal on the right because of a hard, non-compressible mass (Fig. 2). A well-defined round-to-oval radiodense nodule with a few microcalcifications was seen in the upper quadrant of the left breast, and a few enlarged lymph nodes were noted in the right axilla. Ultrasonography showed two to three multilobulated heterogeneous predominantly hypoechoic nodules in the retroareolar and upper inner quadrant of the right breast, the largest measuring 2.9 × 2.7 cm (Fig. 3), with significant peripheral and internal vascularity on color Doppler (Fig. 4) and surrounding subcutaneous edema. Another well-defined hypoechoic lesion measuring 11 × 8 mm with a few internal calcific foci was seen at the 12–1 o'clock position of the left breast, with mild posterior acoustic shadowing. An enlarged right axillary lymph node measuring 12 × 11 mm showed loss of hilar architecture. The overall impression was BI-RADS IV/V, with the possibility of ductal carcinoma *in situ* or malignancy.

Core biopsy of the right breast lump showed tumor tissue arranged in nests, ill-defined glandular and cribriform patterns, composed of round-to-oval cells with hyperchromatic pleomorphic nuclei, high nuclear-cytoplasmic ratio, prominent nucleoli, and scant to moderate eosinophilic cytoplasm. The intervening stroma was desmoplastic with inflammatory cell infiltrates. The report concluded that the features were suspicious for malignancy, category B4.

Systemic staging with contrast-enhanced computed tomography (CT)/positron emission tomography-CT could not be performed because of the patient's rapidly progressive clinical course before definitive oncological evaluation.

Serology was positive for anti-PCA-1/anti-Yo antibodies. Based on the clinical findings, imaging findings, histopathology, and antibody positivity, a diagnosis of anti-Yo-positive PCD secondary to right breast malignancy was established.

Based on the clinical presentation, breast imaging findings (BI-RADS IV/V), positive anti-PCA-1

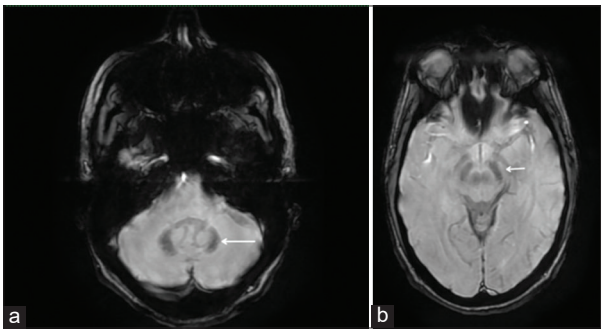

Figure 1: (a) Axial susceptibility-weighted imaging (SWI) of the brain showing symmetric blooming foci in bilateral dentate nuclei, suggestive of mineral deposition in the setting of paraneoplastic cerebellar degeneration; (b) Axial SWI image demonstrating blooming signal abnormalities in bilateral crus cerebri without associated mass lesion or edema

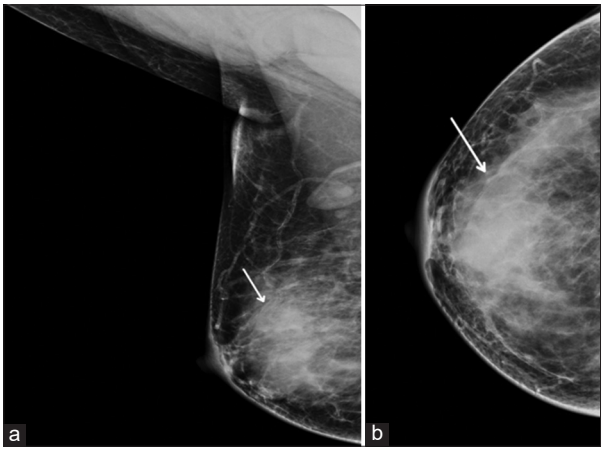

Figure 2: (a) Mediolateral oblique view of Mammography demonstrating dense breast parenchyma with suspicious nodular lesion; (b) Craniocaudal view of Mammography demonstrating dense breast parenchyma with suspicious nodular lesion

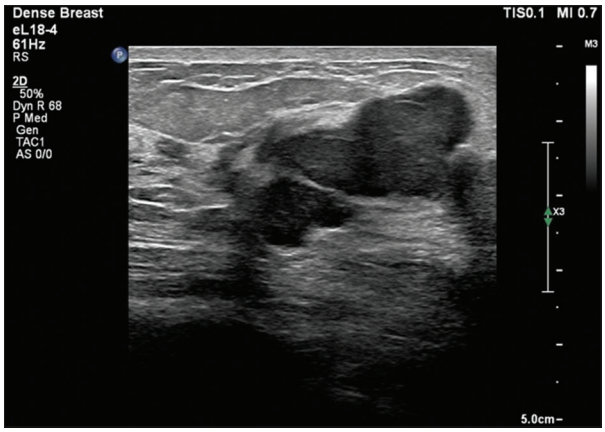

Figure 3: Ultrasonography of the right breast showing a multilobulated heterogeneous hypoechoic lesion in the retroareolar region

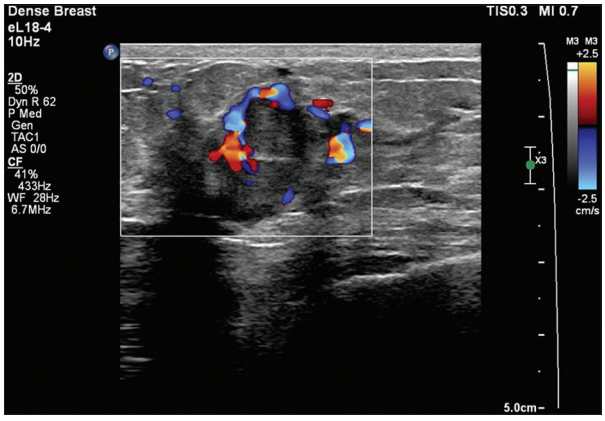

Figure 4: Lesion in the retroareolar region with internal and peripheral vascularity on color Doppler

(anti-Yo) antibody, and core biopsy findings suspicious for malignancy (B4 category), a diagnosis of anti-Yo-positive PCD associated with a highly suspicious right breast neoplasm was made. The patient was referred for definitive oncological evaluation and further tissue diagnosis.

DISCUSSION

PCD is a rare but important cause of progressive cerebellar dysfunction [1]. The diagnosis should be considered when cerebellar symptoms evolve subacutely or fluctuate and are associated with evidence of systemic malignancy [2]. Anti-Yo antibodies are among the best-characterized paraneoplastic antibodies and are strongly associated with breast carcinoma [4].

The neurological findings in this patient, including gait ataxia, truncal ataxia, scanning speech, gaze-evoked nystagmus, and dysdiadochokinesia, are characteristic of cerebellar involvement in PCD [2]. The relapsing-remitting episode that showed transient improvement with corticosteroid therapy, followed by chronic progressive neurological deterioration, further supported an immune-mediated paraneoplastic process [6].

MRI findings in PCD may be normal during the early stages of the disease, whereas cerebellar atrophy may become evident in later stages [7]. In the present case, MRI demonstrated blooming within the bilateral dentate nuclei and crus cerebri, suggestive of mineral deposition. Although this is not a classic imaging feature of PCD, it represented an important neuroimaging abnormality that prompted further investigation for an underlying etiology.

Breast imaging played a crucial role in identifying the probable primary lesion [8]. The right retroareolar lesion with internal vascularity, surrounding edema, and a suspicious right axillary lymph node raised a strong suspicion for malignancy. Core needle biopsy was categorized as B4 (suspicious for malignancy), indicating a high likelihood of malignancy without definitive histopathological confirmation. Nevertheless, the combination of characteristic neurological findings, positive anti-PCA-1 (anti-Yo) antibody, highly suspicious breast imaging (BI-RADS IV/V), and B4 core biopsy findings strongly supported a paraneoplastic process secondary to an underlying breast neoplasm [9].

This case highlights how progressive cerebellar dysfunction may serve as the first clinical manifestation of an otherwise occult breast neoplasm and underscores the importance of multidisciplinary evaluation involving neurologists, radiologists, pathologists, and oncologists [3]. Radiologists should maintain a high index of suspicion for paraneoplastic syndromes in patients presenting with unexplained cerebellar ataxia, particularly when breast lesions or suspicious axillary lymphadenopathy are identified.

CONCLUSION

PCD may be the initial manifestation of an occult breast neoplasm. In patients presenting with unexplained progressive cerebellar dysfunction, multimodality imaging together with paraneoplastic antibody testing plays an important role in identifying an underlying breast lesion and expediting appropriate oncological evaluation. In patients with progressive cerebellar dysfunction, multimodality imaging and antibody testing are essential for the timely detection of an occult primary tumor. Anti-Yo positivity strongly supports a paraneoplastic etiology, and early radiological suspicion can accelerate diagnosis and management.

AI DECLARATION

ChatGPT has been used only for minor language editing and formatting assistance. All scientific content, data interpretation, and conclusions were independently developed and verified by us.

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Funding: Nil; Conflicts of interest: Nil.

How to cite this article: Harshini GS, Teja KJSSR. Anti-Yo positive paraneoplastic cerebellar degeneration unmasking occult right breast malignancy: A case report. Indian J Case Reports. 2026; August 07 [Epub ahead of print].