

Neuroendocrine breast carcinoma metastasis to the brain

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DESCRIPTION

A 53-year-old woman presented to our hospital with visual impairment and diplopia. The symptoms appeared about 2 weeks before. The patient had a diagnosis of neuroendocrine breast carcinoma (NBC) 10 years earlier. The cerebral MR showed the presence of a brain tumour with neuroradiological features suggestive of both high-grade glioma and primitive neuroectodermal tumour (figure 1). We performed a subtotal resection that led to transient aphasia and right hemiparesis.

Histological examination revealed metastasis from poorly differentiated neuroendocrine carcinoma composed of clusters of cells with abundant cytoplasm and vesicular nuclei with finely granular chromatin and high number of mitoses (figure 2A,B). Immunostains showed intense and diffuse positivity for pan-cytokeratin and synaptophysin (figure 2C, left panels), suggesting their neuroendocrine phenotype, and positivity for E-Cadherin and GATA-3, confirming the breast primitivity (figure 2C, right panels). Assessment of prognostic and predictive factors showed diffuse positivity for oestrogen receptors, very few positive nuclei for progesterone receptors (figure 2D, left panels) and low expression of c-erbB-2 (Her2-neu) (score 1). Proliferation index was very high (figure 2D, right panels).

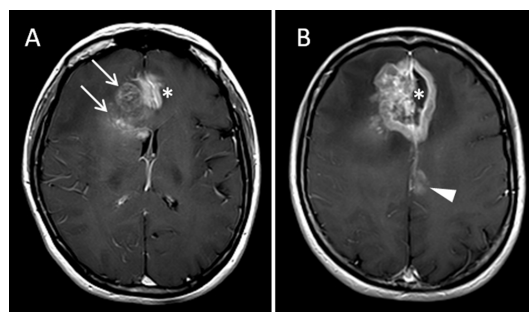


Figure 1 Postgadolinium (Gd) T1-weighted images of two axial contiguous sections showing a highly inhomogeneous lesion constituted of: a right paramedian partially necrotic intra-axial component in genu of corpus callosum and periventricular white matter with infiltrating pattern determining encasement of the right frontal horn (arrows in A); a thick ring-like enhancing midline component with necrotic core, predominantly extra-axial location and infiltration of a thickened falx cerebri (asterisk in A and B). A second intra-axial lesion is seen in left posterior cingulum (arrowhead in B) showing faint irregular enhancement with feathered borders, adjacent to the pathologically Gd-enhancing falx.

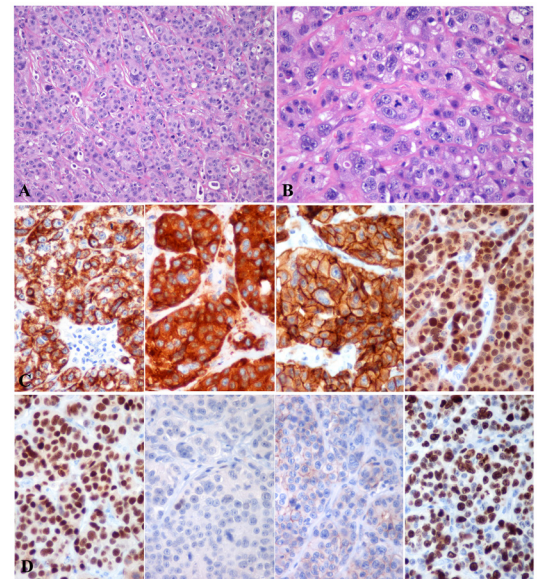


Figure 2 Histological features of poorly differentiated neuroendocrine carcinoma with solid nests of atypical cells with abundant cytoplasm, vesicular nuclei and numerous mitotic figures (panel A and B, H&E, $\times 20$ and $\times 40$ original magnification, respectively); panel C shows expression of pan-cytokeratin and synaptophysin (left two panels) and expression of E-Cadherin and GATA-3 (right panels); panel D shows immunostains for hormone receptors, oestrogen and progesterone (left two panels) and immunostains for c-erbB-2 and Ki67 (right two panels). All immunostains are from $\times 40$ original magnification.

Neuroendocrine tumours (NETs) are rare and usually affect lung, pancreas and gastrointestinal tract.¹ Breast localisation is observed in less than 0.5% of cases.^{2,3} NETs rarely metastasise to the brain. The literature reported only six cases of cerebral metastases of NETs, but none of these were an NBC.^{4,5} NBC was first described in 1977 and was characterised by the presence of positive neuroendocrine markers in over 50% of the tumour cells. According to the 2012 WHO classification, NBC was subclassified into well-differentiated NET, poorly differentiated neuroendocrine carcinoma and invasive breast carcinoma with neuroendocrine differentiation, regardless of the percentage of neuroendocrine markers.³

Our case showed that NBC may metastasise to the brain. Moreover, we observed that in case of NBC cerebral metastasis, the neuroradiological pattern is absolutely atypical and may look like both glioblastoma and neuroectodermal tumour.



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Learning points

- ▶ Neuroendocrine breast carcinoma (NBC) is a rare tumour that may metastasise to the brain even over 10 years.
- ▶ NBC cerebral metastases have an atypical neuroradiological pattern with features of both high-grade glioma and primitive neuroectodermal tumour.

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