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Case Report

Carcinomatous Meningitis of Breast Cancer Atypical Location

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Abstract

Carcinomatous meningitis is estimated that 1 - 3.5% of patients with metastatic breast cancer experience carcinomatous [3]. Leptomeningeal metastases, also known as carcinomatous meningitis and meningeal carcinomatosis, refers to the spread of malignant cells through the CSF space. These cells can originate from primary CNS tumors as well as from distant tumors that have metastasized via hematogenous spread [6].

we describe a case of patient with carcinomatous meningitis of breast cancer.

Keywords: *MRI; Diagnosis; Carcinomatous Meningitis; Cancer*

Abbreviations

CM: Carcinomatous Meningitis; MRI: Magnetic Resonance Imaging; LP: Lumbar Puncture; CSF: Cerebrospinal Fluid

Introduction

The multifocal dissemination of cancer cells from its primary site to subarachnoid, pia mater, and CSF in the brain and spinal cord is referred to as carcinomatous meningitis (CM). It is also termed as 'leptomeningeal meningitis', 'leptomeningeal carcinomatosis', 'leptomeningeal metastasis' or 'neoplastic meningitis'. Beerman, in 1912, used the term 'carcinomatous meningitis' for a condition in which cancer cells metastasized to the meninges without involving brain parenchyma. It can occur in the advanced stage of many malignancies when cancer cells seed through CSF and deposit in the meninges [1].

The leptomeningeal metastases are now more effectively handled when diagnosed at an early stage. The different therapeutic strategies are generally not very effective, and require a good understanding of the disease in order to propose personalized, concomitant or sequential treatments and hope to improve survival without altering quality of life.

Case Report

69-year-old female patient being monitored for breast cancer metastases exhibited altered consciousness. Brain MRI revealed multiple brain lesions above and below the tentorium, showing T2 hyperintensity with restricted diffusion and homogeneous enhancement following gadolinium injection. The most detrimental lesions were situated in the thalami, brainstem, and cerebellum.

Additionally, there was nodular leptomeningeal enhancement in the right frontal, parietal, and temporal lobes. The atypical locations involving the thalami and brainstem are distinctive features of this case.

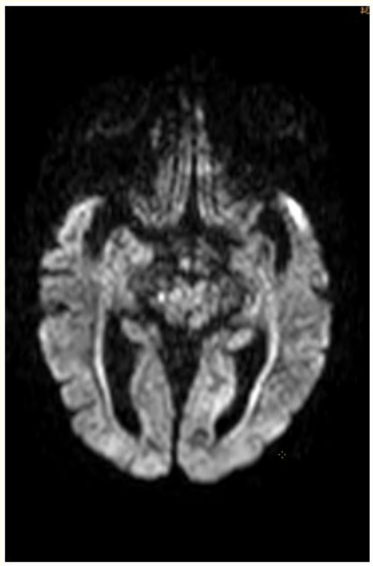

Figure 1: *Axial diffusion-weighted imaging. MRI: Restricted diffusion observed at the level of the brainstem.*

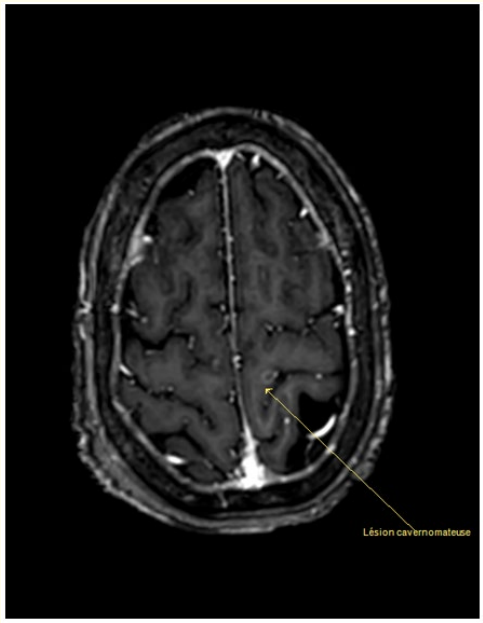

Figure 2: *Axial MRI slice injection revealing meningeal enhancement and associated cavernoma.*

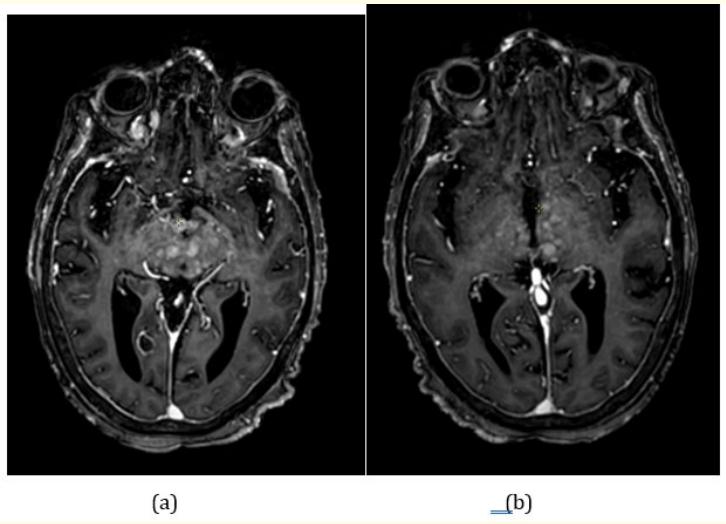

Figure 3: *Axial slice gadolinium injection MRI revealed secondary lesions in the mesencephalon (a) and thalami (b).*

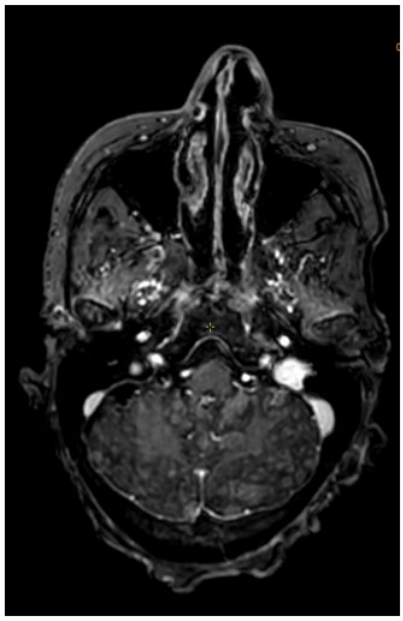

Figure 4: *Axial MRI slice gadolinium injection showing: Secondary cerebellar lesions.*

Discussion

Background

Carcinomatous meningitis is a rare and often devastating complication in patients with breast cancer and the treatment is controversial [3].

Although any cancer can metastasize to the leptomeninges, breast cancer (12 - 35%), lung cancer (10 - 26%), melanoma (5 - 25%), gastrointestinal cancer (4 - 14%), and cancers of unknown primary (1 - 7%) are the most common causes of solid-tumor-related LM. In breast cancer, the most common solid tumor to cause LM, risk factors of LM include an infiltrating lobular carcinoma and cancers negative for estrogen receptor (ER) and progesterone receptor (PR). Cancer cells may invade the meninges through different pathways, depending on histology of the primary tumor.

Hematogenous spread to the arachnoid via the arterial circulation, is probably the most common route of metastasis resulting in LM, but appears less common in solid tumors compared with hematological malignancies. Additionally, seeding of the leptomeninges via retrograde venous pathways along the valveless Batson's venous plexus has been incriminated in pelvic cancers but this hypothesis remains speculative.

Endoneural/perineural and perivascular lymphatic route or along co-associated lymphatics or veins [1] gaining access through the dural and arachnoidal sleeves of nerve roots (spinal roots, cranial nerves) and subsequently into the subarachnoid space [2].

Clinical presentation includes: Headache results from increased pressure in the skull or irritation of the meninges. If the cause is increased pressure in the skull, a person may also experience nausea that worsens in the morning.

The second most common symptom is confusion. It occurs due to the presence of active cancer cells in the cortex, which is the outermost layer of the brain. This can also lead to temporal lobe seizures, which can result in:

- Euphoria
- Hallucinations
- Amnesia
- Repetitive movements [5].

Diagnosis often starts with a physical examination and discussion about a person's symptoms. Often, a person with a CM diagnosis is already living with advanced stage cancer and may also have other complications.

To diagnose the condition, a doctor may order an examination of the cerebrospinal fluid. They may also order an MRI of the brain, spinal cord, and other relevant areas [5].

Treatment based on intrathecal chemotherapy which is the main form of treatment and also radiotherapy.

Conclusion

Carcinomatous meningitis is uncommon metastasis of breast cancer, if left untreated, patient survival is low, typically ranging from four to six weeks, underscoring the importance of diagnosing this condition as quickly as possible. MRI and lumbar puncture are main for diagnostic. Meningeal enhancement and nodular metastasis known as leading signs in MRI of meningitis carcinomatosis this case showed atypical location including thalami and mesencephalon. Treatments can improve patient survival, which also depends on the type of tumor. For instance, median survival might be 4 months for melanoma versus 10 months for lymphoma [7].

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