



## Unusual Location of Metastatic Breast Cancer

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### Abstract

Metastatic spread from non-head and neck tumors to the paranasal sinuses is exceedingly rare. We present a case of breast cancer metastasis to the paranasal sinus which occurred 30 years after modified radical mastectomy. She presented with recurrent bouts of severe sinusitis with progressive right-sided periorbital swelling, nasal discharge, and vision loss. A brain MRI showed a maxillary sinus mass. She underwent to surgical decompression. Pathology confirmed metastatic breast cancer.

An extensive literature review revealed few cases of spread to the paranasal sinuses from distant primary malignancy. When such cases do arise, most are from renal or lung cancers.

A high index of suspicion should be employed to diagnosed metastatic breast cancer to paranasal sinuses.

### Case Report

An 85-year-old female patient with remote history of node-negative breast cancer presented with bloody nasal discharge and right-sided periorbital swelling. The patient was in normal state of health until 2 months prior when she developed recurrent bouts of severe sinusitis with progressive right-sided periorbital swelling, nasal discharge, and vision loss; this was previously treated with antibiotics. Physical examination showed diffuse right-sided periorbital erythematous swelling with no overlying skin changes, 10 mm anterior-inferior proptosis, and complete absence of vision to light in her right eye. The patient was afebrile, no neck masses or lymphadenopathy. She gave no past medical history for diabetes. Her breast cancer was treated 30 years ago with modified radical mastectomy without adjuvant therapy. Social history was significant for a 60 pack-year tobacco history. A computed tomography scan of the face showed complete opacification of the right paranasal sinus and focal osseous erosions. Two images (Figures 1 and 2) from a magnetic resonance study of the brain on admission are shown.

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What is the diagnosis?

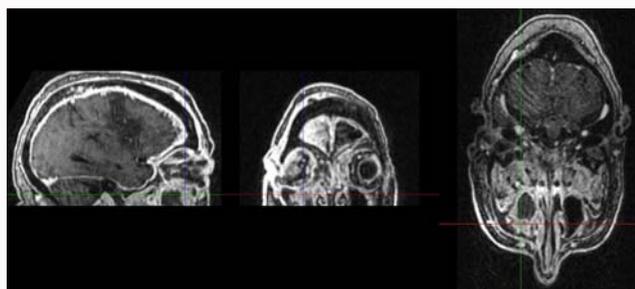
Answers:

- A. Invasive Fungal Mycetoma
- B. Periorbital Cellulitis with Abscess
- C. Nasopharyngeal Squamous Cell Carcinoma
- D. Metastatic Breast Carcinoma
- E. Intrasinusoidal B-Cell Lymphoma

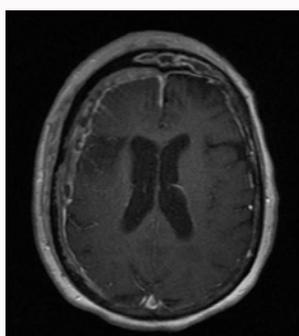
Correct answer: D

### Discussion and Conclusion

The diagnosis is metastatic breast carcinoma to the paranasal sinus with secondary subdural empyema. Interestingly, despite a significant subdural empyema, the patient demonstrated no signs associated with brain disease; the likely pathogen source is direct extension from the sinus. The subacute and progressive course of the sinusitis was concerning for a neoplastic process with secondary infection over a primary infectious process; chronic sinusitis and discharge are the most common presenting symptoms of intrasinusoidal malignancies [1,2]. The patient's extensive tobacco history and age were risk factors for Squamous Cell Carcinoma (SCC) and lymphoma respectively, which are two of the most common neoplasms in this region; however, the unifocal



**Figure 1:** MRI scan of the head showing invasive mass in the right maxillary sinus displacing surrounding structures.



**Figure 2:** Axial MRI scan of the head showing 12 mm subdural organized fluid collection with internal septations.

anatomic location was less consistent with primary SCC and bone invasion was less consistent with lymphoma. The patient described no past history of diabetes or risk factors for fungal disease, making mycetoma less likely. The imaging demonstrated a homogeneously enhancing lobular soft tissue mass without necrosis, which excluded abscess.

The patient was admitted, and tissue biopsy, culture, and surgical decompression were performed. Following surgical decompression, the patient regained some vision in her affected eye. The right-sided vision impairment was likely secondary to optic nerve infarction in the setting of proptosis, which correlated with restricted MRI diffusion signal in the right optic nerve. Tissue cultures taken from the mass demonstrated coagulase-negative staphylococcus, which was treated with intravenous vancomycin. Serum tests were significant for an elevated CA27-29 titer. Her histologic, cytologic, and cell block results were consistent with metastatic breast carcinoma that was positive for estrogen receptors, progesterone receptors, and HER-2/neu. The patient also had a recent pelvic fracture following a ground-level fall; a repeat pelvic computed tomography scan showed two foci of lytic neoplastic disease in her acetabulum and ileum. After extensive counseling, the patient and her family decided not to pursue aggressive surgical or medical treatment measures. The patient remained hospitalized for focused antibiotic therapy and was discharged to a skilled nursing facility with palliative hospice care.

The most common malignancies in the paranasal sinus include SCC, adenoid cystic carcinoma, and primary lymphoma, accounting for over 95% of cases. Most cases present as unilateral obstructive masses with symptoms of sinusitis, nasal discharge, and cranial nerve injury [1,2]. Primary breast carcinoma metastasis to the paranasal sinus is exceedingly rare, with less than 25 cases reported in the literature [3-9]. Both SCC and breast carcinoma appear epithelial

on histological examination and immunochemistry and cell block analyses for estrogen, progesterone, and GCDFFP are critical in their differentiation [8].

Breast is the 3<sup>rd</sup> most common source for nasopharyngeal metastasis behind renal and bronchogenic carcinomas [7,10-12]. Breast carcinoma predilections towards lytic bony metastases can be seen in this patient's bony sinus and pelvic foci [13]. Proposed mechanisms of metastatic spread to the head/neck include Batson's theory of retrograde vertebral plexus venous flow from intercostal/SVC during Valsalva [1,5,12,14] or Nahun's theory of arterial hematogenous seeding [15].

In conclusion, sinus metastasis in breast carcinoma carries a poor prognosis, and all patients in the literature died within months of detection [5,8]; treatment is palliative with a combination of systemic chemo and radiation therapy [1,2], but isolated cases of curative surgical resection have been reported [4].

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