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Case Report

Metastasis of Breast Cancer to the Sphenoid Sinus Presenting as Tolosa-Hunt Syndrome

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Abstract

Breast cancer with sphenoid sinus metastasis has rarely been reported. A 57-year-old woman presented with Tolosa-Hunt syndrome 1 year after undergoing surgery and chemoradiation therapy for ductal breast cancer. The diagnosis of Tolosa-Hunt syndrome was based on a computed tomography scan and granulomatous pathologic findings from the ethmoid sinuses. Magnetic resonance images revealed an enhanced soft tissue mass mainly in the right sphenoid sinus; the second sinoscopic biopsy revealed metastatic invasive ductal breast carcinoma with intact surface epithelium. The patient died 20 days after the second biopsy. In this report, we discuss the possible metastatic pathway and choice of imaging modalities for the diagnosis of this rare metastatic sphenoid sinus cancer. (*Tzu Chi Med J* 2010;22(3):153–156)

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1. Introduction

Sinonasal cancer that has metastasized from the breast is a rare condition, and the metastatic pathway is still unclear. Symptoms and signs of sinonasal cancer mimic those of sinusitis; a definitive diagnosis can only be made by endoscopic sinus biopsy. Tolosa-Hunt syndrome is characterized by ophthalmoplegia and unilateral severe retro-orbital pain associated with a granulomatous inflammatory process that occupies either the cavernous sinus or the superior orbital fissure around the skull base area. The etiology is unknown, and the diagnosis is based on the clinical response to steroid treatment and exclusion of neoplasms (nasopharyngeal tumor or skull base tumor), trauma, aneurysms, and infectious and inflammatory diseases. Additionally, Tolosa-Hunt syndrome should not be the initial diagnosis for a patient who has had a primary malignancy elsewhere in the body until a precise endoscopic sinus biopsy has been performed.

2. Case report

A 57-year-old woman with pathologically-proven left infiltrating ductal carcinoma of the breast T3N2M0 (stage IIIb) underwent left modified radical mastectomy. The patient was given postoperative chemoradiation therapy with three cycles of cyclophosphamide, methotrexate, and 5-fluorouracil (5-FU), and radiation

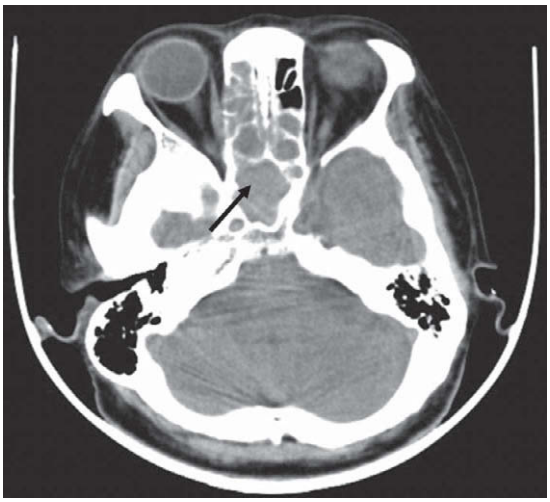

Fig. 1 — First computed tomography scan: no pathological lesion is seen in the brain or cavernous sinus, but a soft tissue lesion is obliterating the sphenoid and bilateral ethmoid sinuses (arrow).

Fig. 2 — Second magnetic resonance imaging shows a T1-weighted high-signal lesion over the right sphenoid sinus and cavernous sinus (arrow).

at a dose of 4800 cGy which finished 3 months after pathological diagnosis. Estrogen and progesterone receptors were negative on pathologic survey; however, the cancer was positive for HER2/neu.

Eight months later, the patient complained of numbness of the right side face followed by a headache and pain in her right eye. She underwent a complete neurological examination and had right ophthalmoplegia and limited extraocular movement in her right eye. A sinus computed tomography (CT) scan (including the brain) revealed homogeneous soft tissue density lesions on both sides of the ethmoid and sphenoid sinuses without bony erosion (Fig. 1). Sinusitis or another sinonasal neoplasm of unknown etiology was suspected. No other pathologic lesions were found in the brain or cavernous sinus at that time. The patient received a right ethmoid sinus biopsy by sinoscopy. Pathology revealed some granulomatous tissue formation and sinus polypoid mucosa, but no malignancy was found. A brain CT, sinus CT, whole body bone scan and abdominal echo were all performed, and no obvious distant metastasis was found. Positron emission tomography scan also revealed no hypermetabolic lesions. Therefore, Tolosa-Hunt syndrome was suspected by neurologists. In addition, her pain, ophthalmoplegia and limited extraocular motion subsided dramatically after taking prednisolone (30 mg) twice a day for 7 days.

One month later, the patient suffered a severe toothache followed by pain in her right eye. She was brought to the emergency department because of recurrent right eye pain and an intractable headache. The patient indicated that she had suffered from bilateral mucoid rhinorrhea with nasal stuffiness over the past 2 weeks. No visible sinonasal tumor was noted in the sinonasal osteomeatal complex on sinoscopic survey. Her mastectomy scar was unremarkable, and there was no evidence of recurrence. Brain magnetic resonance imaging (MRI) revealed a soft tissue density in the sphenoid and ethmoid sinuses (Fig. 2); the lesion was larger than in the previous sinus CT scan. A second endoscopic sinus biopsy was then performed to take a deeper sample from the right sphenoid soft tissue. A smooth mucosal surface with no visible tumor or ulcerative lesion was found in the nasal cavity mucosa; however, mucopus was still noted in the ethmoid sinuses. When the right sphenoid sinus orifice was opened, a fragile fragmented soft tissue tumor in the sphenoid sinus was observed. The final pathology revealed right sphenoid sinonasal metastatic infiltrating ductal carcinoma with an intact surface epithelium (Fig. 3).

Pancytopenia was noted 10 days after the biopsy. The patient died 20 days later due to sepsis without receiving palliative chemotherapy.

3. Discussion

Tolosa-Hunt syndrome is an ambiguous diagnosis for patients with limited eye motion and retro-orbital pain in one eye. It is also similar to the symptoms and signs in patients presenting with tumors in the cavernous sinus [1]. In patients with Tolosa-Hunt syndrome with a cavernous sinus granulomatous tumor, the lesion might extend to the superior orbital fissure, causing malfunction of cranial nerves III, IV and VI, and the first branch of the trigeminal nerve [1]. Patients usually present with limitation of eyeball movement and orbital pain [2,3]. Skull base (sphenoid or cavernous

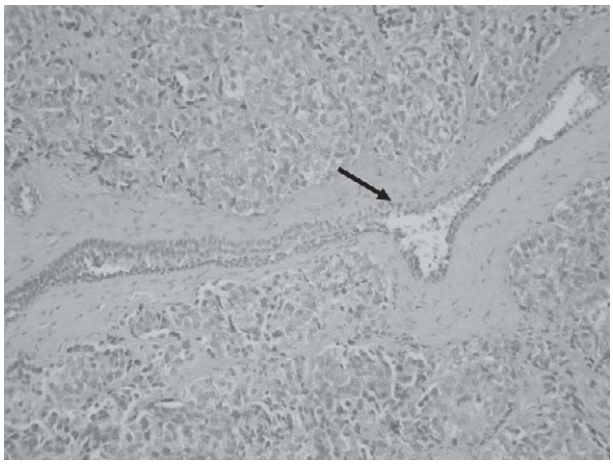

Fig. 3 — Sphenoid sinus metastasis with intact surface epithelium (arrow) (hematoxylin & eosin, 100×).

sinus) primary cancers, metastatic skull base cancers, infectious and inflammatory diseases, trauma, and aneurysms should be excluded before making the diagnosis of Tolosa-Hunt syndrome in patients with headache, unilateral orbital pain or ophthalmoplegia. The algorithm of diagnosis includes a physical examination, followed by CT scan, MRI, or positron emission tomography scan, and the definite diagnosis relies on endoscopic sinus biopsy.

Sinus metastatic cancer should be considered in patients with primary malignancies in areas other than the nasal sinus, and the majority of them are usually renal in origin. However, breast carcinoma metastasizing to the paranasal sinus (PNS) has been described by Austin et al (4). That report concluded that breast carcinoma metastasizing to the PNS is rare and uniformly fatal because, as disseminated disease, it does not respond well to conventional systemic therapies (4). Histopathologic examination and biopsy are important in confirming the origin of the neoplasm. Small cavernous sinus lesions should be closely followed and biopsies should be performed by experienced rhinologists or neurosurgeons.

The route of metastatic infiltrating ductal carcinoma to the sphenoid sinus is suspected to be hematogenous. Monserez et al reported a symmetrical ethmoid metastasis from infiltrating ductal carcinoma of the breast, suggesting transcribrosal spread. Those authors stated that the key to diagnosis is being alert to the possibility (5).

The type of imaging examination used for patients with Tolosa-Hunt syndrome can also be controversial. Pitkaranta et al reported an unusual case of breast cancer that had metastasized to the ethmoid sinus, presenting as ethmoid sinusitis on MRI. The MRI findings were unspecific and mimicked inflammatory lesions that could not be distinguished from neoplastic lesions. Inflammatory or granulomatous mucosal changes in the PNS are also frequently noted on MRI even in healthy adults without disease (6). However, Merimsky et al discussed the role of sinus CT and MRI in distinguishing Tolosa-Hunt syndrome from metastatic sinus diseases and found that MRI is superior to CT in demonstrating lymphomatous involvement of the cavernous sinus and pontine borders (7). In contrast, Post et al reported that CT was an indispensable diagnostic tool (8). They stated that contrast-enhanced, high-resolution CT in both the axial and coronal projections should be the procedure of choice for imaging metastatic disease in the cavernous sinus (8).

In our case, CT revealed an image that mimicked sinusitis (Fig. 2), and the first biopsy revealed pus and granulomatous tissue in the patient's ethmoid sinus. The sphenoid sinuses were not opened due to bleeding from the ethmoid sinus mucosa. Further sphenoid sinus surgery was very difficult because of intractable bleeding. MRI offered more information and showed an enhanced soft tissue mass mainly in the patient's right sphenoid sinus (Fig. 3), which helped in obtaining a specimen from the right sphenoid sinus during the second biopsy. An accurate pathology report was obtained after the second biopsy.

According to the experience with this patient and previous studies, we feel that MRI gives more information about the condition of the cavernous sinus and skull base in surveying a patient with a Tolosa-Hunt syndrome-like appearance (9,10). In addition, precise sinoscopic biopsy in all involved sinuses performed by experienced rhinologists and neurosurgeons is highly recommended to achieve an accurate diagnosis.

The prognosis of patients with metastatic sinus cancer from the breast is very poor even with various treatment modalities (5,6).

Sinonasal metastasis from breast cancer is rare, and the prognosis is poor. Sphenoid sinus primary tumors, metastatic malignancy, and sinus infection should be excluded before making a diagnosis of Tolosa-Hunt syndrome in patients with symptoms mimicking this syndrome. In skull base lesions, MRI is more accurate in evaluating the condition of the cavernous sinus, while head and neck CT scans offer good information about the bony boundary. When breast cancer patients present with Tolosa-Hunt syndrome, a high index of suspicion is needed to survey for sphenoid metastatic malignancy from breast cancer. Endoscopic sinus biopsy by experienced neurosurgeons or rhinologists is highly recommended to achieve a definite diagnosis.

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