

Metastasis of Prostatic Adenocarcinoma to the Sphenoid Sinus

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The presentation, diagnosis, and management of prostatic adenocarcinoma metastatic to the sphenoid sinus are reviewed. We present a case report with a review of the literature. A 67-year-old man with a history of prostatic adenocarcinoma presented with gradual left visual loss. Magnetic resonance imaging revealed a lesion of the left orbital apex with extension into the ipsilateral sphenoid sinus. Operative biopsy of the lesion was significant for adenocarcinoma of the prostate. When an otolaryngologist encounters a mass in the sphenoid sinus, he or she needs to consider a diverse differential diagnosis. In evaluating possible causes, a history of malignancies should be elicited. Furthermore, the pathophysiology and potential routes of metastatic disease should be assessed for these primary neoplasms. Having a high level of suspicion for metastatic disease from specific primary sites will help guide the pathological evaluation. As in this clinical scenario of a patient with a history of prostatic adenocarcinoma, appropriate analysis would entail sending specimens for immunohistochemical staining, such as prostate-specific antigen and prostate-specific acid phosphatase. Correct diagnosis is crucial, as these patients may achieve remission and prolonged survival with irradiation and/or hormonal therapy.

Key Words: prostate cancer, sphenoid sinus.

INTRODUCTION

Prostate cancer is currently the most common neoplasm in men in the United States. It has been estimated that more than 30% of men over the age of 50 will develop this devastating disease.¹ Despite better technology and improved screening techniques, many patients still present with metastatic disease. Although most metastatic prostate cancer will arise in the axial skeleton or the pelvic lymph nodes, it has been reported to spread to the head and neck.

We present a patient with metastasis of prostate adenocarcinoma to the sphenoid sinus and the orbit. A literature review reveals that there are only 9 previously reported cases of metastasis of this cancer to the sphenoid sinus. The presentation, pathophysiology, and management of suspected prostatic adenocarcinoma metastatic to the sphenoid sinus will be discussed.

CASE REPORT

A 67-year-old man with a history of prostatic cancer metastatic to bone was referred by his oncologist to our otolaryngology clinic. The patient had documented decreased visual acuity in his left eye that improved with steroids; subsequent magnetic resonance imaging and computed tomography revealed a lesion that involved the left bony orbital apex sur-

rounding the optic nerve and extended to the adjacent left sphenoid sinus (Fig 1). His otolaryngological examination findings were essentially unremarkable, and cranial nerves III through XII were intact. Because steroids had previously improved his vision and we lacked a true diagnosis, the patient underwent endoscopic transtethmoid optic nerve decompression and sphenoid mass biopsy (Fig 2). The tumor had resulted in significant thickening and sclerosis of the bone, requiring the use of cutting and diamond burs for decompression. Pathologic analysis of the sphenoid mass revealed metastatic adenocarcinoma of the prostate (Fig 3). Although there were no complications, the patient's vision did not improve significantly. After operation, he was sent to the radiation oncology department for treatment of his sphenoid metastatic prostatic adenocarcinoma.

DISCUSSION

Review of Literature. Primary carcinoma of the paranasal sinuses is a rare entity; however, it is even more unusual to find disease metastatic to the paranasal sinuses. In a review of 82 cases of cancer metastatic to the paranasal sinuses, the sphenoid sinus was the rarest site of metastasis, and the maxillary sinus was the most common.² For all of the sinuses collectively, the most frequent source of metastasis was the kidney, at 65%, but the primary sites also

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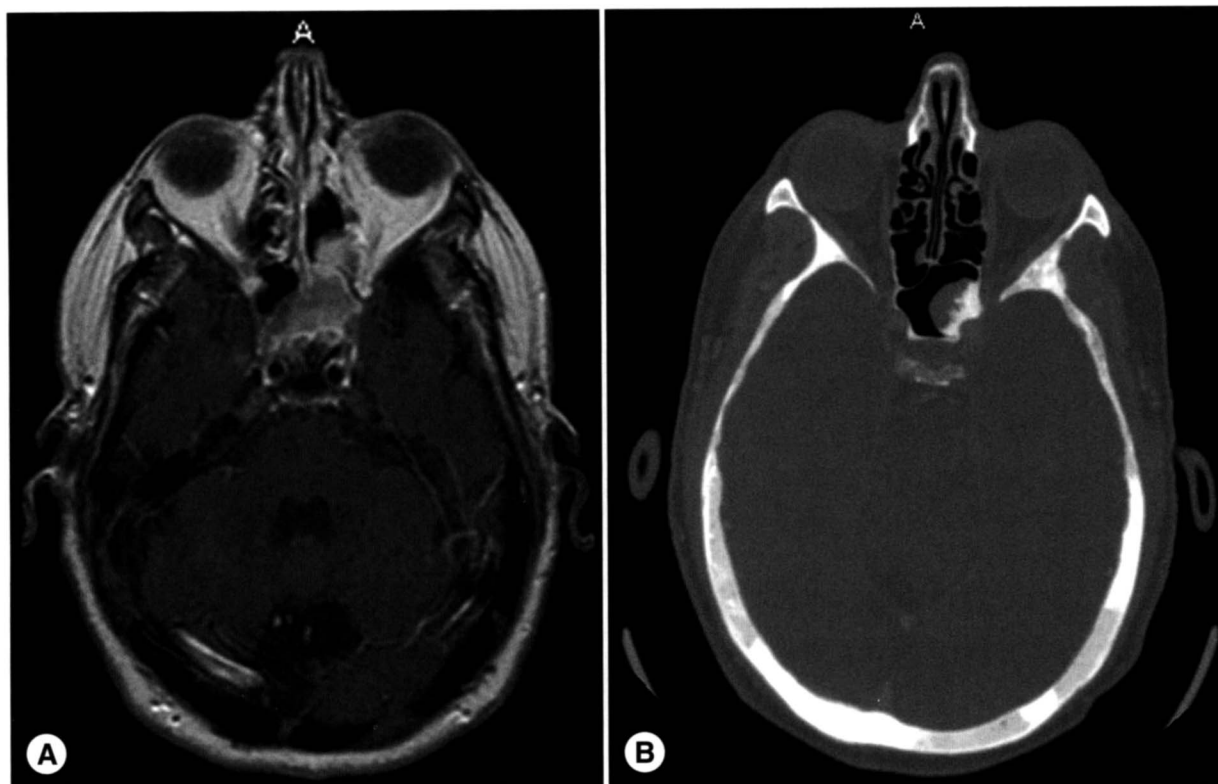


Fig 1. Prostate cancer metastatic to left sphenoid sinus. Lesion extended to left orbital apex, causing optic nerve compression. **A)** Magnetic resonance imaging reveals soft tissue lesion in left sphenoid sinus. **B)** Computed tomographic scan demonstrates osteoblastic reaction of lateral wall of left sphenoid sinus.

included the lung, breast, and thyroid.² In contrast, another study discussed 26 cases in which the most common primaries with metastasis to the sphenoid sinus were prostate adenocarcinoma and lung cancer, which had an incidence of 20% each.³

The Table^{1,3-9} describes the 10 reported cases of prostate adenocarcinoma metastatic to the sphenoid sinus. In these cases, the entity typically presented as diplopia (50%) during the middle to late stages of life (mean age, 67.5 years). Other symptoms in-

cluded facial anesthesia, headache, multiple cranial nerve palsies, blurred vision, and exophthalmos. The mortality rate was 50%, and the mean survival time was 12.9 months. With the primary goal of palliation, physicians used a combination of surgery, irradiation, and hormone therapy to diagnose and treat these cases. At least 7 patients underwent post-operative irradiation, and 1 received a combination of irradiation and hormone therapy.

Pathophysiology. From our review of the literature, it appears that the sphenoid sinus is a common target during the metastasis of prostate adenocarcinoma. The likely pathway is via the paravertebral venous plexus that connects the prostate gland (pelvic venous plexus) to the skull base. During Valsalva's maneuver, flow is reversed through the plexus of veins, and malignant cells from the prostate may seed the sphenoid sinus or the pituitary gland.⁹

Management. When confronted with a suspected mass in the sphenoid sinus in a middle-aged to elderly man, the clinician should consider metastatic prostatic cancer even if there is no history of the malignancy in the patient; radiologic evaluation is warranted. The findings of computed tomographic scanning can help narrow the diagnosis, as prostatic lesions are characteristically osteoblastic (Fig 1B). Other cancers, such as lung cancer, will be osteo-



Fig 2. Intraoperative view of left sphenoid mass.

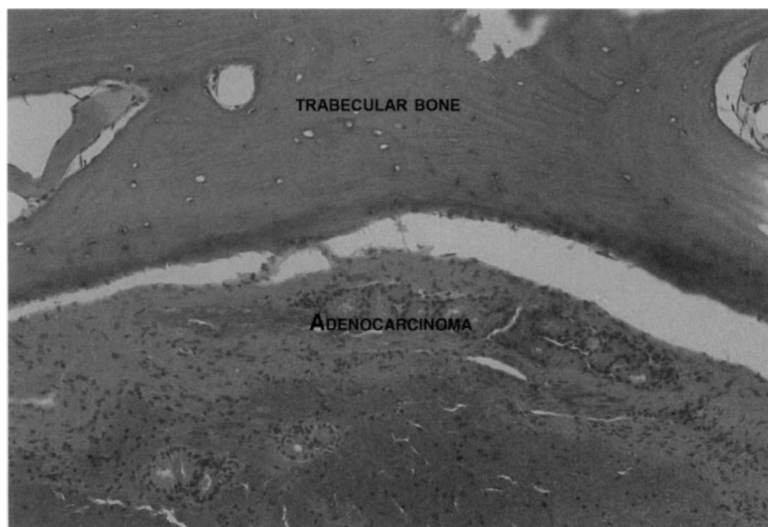


Fig 3. Carcinoma adjacent to trabecular bone of sinus in hemoxylin and eosin-stained biopsy sample demonstrates cribriform pattern often seen with metastatic prostate cancer. Note that tumor has replaced normal sinus mucosa. Immunohistochemical analysis (not shown here) allowed for definitive diagnosis.

lytic.¹⁰ Given the propensity for prostate cancer to metastasize to the sphenoid sinus, a full urological workup would be indicated even if the patient has no known history of this neoplasm. If there was a past history of this malignancy, a biopsy of the mass could demonstrate recurrence, as well as rule out other possible diagnoses.

It is essential that the biopsy tissue be stained with the appropriate immunohistochemical panels. Prostate-specific antigen, prostate-specific acid phosphatase, cytokeratin, and mucin are all highly sensitive for prostatic tissue. Routine histologic analysis of the sample will reveal cribriform or single cells with prominent nucleoli (Fig 3).⁹

After confirmation of the diagnosis, the manage-

ment will usually include radiotherapy and/or hormone therapy. Most patients in our review of the literature underwent irradiation. Because the literature suggests a poor prognosis of prostate adenocarcinoma metastatic to the head and neck, the goal is palliation to alleviate the presenting symptoms.

CONCLUSIONS

Carcinoma metastatic to the sphenoid sinus is rare, but when it does occur, the most common primaries include the prostate, kidney, and lung. When confronted with a middle-aged or older male patient presenting with symptoms and signs of a sphenoid sinus mass (usually diplopia), the otolaryngologist should have a high index of suspicion of metastatic prostate adenocarcinoma. The computed tomo-

TEN CASES OF SPHENOID SINUS METASTATIC ADENOCARCINOMA OF PROSTATE

Authors	Patient		Presentation	Course of Disease	Management
	Year	Age (y)			
Barrs et al ⁴	1979	57	Diplopia, decreased visual acuity, ptosis, left facial numbness	Died 2 y after presentation	Unknown
		61	Diplopia	Died 2 y after presentation	Unknown
McClatchey et al ⁵	1985	55	Frontal headache, blurred vision	Alive 1 y after presentation	Irradiation
Matsumoto et al ⁶	1986	79	Headache, diplopia	Unknown	Unknown
Leduc et al ⁷	1986	75	Diplopia, palsy of cranial nerve III, right exophthalmos	Alive 17 mo after presentation	Irradiation
Mickel and Zimmerman ³	1990	67	Diplopia, right nasal numbness	Died 2½ mo after presentation	Irradiation
Saleh et al ⁸	1993	71	Bilateral exophthalmos, hemoptysis	Died 1 mo after biopsy	No further management
Telera et al ¹	2001	62	Right ptosis, palsy of cranial nerve III and VI, loss of corneal reflex, anesthesia in ophthalmic region of cranial nerve V	Died 13 mo after presentation	Irradiation, steroids
Hunt et al ⁹	2004	76	Unknown	Alive 14 mo after presentation	Leuprolide, irradiation
This report		67	Diminished vision on left side	Alive 6 mo after presentation	Irradiation

graphic scan may show characteristic bony changes. To help with the diagnosis of metastatic prostatic adenocarcinoma, the pathologist should evaluate the specimen with prostate-specific antigen and

prostate-specific acid phosphatase. Once the entity is diagnosed, the treatment follows mainly a palliative course; however, there have been reports of favorable outcomes.

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