Metastatic lesions involving the sella: Report of three cases and review of the literature

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Metastatic cancer must be considered as a possibility for intrasellar masses. Newer treatment modalities, such as gamma knife radiosurgery needs to be explored for these lesions. Three cases of intrasellar metastatic lesions were retrospectively reviewed. Presenting complaints, radiographic studies, operative procedure, and histopathological confirmation were recorded for each patient. All had an unknown primary malignancy prior to the presentation with the intrasellar lesion detected by magnetic resonance imaging (MRI). Presenting symptoms were diplopia with extraocular movement deficits in all patients. Transsphenoidal resection or biopsy was performed. Histopathological analysis revealed small cell carcinoma in two patients and plasmacytoma in one. All patients received postoperative radiation and/or chemotherapy. Survival following initial presentation was 2 months and 6 months for two of the patients; the third patient is alive at 2-month follow-up.

Key Words: Sella, metastasis, pituitary, tumor

Case Reports

A retrospective chart review of three patients admitted to the Louisiana State University Health Sciences Center in Shreveport and affiliated hospitals for the period from 1990 to 2002 was conducted. Clinical presentation, source of suspected primary disease, radiographic studies, treatment, histopathological confirmation, and prognosis were recorded.

Case 1
A 52-year-old African-American female smoker with no history of malignancy presented with a three-month history of progressive right hemiparesis with right ptosis and medial deviation. Examination revealed a right ophthalmoplegia with ptosis and anisocoria. Mild left central facial paresis and hemiparesis were also present. The remainder of her examination was unremarkable as were endocrine studies. Magnetic resonance imaging (MRI) revealed a large enhancing mass in the sella with suprasellar, bilateral parasellar, and intrasphenoid extension. The suprasellar component appeared to extend to the chiasm without compressing it. Both internal carotid arteries were displaced by the mass. In addition, a diffusely enhancing mass in the left parieto-occipital region was seen (Figure 1a). Further work-up revealed a lung mass. The patient underwent a sphenoidotomy with a biopsy of the sellar mass. Histopathological analysis revealed findings consistent with metastatic small cell carcinoma (Figure 1b). Her postoperative course was uneventful, with persistence of presenting symptoms. She was scheduled for Gamma Knife treatment of her tumor following discharge, and remains alive at 1-month follow-up.

Case 2
A 63-year-old Caucasian male with no prior history of malignancy presented with diplopia and headache. Physical examination revealed bilateral abducens palsy and right oculomotor palsy. Visual acuity and visual field testing were intact, with absence of papilledema. MRI showed a large enhancing mass (Figure 2) in the sphenoid sinus and intrasellar and parasellar regions, which extended into the cavernous sinuses bilaterally and appeared to compress the optic cha-
assn. The tumor was partially resected via a transsphenoidal approach. Histopathological analysis of the mass revealed a plasmacytoma. Postoperatively, the patient’s diplopia and headache immediately resolved. An iliac bone marrow biopsy performed postoperatively revealed evidence of systemic disease, and the patient was subsequently diagnosed with multiple myeloma. Following discharge the patient underwent vincristine and Adriamycin chemotherapy. He died five months later due to a pulmonary embolus.

Case 3

A 67-year-old Caucasian female smoker presented with severe headaches and diplopia. Physical examination revealed right abducens palsy, along with proptosis. At this point, a search for systemic malignancy was performed. A right hilar lung mass was discovered, with biopsy (via bronchoscopy) revealing small cell carcinoma. She underwent transsphenoidal resection of the mass, which revealed small cell carcinoma on histopathological analysis. She had an uneventful postoperative course, despite developing diabetes insipidus, which was treated with DDAVP. Her headaches improved, but her abducens palsy persisted. She underwent chemotherapy during her postoperative course. Two months following surgery, she died of presumed aspiration pneumonia, with severe lower cranial nerve palsies which she developed as her disease had progressed.

Discussion

The incidence of sellar metastases, as determined either during transsphenoidal resections of a pituitary mass or via autopsy findings of cancer cases, is rare.\(^4,5,6\) Sellar metastases may be present in patients with or without any prior evidence of systemic disease. The incidence of sellar metastases varies from 1% to 8% across studies.\(^1,2,3\)

While some of the presenting symptoms of SM are similar to pituitary adenoma or other benign processes, certain inconsistencies may alert the clinician to prompt a search for a metastatic lesion.

Headache: This is reported as a rather common symptom throughout the literature with an incidence ranging from 25% to as high as 69%.\(^1,2,7,8,9\) In our series, 2 of 3 (66%) patients presented with headache. However, as headache may be present in pituitary adenomas as well, it is not of great use in helping to distinguish primary pituitary region tumors from metastatic lesions.\(^4\)

Extraocular muscle impairment (EOMI): Evidence of EOMI is well documented in most cases of a metastatic lesion involving the sella.\(^1,2,7,8,9\) Most often, the oculomotor and abducens nerves are involved.\(^1,2,7,8,9\) Our study also found a significant involvement of the oculomotor and abducens nerves with SM. Moreover, complete ophthalmoplegia has also been noted.\(^9\) Yet, one study did not note any evidence of EOMI.\(^3\) Overall, since EOMI in pituitary adenomas occur later (with involvement of the cavernous sinus), this may be a useful sign in suspecting SM, particularly if several different EOMI findings are noted in the same patient over a short period of time.
Visual field deficits (VFD): As expected with any intrasellar lesion, bitemporal hemianopia is the most common VFD reported in the literature for SM, with an incidence as high as 50% reported by Branch & Laws. Other reported VFDs include ipsilateral temporal field cuts and junctural optic nerve deficits. In our study, none of the patients had any evidence of VFD. However, VFD is also a fairly common finding in pituitary adenomas as well. The possibility of SM as a cause of the VFD should be considered as another diagnosis in a patient with evidence of an intrasellar lesion.

Diabetes insipidus (DI): A review of the older literature reveals that the DI is a common presenting symptom of SM, whereas the newer literature finds this to be the case far less often. Of the recent literature reviewed, the highest incidence of 28% was reported by Branch & Laws, whereas most other authors do not mention any evidence of DI in the presentation of SM in their patients. In our series, none of the patients had any evidence of DI upon presentation. This may be attributable to modern imaging techniques, which are able to detect abnormalities earlier than the timeframe required for DI development.

Other endocrine dysfunction (OED): Endocrine dysfunction not specifically related to DI was included in the OED category. Some of the other endocrine dysfunctions reported in the literature include anterior hypopituitarism, hypoadrenalinism, hypothyroidism, hyperprolactinemia, and hypogonadism. While some authors found no evidence of OED, in our series, endocrinopathy was not evident in any of the three patients. OED, often a common presentation of more benign conditions, is also possible in patients with SM. Thus, it is imperative not to exclude SM as a possibility in intrasellar masses with evidence of OED.

The diagnosis of SM has been established using various techniques, including plain X-ray, pneumoencephalography, computed tomography (CT), and MRI. Evidence of bony destruction of the sellar floor or clivus, as well as invasion laterally into the parasellar region and cavernous sinuses was often seen along with the intrasellar mass; however, as noted previously, other findings are less specific. CT and MRI have shown that most SM will invariably fill the sella extending into the suprasellar region, as is the case in many macroadenomas. Two autopsy reviews of SM found that breast carcinoma was the most common primary lesion to metastasize to the sella. A clinicopathologic review of 88 cases of SM revealed that 66% of SM in women were attributed to breast carcinoma, making it the most common primary for females, while lung carcinoma was the most common primary for males at 62.9%. Branch and Laws’ study of 14 patients found that breast, plasmaectoma and adenocarcinoma of an unknown primary were the most common primary lesions in the SM. Autopsy studies have also found that breast carcinoma is the most common primary metastases to the sella. Other reported primary metastases include papillary carcinoma of the thyroid, hepatoma, mesenteric liposarcoma, pheochromocytoma, stomach, and lung carcinoma.

Sellar metastases may be the first evidence of systemic disease for some patients, while others may already have pre-existing disease. Thus, even in patients with known primary cancers, intrasellar lesions are not always metastatic. Conversely, in patients without any prior history of cancer, an intrasellar mass cannot definitely be assumed a primary adenoma, as this may be the first indication of a primary cancer elsewhere.

Transsphenoidal resection of the lesion is most often performed due to preoperative uncertainty in the diagnosis of SM versus pituitary adenoma. Instead of surgery, whole brain or localized sellar radiation therapy has been used in an attempt to control tumor extension. In one report, skull base radiation was used to treat a metastatic pheochromocytoma to the sella, which resulted in complete resolution of the patient’s neurological signs and symptoms. Other reports of localized radiation therapy to the sella have been documented with good results. Postoperative radiation therapy has also been used to help further control tumor extension. Chemotherapy was also used during the postoperative course in one report. Most of the recent literature does not comment on the survival effects of adjuvant radiotherapy or chemotherapy. Still, Juneau et al reported that recurrence of tumor occurred with focused sellar radiation, suggesting that more efficacious techniques need to be explored.

One area of further exploration is that of gamma knife radiosurgery in the treatment of these intrasellar metastases. There is little evidence in the current literature promoting this treatment modality for sellar metastases, yet gamma knife radiosurgery in the treatment of more benign conditions, such as pituitary adenomas, within this same location. There is one report of the successful treatment of a carcinoid tumor metastasis to the pituitary with gamma knife in the recent literature. There is some indication in the literature that this therapy, with care taken to avoid optic nerve damage, may offer a greater survival advantage over other modalities. This area needs further exploration, as it may prove better for the patient to undergo a biopsy of an intrasellar lesion to confirm tissue diagnosis before proceeding with a surgical resection. Thus, a more diagnosis-specific therapy can then be planned, especially since as stated below, the prognosis for SM is much more dismal than that for a pituitary adenoma. As such, it may prove to be more beneficial for patients with SM to undergo gamma knife radiosurgery for the metastatic lesion, rather than having a surgical resection of their tumor.

The variety of different types of SM, with few case reports...
for several types, do not allow definitive statements regarding improved survival with one versus another primary source. There is some suggestion that the extent of systemic disease affects survival in the patient suffering from SM. Branch and Laws determined a mean survival of 22 months (from diagnosis to death) for 14 patients. Symptom improvement or resolution with surgery or radiation therapy was noted in most of the cases reported in the literature; however, no significant improvement in survival was claimed due to adjuvant therapy in the majority of these cases.\textsuperscript{1,2,16,12,14}

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\section*{References}


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