Orbital Apex Syndrome
Due to Metastasis from Lung -
A Case Report

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Case Report

80 year old diabetic male on regular treatment who was apparently normal presented with complaints of painful progressive defective vision of right eye of 3 weeks duration. He also noticed prominence of his right eye. No other significant ocular history was noted.

Ocular examination showed external ophthalmoplegia and complete ptosis of right eye, axial proptosis, grade III RAPD and vision was no perception of light. Fundus was normal; examination of left eye was normal with best corrected visual acuity 6/12. There was also decreased sensation in the distribution of ophthalmic division of trigeminal nerve on the right side. A provisional diagnosis of orbital apex syndrome was made. (Figure 1-6)

A detailed history taking and examination for the cause was made. A history of chronic cough of 1 month duration and significant weight loss prior to his ocular complaints was elicited. System examination showed right supraclavicular, and axillary lymph node enlargement with decreased air entry to the right side.

Chest X-ray showed tracheal shift to left and a mass in right lung (Figure-7). Biopsy from supra clavicular node showed metastasis from squamous cell carcinoma. MRI showed multiple intraparenchymal brain metastases (Figure-8,9,10).

Metastatic deposits in right infra temporal fossa with erosion of lateral wall of maxillary sinus, greater and lesser wings of sphenoid with intracranial-extradural extension into middle cranial fossa.

He was diagnosed to have orbital apex syndrome secondary to metastasis from lung. He was referred to radiotherapy department, advised radiation but he denied the treatment.

Ophthalmic Manifestations of Metastasis

Patients with systemic cancer may develop visual problem in two ways
1. Direct invasion
2. Paraneoplastic phenomena.

Visual signs and symptoms may precede the diagnosis of underlying malignancy, which place the ophthalmologist to play a critical role for medical care delivery for these patients. Metastasis can occur in adnexa, globe, orbit, optic nerve, pituitary gland, cavernous sinus and at other locations that impinge upon afferent or efferent visual pathways.

The most common site in adults in eye for metastasis is uveal tract due to its rich blood supply. The tumors reach metastasis target sites via tumor cell emboli that pass through the vascular system. Tumor cell deposition depend on which artery emboli has entered. Ocular metastasis to anterior chamber like hyphema, iritis, closed angle glaucoma and optic nerve is an infrequent site of metastasis, some can mimic retro bulbar neuritis. Metastatic lesions to cutaneous areas can present like painless swelling of lid. Carcinomatous meningitis can occur from solid tumor or leukemia or lymphoma.

Breast cancer is the most common primary tumor metastasis to visual system. The incidence of ocular metastases among patients with Breast cancer has been reported between 8% and 10%. Lung cancer is the 2nd most common tumor in women, whereas for men lung and prostate Cancer are 1st and 2nd most common tumors. Others are carcinoid tumor of GIT and RCC.

% of Tumors causing eye metastasis

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Breast</td>
<td>42%</td>
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<tr>
<td>Lung</td>
<td>11%</td>
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<tr>
<td>Prostate</td>
<td>8%</td>
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<tr>
<td>Melanoma</td>
<td>5%</td>
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</tbody>
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Leukemia is the most common hematological metastasis to visual system and most of metastatic lesions occur in choroid owing to its rich vascular supply.

In children, orbit is the most common site of metastases. Neuroblastoma is the most common metastatic tumor in pediatric patients followed by Wilm’s tumor.

Paraneoplastic disease arise secondary to production of antibodies in response to antigens expressed by human cells. Antigens are molecularly similar to certain cells of brain, eyes and the antibodies produced cause destruction of cells. It can get access through blood-retinal barriers and affect retina and lens by apoptosis and occasionally perivascular
and vitreal infiltrates. The patients often report positive visual phenomena like flashing light of poorly formed moving images. Paraneoplastic syndromes is uncommon occurring in 0.01% of cancer patients. It can present as cancer-associated retinopathy, melanoma-associated retinopathy and paraneoplastic optic neuropathy.

Initial location of metastatic tumor to orbit is most common in superotemporal quadrant of orbit. The location in 4 quadrants of orbit is
Lateral:39%
Superior:32%
Medial:20%
Inferior:12%

Presenting symptoms may be variable proptosis and diplopia. Defective vision can also be a symptom due to pressure on optic nerve. The condition is initially painless. Presence of pain indicates bony involvement. There may be mechanical motility disturbances of globe. Pulsatile exophthalmos can result from metastasis of renal cell carcinoma causing bony destruction enophthalmos is a feature of seirrus breast cancer due to contraction of fibroblastic tissue leading to tethering of globe.

Metastasis from lung squamous cell carcinoma may have a latency, after silent primary rapid progress on to proptosis with conjunctival congestion and frozen globe causing exposure keratitis. The patient becomes systemically ill and is having poor survival rate.

**Diagnostic modalities**

This includes thorough ophthalmic evaluation. Breast and prostate should be methodically examined to exclude primary tumors. During abdominal examination, possibility of carcinoma of GIT and renal malignancy should be kept in mind. Following modalities of investigation are also necessary before planning the management of condition.

**Laboratory examination**

Both specific and non specific laboratory tests are needed in the work up of pts with metastatic tumors.

1. CEA carcinoembryonic antigen. This may be elevated and degree of elevation may relate to tumor load.
2. Serum acid phosphatase for prostate cancer.
3. 5-Hydroxy indole acetic acid (5-HIAA) for carcinoid tumor.
4. Computerized tomography. It is the practical standard modality for the diagnosis of orbital disease. It not only allows the location of tumor but also provide important clues regarding tissue characteristics. The various CT findings are mass lesson, diffuse involvement, primarily bone involvement with hyperostotic or hypoostatic appearance or muscle enlargement. The most common presentation is mass followed by bony involvement. Usually breast carcinoma presents as a mass or muscle enlargement. Prostate carcinoma causes bone involvement and melanoma causes muscle enlargement.

5. Magnetic Resonanace Imaging. Metastatic tumors in MRI presents as irregular orbital mass with a hypointense signal in respect to the orbital fat on the weigh images.

6. Biopsy. After locating the tumor, fine needle aspiration biopsy or manual surgical biopsy should be done for diagnosis. Metastatic orbital tumors is one of the best indications for FNAC. Hormone receptors and surface antigen studies can be performed if adequate specimen is obtained.

**Metastatic cancer of unknown etiology**

Despite the existing modalities for investigation, about 10-30% of metastatic tumors the primary cancer is not established. These tumors are typically silent metastasizing early in their course. Cancers of lung, stomach, colon, pancreas, thyroid and ovary are the common causes of such cryptic metastases.

**Treatment**

It is to be noted that treatment of orbital metastatic tumor is usually palliative. The principal modalities are radiotherapy, hormone therapy, chemotherapy and surgery. Although the patients have a short expected life span, symptoms like pain and decreased vision can often get dramatic relief with radiotherapy or chemotherapy.

Radiotherapy: Usually a total of 3000-4000 rads is given.

Hormone therapy: Useful in metastatic prostate & breast carcinoma.

Chemotherapy: Small cell carcinoma of lung and neuroblastoma are particularly radiosensitive.

**Conclusion**

Malignancies that do not arise in the eye can produce significant visual problems, which may seem as the herald event that prompts recognition of underlying malignancy. The ophthalmic examination can add greatly to the case of cancer patients to help identify and monitor pathology as well as offer possible restoration of function and alleviate discomfort. Familiarity with these types of disease is necessary for ophthalmologists to add to the case of these patients.

**References**

Figure 1 to Figure 6: initial presentation of patient

Figure 7 - X-ray Chest
Figure 8, 9 & 10: MRI

Figure 11, 12 & 13: After treatment with intravenous dexamethasone