



## **Proptosis from Metastatic Thyroid Carcinoma: Case Report and Review**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. Author RY did the first draft of the manuscript and literature searches. Authors AV and KLSK involved in patient workup and treatment of the patient. All authors read and approved the final manuscript.*

**Case Report**

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### **ABSTRACT**

A 70 year old female presented with right sided orbital proptosis since one and half year with past history of thyroidectomy. On examination thyroid swelling was present with right orbital proptosis. Routine blood investigations were normal except the serum thyroglobulin levels, 220001/U. Histopathological examination (HPE) of the biopsy from the protruding mass from the right orbit showed follicular acini lined with cuboidal cells. CECT (Contrast enhanced computerized tomography) of orbit showed mass in the superior part of retro orbital region eroding the superior wall and extending into right parasellar. A total thyroidectomy was performed and HPE of specimen was suggestive of thyroid papillary carcinoma. For the orbital metastasis patient underwent external beam radiotherapy with 40 Gray in 20 fractions. During her follow up period she was found to have secondary in the left femur metaphysis. Patient refused surgical excision of the bone secondary. Patient is on regular follow up with supportive treatment.

*Keywords: Orbital proptosis; thyroid carcinoma; total thyroidectomy.*

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## 1. INTRODUCTION

Thyroid carcinoma is the most common endocrine malignancy with increasing incidence over the past decade worldwide [1]. Papillary carcinoma thyroid is the most common form of thyroid malignancy with distant metastasis being uncommon, usually involving lung and bone, rarely involving the orbit [2]. Orbital metastasis is infrequent etiology of adult proptosis. Here we present a case of papillary thyroid carcinoma who presented with unilateral orbital proptosis due to metastasis.

## 2. CASE REPORT

A 70 year old female presented with right sided orbital proptosis since one and half year (Fig. 1), diminution of vision on right side with a swelling in front of neck since 1month. She had underwent thyroidectomy 40years back (details were not available). Since then she was on suppressive dose of thyroid hormone and calcium supplementation.



**Fig. 1. Pre operative picture showing right eye proptosis and thyroid swelling**

On examination she was found to have thyroid swelling measuring approximately 3x4cm and right orbital proptosis. Perception of light was absent on the right eye. Bilateral fundus examination was normal. Routine blood investigations were within normal limits including thyroid profile. Her serum thyroglobulin level was found to be 22000I/U. Histopathological examination of the biopsy from the protruding mass of the right orbit showed follicular acini lined with cuboidal cells with tumor cells staining positive for Thyroid Transcription Factor-1 (TTF-1) suggesting metastasis from thyroid. Further workup proceeded with CECT of orbit which showed mass in the superior part of retro orbital region eroding the superior wall and extending into right parasellar region (Fig. 3 and Fig. 4). Due to the economical problems further metastatic workup and evaluation was not possible and thus plan for FDG-PET CT was withheld. A total thyroidectomy was performed and the specimen was sent for histopathological examination. Cut surface of the specimen showed multiple colloid filled nodules of varying size with areas of haemorrhage with microscopic features of nodular hyperplasia with cystic changes and haemorrhage with a nodule showing sheets of oncocytic cells and small foci of micropapillary carcinoma amidst nodular thyroid tissue and one with typical papillary features: diagnostic of papillary carcinoma thyroid with intrathyroidal spread. Remnant ablation was not given due to unavailability in our institution. For the orbital metastasis patient underwent external beam radiotherapy (EBRT) with 40 Gray in 20 fractions (Fig. 2). Following thyroidectomy and EBRT, serum thyroglobulin level started to decline. Postoperative period was uneventful for 1 year. During her follow up

period she started developing pain and limping of the left lower limb and her serum thyroglobulin level started to raise. X-ray revealed a solitary lytic lesion in the metaphysis of the femur suggestive of secondary (Fig. 5). Patient refused surgical excision of bone secondary. Patient is on regular follow up with supportive treatment.



**Fig. 2. Right eye after external beam radiotherapy**



**Fig. 3. CECT Brain 1year before patient developed proptosis showing soft tissue lesion at posterior medial aspect of right orbit**



**Fig. 4. CECT brain showing soft tissue lesion extending from right orbit to sellar region and anterior cranial fossa**



**Fig. 5. Solitary lytic lesion at left femur metaphysis**

### **3. DISCUSSION**

The orbit and globe are not in the list of common sites to which systemic carcinoma metastasizes, incidence being around 4% to 7 % [3,4,5]. Among primary malignancies the ones most commonly found to metastasize to the eye or orbit are from the breast and lung [6,7]. Other less frequent primaries found to do so are in the kidneys, testicles, prostate, and bowel [3,5-7]. Metastatic thyroid carcinoma rarely involves the orbit constituting 5% to 6.5% of the total orbital neoplasms [8]. A total of 22 uveal and 9 orbital metastases have been documented till 2012 from thyroid cancers [9].

Most commonly, patients with metastatic orbital tumor present with diplopia (48%) due to the involvement of extraocular muscles, in contrast with most other primary orbital neoplasms, where either proptosis or visual loss are more frequent [10]. Less frequent presentations are proptosis (26%), diminution of vision (16%), pain and ptosis [11]. Thus orbital metastasis is an infrequent aetiology of adult proptosis; approximately 3–7% of orbital biopsies have demonstrated a metastatic tumour<sup>10</sup>. Around 25% of choroidal metastases are multiple or bilateral; bilaterality is much less frequent in orbital metastases.

Metastatic orbital deposits are less common than uveal metastases; in several series the relative incidence was approximately one to eight [12,13]. In contrast to other malignancies metastasizing to the globe, with thyroid carcinoma the pattern is reversed: thyroid carcinoma metastasizing to the orbit are commoner than to the globe [14,15]. This apparent predisposition of thyroid carcinoma to orbital rather than ocular spread may be due to the probable lymphatic channel connection between the thyroid gland and the orbit as demonstrated by a study using radioisotope thyroidolymphography and orbitolymphography [16].

Even with modern non-invasive diagnostic tests there is a significant false negative diagnostic rate for the detection of a metastatic aetiology of these orbital lesions. Contrast enhanced CT (CECT) has been found to be the investigation of choice for the diagnosis of orbital metastasis. Several patterns are thought to be very typical for orbital metastases, especially with a history of a systemic malignancy. These include intramuscular focal masses, bone destruction with contiguous mass, and diffuse intraconal lesions [17].

Therapy is based on establishing a correct diagnosis, the systemic status of the patient, and whether optic nerve compression is present. In patients with suddenly decreased vision due to a mass compressing the optic nerve, surgical debulking of the tumour is the optimum treatment and it is possible to restore vision in such patients. In a few patients with focal tumours that produce symptoms from a mass effect, surgical extirpation of the lesion is locally effective [17]. In patients with a solitary orbital metastasis that is either diffuse or involved an important structure, such as the muscle, globe, or nerve, almost 80% of patients will obtain symptomatic relief with a total dose of 30 to 40 Gy of photon radiation. It is imperative to obtain a brain MR scan with gadolinium before irradiating a metastatic orbital tumour [18]. Not infrequently, patients will have silent brain lesions when they present with orbital disease. In patients who have both widespread metastases and chemotherapeutically sensitive tumors, chemotherapy is the treatment of choice.

The median survival is approximately 1 year, and only 27% had 2 year survival. Patients with breast cancer have a slightly longer survival than patients with other malignancies [15,19].

#### **4. CONCLUSION**

Orbital metastasis as a primary manifestation of papillary carcinoma thyroid is a very rare event. Unilateral proptosis in elderly age group should always be investigated as a distant metastasis.

#### **CONSENT**

All authors declare that written informed consent was obtained from the patient for publication of this case report and accompanying images.

#### **ETHICAL APPROVAL**

Not applicable.

#### **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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