Skull Metastasis of Follicular Thyroid Carcinoma – A Case Report

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Abstract

Background: Metastasis of follicular thyroid carcinoma to the skull is rare. However, in case of skull metastasis it is one of the most important differential diagnoses to be considered.

Aim & Objectives: Rare occurrence and mostly its importance in clinical practice justify reporting our case.


Results: Total thyroidectomy, excision of metastatic lesions whenever possible followed by radio iodine ablation and thyroid stimulating hormone suppression (Thyroxin therapy) is the recommended treatment. However, prognosis is poor in such cases. We present a case of 51 years old lady with 16 years history of non-toxic solitary thyroid nodule presented with left occipito-parietal swelling for last 1 year and left hip pain for 6 months. Fine needle aspiration of goiter and scalp swelling revealed follicular neoplasm. CT brain demonstrated a large mass in left parietal and occipital region with direct brain compression. The patient underwent total thyroidectomy followed by radiiodine ablation and radiotherapy for the bone metastases. Patient was advised to continue thyroxin tablet for life long.

Conclusions: Follicular carcinoma should be considered as an important differential diagnoses for metastasis lesion over skull.

Key words: Skull metastasis, follicular thyroid carcinoma
Introduction

The incidence of thyroid carcinoma is 3.7 to 4 per 100,000 populations and is the most common tumour of the endocrine system.\(^1\) Thyroid cancer accounts for 0.5% of all cancers in males and 1.5% in females.\(^2\) It is more prevalent in female, with male to female ratio of 1: 2.6.\(^3\) Among the subtype, follicular carcinoma is the second most frequent malignancy of thyroid gland after papillary carcinoma. Follicular thyroid carcinoma (FTC) occurs commonly in older age group.\(^4\) Incidence of FTC is higher in iodine-deficient areas.\(^1\) Solitary thyroid nodule can be the initial presentation in 80% cases.\(^5\) Even though FTC is more likely to present with bone metastasis (10%-40%), skull metastasis is a rare entity accounting for only 2.5% -5.8% of the cases.\(^6\) Due to its rare presentation and clinical importance, we are reporting a case of follicular thyroid carcinoma presented with skull metastasis.

Case report

A 51 years old lady admitted to our surgical ward with a non-toxic solitary thyroid nodule (STN) of 16 years duration who presented with a swelling over the scalp for last 1 year associated with left hip pain for last 6 months. The scalp swelling was painless and gradually increasing in size without associated neurological symptoms. Hip pain was becoming severe day by day and patient was not able to sit and ambulate. She could walk only with the help of a walking frame. She was a known case of hypertension for last ten years and taking medications regularly. She did not have any contributory family history.

On examination, her general condition was good and vital signs were normal. No dypsnea or stridor noted and she was clinically euthyroid. A left solitary thyroid nodule measuring 4 x 5cm was palpated in front of the neck, it was hard and fixed. Inferior border was not palpable. No cervical lymphadenopathy was noted. In addition, neck examination also revealed a 10 x 15cm, well defined, firm, non tender, immobile, globular swelling at the right sterno-clavicular region. Local examination of scalp revealed a 12 x 12cm, well defined, soft pulsatile, non tender, immobile hemispherical swelling at left occipitoparietal region with intact overlying skin (Fig-1). Neurological examination was uneventful except reduced motor power (3/5) on both lower limbs. Spine examination revealed tenderness at T11- L2 vertebra and left sacroiliac joint.

Routine blood analysis showed mild anemia (Hb9.5gm/dl). Blood urea, liver function test, serum calcium and thyroid function test were within normal limits. Fine needle aspiration cytology (FNAC) of left thyroid nodule and scalp swelling was suggestive of follicular neoplasm. Chest
X-ray and CT scan thorax demonstrated multiple metastatic nodules in both the lungs. Lumbo-sacral X-ray and pelvis X-ray showed osteolytic lesions at the left iliac and sacral bones. Contrast enhanced CT scan brain showed large scalp extradural masses in left parietal and occipital region with direct brain compression (Fig.-2). CT neck and thorax revealed a calcified heterogeneous mass in left thyroid lobe measuring 4.1cm x 3.7cm and a large metastatic mass in the right parasternal region with destruction of medial end of the right clavicle, sternum and sterno-clavicular joint. There was also evidence of destruction of T6, T7, T11 vertebra with cord compression. Features were suggestive of lungs, skull and multiple skeletal metastases from thyroid carcinoma.

Treatment plan was to perform a total thyroidectomy, excision of the skull and right sterno-clavicular masses followed by radioiodine ablation and radiotherapy to the bony metastases and continue with lifelong thyroxin, 200mcg/day (TSH-suppressive therapy). However, due to presence of extensive metastatic disease only total thyroidectomy was performed and then patient was referred to higher center for further management due to non availability of facilities like radiotherapy and radioiodine therapy in our hospital. After completion of the radioiodine (I-131) ablation therapy and radiotherapy to the bone and skull metastasis patient was reviewed in our hospital surgical clinic after 8months. She was doing well on tablet thyroxin 200mcg/day and mild reduction (around 2 cm) in the size of the skull metastasis mass was noticed. Patient informed her bone pain was reducing in intensity but still needed help to walk. However, patient needs to be followed-up for longer time to know about the further outcome in terms of treatment response and overall survival.

Discussion

Follicular thyroid carcinoma is a slow growing tumour and is more prone for blood borne metastasis. Hence FTC has higher propensity to have distant metastasis at the initial presentation compared to papillary thyroid carcinoma (PTC). Shaha et al reported 11% of distant metastasis in a series of 1038 patient with FTC, in which 4% presented initially with distant metastasis. The incidence of patients presenting with distant metastasis is highest among the patients over 45 years of age. Distant spread may occur to bone, lung, brain, skin and adrenal glands however skull being one of the rarest site. Females are at higher risk for developing skull metastasis from follicular thyroid carcinoma than males. The clinical course of these patients is usually long. In a study done by Nagamine in Japan stated average time period of reporting of skull metastasis as 23 years from the time of diagnosis of thyroid tumour initially; similarly our case also had a history of goiter for last 16 years prior to developing skull
metastasis. The primary sign of skull metastasis is a soft hemispheric tumour resting on the skull, most frequently located over the occipital region and rich in vascularity with osteolytic changes in the skull.\textsuperscript{6,10} This would explain the soft pulsatile nature of the scalp swelling in our case. Hence the presence of a metastatic lesion in scalp with or without skull involvement should alert one to the possibility of metastatic thyroid carcinoma. Follicular thyroid carcinoma has a greater preponderance for cutaneous metastasis than papillary thyroid carcinoma, with majority localized to the head and neck region. Skull metastasis of follicular thyroid carcinoma is characterized by osteolytic lesion on X-ray or CT scan and highly vascular on angiographic assessment.\textsuperscript{6} Histopathological examinations most frequently revealed follicular adenocarcinoma, with little pleomorphism and atypia. Histopathological examinations revealed vascular or capsule infiltration.\textsuperscript{6}

Differential diagnosis of thyroid carcinoma is to be considered when patient presenting with a lytic skeletal lesion especially when the following features are present:\textsuperscript{11}
(a) Age of patient more than 45 years
(b) Site of lesion at either skull or lumbo-sacral region
(c) Soft, pulsatile lesion

The treatment for differentiated thyroid carcinoma with skull metastasis includes total thyroidectomy, excision of skull lesion, ablation with radio iodine (I-131) and TSH-suppressive therapy. Radiotherapy and I-131 internal radiation are other treatment options recommended for highly vascularized metastatic skull tumours.\textsuperscript{9,10} The prognoses in these patients are relatively poor. Studies have reported the mean survival in the patient with skull metastasis as 4.5 years from time of diagnosis.\textsuperscript{6} Metastatic disease is the primary cause of death in follicular thyroid carcinoma.\textsuperscript{11} However despite distant metastasis, with appropriate management long term survival of 43\% has been reported in studies.\textsuperscript{8}

**Conclusion**

Even though skull metastasis from follicular thyroid carcinoma is rare, still it should kept in mind as a differential diagnoses when secondary metastasis is detected over skull.

**Conflict of Interest:** None declared.
References

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Fig. 1: Fifty one years old female patient with skull mass, goiter and a right sterno-clavicular swelling

Fig. 2: CT scan showing an osteolytic lesion in the left occipito-parietal region with compression of brain