

Scalp, Skull, Lung and Bone Metastasis from Follicular Thyroid Carcinoma - A Rare Case Report

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Citation: Gupta S, Madholia V, Mukherjee A, Bhowmik KT (2017) Scalp, Skull, Lung and Bone Metastasis from Follicular Thyroid Carcinoma - A Rare Case Report. J Cancer Sci Clin Oncol 4(2): 202. doi: 10.15744/2394-6520.4.202

Received Date: December 29, 2016 **Accepted Date:** December 15, 2017 **Published Date:** December 18, 2017

Abstract

Concurrent scalp, skull, lung and bone metastasis from follicular thyroid carcinoma is a very rare event. We herein present the case of a 37-year-old lady, who presented to us with huge scalp swelling that proved to be metastasis from a follicular thyroid carcinoma. The metastatic workup disclosed bilateral lung metastasis and additional metastasis in right iliac crest and 6th rib. The course of her disease was relentless. Although follicular thyroid carcinoma has an excellent prognosis, the presence of metastatic disease leads to a very dismal prognosis.

Keywords: Thyroid cancer; metastasis; scalp and skull

Introduction

Thyroid cancer is a relatively uncommon malignancy comprising about 1% of all malignancies. Follicular thyroid carcinoma accounts for 10-20% of all thyroid malignancies and it tends to occur more frequently in older patients, over 40 years of age [1]. Follicular cancers are generally solitary, have a marked tendency to invade vascular channels and metastasize hematogenously to distant sites. Lymph node metastases are uncommon. These tumours also have a marked propensity to concentrate I-131. On histopathological examination, these cancers lack papillae, psammoma bodies or ground glass nuclei. At the time of diagnosis of follicular thyroid carcinomas, around 15% patients are found to have distant metastasis, most commonly in the lung and bone [2] and also occasionally in the skin. We report an unusual case of scalp metastasis from follicular thyroid carcinoma in a young female with formation of a large mass lesion eroding cranial vault with pulmonary and skeletal metastasis.

Case Report

A 37 years old female presented to us with a large swelling on scalp with history of progressive increase in size of swelling for last 4 years. Patient was in respiratory distress and having severe pain over the right thigh. Patient had not taken any treatment for previous 4 years. On clinical examination there was a huge swelling of the scalp, of size greater than that of head with increased vascularity of the base of swelling. Patient was unable to sit down due to huge skull mass. There was tenderness over the right iliac region. A hard nodule of size 2X3 cm was also noticed at the base of scalp swelling. Fine needle aspiration cytology (FNAC) from this scalp swelling showed metastatic follicular carcinoma of thyroid (Figure 1,2). Patient was thoroughly investigated for metastatic workup. Contrast Enhanced computed tomography (CECT) brain showed erosion of cranial vault over parieto-occipital area (Figure 3). Contrast Enhanced CT neck showed enlarged right thyroid lobe with two hypo dense mass lesions with calcification. Contrast Enhanced CT thorax showed presence of soft tissue nodules of varying size diffusely in both the lung fields, suggestive of metastasis. There was also mediastinal lymph-adenopathy suggestive of metastatic involvement with widening of mediastinum and left shift of the heart. Contrast Enhanced CT abdomen showed destruction of right iliac bone with expansile soft tissue mass formation.

Further nuclear imaging studies were done: Thallium 201 whole body revealed that the viable malignant tissue in the skull lesion was present predominantly in the lateral area and the base of the lesion (Figure 4). 80-90% of the tumour was necrotic. No abnormal tracer uptake was seen in the normal brain parenchyma inferior to the base of tumour. This suggested that the massive tumour region in the skull was largely necrotic and avascular. Abnormal tissue, probably malignant was present in right lobe of thyroid. Focal abnormality was seen in right clavicular region with diffuse area in the right lung mostly lower zone and upper zone of left lung.

A large photopenic mediastinal mass is noted, pushing the heart laterally. An abnormal, discrete focus of radiotracer accumulation is noted in the 6th rib posteriorly and in right iliac bone in the 3 hrs image of the Tc-99m MDP Three phase bone scan (Figure 5).



Figure 1: Photograph of patient showing huge scalp swelling

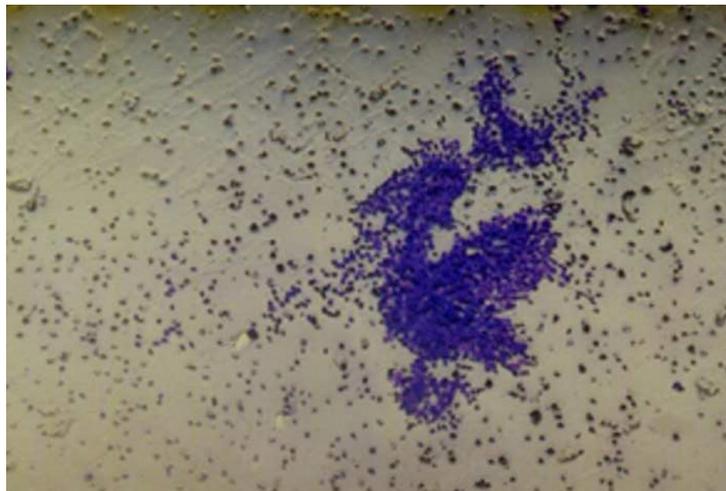


Figure 2: FNAC of scalp swelling showing metastatic follicular carcinoma of the thyroid (Zeimsa stain)



Figure 3: CECT brain showing erosion of cranial vault with homogenous mass

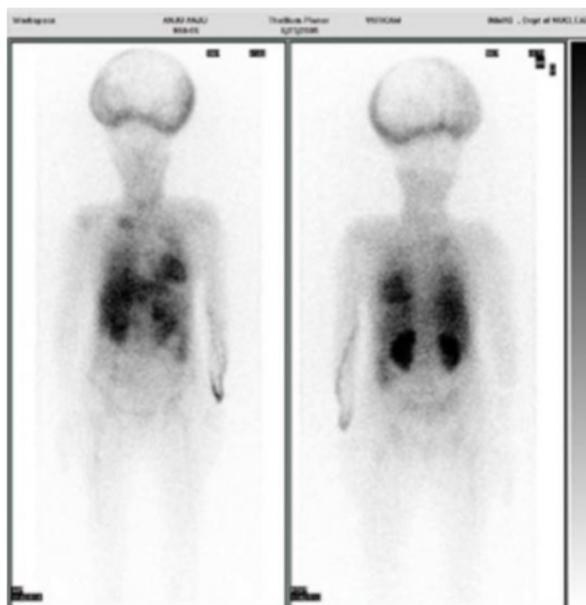


Figure 4: Thallium 201 whole body showing viable malignant tissue in the skull lesion is present predominantly in the lateral area and the base of the tumour

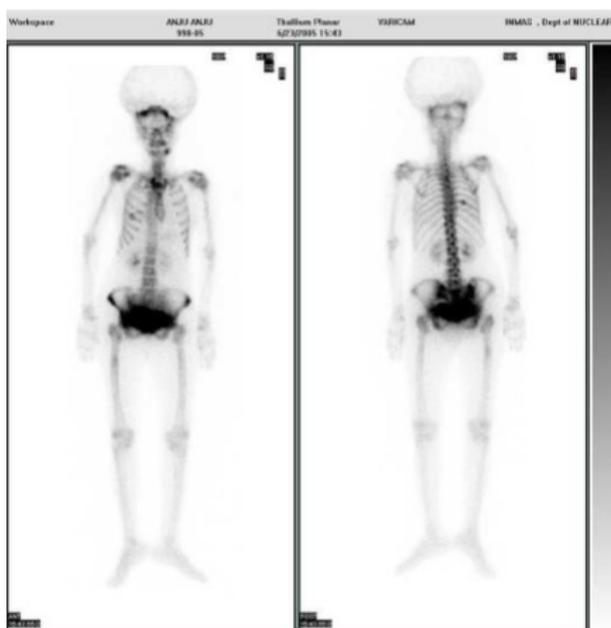


Figure 5: Technetium-99m MDP three-phase bones scan showing discrete uptake in 6th rib and right iliac bone

After all the work up patient was diagnosed a case of follicular thyroid carcinoma with skull, scalp lung and bone secondaries. Patient was offered for subtotal thyroidectomy and debulking surgery of head, but patient denied for any surgical treatment. Radioiodine ablation treatment was not offered due to avascularity of tumour. So patient received 2 cycles of Palliative chemotherapy in the form of combination regimen consisting of Cyclophosphamide, Doxorubicin and Cisplatin. Patient showed good response after 1 cycle of chemotherapy but after second cycle of chemotherapy patient condition worsened and was kept on best palliative care only. Lastly patient died due to sudden cardio-pulmonary arrest after 3 months of diagnosis.

Discussion

Follicular thyroid carcinoma usually has a benign clinical course with an excellent long term prognosis and a propensity for vascular invasion. The most common sites of distant metastasis are lung, bones and lymph nodes. Generally this is not an aggressive tumour with 10-years survival as high as 80-95%. However the 10-years survival rate in cases with distant metastasis decrease to around 40% [3,4]. Bone metastasis of thyroid carcinoma is the second most common form of metastasis after lung metastasis [5,6]. The incidence of skull metastasis varies from 2.5-5.8% [7,8] and is associated with mean survival rate of 4.5 years and 3.1 years respectively. In the large series of Mc Cormac, the incidence of bone metastasis is 12.7% but skull metastasis is rare [7]. In 1985, Nagamine *et al.* also reported a series of 12 cases (2.5%) of skull metastasis among 473 cases of thyroid carcinoma [8]. The average

age of patients with skull metastasis from thyroid carcinoma is around 60 years, with a female preponderance [8,9]. The usual presenting sign is a soft, painless scalp mass that is hemispheric in shape and that arises on the convexity of the skull. The lesion is usually singular but can be multiple. The lesion can be pulsatile and extremely vascular. The metastatic mass may invade the epidural space but the dura forms a barrier to further intracranial spread [9]. Most of these tumours are located in the posterior portion of the cranium and fed primarily from the external carotid artery system [8-11]. Progression of these lesions is generally very slow and mean survival period from the definitive diagnosis of skull metastasis is about 4-5 years [8,9 and 12]. Previously Skin metastases have not been widely reported among the largest series in literature [1,13,14].

Boehm *et al.* published a report on 28-year-old woman with follicular thyroid carcinoma and a single left occipital lytic lesion without subcutaneous metastasis. Other large study groups like those of Woolner *et al.* (0\698patients), Fiazell and Foote described 1 patient (1/393) with suspected skull\ brain metastasis with cutaneous metastasis [13,14]. Ibanez *et al.* reported one case with skull lesion and scalp metastasis of papillary carcinoma [15]. Gates suggested that the apparent predilection for the scalp could be due to the vascularity and relative immobility of the skin at this site [16]. The metastatic pathway may be consistent with hematogenous dissemination¹⁷ via the external carotid artery system [1]. The overall rarity of cutaneous metastasis from follicular thyroid carcinoma is reflected by presence of only 10 such cases previously reported in English language literature (Table 1): It has been noted that skin metastasis from malignant tumours generally indicated a poor prognosis and the patients usually die with in 3-6 months. However, rare cases of skin metastasis from thyroid carcinoma with relatively prolonged survival have been recorded despite the presence of other metastasis [17]. Ghfir I *et al.* published a case report where a follicular thyroid carcinoma metastasized to unusual skin locations in a 82-year-old woman who followed after a total thyroidectomy for follicular thyroid carcinoma [18]. Assessment after 2 years showed the presence of a small cervical residue, pulmonary metastases, and a high thyroglobulin level. Two sets of internal radiation therapy with iodine 131 (100 mCi each) followed. Response to treatment was poor, and cutaneous and subcutaneous nodules appeared on the abdomen, back, and front left thigh. Biopsy of these lesions showed that they were malignant, and testing with anti-thyroglobulin antibodies confirmed the diagnosis of cutaneous metastasis of follicular thyroid carcinoma. Ali Alkan reported a case of 57 year old female with a 7 years history of ischemic heart disease who presented with 4 cm thyroid mass with compressive symptoms [19]. Diagnostic workup revealed a follicular Thyroid Carcinoma and thyroidectomy was performed. With post surgical radioactive iodine therapy (RIT), patient was treated with l-thyroxine replacement. Two year after surgery, metastatic lesions in the lungs were detected and patient was followed with RIT. With progression after 2 courses of RIT, patient was for palliative chemotherapy but the comorbidity and the performance status were not suitable for cytotoxic therapy. Sorafenib was planned for palliative intent. Asad Jehangir *et al.* reported a 65-year-old Caucasian woman with a history of thyroid nodule presented with the complaint of rapidly growing skull nodules which had been present for 3 years but were stable [20]. The prognosis is relatively poor in metastatic follicular thyroid carcinoma with 5 and 10 years mortality rates of approximately 60% and 80% respectively [10]. Nagamine *et al.* reported in his series of 12 patients, a mean survival time of 4 years and 5 months from the time of definitive diagnosis of skull metastasis from thyroid carcinoma [8]. A few other reports have indicated however a favorable long term survival in patients younger than 45 years and especially in children.

SN	Author (s)	No of Cases	Age/Sex	Lesion location	Interval between diagnosis of primary and metastasis	Status of last follow-up
1	Auty19	1	M/41	Scalp, Face, Neck, Thorax	2 Years	NA
2	Hamiltor20	1	M/56	Back thigh, Arm	3 Years	NA
3	Rico &Penneys21	1	M/78	Cheek	NA	NA
4	Pavlidis et al18	1	M/85	Scalp	8 Years	Died 2 months later
		1	F/55	Scalp	0	NA
5	Tronnrer et al22	1	F/66	Scalp	1 Year	NA
6	Vives et al23	1	F/71	Scalp	9 Years	Alive 1 year later with residual disease
7	Caron et al24	1	M/66	Scalp	0 Years	Died 3.6 years later
8	Ruiz de Erenchua et al25	1	F/57	Scalp	6 Years	Alive 1 year later with residual disease
9	Toyota et al26	1	M/72	Scalp	1 Year	Alive 1.6 years later with no e/o disease
10	Perikala V. Kumar	1	M/68	Scalp	NA	NA

Table 1: Details of cases of cutaneous metastasis from follicular thyroid carcinoma since 1964

Conclusion

Bone and lung are the common sites of metastasis from Follicular Thyroid Carcinoma but involvement of skull is unusual, especially as the presenting feature. Cases of neglected or untreated follicular thyroid carcinoma can give rise to subcutaneous

nodule of scalp and can also directly invade the underlying bone to produced lytic lesions; which must be differentiated from other tumours producing lytic lesion. Although the rare cutaneous metastases of follicular thyroid carcinoma usually occur on the scalp, firm nodular cutaneous lesions that are painless and resist standard treatment in patients with a history of thyroid cancer should suggest the possibility of metastasis. Metastases from Follicular Thyroid Carcinoma should be included in the differential of patients with new osteolytic hypervascular skull lesions or cutaneous lesions in head and neck area.

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