CASE REPORT

Anaplastic carcinoma of thyroid gland with widespread soft tissue metastasis: an unusual presentation

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SUMMARY

Anaplastic thyroid cancer is the rarest tumour of the thyroid gland, representing only 2% of clinically recognised thyroid cancers. The most common metastatic sites are lungs, followed by the intrathoracic and neck lymph nodes. We report the case of a 62-year-old woman who presented to our setting with multiple soft tissue nodules, thyroid mass, head swelling and weight loss. Radiological investigation showed a large thyroid mass with widespread metastasis in subcutaneous tissues of both upper limbs, chest and abdomen. Metastasis was also found in lungs, skull and adrenal glands after which the patient was diagnosed with stage IVc anaplastic thyroid carcinoma (ATC). After careful consideration of patient's clinical condition with multiple poor prognostic factors, medical therapy was withheld and she was discharged on hospice care. The patient expired after 1 month. In ATC, metastasis to subcutaneous tissue is an extremely rare occurrence of which there is hardly any evidence in literature.

and decreased appetite. There was swelling in the left side of the head since 6 months. She also noted lumps in various parts of the body including arms, chest and abdominal regions. She denied dysphagia, dyspnoea and any history of cancer in the family. Prior medical history was described as non-significant.

On clinical examination, the patient was bed bound and in no apparent distress. Vital signs were normal. Generalised swelling was noted around thyroid gland region where a hard, smooth, immobile mass was palpated (figure 1A). Moderate swelling was also noted around the left parietal region of the head while no mass was palpated. Numerous nodular masses were palpated on various regions of the body—cubital fossae of both arms, deltoid region of the left arm, chest and anterior abdominal wall (figure 1B–D). During the neurological examination, there was complete paralysis of right upper and lower limbs with power of 0/5 in both limbs.

BACKGROUND

Anaplastic thyroid carcinoma (ATC) is the rarest tumour of the thyroid gland, representing only 2% of clinically recognised thyroid cancers.¹ Most cases at the time of diagnosis are associated with extensive local disease spread and distant metastasis in 20%–50% of cases.² The most common metastatic sites are lungs, followed by the intrathoracic and neck lymph nodes.³ Patients with anaplastic thyroid cancer (ATC) face a uniformly dismal prognosis, with average 5-year survival rates of around 7% and a median survival time of 6 months.⁴ Distant metastasis in patients with ATC to subcutaneous tissues has hardly ever been reported. We report the case of a 62-year-old woman with an unusual presentation of ATC with multiple soft tissue metastases in subcutaneous tissues of both upper limbs, chest and abdominal wall.

CLINICAL CASE

A 62-year-old South-Asian woman presented to the outpatient clinic with complaints of fever since 1 month, generalised weakness, anterior neck swelling since 4 years but rapidly progressing since past 3–4 months and loss of speech (motor aphasia). The patient further reported history of falls, right-sided upper and lower limb paralysis, bilateral arm swelling since 2–3 months, weight loss

INVESTIGATIONS

The patient was admitted to the hospital for further evaluation. Laboratory workup was done. Her baseline investigations were normal including thyroid function tests. Infection and microbiology workup all came out as negative.

Ultrasound of the right upper extremities was done. Ill-defined heterogeneous multiloculated masses measuring 11.0×5.5 cm in the cubital fossa of right arm encasing the main vessels were noted. A hypoechoic well-defined mass measuring 9.0×3.6 cm was identified in the left arm overlying the deltoid muscle in the fascial plane showing internal vascularity.

DIFFERENTIAL DIAGNOSIS

With patient's numerous subcutaneous masses lipoma versus soft tissue sarcoma should be strongly considered. It is possible for metastatic carcinoma to spread to soft tissue, and it should be especially considered if there was a history of tumour associated with symptoms of weight loss and older age. Other causes giving similar presentation include lymphoma, neuroma and fibromatosis.

CT scans of the neck, chest and abdomen with contrast were done which showed large soft tissue density enhancing mass involving the thyroid gland (figure 2). Multiple small nodules were seen in both

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Figure 1 Numerous masses were noted in different parts of the body. (A) Generalised swelling was noted around thyroid gland region where a hard, smooth, immobile mass was palpated on examination. (B) Soft tissue mass palpated in deltoid region of left arm. (C) Soft tissue mass palpated in cubital fossa of right arm. (D) Soft tissue mass palpated in right lumbar region of the abdomen.

lungs as well. Lymphadenopathy with central necrosis was noted in para-aortic, paratracheal and diaphragmatic lymph nodes. A large hypodense nodule was also noted in the left adrenal gland. CT scan further revealed multiple soft tissue nodules in subcutaneous tissues and muscles of chest and abdomen (figure 3). MRI scan of the brain with contrast revealed a large mass in the left parietal bone (figure 4).

Echocardiography showed a filling defect in the base of the right atrium with an echogenic mass most likely representing a thrombus, for which the patient was started on enoxaparin.

At this point, thyroid carcinoma with widespread metastasis was strongly suspected.

After all aseptic measures, informed consent and under local anaesthesia, ultrasound-guided trucut biopsy of soft tissue mass near right anterior iliac spine involving underlying bone was performed. Histopathological reports showed poorly differentiated metastatic carcinoma positive for the following immunohistochemical markers: CKAE1/AE3, CK7, p63 (figure 5).

With a large necrotic thyroid mass, widespread metastasis and poorly differentiated metastatic carcinoma identified on abdominal soft tissue biopsy, diagnosis of anaplastic thyroid cancer of stage IVc was established.

Figure 2 Large mass in thyroid gland with central necrosis and calcification revealed on CT scan of neck. It measured 8.3 cm×7.4 cm×9.7 cm (AP×TS×CC) in size. The mass was posteriorly compressing the trachea causing its luminal narrowing though no definite infiltration was noted.

Figure 3 Numerous masses were revealed in subcutaneous tissue in various parts of the body. (A, B, D) Anterior abdominal wall soft tissue masses, the largest mass showed necrosis and measured 3.4×2.8 cm. (C) A large soft tissue mass was also seen on the right side of the abdomen involving the right iliac crest causing its erosion and destruction, measuring 8.1×6.1 cm.

OUTCOME AND FOLLOW-UP

Since the patient's performance status was poor with widespread metastasis and her Eastern Cooperative Oncology Group score being 4, we decided against medical intervention for ATC at this point after counselling the family. The patient was discharged from the hospital on hospice care after a week of hospitalisation. The patient expired at home after 1 month.

Figure 4 MRI (A, B, C) and CT scan (D) of the head revealed a large mass in the left parietal bone causing bony expansion, remodelling and erosion. The mass measuring 8.5×8.0×5.0 cm (anteroposterior X craniocaudal X transverse) medially was causing buckling of underlying parenchyma, effacement of cortical sulci, pressure effect over the left ventricle and contralateral midline shift of approximately 0.6 cm towards the right side. No obvious intracranial extension of the lesion was seen.

Figure 5 Biopsy of the soft tissue mass near right superior iliac spine. Tumour cells having epithelioid morphology were seen infiltrating cores of tissue that were biopsied. Cells had moderate to markedly pleomorphic nuclei having bizarre forms, having abundant intensely eosinophilic and slightly granular cytoplasm. The tumour was positive for the following immunohistochemical markers: CKAE1/AE3, CK7 and p63, and negative for CK20, TTF-1, thyroglobulin, CDX2 and mammaglobin. (A) H&E stain 40x (B) CK7 (C) thyroglobulin.

DISCUSSION

ATC often originates in an abnormal thyroid gland; a history of goitre is reported in >80% of cases.⁵ It is more common in women than in men.⁶ Most patients present with a neck mass and symptoms of dyspnoea, dysphagia and dysphonia.⁷ Papillary carcinoma is the most common thyroid carcinoma (70%–80%), followed by follicular (10%–15%), medullary (2%) and anaplastic (2%).⁸ Soft tissue metastasis from thyroid carcinoma mimicking sarcoma is an extremely rare phenomenon. There is hardly any evidence of soft tissue metastasis in ATC, though some cases of metastatic follicular and papillary carcinoma have been associated with it.^{9–11} In this case, the patient presented with widespread metastasis in soft tissues of upper limbs, chest and abdominal region.

Metastasis to soft tissue from a distant site is very uncommon. In a study of 7935 patients who presented with soft tissue mass, only 100 were found to have a metastasis (1.7%).¹² In another study of 7237 patients with soft tissue mass on presentation, only 118 were found to have metastases (1.6%).¹³ Both studies show lung as the primary tumour site most frequently the cause of soft tissue metastasis followed by skin and kidney. The clinical features of soft tissue metastasis are very similar to primary soft tissue tumours, thus further investigations are needed to distinguish these tumours as the management varies based on the diagnosis.^{12 13} It is unclear why metastasis to soft tissues is so rare, considering the percentage of body mass and cardiac

output devoted to the skeletal muscle and soft tissues. Mechanisms include changes in pH, accumulation of metabolites, local temperature at soft tissue sites and variation in blood flow influenced by adrenergic receptors of the soft tissues affecting tumour implantation.¹³

Patients <60 years old who have intrathyroidal ATC have a better prognosis compared with older patients who have distant metastasis.¹⁴ In a study of 47 patients with ATC, the presence of acute symptoms, tumour size >5 cm, distant metastases and leukocytosis were each independent significant risk factor associated with poor outcome and increased risk of mortality.¹⁵ In our case, patient had poor prognostic factors with age >60 years old, female, having widespread metastasis and tumour being greater than 5 cm.

The American Joint Committee on Cancer defines all of its stages as stage IV considering the aggressive nature of the tumour. The tumour is divided into stages IVa, IVb and IVc according to the extension of the primary tumour (thyroid capsule invaded or not invaded by the tumour), lymph node involvement or presence of distant metastasis (table 1). The patient was diagnosed with stage IVc after widespread metastasis was noted in various parts of the body including lungs, skull, adrenal glands and soft tissues of upper limbs, chest and abdomen.

Patients with metastatic ATC almost uniformly have short survival and no prospects for curative outcome.⁵ In a recent study of 50 patients with ATC with distant metastasis (IVc), there was no difference between the overall survival time of those treated with surgery and those with non-surgical treatment, chemotherapy and those treated without chemotherapy, and radiotherapy and those treated without radiotherapy.¹⁶ Aggressive approach has rarely shown to benefit patients with widespread metastasis in ATC, and if an aggressive approach is desired by the patient, a clinical trial should be considered.^{5 14} Doxorubicin, the most studied chemotherapy agent in patients with ATC, has shown no significant survival benefit in clinical trials. Hospice or palliative care is also an important component of managing patients with stage IVc disease.¹⁴

Due to widespread metastasis, poor prognosis of patient and lack of data of benefit in treating stage IVc patients, medical therapy was withheld after discussion with the family and the patient was discharged on hospice care.

Learning points

- ▶ Anaplastic thyroid carcinoma is the rarest tumour of thyroid gland.
- ▶ Soft tissue metastasis is hardly ever reported in patients with anaplastic thyroid carcinoma.
- ▶ Our study strongly adds to the rare soft tissue metastatic findings of anaplastic thyroid carcinoma.
- ▶ Anaplastic thyroid carcinoma with widespread metastasis has a grave prognosis, and no kind of intervention has shown to prolong survival in these patients.

Contributors The patient was admitted under the care of NAZ (head of department of oncology). She was actively involved in the management along with HKA, TKJ and MH. The case report was written by MH and TKJ under the supervision of HKA and NAZ. MH and TKJ were involved in formulation and conceptualisation of the case report. MH, TKJ and HKA were involved in writing the initial draft of the case presentation. MH was mainly involved in final writing, designing and literature search of the manuscript. TKJ, HKA and NAZ did the final editing of the case report before submission.

Competing interests None declared.

Patient consent Obtained.

Table 1 Anaplastic thyroid carcinoma tumor, node and metastasis (TNM) staging

Classification	Tumour size	Lymph nodes	Metastasis
Stage IVa	T4a (capsule not invaded)	N0 or N1	M0
Stage IVb	T4b (capsule invaded)	N0 or N1	M0
Stage IVc	Any T (capsule +/- invaded)	N0 or N1	M1

Source: <https://www.cancer.org/cancer/thyroid-cancer/detection-diagnosis-staging/staging.html>.

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