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Clinical Case Seminar

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Single bone metastasis as first sign of differentiated thyroid carcinoma

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Abstract

The case of a 46 years old man with single bone metastasis as the first sign of differentiated thyroid carcinoma is described and discussed along with advanced imaging.

KeyWords: Thyroid; papillary carcinoma; thyroid metastases; endocrine surgery; bone metastasis

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Introduction

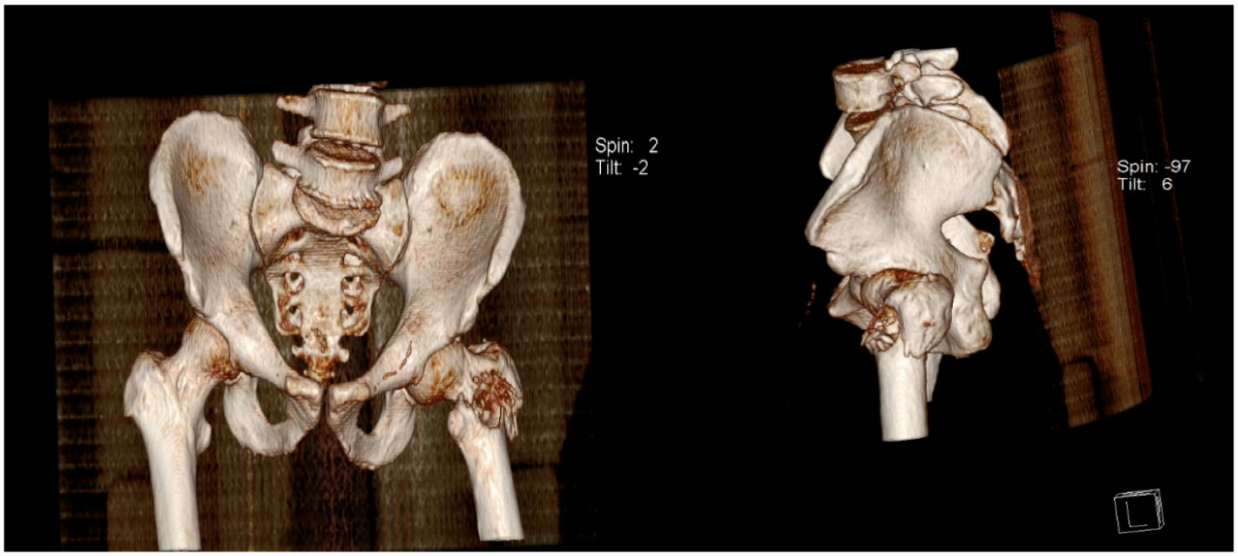
Differentiated thyroid carcinoma (DTC) is a relatively common malignant disease with a good prognosis. It usually presents as a disease limited to the thyroid gland, with or without involvement of regional lymph nodes. Distant metastases occur during follow-up in 6-20% of patients. The presence of distant metastases at the time of diagnosis is less common with an incidence ranging from 3% to 15%. Bone metastasis is rare with an incidence of approximately 5.5% (1). Within this group, surgical treatment still plays an important role in most patients, mainly to facilitate metabolic radiotherapy but also to control lymph node disease in the central compartment. In this report we want to present a case of a young patient with bone metastasis as the first manifestation of thyroid carcinoma.

Clinical case report

A 46-year-old man with a history of left lumbosciatalgia radiating up to the ipsilateral foot for

two months came to the observation of the neurosurgeon. Over time the pain became worse and resistant to drug therapy. On his doctor's advice, he performed magnetic resonance imaging of the lumbosacral tract that documented the presence of a left paramedian hernia at the level of L5-S1. In the light of the clinical and imaging evaluation, an indication for surgery was given. The patient was admitted to the Neurosurgery of the G. Martino University Hospital in Messina to undergo a discectomy. Negative family history of malignant, cardiovascular, and endocrine neoplastic diseases. In personal medical history, diabetes mellitus (Type 2) and diaphragmatic hernia from previous abdominal trauma. The postoperative course was regular until the second day when, following mobilization, without apparent cause, the patient complained of excruciating pain in correspondence of the left femur with global functional impotence. He was then subjected to CT (Figure 1), and subsequently, for the rarefaction of the bone tissue at the site of the fracture,PET-CT, and MRI of the left femur were required.

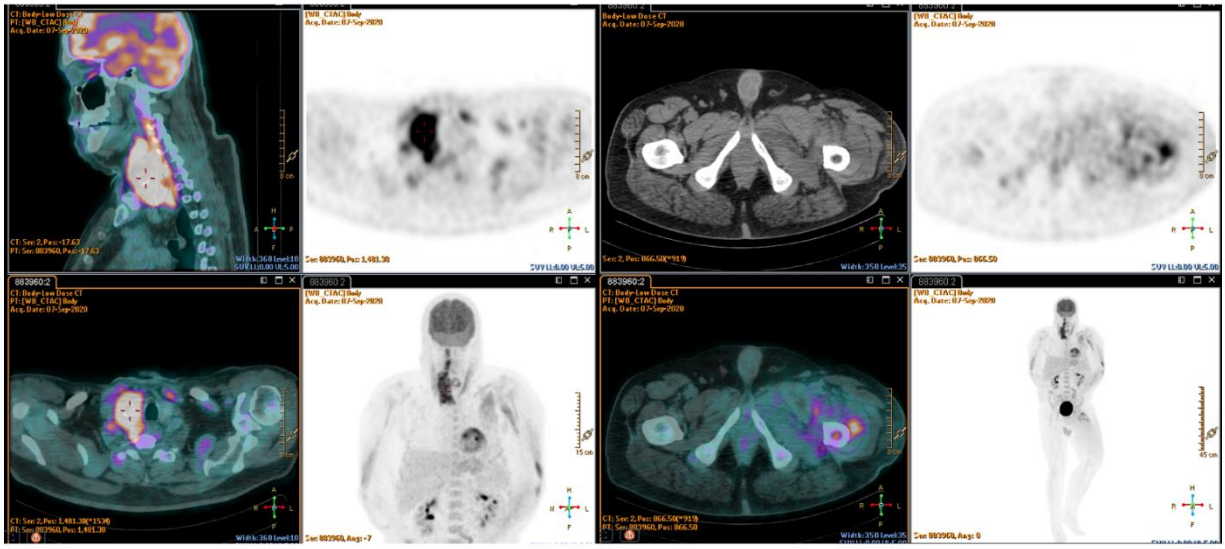
Fig.1 3D reconstruction of CT images of the left intertrochanteric fracture (anteroposterior and lateral views).



The PET-CT documented high metabolic activity in the known pathological tissue at the left intertrochanteric site and also indicated the presence of an area of abnormal and inhomogeneoustracer hyperaccumulation in the right lobe of the thyroid, which appeared enlarged and extended from a plane passing through C3 to the superior mediastinum (Figure 2)

The thyroid ultrasound documented the right lobe largely occupied by a mass with a maximum size of 5.2 x 3.5 x 3.5 cm with a markedly inhomogeneous echo structure and some colliquation areas in the context. On color Doppler evaluation, this lesion appeared to be remarkably vascular. In the same lobe, the presence of some smaller satellite nodular formations was noted. No alterations in the left lobe. No regional lymph adenopaties were detected.

Fig. 2 PET-CT images documenting the high metabolic activity of the right thyroid lobe and the left femur.



Thyroid function tests showed TSH: 2,990 mU / L; TG:> 5000 ng / ml; calcitonin: 4.85 pg / ml. To complete the diagnosis and in the planning of the surgical intervention, the FNA (Fine Needle Agoaspiration) of the aforementioned lesion was programmed, the report of which reported in the context of abundant fibrin-haematic material two aggregates with a microfollicular structure consisting of medium-sized thyroglobulin positive thyroidocytes, TTF-1, HBME- 1 and negative for galectin-3 and BRAF V600E, with a proliferative index with Ki-67 of 1%. The morphological and immunohistochemical pictures showed a neoplasm with a microfollicular structure. Guided CT biopsy of the bone lesion was also scheduled, but the sampling was inconclusive because it consisted exclusively of necrotic material. The patient initially underwent a total thyroidectomy and subsequently resection surgery of the proximal femur and reconstruction with GMRS (Global Modular Replacement System) prosthesis. Definitive histological examinations confirmed the diagnosis of papillary carcinoma with poorly differentiated component (40%) infiltrating the thyroid capsule, angioinvasive (pT3a according to TNM / AJCC 8 ed. 2017) and metastasis from thyroid primitiveness. The patient was referred for further treatment to nuclear medicine with radio-metabolic treatment planning

Discussion

Thyroid cancer comprises 1% of all neoplasms, among the malignant endocrine tumors it is the most common. Papillary thyroid cancer is the most common and comprises 80% of all thyroid cancers. It occurs most frequently in the third to fifth decade (2). Although lymph node metastases are often present at diagnosis, hematogenous spread is a rare and late event.

In contrast, distant metastases (commonly to the bones and lungs) are more common in follicular thyroid cancer, which accounts for approximately 10-20% of all thyroid cancers.

Distant metastases are seen in 3-15% of patients with thyroid cancer at the time of diagnosis,

while 6-20% develop distant metastases during follow up. Thyroid cancer commonly presents as a solitary lump in the neck and initial presentation with bone metastases is rare (3). However, as evidenced in the case report, thyroid cancer can present with bone metastases and should be considered as a potential differential diagnosis. Commonly reported bone sites include the vertebrae, skull, pelvis, and femur (3). Any type of thyroid carcinomas can metastasize to bone structures but the rate of bone metastases is threefold higher for follicular thyroid cancer compared with papillary thyroid cancer (4). Follicular carcinomas have been reported to have a higher prevalence of distant metastases than papillary or anaplastic subtypes. A likely explanation is that follicular carcinoma more easily spreads via the blood to distant organs, because of its tendency to invade blood vessels.

However, this may be due to the general use of the term follicular carcinoma before the recognition of specific subtypes, including the follicular variety of papillary carcinoma. Although the latter is thought to behave in a clinical way similar to true papillary thyroid cancer, it has been suggested that some may mimic the pathological characteristics and clinical behavior of follicular carcinoma (5). Therefore, more and more recent studies report a higher incidence related to papillary carcinoma and bone metastases (3-5).

The prognosis of differentiated thyroid carcinomas is good with a 10-year survival rate of 80-95%, but this is reduced to 50% when metastases are present. Furthermore, age at diagnosis is a consistent prognostic indicator with the risk of recurrence and death, which clearly increases with age, especially in those over 40 (1). Bone metastases are associated with a worse prognosis than lung metastases. In patients with bone metastases, isolated or associated with pulmonary metastases, the prognosis is markedly poor with 10-year survival rates reported from 13 to 21% (6).

Differentiated thyroid carcinoma patients with bone involvement generally show a poor prognosis; however, their clinical course may be quite heterogeneous. Asymptomatic patients with RAI-avid metastasis, but no structural evidence of disease on high-resolution imaging studies, demonstrate excellent responses and better survival (7). Various retrospective studies tried to identify factors able to independently predict the natural course of metastatic thyroid carcinoma. Nevertheless, many of them lead to inconclusive outcomes, since cohorts were often assembled over multiple decades during which both histopathological evaluation and clinical management have evolved. In several cases, the sample size was very limited to perform meaningful multivariate analyses. Moreover, data about bone metastasis were not always separated from those regarding other distant metastases. Current guidelines recommend treating bone metastases with a combination of surgery, external beam radiotherapy, and iodine therapy. Surgical excision is recommended for accessible, solitary and isolated metastases. Patients with

early distant metastases compared to those who develop metastasis during follow up seem to have better outcomes in relation to overall survival: in fact, early detection of bone metastasis when tumor burden is low has been shown to improve response to therapy with iodine 131 (8-9).

Conflicts of interest
The authors declare no conflict of interest.

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