Knee Pain and Limping as Presenting Symptoms of Metastatic Thyroid Cancer

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Patient: Female, 60-year-old

Final Diagnosis: Metastatic thyroid cancer

Symptoms: Knee joint pain

Medication: —

Clinical Procedure: —

Specialty: Endocrinology and Metabolic • Orthopedics and Traumatology • Radiology

Objective: Unusual clinical course

Background: Most thyroid nodules are fortunately benign; however, up to 15% of thyroid nodules turn out to be malignant. Follicular thyroid cancer is the second most common type of thyroid malignancy, originating from the follicular cells lined by cuboidal epithelium, with a peak incidence between the ages of 40 and 60 years. The feature that differentiates follicular carcinoma from adenoma is the presence of capsular invasion. While distant metastases occur in 10% to 15% of patients with follicular thyroid cancer, only 2% to 13% of patients with thyroid cancer develop bone metastases. Metastasis to the knee in thyroid cancer is extremely rare. This report describes a rare case of limping and knee pain as presenting symptoms of metastasis of follicular thyroid cancer to the knee joint observed during clinical practice and addresses its implications.

Case Report: A 60-year-old woman presented with right knee swelling, disabling pain, and difficulty with walking in the last 3 months. Magnetic resonance imaging showed a large mass, and a computed tomography scan-guided biopsy confirmed it to be a distant metastasis of follicular thyroid cancer. The patient underwent total knee replacement and thyroidectomy and was postoperatively treated with radioactive iodine therapy. She was in good condition at her 1-year follow-up, with no recurring pathology.

Conclusions: This case reports on the metastasis of follicular thyroid cancer to the knee, which is exceedingly rare. However, it should be considered in the differential diagnoses of lytic bone lesions, as early diagnosis and management yield a more favorable prognosis for patients.

Keywords: Bone Metastasis-Targeting Peptidomimetic-11 • Knee Joint • Thyroid Cancer, Hurthle Cell

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Background

Thyroid cancer is the most common endocrine malignancy [1]. It is classified into 4 main categories: papillary, follicular, medullary, and anaplastic [2]. The prognosis is generally favorable, with a 10-year survival rate of over 95%. However, in 5% to 25% of patients, distant metastases are discovered at the time of diagnosis or during the course of the disease. Nearly half of the patients with distant metastases and 2% to 13% of thyroid cancer patients have bone metastases. Additionally, after the lungs, the bone is the second most prevalent site for distant metastases, with the spine being the most common site for metastasis. Compared with lung metastasis, bone metastasis correlates with a worse overall prognosis [3].

Distant metastases occur in 10% to 15% of patients with follicular thyroid cancer (FTC). FTC is the second most common type of thyroid malignancy and has a peak incidence between the ages of 40 and 60 years. Metastasis of FTC to the knee is extremely rare; thus, in this report, we describe a rare case of distant metastasis of FTC to the knee observed in our clinic.

FTC arises from the follicular cells that are lined by cuboidal epithelial cells. The differentiating feature of FTC is its capsular and vascular invasion. A follicular adenoma is benign and occurs more commonly than carcinoma, with a ratio of 5:1 [4].

A thorough literature review showed a minimal number of cases in which the first symptom of thyroid cancer metastasis was knee mass and pain [5].

Case Report

We report the case of a 60-year-old female patient with no chronic past medical history. She presented to our outpatient clinic at Prince Hamza Hospital, Amman, Jordan, with right knee swelling, disabling pain, and difficulty with walking for the last 3 months. The patient also reported decreased appetite and weight loss of approximately 10 kg over 2 months. The patient denied any history of similar abnormalities to the same joint or other joints, trauma to the knee, a feeling of hotness, or other systemic complaints, including chronic cough, hemoptysis, chest pain, shortness of breath, difficulty swallowing, voice changes, breast lumps or nipple discharge, change in urine color, or alteration in bowel habits. The patient’s family history was unremarkable.

Physical examination revealed right knee circumferential swelling with tenderness at the posterolateral aspect. The overlying skin was normal (not red or hot).

The initial knee X-ray and Doppler venous ultrasound were reported as normal. Right knee magnetic resonance imaging showed a large enhancing distal femur mass, measuring 3.7×3.3×2.6 cm at the posterolateral metaphysis, associated with periosteal soft tissue involvement and causing cortical destruction. Other similar intramedullary bone lesion foci were observed at the distal metaphysis of the femur. Visualization of the anterior cruciate ligament femoral attachment was unclear, raising the possibility of its invasion by the lesion (Figures 1-4).

Under computed tomography (CT) guidance using a Philips Brilliance 16 CT Scanner, a Tru-Cut biopsy specimen was obtained from the knee mass. Upon histopathological examination, cores of fibromuscular tissue infiltrated by sheets of follicular epithelial cells (acinar pattern) were seen. Immunostaining with TTF1 was positive (Figure 5). The overall findings were consistent with a diagnosis of metastatic follicular carcinoma of the thyroid gland. A whole-body CT scan was subsequently performed.

A CT scan of the neck showed a large heterogenous left thyroid mass with retrosternal extension, causing a mass effect and shifting of the midline structures (Figure 6). The whole-body CT scan images were unremarkable.

Fine-needle aspiration from the thyroid was performed under ultrasound guidance and revealed clusters of follicular cells and thin colloid, consistent with a follicular lesion.

Upon diagnosis, the patient was referred for a total knee replacement, shortly followed by a total thyroidectomy. Both surgical specimens confirmed the diagnosis of FTC. The patient was then started on radioactive iodine therapy. The patient was doing well and did not have any recurring pathology at the 1-year follow-up.

Discussion

We report a rare case of limping and knee pain as the presenting symptoms of metastatic FTC to the knee joint. A thyroid nodule is a prevalent pathology affecting human beings. While most thyroid nodules are fortunately benign, up to 15% of thyroid nodules turn out to be malignant. Radiation exposure, female sex, advanced age, and family history are risk factors for thyroid cancer. FTC, the second most common type of thyroid cancer [6], causes 10% to 20% of all thyroid cancers. Metastatic thyroid carcinoma of the skeleton has been reported in the spinal column and the skull [7-9]. Malignant metastases to the knee joint are rare. Only a few cases have been reported in tumors, such as melanoma, lung cancer, renal cell
Only 2% to 13% of patients with thyroid cancer develop bone metastases. However, 1% to 4% of patients with differentiated thyroid cancer present with the distant disease at diagnosis, and 7% to 23% develop the metastatic disease during follow-up [11]. FTC metastasis to the knee is quite rare. As the presenting feature of thyroid cancer, cases of bone metastases range from 38.1% to 62%, with the spine as the most common site of metastasis. Moreover, in a recent systematic review, most patients with bone metastases had FTC [11].

Figure 1. Knee magnetic resonance imaging coronal view T1 with contrast.

Figure 3. Knee magnetic resonance imaging sagittal view T1 with contrast.

Figure 2. Knee magnetic resonance imaging coronal view T1 with contrast.

Figure 4. Knee magnetic resonance imaging coronal view gradient echo sequence showing a large enhancing distal femur mass, causing cortical destruction.
FTC is usually a slowly growing tumor and has a good prognosis. However, FTC has a bad prognosis in distant metastasis cases [12]. After the lungs, the bone is the second most common site of distant metastases in FTC. Additionally, bone metastasis appears more aggressive than lung metastasis [13,14]. According to reports, differentiated thyroid cancer with bone metastasis has a 10-year survival rate of 27% [15].

Surgical treatment to remove metastatic lesions (total knee replacement) and primary thyroid cancer (total thyroidectomy) alongside postoperative radioactive iodine therapy were reported as the recommended management methods for FTC. These treatments are associated with the best long-term survival [16].

**Conclusions**

In this case report, we present an exceedingly rare metastasis of FTC to the knee. Our findings show that, despite its rarity, distant bone metastases of FTC to the knee can be encountered in the clinic and, therefore, must be considered in the differential diagnoses of lytic bone lesions, since early diagnosis and management yield a more favorable prognosis.

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**Declaration of Figures’ Authenticity**

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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