Case Report

Metastatic Thyroid Carcinoma With Initial Presentation As Spinal Cord Compression

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Summary

Spinal cord compression due to the follicular thyroid carcinoma is rare. In this paper, we report 6 unusual cases of isolated vertebrae metastasis of the follicular thyroid carcinoma presenting with spinal cord compression. It is unusual for this neoplasm to begin with present as a single metastasis to the spine. Comprehensive preoperative works up for metastatic tumors of vertebrae is significant. This should include evaluation of the thyroid gland consisting of detailed clinical history and physical examination.

Key words: Metastasis, thyroid carcinoma, spine, vertebrae

INTRODUCTION

Follicular thyroid carcinoma is a slow-growing tumor, which is the second most common cancer of the thyroid gland\(^\text{(11)}\). The lesion tends to occur in older age groups, with a peak incidence in the fifth decade and besides, it is three times more common in females than in males.

Metastatic follicular thyroid carcinoma is rare and occurs commonly in the bones, brain, and lungs\(^\text{(11)}\). Although the incidence of distant metastasis of the follicular thyroid carcinoma was reported between 11 and 25 %, the incidence of initial presentation as distant metastasis is unknown\(^\text{(2,13)}\). Thyroid carcinoma presenting as an epidural metastasis with distal spinal compression without any previous symptoms of thyroid carcinoma is rare.

In this paper, 6 cases of isolated vertebrae metastasis of the follicular thyroid carcinoma presenting with spinal cord compression are discussed with the review of the pertinent literature.

CASE PRESENTATION

Case 1

A 33-year-old woman presented low back pain and weakness of both lower extremities. Neurological examination
revealed paraparesis with hyperreflexia on the lower extremities and an inconsistent sensory loss in the right L3–4–5 dermatomes. Laboratory investigations revealed normal hematological and biochemical parameters. Serum tumor markers and thyroid hormone levels were normal. A computerized tomography (CT) of the spine showed osteolysis of the L3 vertebral body and narrowing of the spinal canal due to the extradural mass. A magnetic resonance imaging (MRI) showed abnormal areas of low signal intensity on T1-weighted image of the mass lesion at L3 vertebral body and pedicles. The narrowing of the spinal canal due to the extradural mass was also seen on MRI (Figure 1). Thyroid studies revealed hypoactive solid nodule in the left thyroid lobe. L3 vertebral body was totally resected and human femur allograft was inserted via anterolateral approach (Figure 1). The L2-L4 spine was stabilized by spinal implants. Histological examination revealed a metastatic thyroid carcinoma with a predominantly follicular pattern (Figure 2). The patient underwent a total thyroidectomy and whole body iodine-131 (I-131) was given for internal radiation.

**Figure 1:** (A) A 47-year-old woman with back pain was admitted. Neurological examination revealed weakness of lower extremity, bilateral Babinski response, clonus and decreased anal tonus. The radiological investigations of the spine showed loss of height and large destructive lesion of the T11 and T12 vertebrae corpus with paraspinal mass compressing the cord at the level of T11 and T12. (B) Tumor was totally resected and titanium mesh cage was inserted via anterolateral approach. Post-operative lateral x-ray showing spinal stabilization.

**Figure 2:** Histological examination revealed a metastatic thyroid carcinoma with follicular pattern.
Case 2

A 47-year-old woman with back pain was admitted. Neurological examination revealed weakness of lower extremity, bilateral Babinski response, clonus and decreased anal tonus. The radiological investigations of the spine showed loss of height and large destructive lesion of the T11 and T12 vertebrae corpus with paraspinal mass compressing the cord at the level of T11 and T12. Hematological and biochemical parameters were normal. The patient was taken to the procedure room for T11-T12 hemicorpectomy, anterior interbody fusion use a cage with T10-L1 stabilization and excision of epidural and paraspinal mass. Pathological examination revealed metastatic follicular carcinoma. Postoperative thyroid examinations revealed hypoactive multinodular hyperplasic thyroid gland. Thyroid function studies all within normal limits. The patient underwent total thyroidectomy and radioactive iodine treatment.

Case 3

A 48-year-old woman presented with a year history of low back pain. Except for slightly decreased motor strength of the left leg, there were no other neurological symptoms. Radiological examinations showed contrast-enhancing lesion compresses left L4 nerve root in the lamina, pedicle and paravertebral region of L3 vertebrae. Also, another 2 x 1 x 2-cm contrast-enhancing mass was obtained at the right posterior side of L4 vertebrae. A 2-cm lesion in the right lobe of the thyroid gland and multiple lymph node enlargements were established on CT images. Thyroid function tests were all within the normal limits. Thyroid ultrasound demonstrated a heterogenic, hypoechoic nodule. The thyroid scan revealed hypoactive multinodular hyperplasic thyroid gland. The patient underwent a gross-total resection of paravertebral mass attacks the psoas muscle, vertebral body of L3 vertebra. The pathologic examination showed a well-differentiated thyroid carcinoma. Following a total thyroidectomy and whole-body scan with iodine-131, the patient has been discharged without additional neurodeficit.

Case 4

A 37-year-old woman presented with 2-year worsening low back and bilateral leg pain, 1-month urine incontinent history. Neurologically, the patient had slightly decreased motor strength and symmetrically reduced deep tendon reflexes of the lower extremities. The magnetic resonance image presented a lesion blocking whole L3 vertebra body, causing spinal stenosis and compressing bilateral L3 and L4 nerve roots. The lesion spread to epidural space and compressed neural foramen of L3 and L4 levels. The computed tomographic scan of the spine demonstrated a large destructive lesion of the L3 vertebral body with an expansion to pedicles, left transverse process and spinal epidural space. The patient underwent L3 corpectomy, gross-total excision and anterior lumbar stabilization by left flank incision. Pathologic examination of the specimen revealed follicular type of thyroid carcinoma. Total thyroidectomy and whole-body scan with iodine-131 was performed.

Case 5

A 37-year-old woman admitted to our clinic with a 6-month history of back pain and weakness of the lower extremities. Neurological examination revealed paraparesis, hypoesthesia below the T9 level and reduced deep tendon reflexes. Radiological findings revealed spinal stenosis, enlargement on T8 vertebral body. Laboratory investigations were revealed normal hematological and biochemical parameters. The patient underwent total laminectomy, due to progressive paraparesis in emergency
conditions. Follicular type of thyroid carcinoma was the conclusion of the pathologic examination. After the patient diagnosed of thyroid follicular carcinoma, the patient underwent total thyroidectomy and whole-body scan with iodine-131.

Case 6
A 41-year-old man admitted with a 6-month history of left leg and back pain. Neurological examination revealed slightly reduced motor strength, L2 dermatomal hypoesthesia and reduced deep tendon reflexes of left leg. Hematological and biochemical parameters were normal. The radiologic imaging techniques presented a large destructive lesion of the L2 vertebra body, causing spinal stenosis and compression of left L2 and L3 nerve roots. The lesion spread neural foramen of L2 and L3. The patient underwent L2 corpectomy, gross-total excision and anterior lumbar stabilization by left flank incision. Pathologic examination of the specimen revealed follicular type of thyroid carcinoma. Then total thyroidectomy and whole-body scan with iodine-131 was performed.

DISCUSSION
Follicular carcinoma is the predominant element of malignant tumor of the thyroid which is the second most common differentiated thyroid malignancy\(^4,11\). It accounts for 20% to 30% of all thyroid carcinomas and usually seen in old females\(^3\). There are few reports regarding primary presentation of patient with distant metastasis leading to diagnosis of follicular thyroid carcinoma. Shaha et al. reported that 4% of 1038 patients with thyroid cancer initially presented with distant metastasis\(^13\). But, the incidence of initial presentation as distant metastasis to vertebrae is unknown. Solan reported that about 25% of patients with follicular carcinoma have distant metastasis at the time of diagnosis\(^14\). Moreover, these patients have not been diagnosed as thyroid primary carcinoma. Although we performed radiological and biochemical investigations to find any primary source of metastasis, we were not able to detect any primary lesion in these patients. Besides the early age group, the gender of patients was tended to be female. However, it can be related with the increased incidence of follicular thyroid carcinoma in the female sex. Taken together, we speculate that patients with vertebral metastasis in which primary origin could not be detected with routine physical examination, biochemical and radiological investigations, the probability of follicular thyroid carcinoma should be keep in mind, especially in early decades. Also in our series, the physical exam and tumor markers and thyroid functions could be completely normal during preoperative investigations. It is not surprising however.

The age at presentation is the single most important prognostic factor in metastatic thyroid carcinomas\(^11\). The survival of cases is influenced by the patient's age at diagnosis, the histological patterns of the tumor, and the location of metastasis\(^3,7,12\). Although it has been announced that the frequency of demonstration of distant metastasis of follicular thyroid carcinoma increases among patients over 45 years of age, in our series the mean age of patients was 39.2 years which was relatively early age. This could be important to examine the spinal column in an early age when the patient had a distant metastatic thyroid carcinoma.

Marcocci reviewed 780 patients with differentiated thyroid cancer and found 18 patients presenting with a manifestation of bone metastases\(^5\). All patients had either pain or pathologic fracture. The patients in this study, however, had neither bone pain nor fracture. Instead these patients complained of radicular and/or myelopathic type symptoms.

The prevalence of thyroid malignancy in patients with elevated thyroid function tests has been reported as low as 0.3%\(^10\). In our cases, thyroid function tests were all within the normal limits.
Although palpation of the thyroid independent of clinical suspicion will not detect a significant number of thyroid tumors\(^{(12)}\). Palpation of the thyroid gland as a mass screening device for thyroid cancer has recently been evaluated in a low incidence population in Japan. Among 18619 examinations, only 36 cases (0.19\%) of thyroid cancer were identified\(^{(6)}\). The routine physical examination of our patients had no findings of thyroid disease. Preoperative evaluation of the thyroid gland by physical examination does not have a significant importance to define thyroid carcinoma. If a mass is palpated within the thyroid, a radionuclide scan with \(^{123}\)I or fine needle aspiration is indicated. Thyroid function tests are not effective in ruling out a primary thyroid cancer although thyroglobulin levels may be helpful in diagnosis once a clinical suspicion for thyroid cancer is raised\(^{(12)}\). Scarlow et al reported that routine screening of the thyroid with CT or MRI in patients with metastatic disease of unknown origin has a low yield and routine imaging of the thyroid with CT or MRI is not regarded as a more sensitive test than palpation for detecting masses within the thyroid\(^{(12)}\).

As reported in the literature, the best therapy in cases of metastasis of thyroid carcinoma includes removal of the metastatic foci as much as possible\(^{(3,7,8,12)}\). Vertebral metastases from thyroid malignancies are generally slow growing and usually remain fairly well localized to one area of the spine\(^{(12)}\). In our series, patients underwent surgery to complete resection of the tumor as recommended in the literature. However in Case 5, we performed total laminectomy and posterior lumbar stabilization in emergency conditions. We planned to re-operate the Case 5 to remove metastatic foci totally. Radiotherapy and I-131 internal radiation are other treatment options recommended for highly vascularized and/or inoperable metastatic vertebrae tumors\(^{(1)}\). The utility of radioactive iodine (RAI) in patients with follicular thyroid carcinoma is well founded. RAI provides survival benefit to some patients with follicular carcinoma of the thyroid\(^{(19)}\). After removal of metastatic foci or decompressive surgery, total thyroidectomy was performed to all our patients. Then radioactive iodine treatment was administered. In the mean range of 24 months follow up of our patients, except one patient (case 3) have no problem. Case 3, the 37-year-old woman was died because of intracranial metastasis and its complications.

In conclusion, when a metastatic spinal tumor is detected, thyroid follicular carcinoma can not be excluded although it is extremely rare. Thus, detailed evaluation must be performed although the physical examination and laboratory tests have low value. The total excision of metastatic foci followed by total thyroidectomy and radioactive iodine therapy should be chosen for patients with thyroid malignancy metastasis to the vertebral bodies.

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