

Follicular Thyroid Carcinoma Presenting as Large Solitary Vertebral Metastasis: Report of Two Unusual Cases Treated with Radiotherapy

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ABSTRACT

Solitary spinal metastasis with cord compression as the presenting feature of follicular thyroid carcinoma (FTC) is extremely unusual with <10 cases reported in world literature. We hereby present two such cases in a 39-year-old male with lytic lesion left sacral bone with biopsy showing metastatic carcinoma with morphology and immunophenotype of thyroid gland and a 35-year-old female with thoracic vertebral lesions suggestive of metastatic deposit of FTC. Subsequently, both patients were found to have a solitary nodule in the thyroid lobe. They were treated with local radiotherapy (RT) with

significant symptomatic relief. The present cases highlight the rarity of FTC to present as upfront solitary vertebral metastases with significant morbidity in young individuals although a slow indolent course with metastases in late stages of disease is more common, debilitating the effect of metastatic lesion requiring RT for pain palliation and the role of supportive nursing care for patient rehabilitation.

Key words: Follicular thyroid carcinoma, nursing care, radiotherapy, vertebral metastases

Introduction

Follicular thyroid carcinoma (FTC) is the second most common thyroid cancer with a slow-growing indolent course^[1] presenting as an asymptomatic solitary

intrathyroid nodule. It has a propensity for hematogenous spread with 10%–15% of patients presenting with metastatic disease to lung followed by bone with brain,

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liver, and skin less commonly involved.^[2] Bone metastases most commonly occur in the vertebral bodies followed by pelvis, femur, skull, and ribs. However, spinal metastasis with symptomatic cord compression as the initial presenting feature with solitary site of involvement of FTC is extremely rare^[3] requiring customized treatment in very young patients.

Case Report

Case 1

A 39-year-old male presented with severe low backache and urinary incontinence of 6 months' duration with a *Karnofsky performance status* (KPS) of 60% prompting frequent analgesic ingestion. Magnetic resonance imaging (MRI) showed a 9.0 cm × 9.0 cm × 8.4 cm lesion sacrum with soft tissue component involving S1, S2, and S3 vertebrae [Figure 1]. Positron emission tomography (PET) scan confirmed the same with metabolically active lesion in the right lobe of thyroid measuring 4.1 cm × 3.1 cm × 3.3 cm. Biopsy from sacral mass revealed thyroid follicles filled with colloid material with intense positivity for thyroglobulin [Figure 2]. Immunohistochemistry (IHC) showed cytokeratin 7+/20-(CK7+/CK20-), thyroid transcription factor-1 (TTF-1) [Figure 3], and thyroglobulin positivity. Fine-needle aspiration cytology (FNAC) from thyroid lesion showed follicular neoplasm [Figure 4]. Thyroglobulin level was elevated to 600 IU. The patient underwent total thyroidectomy and lymph node dissection (LND). He was treated with radiotherapy (RT) to sacral mass to a dose of 40 Gray (Gy) in 20 fractions resulting in significant symptomatic relief. Six weeks post-RT, he underwent iodine-131 ablation. He has been placed on lifelong thyroid replacement and nursing care. His requirement of analgesics has drastically

reduced leading to a much better quality of life since the past 1 year.

Case 2

A 35-year-old female presented with bilateral paraparesis of 1 month duration with a KPS of 50%. MRI spine showed a 6.9 cm × 5.4 cm × 3.1 cm expansile osteolytic lesion with large soft tissue component involving thoracic vertebrae 2 and 3 [Figure 5]. The patient was taken up for upfront surgery because of progressive weakness. Postoperative histopathology suggested metastatic thyroid carcinoma with IHC positive for CK7+/CK20-, TTF-1, and thyroglobulin. PET scan showed a residual lesion at DV2–DV3 levels 2.0 cm × 1.5 cm × 2.0 cm and a left thyroid nodule measuring 1.5 cm × 1.0 cm × 0.5 cm. FNAC from thyroid lesion showed follicular neoplasm. Thyroglobulin level was elevated up to 400 IU. The patient underwent thyroidectomy and LND. Subsequent histopathology from thyroid confirmed follicular carcinoma. The patient received RT to spine to a dose of 46 Gy in 23 fractions followed by iodine-131 ablation. At present, the patient is on thyroid replacement with levothyroxine since the past 6 months with significant symptomatic relief and improved KPS. Continuous nursing care was provided for prompt rehabilitation and improved quality of life.

Discussion

There are very few case reports in literature of FTC metastasizing to the sacrum and vertebrae as a solitary site of metastases with a large osteolytic lesion and neurological symptoms because of spinal cord compression. Khan *et al.*^[3] reported FTC presenting with spinal cord compression because of involvement of thoracic vertebrae. Okuntan *et al.*^[4] presented a case of FTC metastasizing to the

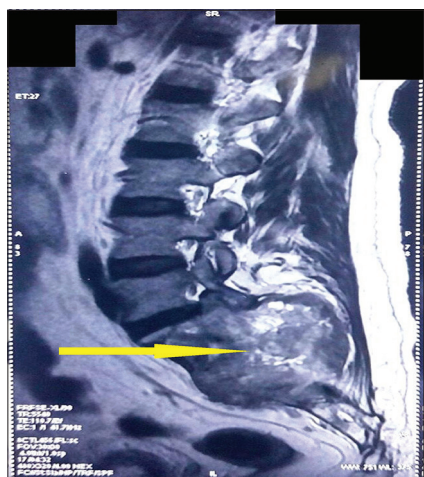


Figure 1: Magnetic resonance imaging showing a large destructive left sacral lesion with soft tissue component involving S1, S2, and S3 vertebra in case 1 (yellow arrow)

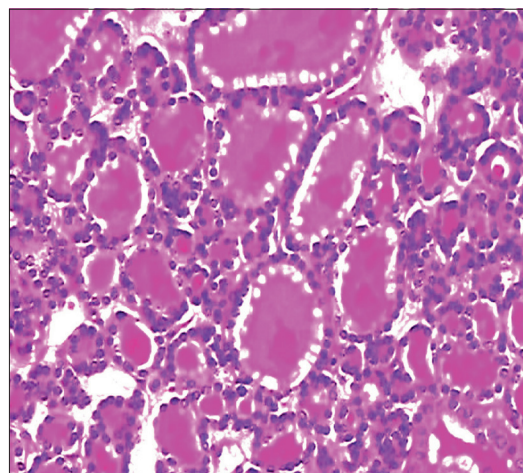


Figure 2: Biopsy from sacral mass revealing thyroid follicles filled with colloid material with intense positivity for thyroglobulin (H&E, ×100)

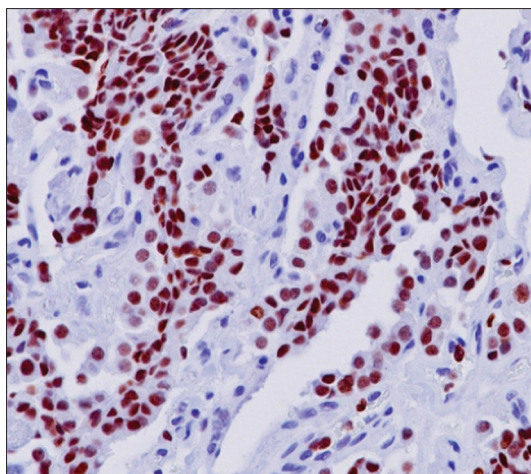


Figure 3: Immunohistochemistry showing thyroid transcription factor-1 positivity

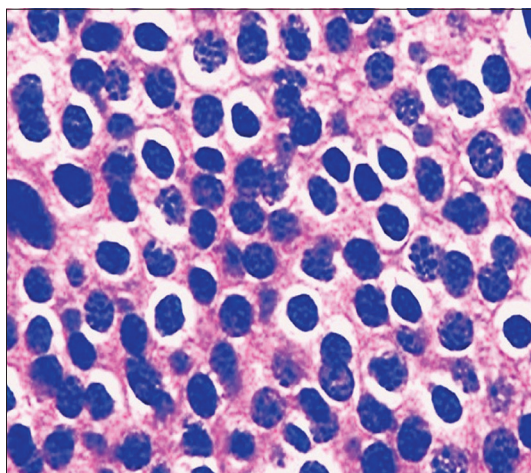


Figure 4: Fine-needle aspiration from thyroid nodule showing follicular variant of thyroid carcinoma in case 1 (H&E, $\times 200$)

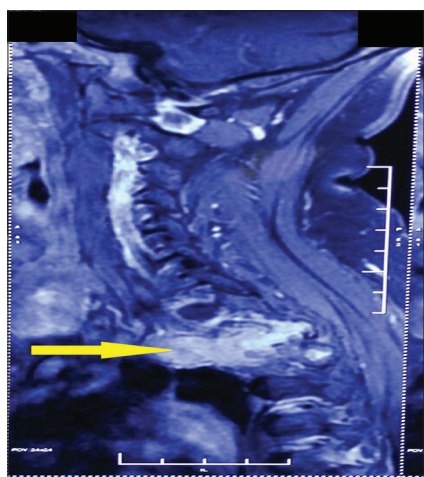


Figure 5: Magnetic resonance imaging showing an expansile osteolytic lesion with large soft tissue component involving thoracic vertebrae DV2 and DV3 in case 2 (yellow pointer)

lumbar vertebra. A review of 389 cases of FTC with bone metastases by Sreedharan *et al.*^[5] described only one case

of metastases to sacral region. Quinn *et al.*^[6] confirmed four cases as sacral metastasis from FTC. Tazi *et al.*^[7] reported a case which presented as dural metastasis. There are no other large series which has reported solitary bony metastases to vertebrae with spinal cord compression.

Patients with vertebral body metastases are less likely to concentrate radioiodine and are associated with a worse prognosis than pulmonary metastases. High-dose radioiodine is used for the treatment of bone metastases that concentrate radioiodine. Bisphosphonate may help reduce pain, pathologic fractures, and progression of bone metastases. Patients with asymptomatic bone metastases that do not concentrate radioiodine can be treated with levothyroxine therapy alone. Patients with vertebral collapse or tumor compression are candidates for spine stabilization with tumor resection or percutaneous vertebroplasty.^[2] Surgery may also be indicated for severe pain refractory to medical therapy and for metastases that do not concentrate radioiodine.

External beam radiation therapy is one of the main therapeutic options available to these patients with skeletal metastases associated with large soft tissue component from thyroid cancer for palliation of bone pain and control of tumor growth that do not take up radioiodine. Complete or partial pain relief is obtained in more than 80% of patients for at least 6 months in 50% of cases. All prospective randomized trials for different bone-seeking cancers showed that single fraction regimens are at least as effective as fractionated regimens with increased convenience and cost control.^[8]

For differentiated thyroid cancer, the combination of external RT and radioiodine therapy has been reported to have an impact on cancer recurrence and pain relief.^[9] Delivered RT doses varied from 40 to 50 Gy in various case reports.^[10] We limited our dose to <50 Gy in both cases respecting the tolerance of organs at risk such as bladder, rectum, and spinal cord since the purpose was purely palliation in both the cases. Both our patients showed marked improvement in their neurological symptoms. Nursing care is of utmost importance in oncological palliative care to promote patient comfort, provide patients and their families with information related to pain control, provide assistance with behavioral and physical interventions, prevent and alleviate side effects of pharmacologic therapies, and promote patient compliance with therapy and required follow-up.

Spinal cord compression, as a complication of thyroid carcinoma, is uncommon requiring prompt diagnosis and treatment. Prompt management of the primary carcinoma and the metastatic lesion, maintenance of thyroid suppression, and consideration of the patient's response to therapies along with nursing care may culminate in long-term survival, early rehabilitation, and favorable

prognosis. It is recommended that thyroid carcinoma should be considered in the differential diagnosis of every patient with new-onset spinal cord compression.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patients have given their consent for their clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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