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Research Article

Case Report of Follicular Carcinoma of The Right Primary Thyroid Lobe with Rare Metastasis to the Proximal Femur in Young Adult

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Abstract

This case report details a rare presentation of metastatic follicular thyroid carcinoma (FTC) in a 22-year-old postpartum female who presented right hip pain due to pathological fracture of the proximal femur. Initial evaluation revealed a neck swelling and imaging studies identified a destructive femoral lesion and a suspicious thyroid nodule. Biopsy and PET scan confirmed FTC metastasis from the right thyroid lobe to the proximal femur. The patient underwent preoperative embolization of the tumor followed by wide resection of the proximal femur and reconstruction with mega prosthesis. Histopathological examination confirmed metastatic FTC (pT2NxM1). Subsequently total thyroidectomy was performed. Postoperative recovery was favourable, with the patient regaining full weight-bearing mobility without support at three months. FTC commonly metastasizes hematogenous to bones and lungs; however, such early and isolated bone metastasis in a young patient is exceptional. This case emphasizes the diagnostic challenge posed by atypical presentations and highlights the importance of multidisciplinary collaboration involving orthopaedics, ENT, and oncology for optimal management. The patient is planned for radioactive-iodine (RAI) scan and RAI remnant ablation as part of follow-up care. Early diagnosis and aggressive surgical management in cases of FTC with bone metastasis are critical for improving outcomes and preserving quality of life.

Introduction

Follicular thyroid cancer (FTC) is the second most prevalent form of thyroid malignancy that metastasizes to bone, typically spreading through the bloodstream rather than the lymphatic system, which may account for its higher likelihood of distant spread [1]. FTC more commonly presents with metastases to distant sites than with local involvement. Approximately 6% to 20% of FTC cases develop distant metastases, with the bones and lungs being the most frequently affected locations [2]. Prognosis in these cases is generally good, with 10-year survival rate for the older age group was 48% while the younger age group was 92% [3].

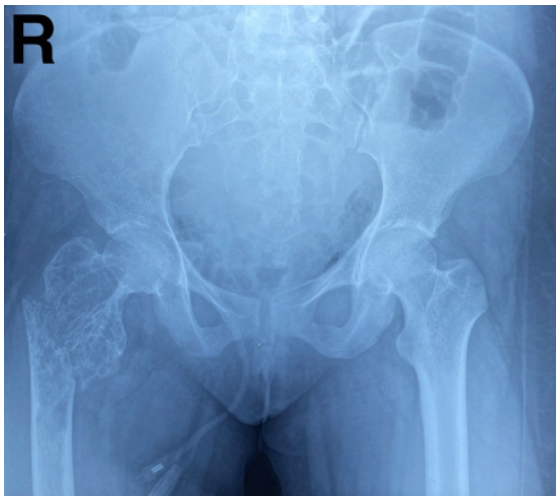

Figure 1: Xray Showing right proximal femur pathological fracture with metastasis

Proximal femur fractures are increasingly common with advancing age and are associated with significant morbidity and mortality, often leading to decreased function after surgery. In clinical practice, atraumatic proximal femur fractures which result from low-impact or non-traumatic events are regularly observed. These fractures can result from various underlying conditions, including stress, insufficiency, fatigue, atypical patterns, or pathological processes, all of which compromise bone strength or healing capacity. Accurate prevalence rates for pathological fractures are difficult to determine, as many studies do not conduct routine histological examination. In the presented case, follicular carcinoma was localized exclusively to the right proximal femur and the right thyroid lobe.

Case History

A 22-year-old woman came in with a four-month history of right hip pain. Despite the discomfort, she was able to walk with full weight-bearing, though with a limp, and could squat and sit cross-legged. When she presented, she was nine months pregnant and underwent an attempted vaginal delivery in the lithotomy position. When this failed, a Caesarean section was performed. About a week after delivery, she returned with intensified pain in her right hip. During the physical examination patient had greater trochanter tenderness and restriction of movements in all directions due to pain.

On further examination, a single, firm, 3x3cm globular swelling was noted on the front of her neck, slightly to the right of the midline. The mass had irregular borders, was not tender, not fixed to deeper tissues, and the overlying skin was movable. The swelling moved with swallowing, and Pemberton's sign was negative. There was no other relevant medical or family history reported.

Investigations

Laboratory investigations revealed serum T3, T4, and TSH levels of 3.20 pg/mL, 1.16 pg/mL, and 0.86 mIU/L, respectively. Additionally, both parathyroid hormone (PTH) and serum alkaline phosphatase levels were elevated at 35.6 pg/mL and 125 IU/L, and the patient showed signs of hypercalcemia, with ionized calcium measured at 8.91 mg/dL. Imaging studies, including X-ray (Figure 1) and MRI, identified an ill-defined, expansile, and heterogeneous lesion in the right femoral neck extending to the intertrochanteric area and proximal shaft. This lesion had caused bone destruction, leading to a pathological fracture of the proximal femur.

A whole-body PET scan revealed an FDG-avid nodule measuring 25x23 mm in the right thyroid lobe (SUV 13.30) and an FDG-avid lytic lesion affecting the femoral neck, intertrochanteric area, and upper shaft (Figure 2). Based on the PET findings, a fine needle aspiration biopsy (FNAB) of thyroid was performed, which indicated a follicular neoplasm in the right thyroid lobe.

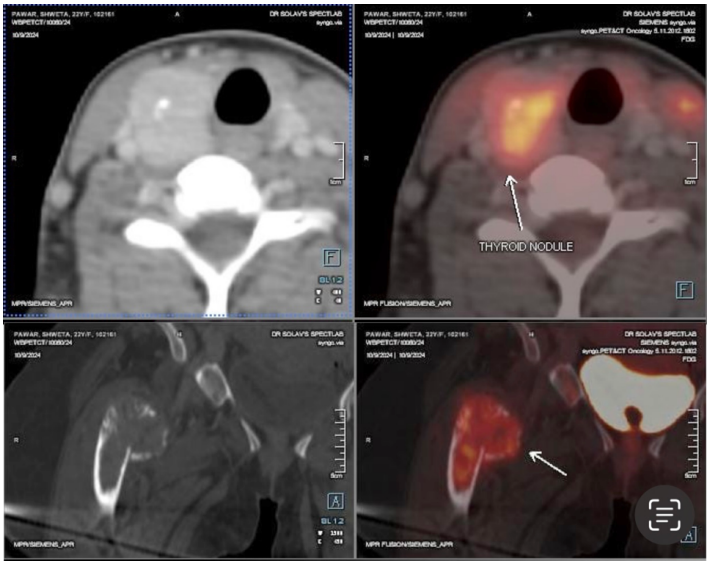

Figure 2: PET scan showing FDG-avid module.

Surgical Procedure

The patient first underwent preoperative tumor embolization, performed by the interventional radiologist, to minimize intraoperative bleeding (figure 3a). The following day, she underwent a wide resection of the right proximal femur, which involved removal of the entire femoral head and neck, along with 16 cm of bone extending from the greater trochanter (figure 3c). The excised bone was sent for histopathological evaluation, and bone marrow frozen section of the healthy resected end was analyzed during surgery to ensure that the surgical margins were free of malignant cells.

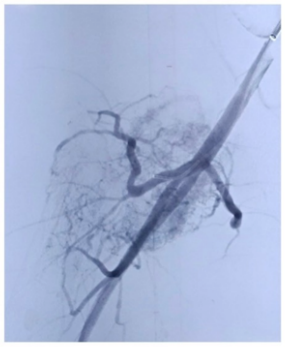

Figure 3a: Post Tumor Embolisation

Figure 3b: Proximal Femur Megaprosthesis

Figure 3c: Resected Right Proximal Femur

Figure 3d: Resected Right lobe of Thyroid

Figure 3

After confirming clear margins, reconstruction was carried out using a proximal femur megaprosthesis (ADLER RESTOR Modular Reconstruction Prosthesis) (figure 3b). Histopathological analysis of the bone confirmed metastatic spread from a follicular carcinoma originating in the right lobe of the thyroid, classified as stage pT2NxM1. Based on these findings, the patient was referred to an ENT surgeon, who performed a total thyroidectomy (figure 3d) one week after the initial procedure.

Follow up and Outcomes

Following surgery, the patient remained stable and was able to walk weight-bearing with support. She was discharged on postoperative day 15 after the primary surgery, which was five days after undergoing the second procedure (thyroidectomy).

At the three-month follow-up, the patient was walking independently without any support, and there were no signs of recurrence (figure 4).

Figure 4: 3Months Post-Operative Xray.

A radioactive iodine (RAI) scan is scheduled for six months after surgery, along with TSH levels. The decision for RAI remnant ablation will be taken as per the RAI scan reports and after consultation with a medical oncologist.

Discussion

Follicular thyroid carcinoma (FTC) is a well- differentiated malignancy known for its hematogenous spread, most commonly to the lungs and bones [2]. While bone metastases occur in a notable subset of FTC cases, their presentation as the initial or sole symptom, in a young patient, is exceptionally rare. In this report, the patient presented with right hip pain due to a pathological femoral fracture, a manifestation associated with thyroid cancer, particularly during the postpartum period. The diagnostic process benefited significantly from a multidisciplinary approach, involving imaging, histopathology, and interventional radiology. The use of PET-CT facilitated the identification of both the primary thyroid lesion and the bone metastasis, while FNAB confirmed the thyroid origin. Surgical management through wide resection and megaprosthesis reconstruction, followed by total thyroidectomy, exemplifies an aggressive but appropriate therapeutic strategy aimed at improving survival and quality of life in metastatic FTC.

FTC patients typically have a good prognosis, but they may experience local recurrence, distant metastasis, or even death during the follow-up period [4]. Furthermore, several studies have

identified some clinical indicators as poor prognostic factors of FTC for long-term patient survival, which remains debatable, such as age, gender, tumor size, extra thyroidal extension (ETE), and so on [5-7]. Few studies evaluated these characteristics with the recommended surgical procedure. Thus, the risk factors of death in patients with FTC should be carefully considered and evaluated, particularly in patients undergoing preoperative evaluation.

Conclusion

This case illustrates a highly uncommon presentation of metastatic FTC in a young postpartum woman, emphasizing the need for high clinical suspicion in unexplained bone lesions. Early identification and comprehensive surgical management, supported by a coordinated multidisciplinary team, are vital for favourable outcomes. This report highlights the value of integrating Orthopedic, endocrine, and oncologic expertise in diagnosing and treating rare metastatic patterns of thyroid cancer. Long-term management with radioactive iodine therapy and continued surveillance remains essential for disease control and recurrence prevention.

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