

**Case Report**

Occult Follicular Thyroid Carcinoma presenting as Primary Breast Tumor with Sternal and Skull Metastasis

Fernando Candanedo-Gonzalez^{1*}, Alejandra Romero-Utrilla²,
Juan Fidel Osuna-Ramos², Carlos Alvarado-Sanchez¹, Leslie Camacho-Rebollar¹,
Vasty Jael Mendez-Perez¹, Candelaria Cordova-Uscanga¹, Luis Mora-Hernandez³

¹Department of Pathology, Oncology Hospital, National Medical Center Century XXI I.M.S.S. Mexico City, Mexico

²Faculty of Medicine, Autonomous University of Sinaloa, Culiacan, Sinaloa, Mexico

³Department of Radiology, Oncology Hospital, National Medical Center Century XXI. I.M.S.S. Mexico City, Mexico

Abstract

Introduction: Follicular thyroid carcinoma (FTC) that initially presented as breast tumor with no previous medical history of malignancy of thyroid gland is relatively rare and may cause diagnostic confusion.

Presentation of case: We report a 59-year-old Mexican woman with no prior history of malignant thyroid neoplasm that presents with pain and swelling in the upper outer quadrant of the left breast with a year of evolution. Subsequently, subcutaneous tumor was identified in left parietal region. Clinically it was thought in primary breast tumor metastasis to skull. Furthermore, computerized tomography scan identified a tumor in the deep portion of the left breast, infiltrating the sternum that subsequently was confirmed a follicular carcinoma of the thyroid gland.

Conclusion: Metastatic FTC may mimic a primary breast tumor. The combined use of clinical information, histopathology and immunohistochemistry were important to establishing a correct cancer diagnosis.

Keywords: follicular thyroid carcinoma; metastasis; mimic; primary breast tumor

Academic Editor: Xiaoning Peng, Hunan Normal University School of Medicine, China

Received: May 3, 2015; **Accepted:** July 9, 2015; **Published:** August 20, 2015

Competing Interests: The authors have declared that no competing interests exist.

Consent: Consent was taken from the patient for publication of this case report.

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***Correspondence to:** Fernando Candanedo-Gonzalez, Department of Pathology, Oncology Hospital, National Medical Center Century XXI, IMSS. Av. Cuauhtémoc #330, Mexico City, Mexico. **E-mail:** fa_candanedo@yahoo.com.mx

Introduction

Follicular thyroid carcinoma (FTC) accounts for about 10-15% of thyroid cancer, which occurs more commonly in women of over 50 years old. It is characterized by a slowly progressive course and a 10-year survival rate as high as 80–95% [1, 2]. In iodine-deficient areas, the relative rate of follicular carcinoma tends to be increased. The first manifestation of follicular carcinoma is usually a thyroid nodule and less frequently metastasis, which usually occur in advanced stages of the disease. Follicular carcinoma mainly spreads hematogenously. At the time of diagnosis, distant metastasis was found in more than 20% of cases, in particular metastasis to the lungs and bones [2]. The rare sites of distant metastasis are brain, skin, scalp, soft tissue, liver, and kidney [3-5]. Metastatic thyroid follicular carcinoma presenting as a primary breast tumor is especially rare. To our knowledge, in the English literature, few cases of follicular thyroid carcinoma with metastases to the breast have been reported [5, 6]. We report a case of a Mexican woman with metastatic follicular thyroid carcinoma to the breast that clinically mimicked a primary breast tumor.

Case Presentation

A 59 years-old woman with no history of malignant disease presented with pain and swelling in the left breast as the initial clinical manifestation of one year of evolution. Additionally, on physical examination a mass was palpated in the upper-outer quadrant of the left breast, fixed to the rib cage, without palpable axillary lymphadenopathy. A chest CT without contrast revealed a tumor in the deep plane of the left breast under the sternum of 6x5 cm and lymph node of 13 mm in left axilla (Figure 1A). Furthermore, a solid subcutaneous mass was identified in the left parietal region that measured 10x10 cm with high vascularity, which invaded the skull with fast growth (Figure 1B); clinically it was thought in breast tumor metastasis to skull. Two months later, was performed an incisional biopsy of sternum tumor that suggested the presence of a malignance of thyroid origin. In addition a head and neck TC was performed and was confirmed the presence of one nodular lesion in the left lobe of the thyroid gland greater than 2 cm, which grow in an expansive fashion with calcification (Figure 2). Laboratory findings showed serum thyroglobulin of 2,121 ng/mL (reference range, 0.10-78.00 ng/mL), triiodothyronine (T3) 149.70 ng/mL (80-200 ng/mL), thyroxine (T4) 7.53 µg/dL (5.10-12.80 µg/dL), free thyroxine 1.2 ng/dL (0.90-1.70 ng/dL), thyrotropin 1,230 uIU/mL (270-4,200 uIU/mL). Histologically, the tumor showed tumor encapsulated with follicular cell differentiation and showed ranging from small/medium-sized follicles containing colloid. Many cells showed altered nucleus/cytoplasm ratio, dense chromatin and generally conserved cytoplasm and lacking the diagnostic nuclear features of papillary thyroid carcinoma (Figure 3). Additionally, Immunohistochemistry was performed on 5-µm sections from a representative block using the avidin-biotin-peroxidase complex method. Appropriate negative and positive controls were also examined. The following antibodies were used: thyroglobulin (1:100; Dako, Glostrup, Denmark), thyroid transcription factor-1 (TTF-1, 1:50; Dako), calcitonin (1:40; Dako), carcinoembryonic antigen (1:50; Dako), cytokeratin 7 (1:75; Dako), cytokeratin 20 (1:25; Dako), chromogranin (1:200; Dako), and synaptophysin (1:75; Dako). Neoplastic cells were diffusely positive for thyroglobulin and focally positive for TTF-1 (Figure 4). They were negative for calcitonin, carcinoembryonic antigen, chromogranin, synaptophysin, cytokeratin 7, and cytokeratin 20. Conclusively, histological and immunohistochemical findings confirmed the presence of follicular carcinoma of the thyroid gland in IVB stage with sternum, skull, grilled rib and lumbar spine metastasis. The patient received radiotherapy for three months without response.

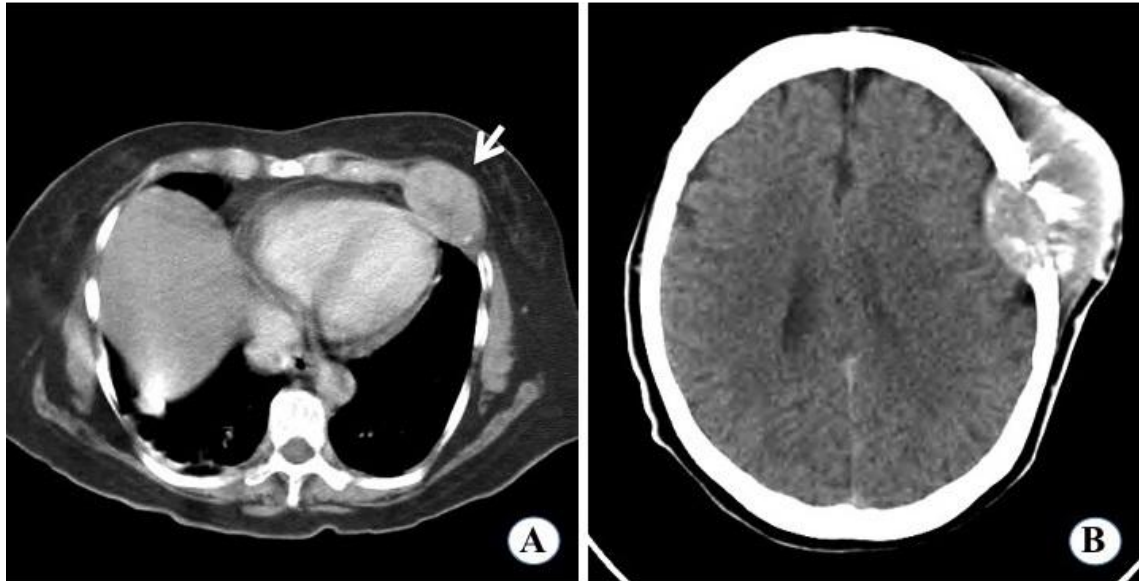


Figure 1 (A) Thoracic computerized tomography (CT) revealed a mass in the upper outer quadrant of the left breast (arrow). (B) Head and neck CT showed a subcutaneous solid mass in the left parietal region with high vascularity, which invaded the skull with fast growth.

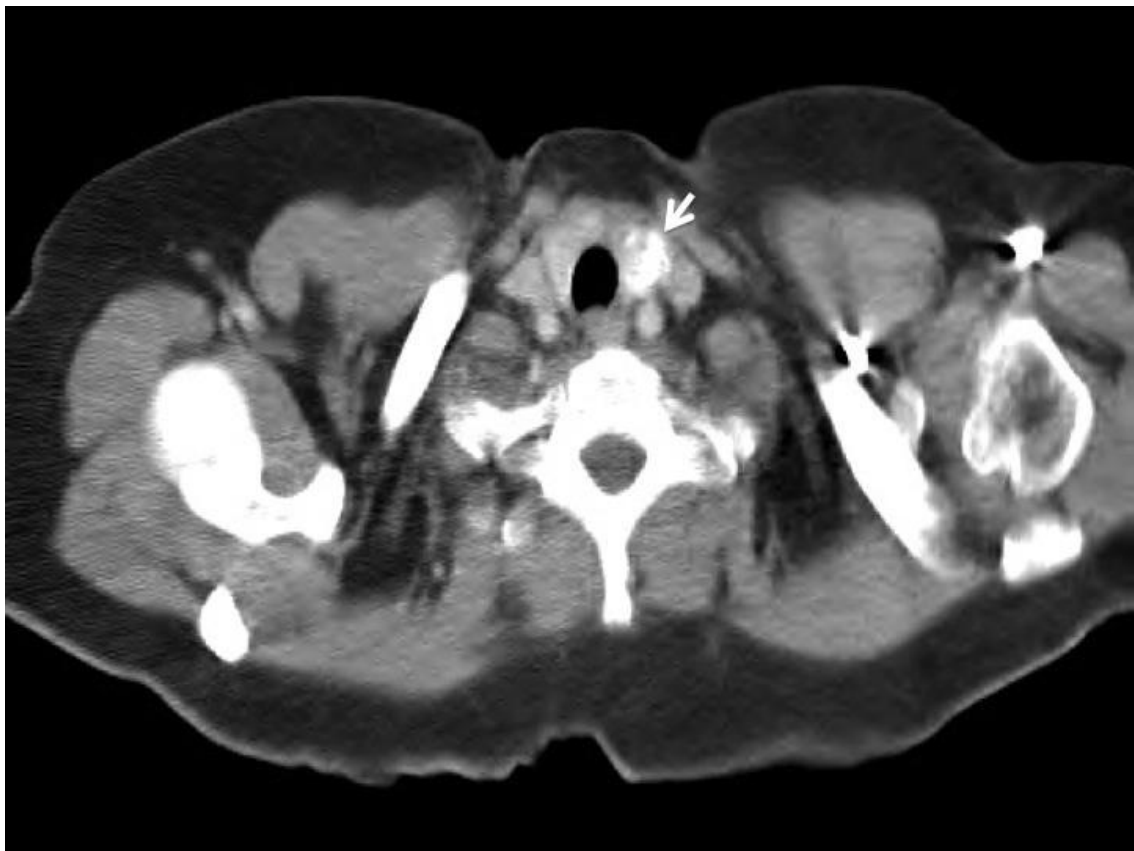


Figure 2 Head and neck computed tomography revealed a 2.8 cm × 2.3 cm mass on the left lobe thyroid gland (arrow).

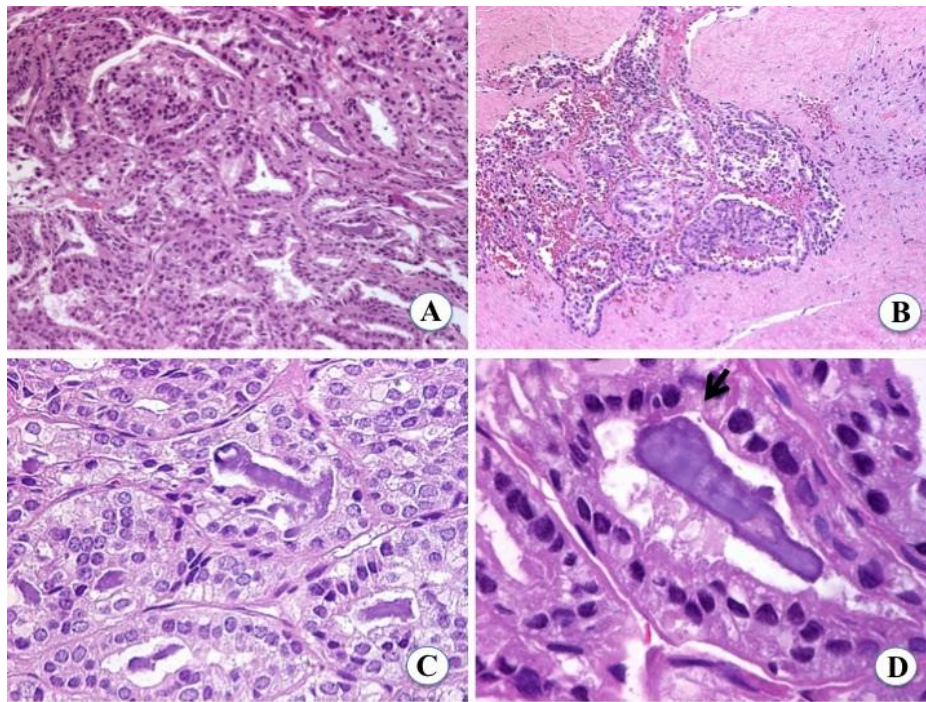


Figure 3 (A-B) Histological findings of the sternum tumor biopsy revealed a tumor encapsulated round with cells that were arranged in well differentiated follicular pattern with capsular and vascular invasion (H&E staining with original magnification x10). (C-D) Follicle cells with an altered nucleus/cytoplasm ratio, dense chromatin and generally conserved cytoplasm containing colloid. Colloid-like materials were found in the intrafollicular space (arrow; H&E staining with original magnification x40).

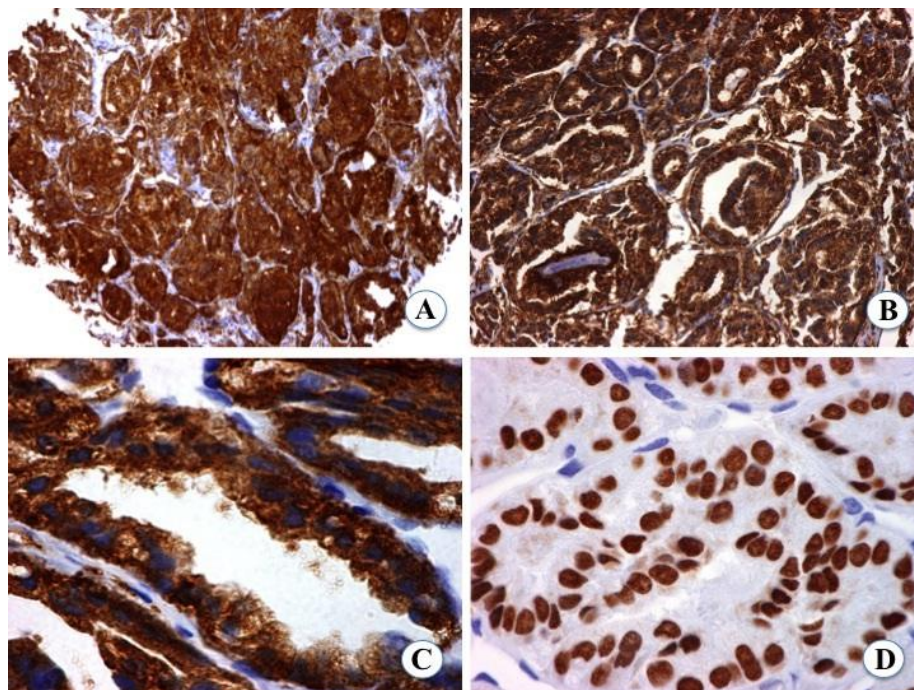


Figure 4 (A-C) Neoplastic cells were strongly positive for hyroglobulin (Immunohistochemical (IHC) staining with original magnification x10); (D) Also, Neoplastic cells were reactive for TTF-1 (IHC staining with original magnification x40).

Discussion

FTC accounts for about 10-15 percent of all thyroid cancers and most commonly present as asymptomatic intra-thyroidal mass lesion [1, 2]. The tumor tends to be encapsulated, spread by vascular invasion and usually remains localized to the thyroid gland. It shares with papillary carcinoma the same predilection for the women. At the time of diagnosis of FTC, over 20% of cases were found with distant metastasis, in particular metastasis to the lungs and bones [2]. Brain, skin, scalp, soft tissue, liver, and kidney are rare sites of metastasis of follicular thyroid carcinoma [3-5]. The incidence of skull metastasis of FTC is about 2.5 to 5.8% and in most reported cases, metastasis occurred after the diagnosis and treatment of primary tumor; but in few cases, skull metastasis was the first presentation of an occult FTC [2], like in our case. On the other hand, metastatic FTC presenting as mimicking primary breast tumor with sternal and skull metastasis is especially rare [3, 4]. Breast metastasis may be observed in patients with disseminated cancer or more rarely, is the first sign of an occult extra-mammary cancer [5]. However, in our case biopsy residual breast tissue not identified. The diagnosis of metastases to the sternum from extramammary malignancies, and distinction from primary mammary malignancy is important for patient management. The prognosis is generally poor in most patients have widely disseminated disease [6]. Most patients die within a year of diagnosis although longer survival is well recognized if there is effective systemic treatment [6]. Sternum and skin are unusual sites for thyroid metastasis [1]. About 10 cases of breast metastases of a thyroid carcinoma have been described, including, papillary carcinoma, Hürthle cell carcinoma, and medullary carcinoma. But, FTC is extremely rare [2, 7-10]. Moreover, approximately in 30% of patients, metastasis to the breast is the first sign of malignancy [11]. In our case, the patient was a 59-year-old woman with a rapidly growing painless mass involving the sternum that mimicked a primary tumor of the left breast with metastasis to left parietal region, subsequently was proved the presence of a follicular thyroid tumor in stage IVB by histopathological diagnosis and immunohistochemistry testing. There are site described here should alert the physician to include this in the differential diagnosis, especially in an elderly patient with a breast mass and a previous history of FTC. The most useful data in making the diagnosis of metastasis to the sternum are the clinical history and histopathological assessment of hematoxylin and eosin stained sections. If there is no previous history, immunohistochemical (IHC) analysis may be helpful in supporting origin from an extra-sternal site [11]. The microscopic appearance of FTC is extremely variable, ranging from well-formed follicles to predominantly solid growth pattern. The most important IHC markers of thyroid tumors are Tg and TTF-1 for follicular cells, and calcitonin, CEA, and chromogranin for C cells [12]. On the other hand, serum Tg is a sensitive marker for identifying thyroid carcinoma and can be quantified by clinical trials [13]. It is important to remember that no marker is 100% specific or sensitive. Thus, one should use panels of IHC antibodies and not rely too much on any individual result [11]. In our case, metastatic neoplastic cells were reactive for Tg, TTF-1, low molecular-weight-keratin, and EMA. Also, we found a serum thyroglobulin of 2,121 ng/mL, along with neck a tomography which confirmed the presence of FTC.

Conclusion

Occult FTC may mimicking clinically primary breast tumor and may lend diagnostic confusion both clinically and histopathologically. Unlike other previously reported cases, our case initially manifested as sternum tumor with no history of malignancy of thyroid gland.

Disclosure

The authors declare that they have no potential conflicts of interest which would warrant disclosure.

Acknowledgments

The authors thank Oscar Martinez Quirarte and Juan Diaz Morales for their assistance in immunohistochemistry analysis.

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