
A Rare Site of Osseous Metastasis in a Primary Thyroid Malignancy to the Mandible: A Case Report

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ABSTRACT

This is a case of a 65-year-old, female, Filipino, with a 34-year history of anterior neck mass. The history started when the patient noticed an anterior neck mass that progressively enlarges. There were no associated signs and symptoms of primary hypothyroidism as well as hyperthyroidism. Consults were done at multiple institutions wherein the patient was advised to undergo diagnostics tests such as thyroid function test and surgical procedures. However, the majority of them were not done due to the patient's hesitance. The patient opted for herbal medications and "hilot", at this point in time. Eventually, the patient agreed to be admitted and proceeded with the proposed intervention after a series of referrals to several specialists.

A Contrast Enhanced Computed Tomography scan was performed to evaluate the said mass as well as spread to distant organs. The patient subsequently agreed to have her thyroid removed and her mandibular mass to be biopsied. Histopathology confirmed that the mass on her mandible is a metastatic lesion from a known primary cancer of the thyroid.

This report aimed to document a rare case of a mandibular metastasis from a primary thyroid cancer in a 65-year old, Filipino, female presented with a right mandibular mass associated with an enlarging anterior neck mass and vertebral mass.

Key words: Metastatic lesion, hypothyroidism, hyperthyroidism, mandible

Metastatic involvement of the jaw is an uncommon clinical occurrence. When present, such metastases most frequently involve the mandible and originate from primary tumors of the breast, prostate, or kidney, disseminating via hematogenous routes. These lesions typically elicit a dysplastic response, characterized by osteogenesis and metaplastic transformation²⁵. Breast and thyroid cancers generally do not induce dysplastic alterations in their metastatic sites, but instead produce exclusively osteolytic lesions⁶.

These lesions are marked by the replacement of normal bone architecture with tissue that closely

mirrors the histopathological characteristics of the primary neoplasm. The most common primary malignancies that metastasize to the mandible include carcinomas of the breast, prostate, kidney, and thyroid. Bone metastases are identified in approximately 1–3% of well-differentiated thyroid carcinomas, with a greater prevalence noted in the follicular subtype^{26,27}. This case is of particular interest due to the rarity of osseous metastasis from primary thyroid carcinoma to the mandible, a site seldom reported in the literature. Distant metastasis from differentiated thyroid carcinomas most commonly affect the lungs and axial skeleton, with mandibular involvement being exceptionally rare. This unusual site of metastasis renders this case clinically significant. The present report contributes to the scarce body of literature on mandibular metastasis originating from thyroid malignancy and emphasizes the importance

of including metastatic disease in the differential diagnosis of jaw lesions, particularly in patients with a known history of thyroid cancer. Furthermore, it highlights the critical role of a multidisciplinary approach in diagnosing and managing atypical metastatic presentations.

THE CASE

A 65-year old female, Filipino, came in with a chief complaint of anterior neck mass. The history started 34 years prior to admission, wherein the patient noticed an approximately 2.5cm x 2.5cm, firm, nontender, non hyperemic, anterior neck mass that moves on deglutition. (Figure 1) There were no associated signs and symptoms such as difficulty of breathing, palpitations, hoarseness, odynophagia, dysphagia, weight loss or gain, tremors, limitation of range of motion of the neck and neck pain. Consult at a private institution was done wherein the patient was advised radiation, however, diagnosis was unrecalled. No medications taken nor work ups done to diagnose the patient's current condition. The patient then opted for observation of the mass due to the patient's pregnancy at this point.

During the interim, the patient noted slow increase in the size of the anterior neck mass associated with cold intolerance and occasional hoarseness. Consults were done at multiple institutions wherein the patient was advised to undergo diagnostic tests such as thyroid function test and surgical procedures such as total thyroidectomy, however, the majority of them were not done due to the patient's hesitance. The patient opted for herbal medications and "hilot".

Two years prior to consultation, due to the increasing severity of pelvic pain, and still with enlarging anterior neck mass, the patient consulted a physician where she was given pain medications to address the pelvic pain however only afforded temporary relief of pain. The patient also consulted another physician for a second opinion where a pelvic x-ray was done which revealed a mass on her lumbar spine and was then referred to an orthopedic specialist where further workups were done such as pelvic CT scan and MRI and was advised surgery. However, the patient refused the proposed procedure.

One year prior, the patient had an enlarging anterior neck mass and pelvic pain. The patient consulted the emergency room of a public institution wherein she was advised admission and surgery. During this time, the patient was referred to an ENT specialist, where a Fine Needle Aspiration Biopsy of the thyroid was performed, yielding benign results. The patient then underwent Open Biopsy with Total Laminectomy, L1 as well which yielded metastatic cancer to the bone. The patient was referred to oncology for possible chemotherapy and radiation treatment. This prompted the medical team to investigate the primary source of the cancer, leading to a second referral to an ENT specialist for another biopsy. Surgical intervention was recommended again, however, the patient refused.

Nine months prior, the patient consulted a Radiation Oncologist where metastatic work ups were done prior to radiotherapy. A mandibular, neck, chest and spinal mass was seen. Hence the patient was referred to an ENT Radiation Oncologist that led to referral to this institution for surgical intervention of the anterior neck mass.



Figure 1. 65 year old, Filipino, female with a firm, nontender, nonhyperemic, anterior neck mass that moves with deglutition and soft, nontender, nonhyperemic, fixed mandibular mass.

Six months prior, the patient first consulted the outpatient department of their institution where a repeat Head and Neck CT scan was performed, and a referral was made to the Head and Neck Oncology team.

One month prior, the patient then decided to proceed with the surgical procedure.

A repeat Contrast Enhanced Computed Tomography scan of the Neck and Chest was performed which yielded a 4.7cm x 2.4cm x 2.9cm in the right and 13.9cm x 7.6cm x 4.4cm in the left with associated mass effect resulting to leftward tracheal deviation and lateral deviation of the internal jugular vein and carotid arteries. As well as an expansile enhancing soft tissue attenuation focus in the right body of the mandible measuring 3.3cm x 5.0cm x

3.1cm. The aforementioned lesion crosses the midline of the mandible and still exhibits lytic change.

The patient subsequently underwent Total Thyroidectomy and Incision Biopsy of Mandibular Mass. Wherein an apron incision was done up to the subplatysmal layer with superior and inferior flaps were made. Structures were identified and dissected and eventually the right thyroid lobe was identified and noted to be enlarged. Important vessels were identified and ligated. The bilateral parathyroid glands and recurrent laryngeal nerves were identified and preserved. A Jackson-Pratt drain was placed as well as layered and skin closure was done.

A incision at the gingivobuccal area was done until the friable mandibular mass was identified and a tissue was taken for histopathology exam. Hemostasis

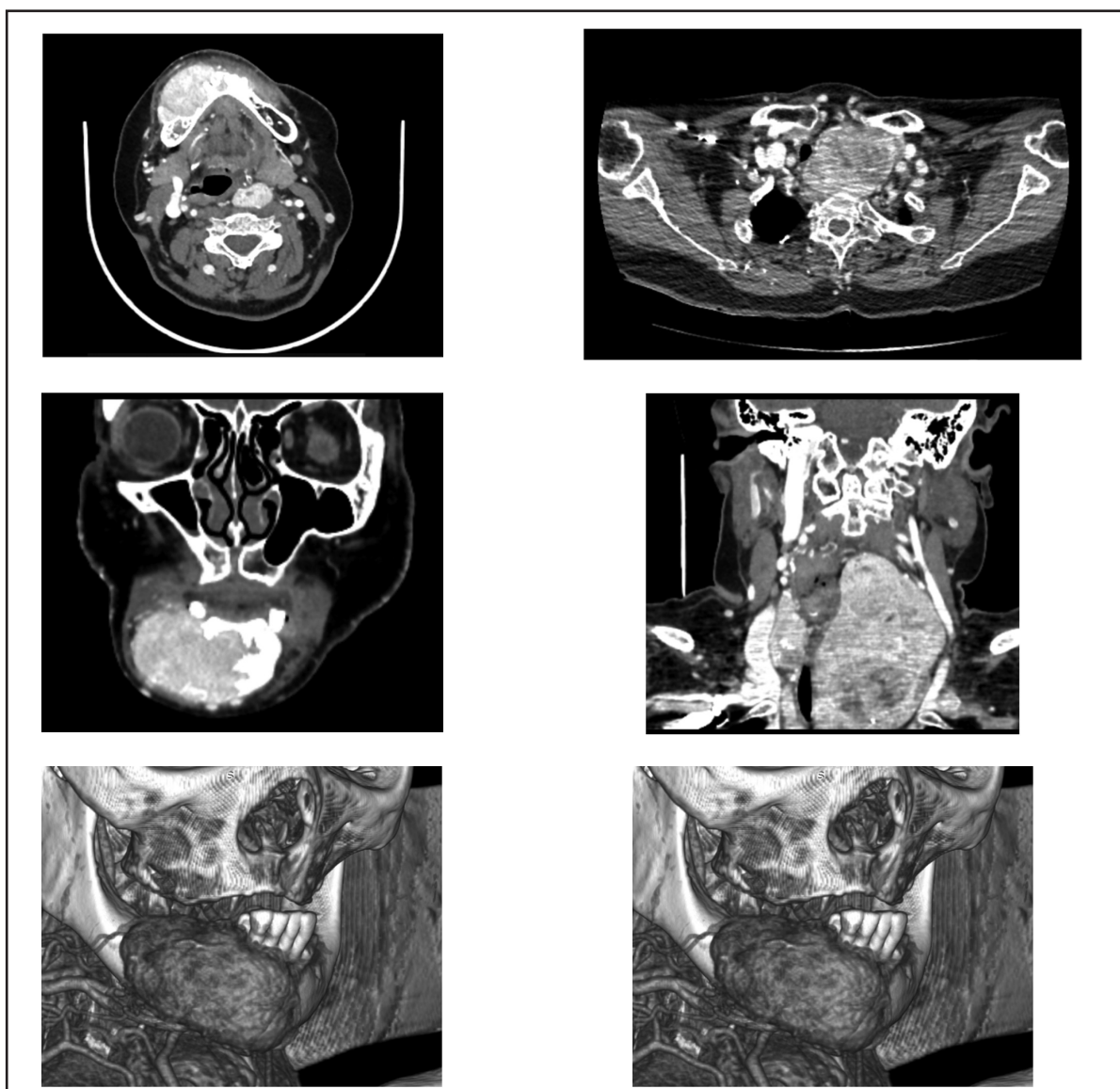


Figure 2. CT scan images of the anterior neck mass and mandibular mass [Axial view (top left and right), coronal view (middle left and right), 3D reconstruction of the mandibular mass (bottom left and right)]

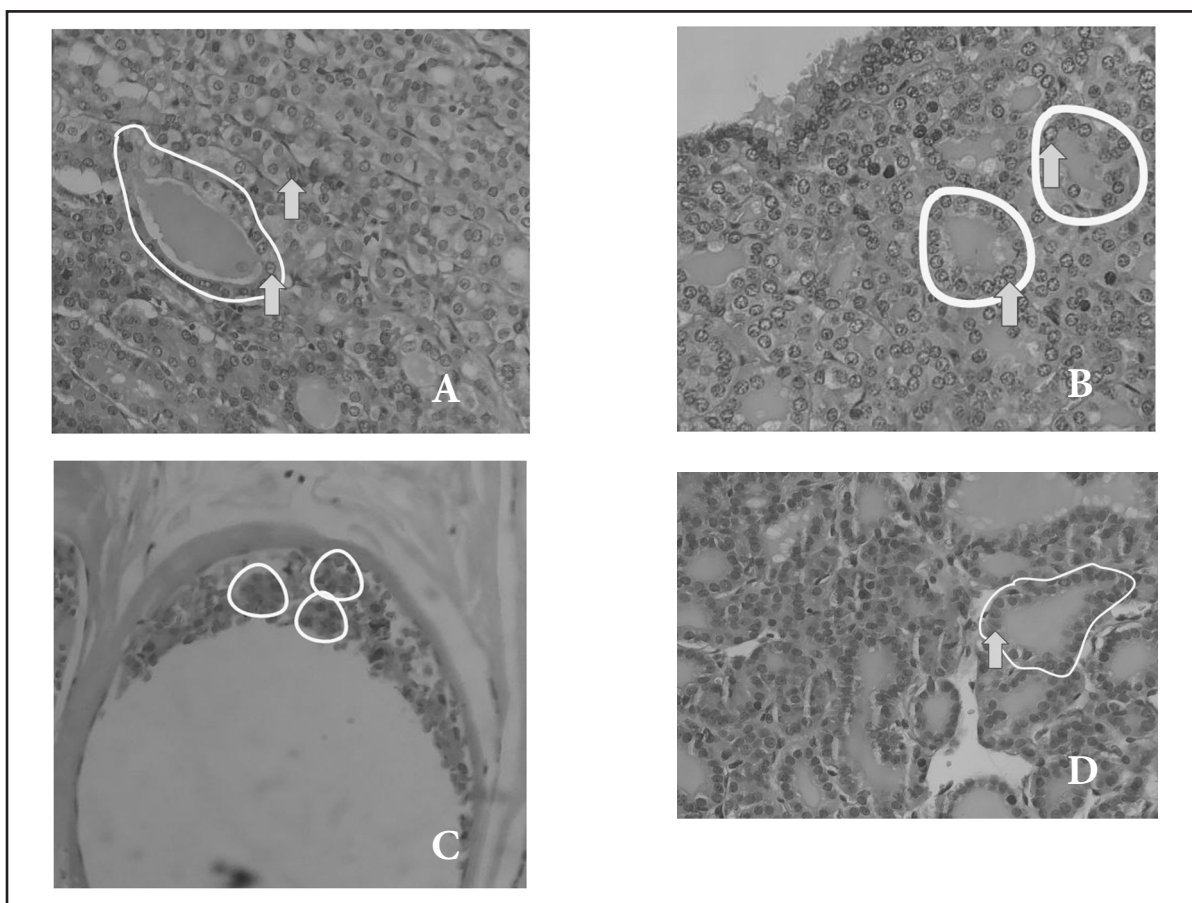


Figure 3. Histopathology slides: A - Right thyroid lobe (Circle: thyroid follicles with nuclear clearing; solid arrow: nuclear grooving) B - Substernal mass (Circle: thyroid follicles; solid arrow: nuclear clearing) C - Blood vessels showing presence of thyroid follicles (circle) D - Mandibular mass with thyroid follicles with nuclear clearing and grooving (circle)

and closure of layers was done. Stay at the recovery room was unremarkable with stable vital signs until cleared and wheeled back to the ward.

During the patient's stay at the ward, the ionized calcium was fluctuating hence serial assessment of ionized calcium and administration of calcium were done to normalize the calcium. Eventually, the patient's calcium stabilized and subsequently deemed fit for discharge. In addition, the patient also had episodes of loose bowel movement hence referrals were made in order to address the patient's condition, which was subsequently resolved.

Upon follow up, the patient complained of minimal post operative site pain and pelvic pain. There were no subjective complaints of hypocalcemia. Physical examination also revealed a well coapted post operative site with no hoarseness upon vocalization of the patient. Final histopathology results yielded a follicular variant of papillary thyroid carcinoma and the mandibular mass tested positive for tumor. Referrals were then made to the General Surgery service as well as to Nuclear Medicine for radioactive

iodine and Medical Oncology for chemotherapy and radiation therapy.

DISCUSSION

Metastatic lesions in the jaw are rare and often pose significant challenges for early diagnosis⁸. Beyond the prevalence of the primary malignancy, factors such as the tumor's biological behavior, degree of aggressiveness, and its tropism for specific oral sites may influence the likelihood of oral metastatic spread^{9,10}. These metastases are predominantly observed in older individuals⁸, consistent with the age of the patient in the present case, who was in her sixth decade of life. Although jaw metastases have been reported to occur more frequently in males, thyroid carcinoma metastases exhibit a marked female predominance⁸. The mandibular molar and premolar regions are the most commonly affected sites^{8,10} however, in this case, the metastasis was located in the anterior region of the mandible.

Metastasis on the mandible can present with a range of clinical signs and symptoms, including pain, swelling, tooth mobility, pathological fractures, and sensory disturbances such as paresthesia; however, in some instances, they may be clinically silent⁹. In the case reported, the patient had a subjective complaint of numb-chin syndrome. This syndrome, results from involvement of the mental nerve and is a recognized manifestation of mandibular metastasis²¹. There were reported cases that paresthesia was observed in 90% of such cases, suggesting that these symptoms may serve as important indicators of mandibular metastasis, particularly in the context of an undiagnosed primary tumor²¹. Oral metastases are often associated with widespread dissemination, particularly to the skeletal system^{9,11}, as was also observed in this patient with extensive skeletal involvement.

The majority of metastatic thyroid carcinomas reported in the oral cavity have been attributed to follicular thyroid carcinoma, while metastases from papillary thyroid carcinoma are considered to be very rare^{11,22,23}. Mandibular metastases have been documented from other thyroid cancer subtypes, including Hürthle cell carcinoma, poorly-differentiated carcinoma, and medullary carcinoma¹¹. Papillary thyroid carcinoma represents the most common histological variant of thyroid cancer; however, it has a low propensity for distant metastasis and predominantly spreads through lymphatic pathways^{9,11,21}. Clinically, PTC often manifests as a slow-growing, asymptomatic thyroid nodule that is frequently detected incidentally⁹. Distant metastases occur in approximately 7% to 23% of patients with thyroid carcinoma²¹.

The sternum, vertebrae, and pelvis represent the most frequently affected osseous sites for metastatic spread of thyroid carcinoma. Radiographically, metastatic lesions arising from papillary thyroid carcinoma or follicular thyroid carcinoma typically present as ill-defined radiolucent areas¹¹. The follicular variant of papillary thyroid carcinoma exhibits intermediate clinical and pathological features between those of papillary and follicular thyroid carcinomas. Microscopically, the follicular variant of papillary thyroid carcinoma is characterized by a follicular architectural pattern in conjunction with the distinctive nuclear features of PTC, such as ground-glass nuclei. In cases of papillary thyroid carcinoma, the presence of bone metastasis in the absence of cervical lymphadenopathy may raise suspicion for follicular variants of papillary thyroid carcinoma.

Nevertheless, in the case discussed, incisional biopsy specimens revealed a histopathological profile consistent with classical papillary thyroid carcinoma. Clinically, follicular thyroid carcinoma and follicular variants of papillary thyroid carcinoma lesions may mimic arteriovenous malformations due to their marked vascularity¹⁴.

Distant metastasis is a pivotal consideration in the management of the patient, while metastasis to the oral cavity represents a considerable therapeutic challenge for clinicians²⁴. The management approach generally spans from palliative care to various combinations of surgical intervention, radioactive iodine therapy, radiotherapy, and chemotherapy⁹. In the present case, the patient underwent total thyroidectomy with sternotomy with incision biopsy of the mandible, right. The 10-year survival rate for individuals with metastatic thyroid carcinomas is between 13% and 21%.²¹

Metastatic spread of primary thyroid carcinoma to the mandible represents an exceedingly rare clinical entity. Although osseous metastases from differentiated thyroid carcinomas (DTCs) occur in approximately 0.5% to 0.8% of cases, involvement of the mandible remains particularly uncommon. In a 2022 population-based study involving 69,992 patients newly diagnosed with thyroid cancer, bone metastases were identified at initial presentation in only 347 cases (0.5%), with follicular thyroid carcinoma (FTC) comprising the majority of these occurrences²⁸.

To date, there are no publicly available case reports or studies that specifically document mandibular metastasis of papillary thyroid carcinoma originating from our local setting. This highlights the rarity of such a presentation within the local context. However, a related case has been reported, involving osseous metastasis of papillary thyroid carcinoma to the temporal bone and vertebrae, manifesting as cranial nerve VII palsy and spinal cord compression. This underscores the potential for unusual metastatic patterns in PTC and reinforces the importance of maintaining a broad differential diagnosis when assessing jaw lesions in patients with a history of thyroid malignancy. The scarcity of such cases, particularly within the local context, emphasizes the importance of documenting and reporting similar instances. Such documentation would contribute valuable insights into the clinical presentation, diagnostic challenges, and management of rare metastatic patterns of thyroid carcinoma in the region.