

Incidental finding of papillary thyroid carcinoma on CT examination of mandibular lesion: Case report

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Abstract. The number of significant incidental findings identified on radiographic examinations has increased. In total, 169 patients, 87 males and 82 females, with a mean age of 67.3 years (range, 17-92 years), as well as 65 patients (38.5%), 43 (66.2%) female and 22 (33.8%) male had abnormal findings in the thyroid for one year in our institution. Thyroid nodules are the most common incidental findings on oral and maxillofacial evaluations. Computed tomography (CT) and magnetic resonance imaging (MRI) examination are frequently used to detect thyroid abnormality. The present study reported a case of papillary thyroid carcinoma (PTC) detected following CT and MRI examination of a mandibular lesion. The CT examination of the oral and maxillofacial region included the thyroid, which must be examined carefully to detect various diseases, including PTC. Collaboration between radiologists and clinicians is important to manage these incidental findings.

Introduction

Imaging technology is continuously improving, and advanced diagnostic imaging modalities such as high resolution ultrasonography (US), computed tomography (CT) and magnetic resonance imaging (MRI) can obtain images of wider areas over shorter times. Along with this technical advancement, the detection of unexpected lesions has increased (1). Such findings are referred to as 'incidental findings'. Incidental findings

include masses (often called 'incidentalomas') or anatomic malformations. Incidental thyroid nodular lesions are common and were first identified on CT (2-4).

The most common type of thyroid nodule lesions are benign while approximately 20% are malignant. Most of the malignant lesions in the thyroid are papillary thyroid carcinoma (PTC), followed by follicular, medullary, and anaplastic thyroid carcinoma (5). On CT or MRI, malignant nodules do not have specific imaging findings (6,7). PTC ≤1 cm is defined as papillary thyroid micro-carcinoma (PTMC), and it is the most prevalent type of papillary thyroid carcinoma. A diameter of 1 cm is regarded as the cut-off above which US examination is suggested for incidental thyroid nodule (1).

In the present study, we examined factors including frequency, size, age, and sex with regard to the incidental finding of thyroid nodules in patients presenting for oral and maxillofacial CT examination. Additionally, we conducted a retrospective review of patients without a history of thyroid disease who underwent CT examination in our institution between January 2009 and December 2009 for oral and maxillofacial pathology with incidental findings in the thyroid.

Case report

A 59-year-old man was referred from a private dental practice. He had undergone an extraction of first molar of right mandible for spontaneous pain. Following the extraction, the symptoms persisted, and he was referred to our university hospital. A panoramic radiograph showed a multiloculated radiolucency extending from the third molar area of the right mandible extending to the mandibular ramus. There was no root resorption of the second molar (Fig. 1). CT images demonstrated low density in the multiloculated area with lingual expansion. The interior of the lesion was of heterogeneous soft tissue density that did not undergo contrast enhancement (Fig. 2). MR images showed intermediate signal intensity (SI) on T1WI, high to markedly high SI on STIR and strong enhancement of the lesion's wall and weak enhancement inside the lesion

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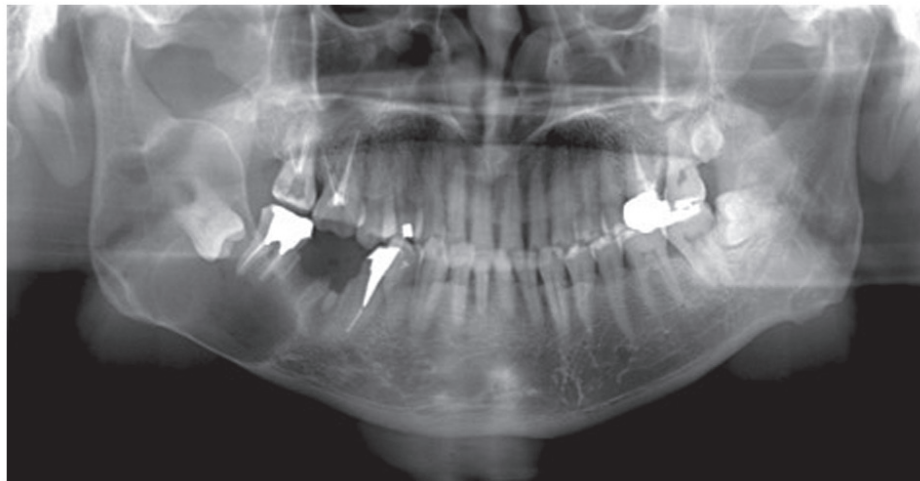


Figure 1. Panoramic image, multilocular lesion on right side area of mandible from first molar area extended to ramus mandible area and third molar was inside the lesion.

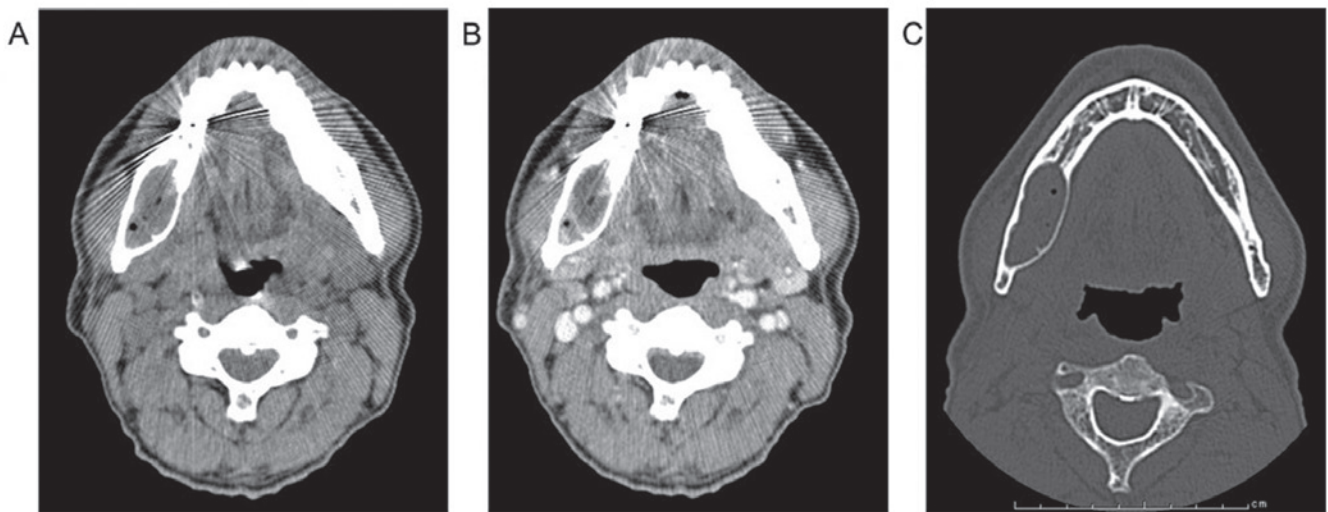


Figure 2. CT images of mandibular lesion. (A) Axial soft tissue CT images show multilocular lesion with clear boundary, low and several low concentration areas, which seems mixed with air, (B) axial contrast-enhancement demonstrated heterogeneous area inside the lesion, and (C) axial bone CT image showing bone was bulging on the lingual side.

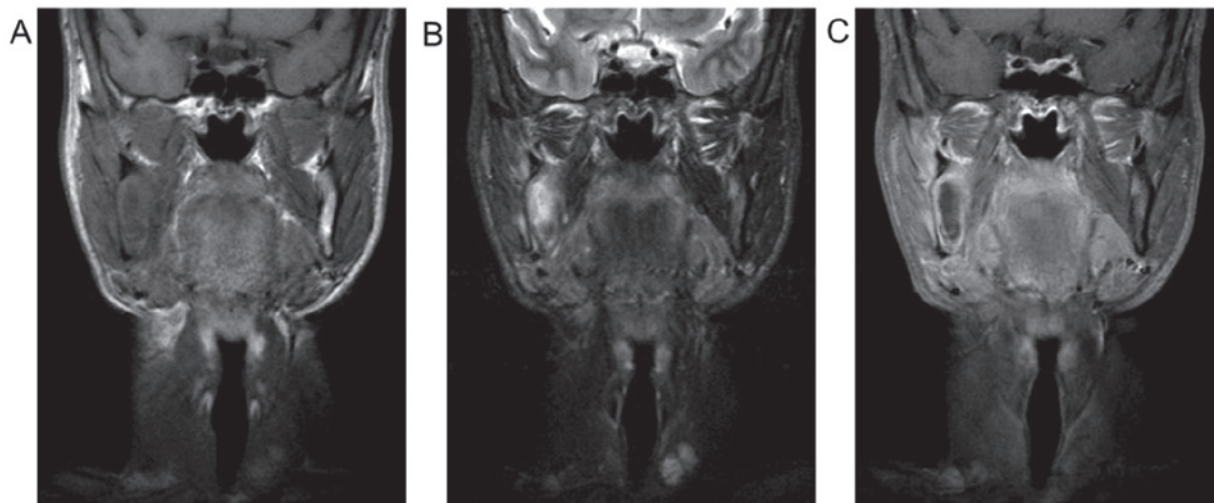


Figure 3. MR images of mandibular lesion. (A) T1WI, homogeneous low to slightly high SI. (B) STIR showed high to markedly high SI indicated cystic area inside the lesion. (C) CE-T1WI demonstrated tight strong enhancement of wall and weak enhancement inside the lesion.

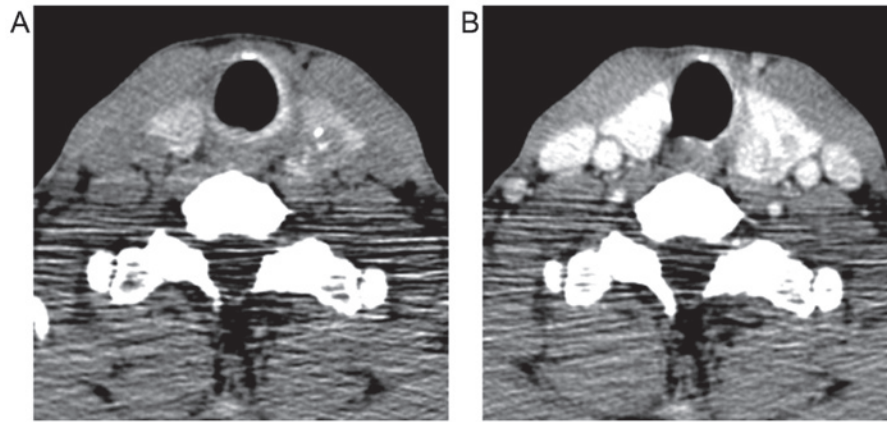


Figure 4. CT images on thyroid level. (A) Soft tissue CT image shows left lobe was enlarged. (B) CE-CT demonstrated lesion with calcification inside, lesion showed non-uniform low concentration with approximately 28 mm in diameter size.

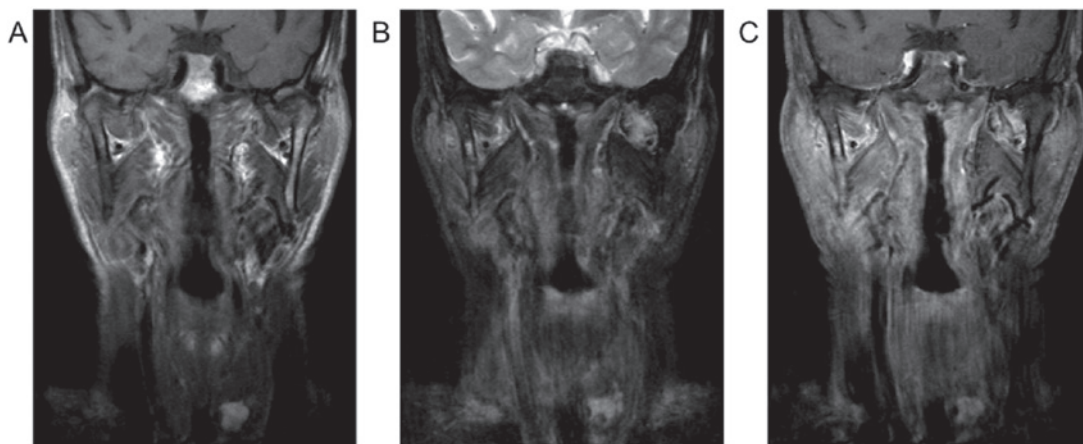


Figure 5. MR images of thyroid lesion. (A) T1WI image shows high signal intensity, (B) STIR image demonstrated high signal intensity, and (C) CE-T1WI shows strong enhancement.

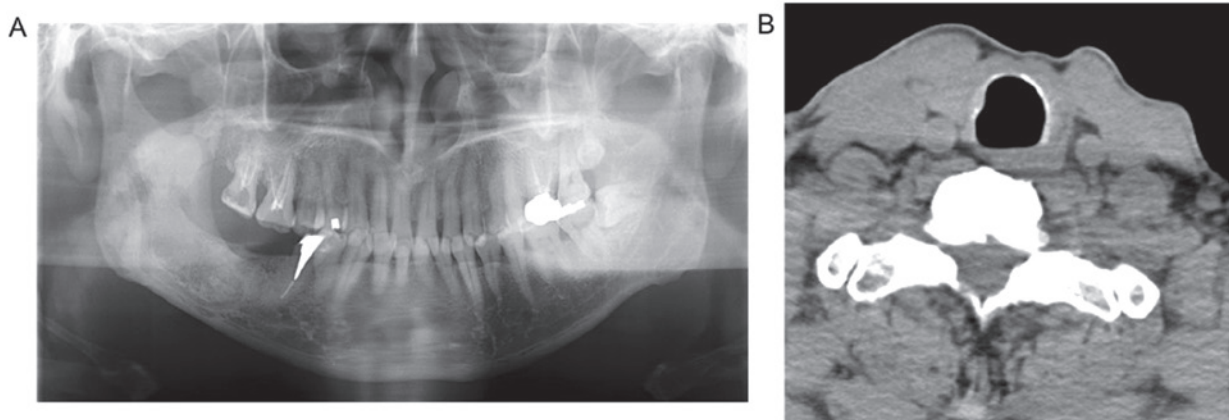


Figure 6. Follow up of patient. (A) Panoramic image shows no recurrence of the mandibular lesion and (B) CT image 10 years after total thyroidectomy shows no recurrence lesion on thyroid area.

(Fig. 3). Based on these findings, a preliminary diagnosis of keratocystic odontogenic tumor was made.

On the same CT images, the left lobe of the thyroid was enlarged by a 28-mm nodule containing calcifications. It showed non-uniform low density, and heterogeneous contrast

enhancement (Fig. 4). MR images demonstrated high SI on T1WI and STIR and strong enhancement on CE-T1WI (Fig. 5).

The patient was referred to the Department of Breast and Thyroid Surgery. Fine-needle aspiration biopsy (FNAB) of the

thyroid nodule suggested category V (suspicious for malignancy) based on the Bethesda System for reporting thyroid cytopathology. He was treated with a total thyroidectomy and bilateral neck dissection. The histological diagnosis of the surgical specimen was papillary thyroid carcinoma. A CT performed 3 months after surgery showed no evidence of recurrence (Fig. 6). After the patient's recovery from surgery, fenestration was performed on the right mandibular lesion. After 3 years, panoramic images showed no lesion recurrence in the mandible. Ten years post-thyroidectomy, the patient is well with no evidence of recurrence.

Retrospective review. In total, 169 patients, 87 males and 82 females, with a mean age of 67.3 years (range, 17-92 years), as well as 65 patients (38.5%), 43 (66.2%) female and 22 (33.8%) male had abnormal findings in the thyroid for one year.

Discussion

Use of advance radiology devices in oral and maxillofacial region such as US, CT, MRI and PET-CT could produce high quality examination of the maxillofacial region and contiguous structures and organs. Based on the increase of quality and usage of the devices, incidental findings in USG, CT and MRI examination are often found.

Incidental finding is an unexpected discovery rather than the initial purpose for which the radiographic examination was carried out. Incidental findings may be anatomy disorder or neoplasm, most of which are asymptomatic and insidious. In head and neck, the most common area of incidentaloma is thyroid (8). Thyroid nodules appear with nodular or rim calcification on CT images and may likely be malignant (3). However, unlike US which has adequate spatial resolution such as microcalcification or margin detail, CT and MR images have no indicators to differentiate between benign and malignant tumors (6,7). Both benign and malignant tumors demonstrated intermediate signal intensity on T1WI and high signal intensity on T2WI, even if in our case showed high signal intensity in T1WI and STIR. Additional investigations are required to determine malignancy such as US or FNA (7,9-11).

Papillary thyroid carcinoma is the most common malignant tumor in thyroid. Some risk factors of PTC are associated with ionizing radiation exposure, particularly head and neck or total body irradiation for bone marrow transplantation and family history of thyroid carcinoma (12). The PTC with less than 5 mm in diameter has almost no metastatic potential. On PTC case size and patient age are important for treatment consideration. Some study of PTC has grouping PTC based on size (2,7,10,11,13). PTC with <5 mm known as papillary thyroid microcarcinoma (PTMC), in elderly patients, progressivity of lesion was not evident during observation and immediate surgery was not needed (4,11,13).

As age is one of the considerations for PTC treatment, clinicians tend to focus on younger patients (7,10) as progression of the disease is more likely in younger patients compared to elderly patient (2,13). In addition, the ratio of malignant and benign was higher in younger patients, although age was not an independent predictor of PTMC (10,11,13).

Noguchi *et al* reported that thyroid PTMC prevalence was higher in women (11), similar with our retrospective

survey, which showed a predominance of cases in females, although some authors reported that sex was not an independent predictor of PTMC, as the high incidence of PTMC in women was due to more frequent exposure to diagnostic or treatment procedures (10). Radiologists have an important role to determine incidental finding and provide a complete report and to be aware about the potential of malignancy (4). Tanpitukponse *et al* reported only a small proportion of incidental finding of thyroid lesions from CT and MRI examinations that were referred from radiologists to clinicians, had undergone additional examination (14). Patient age and nodule size influenced clinicians to make decisions regarding additional examination (6,11,13-15). Hoang *et al* reported that 2 cm is the threshold size of CT and MR examinations for incidental finding of thyroid lesion (6). Other factors that should be considered include patient comorbid condition or financial condition. In addition, different perceptions between radiologists and clinicians towards incidental finding pose a potential problem. Therefore, collaboration between radiologists and clinicians is imperative in the incidental finding of thyroid lesion.

In summary, the wider usage of CT and MR devices on head neck examination increases the incidental finding of PTC. Treatment consideration and prognosis of incidental finding of PTC depend on nodule size and patient age. Collaboration between radiologists and clinicians is important in the incidental finding of PTC.

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