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Papillary carcinoma arising from the pyramidal lobe of the thyroid gland – Two case reports

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Running title: Pyramidal lobe papillary carcinomas of the thyroid gland

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Abstract

The pyramidal lobe (PL) displays variations and is rarely affected by carcinoma. This manuscript presents two such carcinomas.

**Case 1:** Painful mass in the neck, and swallowing difficulty. Echography showed hypoechoic mass, with Bethesda VI cytology. Total thyroidectomy was performed.

**Case 2:** Prominent mass in the neck for 25 years that enlarged. CT revealed a mass in PL. Total thyroidectomy with prophylactic central compartment was performed, followed by bilateral lymph node dissection.

Pathology revealed for the first patient two papillary tumors (pyramidal and right lobe) and for the second a papillary tumor with focal extrathyroidal extension (PL) and multiple papillary microcarcinomas. Central compartment had 3 and lateral 5 lymph nodes infiltrated.

Although PL is a non-constant anatomic formation, the oncologic principles followed should be the same as in classic thyroid surgery. The central position of PL may be the reason of bilateral lymph node positivity.

**Key words:** Pyramidal lobe; Papillary carcinoma; Rare thyroid carcinomas; Total thyroidectomy; Thyroid anatomic variations
Introduction

The thyroid gland consists of two lobes and the isthmus. At a variable rate there is an extra lobe, the pyramidal lobe, which is a prominent thyroid tissue and develops from the distal part of thyreoglossal duct and displays many anatomical variants [1]. Usually starts from the isthmus of the left lobe and rarely from the right and ends at the hyoid bone. The radical excision is mandatory, in those cases in which total thyroidectomy should be performed [1]. The implication of the pyramidal lobe in pathologies of the thyroid gland is mainly studied when the lobe is not excised. Concerning pathologies arising from the pyramidal lobe—especially tumors—only few cases exist in the literature [2].

The aim of the present manuscript is to describe two cases of pyramidal lobe carcinoma, present images of this particular clinical and imaging entity and discuss possible special considerations.

Cases Report

Case 1

A 43-year-old female patient was investigated as outpatient in the endocrine department as a mass (small nodule) located in the anterior cervical area. A year before, she presented with dyspnea, tachycardia, increased appetite and insomnia, and was diagnosed with hypothyroidism and multinodular goiter. She gradually developed difficulty swallowing and cervical pain. Ultrasound imaging during follow-up showed three hyperechoic nodules in the left lobe (of diameters of 0.65cm x 0.53cm x 0.43cm, 0.24 x 0.32cm, and 0.39cm x 0.51cm) and two in the right lobe (6 x 0.58cm x 0.68cm and 1.91cm x 1.11cm x 2.3cm). A painful hypoechoic submandibular mass of 1.04cm x 1.05cm in size was also revealed. The above-mentioned lesion had a FNA and the
presence of a papillary carcinoma was identified. Further imaging (CT) showed a 1.1cm in diameter round mass on the cervical middle line of the infrahyoid area, resembling to a thyroglossal duct cyst. After the admission, a cervical MRI was performed, and confirmed the presence of a 11mm x 10.5 mm x 10mm mass in the same location, with rather heterogeneous enrichment, a 25mm x 11mm x 17mm mass in the right lobe with the same characteristics and a small number of swollen cervical lymph nodes with a diameter of up to 12mm. After preoperative laboratory control and a vocal cord examination, a total thyroidectomy was performed (Figure 1). Her postoperative course was uneventful and she was discharged on a day surgery basis. Pathology revealed the development of two papillary tumors one of about 1.4 cm in diameter (pyramidal lobe) and one of 0.3 cm in diameter (right lobe). There was no evidence of lymph node metastasis in the 5 delphian lymph nodes included in the adjacent to the pyramidal lobe tissues.

**Case 2**

A 73-year old female patient had a prominent mass in the anterior cervical area during the last 25 year. During the last 3 months the mass started to enlarge rapidly leading her to as outpatient in the department of endocrine surgery. Her functional status was normal. On clinical examination the mass was firm and practically fixed on the anterior part of the trachea (Figure 2). The initial diagnosis was possible undifferentiated carcinoma of the pyramidal lobe. Neck CT revealed a mass of the pyramidal lobe without infiltration of the adjacent structures (Figure 3). No pathologically enlarged lymph nodes were present. After preoperative laboratory control and a vocal cord examination, a total thyroidectomy was performed (Figure 2). Despite the negative preoperative lymph node imaging due to the tumor size (5cm = T3) prophylactic central compartment lymph node dissection was performed. Her
postoperative course was uneventful and she was discharged on a day surgery basis. Pathology revealed the development of one major papillary tumor of 5 cm in diameter in the pyramidal lobe and multiple foci of papillary microcarcinomas one in the left lobe (0.7 cm) and four in the right lobe (0.2, 0.3, 0.3, 0.9 cm). The tumor of the pyramidal lobe had focal extrathyroideal extension. Central compartment consisted of 19 lymph nodes with 3 of them (the pretracheal group) infiltrated. Further bi-lateral lymph node dissection was performed giving 3 lymph nodes infiltrated on in the right compartment III and 2 on the left compartment II (Figure 2).

Discussion

Embryologically, thyroid gland is recognized by the 17th day of fetal life. It arises from a midline endodermal invagination of the foregut at the future foramen cecum and it descends to its normal location through the thyroglossal duct by the 7th to 8th week of the development. The thyroglossal duct disappears during the 9th to 10th week of the development. The pyramidal lobe, representing the lower part of thyroglossal duct, varies in shape and position as well as appearance and size. It may be attached to the thyroid cartilage by fibrous tissue. The percentage of occurrence of pyramidal lobe in the literature ranges from 12 to 80%, with a median value of 61% [3]. Information on the length of pyramidal lobe varies considerably, ranging from 3 to 63mm [3]. The origin of lateralization of the pyramidal lobe depends on the series, however its clinical importance is questionable since intraoperatively cautious dissection of this lobe is needed regardless its lateralization. The knowledge of the morphology of anatomical variations and frequencies is necessary in thyroid surgery, considering the fact that this normal component of thyroid gland can be a potential place of recurrent thyroid disease after total thyroidectomy or a primary localization.
of a solitary or multifocal disease [3]. Furthermore its removal is mandatory in case of differentiated thyroid cancer because that improves radio-iodine treatment, and it can increase the sensitivity of serum thyroglobulin.

Well differentiated thyroid carcinoma (WDTC) (papillary or follicular) is the most common thyroid malignancy and is characterized by multifocality and frequent regional lymph node metastases. Multifocality either occurs due to intra-glandular spread from a single primary focus or represents primary tumors in the thyroid gland. Malignant tumors arising from the pyramidal lobe are extremely rare. They have been reported only a few in the literature, with one case series (10 cases) [4]. In general, we acknowledge only 28 cases of WDTC (including ours), twenty seven of which being papillary (PTC) and one follicular. Most cases were present to female patients (26 cases) All surgeons with patients with PTC on pyramidal performed total thyroidectomy (26 from the beginning and 2 complementary after a lobectomy). Central compartment prophylactic dissection was mostly performed by surgeons. In all cases when lateral lymph nodes were positive then their presence was bilateral and bilateral lymph node dissection was performed. In the present cases, central compartment dissection was performed following ATA guidelines [5]. Our choice was confirmed by our findings: in case 1 no positive delphian lymph nodes were identified, while in case 2 three positive lymph nodes were identified and further bilateral lymph node dissection was performed. We believe that prophylactic central lymph node dissection in not necessary routinely in pyramidal lobe WDTC of T1 or T2, while for tumors of >T3 it is possible that when lymph node involvement is present a bilateral lymphadenectomy would be more appropriate.

Midline anterior neck masses differential diagnosis includes a wide variety of solid and cystic masses. It comprises thyroid nodules and tumors, thyroglossal duct and
cervical cysts, as well as bronchogenic cysts. Median cysts are usually remnants of thyroid gland descent along thyrolingual duct. All these structures are best explored with ultrasound which helps evaluating the nature of the mass. When ultrasound is combined with fine needle aspiration, it allows exact cytology and drainage/treatment of the cyst.

Well differentiated thyroid carcinomas seldom appear on the pyramidal lobe. Although a non-constant anatomic formation, the oncologic principles followed during tumor excision originating from pyramidal should be the same as those during classic thyroid surgery [6]. Prophylactic central lymph node compartment should be reserved to more than T3 tumors. However, when lymph node extension of the disease is present then lateral extension of lymph node positivity may be easier than carcinomas coming from the main gland. Moreover, the central position of the pyramidal may be the reason of lateral lymph node positivity to both sides of the neck.
Declarations

Ethics approval and consent to participate

Written informed consent was obtained from both patients and ethics approval was obtained by the hospital’s ethics committee.

Consent for publication

Written informed consent was obtained from both patients.

Availability of data and materials

The datasets during and/or analysed during the current study available from the

Competing interests

There are no financial and non-financial competing interests to be declared by any author.

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References


Figure Legends

**Figure 1.** A-B Intraoperative image of the thyroid with the pyramidal lobe, C. Thyroid specimen after excision, D-E Thyroid specimen after fixation

**Figure 2.** A Clinical appearance of the patient, B Thyroid specimen after excision, C Lymph nodes of the lateral compartments after excision

**Figure 3.** CT scan of the mass in the pyramidal lobe.