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CASE REPORT / ПРИКАЗ БОЛЕСНИКА

Ectopic thyroid nodes in the mediastinum – report of two cases

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SUMMARY

Introduction Ectopic thyroid is a rare anomaly characterized by presence of thyroid tissue outside its normal location, which could be the consequence of developmental abnormality, sequestration of thyroid nodes from nodal thyroid goiter or mechanical implantation of thyroid tissue after resection or trauma. Ectopic thyroid is commonly incidentally detected and causes differential diagnostic dilemma towards the neck and mediastinal tumors. The object of this report was to present two types of ectopic thyroid nodes located in the upper mediastinum, incidentally discovered by computed tomography (CT).

Outline of cases A hyperdense nodular lesion was found in the anterior upper mediastinum in a 42-year-old woman with adenocarcinoma of the esophagogastric junction in whom CT was performed due to staging purposes. Metastatic left supraclavicular lymph node was considered in the differential diagnosis. However, as the node was located in front of the neck fascia and just below the thyroid gland and showed similar density to thyroid tissue, the diagnosis of accessory thyroid gland was made, which was later confirmed by multiple repeated CT scans during the two-year follow-up period.

In a 52-year-old woman presenting with intermittent chest pain and cough, contrast-enhanced CT scan revealed nodal thyroid goiter and three nodes of similar CT texture, located in the upper mediastinum, below the thyroid gland. Accordingly, the diagnosis of parasitic mediastinal goiter thyroid nodes was made.

Conclusion Ectopic thyroid nodes are presented by CT as well-circumscribed nodes of the same density as the thyroid gland, typically located anteriorly in the upper mediastinum.

Keywords: thyroid gland; computed tomography; ectopic thyroid nodes; accessory thyroid gland

INTRODUCTION

Ectopic thyroid is a rare developmental disorder, characterized by the presence of thyroid tissue outside its normal location. Most commonly it is located along the way of descent of the thyroid gland, along the thyroglossal duct, from the base of the tongue to the infrahyoid part of the neck [1, 2]. However, thyroid tissue can rarely be found at certain distant sites [1–11]. Patients are mostly asymptomatic and ectopic thyroid is usually detected incidentally. As an increasing number of patients are undergoing ultrasonography (US), computed tomography (CT), and magnetic resonance imaging (MRI) examinations, these anomalies are being seen more frequently [12, 13]. This can cause serious diagnostic dilemma especially towards the lymph node metastasis from occult thyroid carcinoma or other malignant tumors [12, 13]. We report two cases of ectopic thyroid nodes located in the upper mediastinum, which were incidentally discovered on CT exams.

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CASE REPORTS

Case 1

The first patient was a 42-year-old woman with the adenocarcinoma of the esophagogastric junction, which was diagnosed by endoscopy. Preoperative contrast-enhanced CT scan of the neck, thorax, and abdomen was performed due to staging purposes and an oval well-circumscribed soft tissue mass 2 cm in diameter was detected, located at the upper mediastinum just below the left lobe of the thyroid gland and in front of the trachea. The lesion was hyperdense in comparison to neighboring skeletal muscles in both noncontrast and contrast-enhanced phase of CT, and isodense to the tissue of the thyroid gland (Figure 1a–c). It was not accessible for US visualization due to its deep location in the upper mediastinum. The patient underwent laparoscopic surgery for esophagogastric carcinoma. Four months later, the first postoperative CT scan was done and the lesion was same in size and shape. In the next two-year follow-up period, several additional CT examinations revealed that the lesion remained unchanged (Figure 1d). Accordingly, the diagnosis of accessory thyroid gland was clinically confirmed.

Case 2

The second patient was a 52-year-old woman presenting with intermittent chest pain and cough. She had a history of prolonged cough with expectoration of blood-stained mucus one year before when she underwent a CT

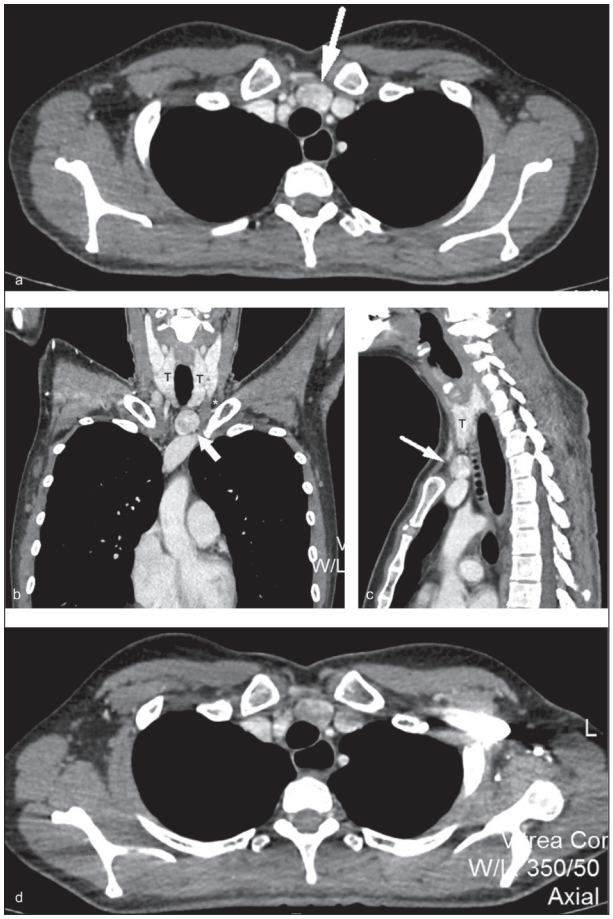


Figure 1. Ectopic thyroid node (arrow) on the axial section (a), coronal plane (T – thyroid gland, * – supraclavicular fossa) (b), sagittal plane (c), and follow-up computed tomography after two years (d)

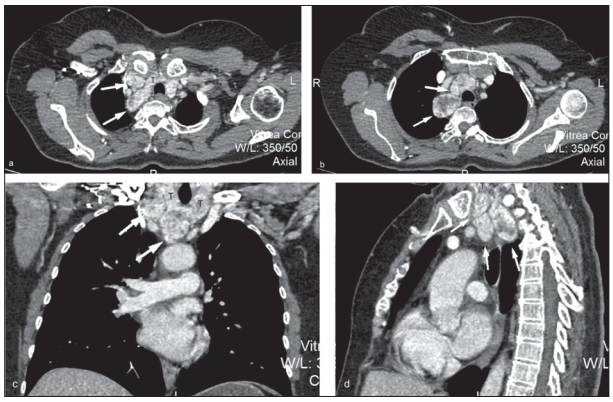


Figure 2. Three parasitic thyroid nodes (arrows) in the upper mediastinum below the nodular thyroid goiter (T) on the axial (a, b), coronal (c) and sagittal (d) sections of contrast-enhanced computed tomography

examination and right-sided mediastinal paratracheal lymphadenopathy was described by the radiologist. In actual contrast-enhanced CT scan, three well-circumscribed soft-tissue lesions of 3 cm, 4 cm, and 3 cm in diameter were detected in the upper mediastinum, below the thyroid gland and beside the right wall of the trachea (Figure 2a–d). The thyroid gland was enlarged with the hypodense node in the isthmus, which suggested the diagnosis of nodal thyroid goiter. Mediastinal nodes showed the same CT texture as the node in the isthmus of the thyroid gland. Laboratory findings revealed euthyroid hormonal state. To exclude metastatic thyroid malignancy, the patient was referred to scintigraphy. Scintigraphy with iodine-123 showed hyper uptake of radiotracer in the right lobe and isthmus of thyroid gland and no any uptake in the mediastinum. Accordingly, the diagnosis was nodular thyroid goiter with parasitic mediastinal goiter thyroid nodes. Surgical treatment (partial thyroidectomy and removing the parasitic mediastinal thyroid nodes) was planned but the operation was postponed due to the COVID-19 pandemic situation.

All procedures involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written consent to publish all shown material was obtained from the patient.

DISCUSSION

In the oncologic patient with the esophagogastric junction carcinoma, our diagnosis based on the repeated CT examinations was an accessory thyroid node located in the upper mediastinum. Differential diagnosis that we considered in this patient after initial CT exam was metastatic supraclavicular lymphadenopathy. It is well known that gastric cancer tends to metastasize in the left supraclavicular lymph node, i.e., Virchow's node. However, a key factor which influenced our conclusion was the exact site of the lesion. Metastatic Virchow's node is located deeper and more laterally in the left supraclavicular space (Figure 1a), while ectopic thyroid tissue is always in front of the neck fascia and just below the thyroid gland as was in our patient [1, 2]. Most importantly, the node showed similar density to the thyroid gland [13]. Multiple repeated CT scans during the two-year follow-up period supported our diagnosis.

In the second patient with respiratory symptoms, the presence of enlarged isthmus of the thyroid, extended retrosternally together with the multiple nodes of the same CT appearance located just below the thyroid and laterally in the mediastinum, suggested the diagnosis of parasitic goiter thyroid nodes associated with the nodal thyroid goiter [14].

Ectopic thyroid is a rare anomaly diagnosed in approximately 1 in 100,000–300,000 people, but more frequently found on autopsies, with higher prevalence in females [2]. Possible reasons of thyroid tissue being outside its normal location are developmental abnormality, sequestration of thyroid nodules from a multinodular thyroid goiter and mechanical implantation of thyroid tissue after resection or trauma of the thyroid gland [1, 2, 14, 15].

The most common cause of ectopic thyroid is embryological developmental abnormality [1, 2]. The thyroid gland is normally located in the anterior neck, just below the larynx and in front of the trachea (spanning from the second to the fourth tracheal ring). During development, the thyroid gland is formed from endodermal cells that

originate from the third branchial pouch in the floor of the primitive pharynx, at the base of the tongue (foramen cecum) [1, 2]. Throughout further development, the gland descends from the base of the tongue, reaching the midline of the neck to the hyoid bone, after which it loops inferiorly to the infrahyoid portion of the neck, inserting itself between the thyroid cartilage and thyroid membrane [1, 2]. During descend, there is a rare possibility that thyroid embryonic cells fail to migrate along their pathway, which forms the ectopic thyroid gland. The ectopic locations are usually from the foramen cecum at the base of the tongue to the anterior midline of the neck and all the way to the upper mediastinum, and the lingual thyroid is the most common location (found in 90% of all cases) [16]. Rarely, it can be found below the way of thyroid descent in the midline or laterally in the mediastinum like in cases which we presented or even below the diaphragm [3–11, 16, 17, 18]. Ectopic thyroid is often asymptomatic, but if there are symptoms, they would be a result of mass effect on adjacent structures, causing cough, dyspnea, or dysphagia [3, 16].

The thyroid gland, as well as the spleen, both being hypervascular organs, has a possibility of auto implantation of one or more focal deposits of splenic and thyroid tissue after surgery, known as splenosis and parasitic thyroid nodules, respectively [19]. A comparison can also be made between splenunculum and ectopic thyroid nodes, i.e., accessory spleen and accessory thyroid as these are small nodules of tissue, which are separated from the rest of the organ [19].

Radiological imaging modalities, such as US, CT, and MRI, have been deemed very useful for detection and evaluation of ectopic thyroid. Ectopic thyroid has approximately the same radiological characteristics on all imaging modalities as the orthotropic thyroid gland. It is usually oval and well-circumscribed. On US, the ectopic tissue of the thyroid gland is hyperechogenic. US as the most accessible and the safest radiological modality is mainly used for the detection of ectopic tissue in the neck, but is of limited diagnostic value in other locations [14]. The ectopic focuses of the thyroid gland are mostly incidentally detected on CT examinations, especially distant, extra cervical sites such as the abdomen or, as in our cases, the mediastinum. A non-contrast CT scan shows ectopic thyroid tissue as hyper dense compared to skeletal muscles, due to higher iodine concentration in the thyroid tissue [12, 13]. Contrast enhanced CT scan shows ectopic thyroid as homogeneously enhancing mass the same as thyroid gland [13]. MRI is also very useful in detecting ectopic thyroid, which is hyper intense in both T1w and in T2w sequences [13].

Scintigraphy, using Tc-99m, I-131, or I-123 could be a valuable diagnostic tool to detect ectopic thyroid tissue [3, 12]. However, the literature reveals that, as in our case, ectopic thyroid tissue does not have to show radionuclide uptake in the separated nodules [12].

Fine needle aspiration cytology is also a very useful diagnostic method in confirming the diagnosis of ectopic thyroid, with specificity of 95–97%, but only in cases where ectopic thyroid is suitable for biopsy [3]. However, in cases of mediastinal or other deep localizations, the ultimate diagnosis is most accurately made by histological analysis, after surgical removal of mass [14].

Differential diagnosis of ectopic thyroid depends on the location, but thyroid cancer metastases should always be excluded first, as they can manifest as ectopic thyroid tissue.

Since in both of our cases ectopic thyroid tissue was located in the upper mediastinum retrosternally, differential diagnosis primarily included metastatic lymph nodes from papillary thyroid carcinoma, followed by the germ cell tumors, neurogenic tumors, lymphomas, thymic and parathyroid tumors [13]. Germ cell tumors, of which teratoma is the most common one, consisting of different tissues, are mainly presented as large well-circumscribed heterogeneous mass, usually cystic (90% of all cases) of variable density [20]. In both our cases the mass was mainly hyperdense on CT exams, and had no cystic component. Neurogenic tumors are more common in the posterior mediastinum and are mostly hypodense on CT, compared to skeletal muscles [12]. Lymphoma usually consists of enlarged lymph nodes in several mediastinal lymph node groups. Thymic tumors – thymoma – are hypodense, with cystic component and calcification that can be seen in some patients [20]. Parathyroid tumors are relatively easy to differentiate from ectopic thyroid since they are located posteriorly to the thyroid gland and show reduced post-contrast enhancement compared to the normal thyroid gland in the arterial phase and greater washout than the thyroid tissue in the delayed phase [13].

The treatment of ectopic thyroid depends mainly on localization and local symptoms; however, the age and the overall condition of the patient should also be considered. In most cases, the patients are asymptomatic and no treatment is needed, only regular follow-up. Follow-up imaging is also recommended since ectopic thyroid has the same histological structure as normal thyroid and can be affected by the same pathological changes (Hashimoto thyroiditis, goiter, or carcinoma) [14, 21]. If the patient is symptomatic due to mass effect on the surrounding structures, surgery is the treatment of choice.

In summary, ectopic thyroid nodes are rare entities that mainly occur as a result of a developmental anomaly. Parasitic thyroid nodes are sequestrated from the multinodular thyroid goiter. They are most commonly present in the neck, but can be rarely found in the mediastinum, and then cause diagnostic dilemma towards a spectrum of mediastinal tumors. Patients are mostly asymptomatic and euthyroid, but symptoms related to node size and location may develop. CT scan, as a leading diagnostic tool, shows well-circumscribed nodes of the same density as the thyroid gland located anteriorly in the upper mediastinum. Even though this entity is a rare disorder, clinicians should take it into consideration in differential diagnosis to other mediastinal masses.

Conflict of interest: None declared.

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Ектопични тиреоидни нодуси у медијастинуму – приказ два случаја

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САЖЕТАК

Увод Ектопична штитна жлезда је ретка аномалија коју карактерише присуство ткива штитасте жлезде ван њеног нормалног положаја, што може да буде последица развојне аномалије, секвестрације тиреоидних нодуса код нодозне струме, или механичке имплантације ткива штитасте жлезде након њене ресекције или трауме. Обично се случајно открива и узрокује диференцијално-дијагностичку дилему према туморима врата и медијастинума. Предмет овог рада је приказ два типа ектопичних тиреоидних нодуса локализованих у горњем медијастинуму који су случајно откривени компјутеризованом томографијом (КТ).

Прикази болесника Код 42-годишње жене са аденокарциномом езофагогастричног споја, којој је урађен КТ преглед ради стадирања карцинома, нађена је хипердензна нодуларна лезија у предњем горњем медијастинуму. У диференцијалној дијагнози је разматран метастатски измењен леви супраклавикуларни лимфни нодус. Ипак, како је нодус био локализован испред вратне фасције и непосредно испод штитасте жлезде и био сличног дензитета као ткиво штитасте жлезде, постављена је дијагноза акцесорне штитасте жлезде, што је касније потврђено понављаним КТ прегледима током двогодишњег периода праћења.

Код 52-годишње жене са симптомима повременог бола у грудима и кашља, постконтрастним КТ прегледом откривени су нодална струма штитасте жлезде и три нодуса сличне КТ текстуре локализована у горњем медијастинуму, испод штитасте жлезде. Према томе, постављена је дијагноза медијастиналних тиреоидних нодуса секвестрираних од нодозне струме.

Закључак Ектопични тиреоидни нодуси се КТ прегледом приказују као јасно ограничени нодуси истог дензитета као штитаста жлезда, локализовани антериорно у горњем медијастинуму.

Кључне речи: штитаста жлезда; компјутеризована томографија; ектопични тиреоидни нодуси; акцесорна штитаста жлезда