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Case Study

A rare case of Subglottic Ectopic Thyroid Tissue Causing Upper Airway Obstruction: Detection by CECT and MRI Neck

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ABSTRACT

Internal obstruction of the upper airways can be due to infection, anaphylactic reaction, congenital anomaly, foreign body inhalation or mass. This case report is of a lady who presented with upper airway obstruction due to subglottic ectopic thyroid tissue. She had a history of noisy breathing and progressive neck swelling since childhood. Biochemical results showed hypothyroid features while flexible scope showed tracheal stenosis. Computed Tomography (CT) detected a goitre and a posterior laryngeal mass at subglottic region causing laryngeal stenosis. The MRI helped to better delineate the soft tissue details of this mass. while elective direct laryngoscope showed a firm mass arising from the trachea. Debulking of the mass was done and histopathological diagnosis was nodular thyroid hyperplasia. Treatment with L-thyroxine was instituted with good clinical improvement. An ectopic thyroid gland can develop if its normal migration is halted along this tract during embryogenesis. Subglottic location of ectopic thyroid is extremely rare. However, ectopic thyroid tissue in the larynx should be considered as a possible diagnosis causing upper airway obstruction, especially in a patient that is clinically hypothyroid and having a concurrent goitre.

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INTRODUCTION

Upper airway obstruction can be due to internal or external compression of the trachea. Internal obstruction can be a result of an infection, anaphylactic reaction, congenital anomaly, foreign body inhalation or mass. We report a case of a young lady who presented with upper airway obstruction due to subglottic ectopic thyroid tissue.

An 18-year-old lady with no known comorbid medical history, presented with difficulty in breathing. She had a history of noisy breathing and neck swelling, since childhood, which was progressively worsening. On examination, she had stable vital signs, normal nutritional status, and presence of an anterior neck mass which moved with swallowing and occasional stridor. She was however, not in acute respiratory distress. Thyroid function test confirmed she had hypothyroid condition. Flexible laryngeal scope showed tracheal stenosis. Elective tracheostomy insertion was performed for prophylactic airway protection. Contrast-enhanced Computed Tomography (CECT) of the neck showed the presence of enlarged thyroid gland and also a posterior laryngeal mass at the subglottic region causing laryngeal stenosis. Magnetic Resonance Imaging (MRI) delineated the well-defined subglottic mass and its location accurately. The MRI also demonstrated that the mass had a similar signal intensity to the normally placed thyroid gland; i.e. hyperintense signal on T1-weighted and T2-weighted images as well as avid enhancement in post-gadolinium images.

Elective direct laryngoscope showed a firm mass arising from within the trachea, having no evidence of invasion of the wall of the larynx and trachea. Debulking of the mass was done and histopathological diagnosis confirmed the lesion to have cells of nodular thyroid hyperplasia in origin. The patient was started on L-thyroxine and showed clinical improvement with progressive resolution of her stridor.

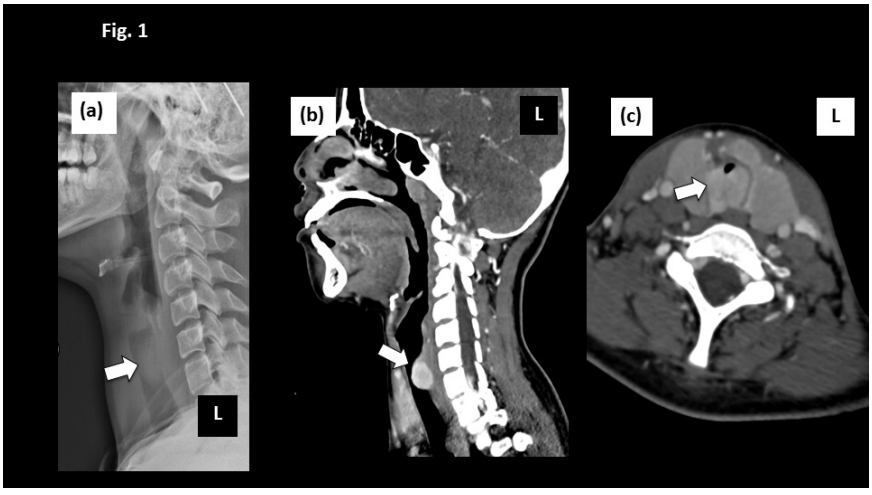

Figure 1: (a) Plain radiograph of the neck in lateral projection showed a lobulated soft tissue opacity within the larynx (white arrow). (b) CT scan of the neck in sagittal view showed a well-defined, enhanced subglottic lesion (white arrow) arising from the posterior laryngeal wall. (c) CT scan of the neck in axial view, showed a hypertrophied thyroid gland and homogenously enhancing, intra-laryngeal lesion (white arrow) causing almost total occlusion of the upper airway

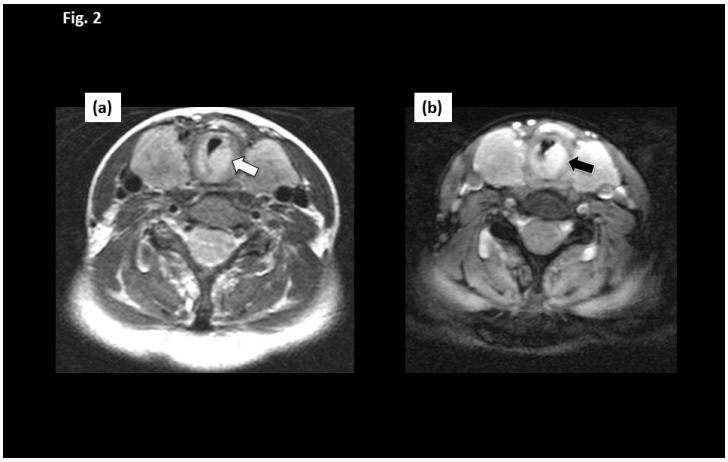

Figure 2: (a) MRI of the neck on T1-weighted images showed a well-defined intra-laryngeal hyperintense lesion (white arrow) causing occlusion of the airway. The native thyroid gland also appeared enlarged. (b) MRI of T1-weighted post gadolinium images showed avid enhancement of the intra-laryngeal lesion (black arrow) and also enhancement of the thyroid gland

DISCUSSION

The ectopic thyroid gland is an aberrant development of the gland during embryogenesis, whereby its migration is arrested somewhere along the tract of its normal migration from the floor of the primitive foregut to its final pre-tracheal position. The most frequent location of ectopic thyroid tissue is at the base of the tongue, accounting for about 90% of the reported cases (Noussios, Anagnostis, Goulis, Lappas, & Natsis, 2011). Subglottic ectopic thyroid tissue is an extremely rare abnormality that can cause airway obstruction (Sung, Lee, Han, & Cho, 2008). Only 14 well documented cases of subglottic ectopic thyroid tissue have been reported in the literature since 1966 until 2005 (Ramalingam, Ramalingam, Dhote, & Murthy, 2005).

Two theories may explain the origin of subglottic thyroid tissue. The first theory is that a foetal anomaly could occur when the thyroid is split by the developing trachea and its cartilage rings. The second is that thyroid tissue could rise into the tracheal lumen (Ammor et al., 2014). In CT scans performed without contrast material administration, the ectopic thyroid tissue demonstrates mildly increased attenuation (HU 70 ± 10); relative to adjacent muscle - a finding that is due to the intrinsic iodine content in the thyroid gland. On T1-weighted MRI images, ectopic thyroid tissue is typically isointense to mildly hyperintense compared with the musculature, and on T2-weighted MRI images, ectopic thyroid tissue is mildly hyperintense, with variable enhancement after administration of a gadolinium-based contrast agent (Zander & Smoker, 2014).

Different diagnoses for this type of mass lesion among others include metastasis from thyroid cancer, angioma, fibroma, lymphangioma, and thyroglossal duct cyst. By utilising MRI, we were able to demonstrate that the lesion was solid and not cystic in nature. The intrinsic signals of this lesion were also similar to the thyroid gland at the thyroid fossa, thus making the diagnosis of an ectopically located thyroid nodule more likely. Furthermore, MRI provided

excellent soft tissue details that aided in the planning of surgery. It also helped to exclude the presence of cervical lymphadenopathy, thus allaying fears of a more aggressive aetiology. Additional imaging techniques that could be utilised include Technetium 99m pertechnetate or Iodine-131 thyroid scintigraphy which can give functional information to differentiate an ectopic thyroid from other causes of midline neck masses. (Noussios et al, 2011). In certain instances, 18F-Fluorodeoxyglucose positron emission tomography/ computed tomography (18F-FDG PET/CT) was utilised to differentiate suspicious next masses especially involving patients with known primary cancers, although this method is non-specific for diagnosis of ectopic thyroid tissue and may mislead the clinician into making a diagnosis of a metastatic lesion as it can give abnormally elevated maximum standardised uptake value as high as 8.0 g/mL (Kim, 2013).

Our patient was clinically hypothyroid and therefore, developed a goitre as well as hyperplasia of an ectopically located thyroid tissue. This hormonal imbalance that leads to hyperplasia of the ectopic thyroid was the cause of the patient's progressive difficulty in breathing. Contrast-enhanced CT scan is a useful modality to investigate causes of difficulty in breathing as it can help to accurately detect upper airway, lung or mediastinal masses (Balakrishnan, Suppiah, Md Sidek & Noriah, 2015) as the causative factors.

A biopsy is required in order to confirm the diagnosis of ectopic thyroid; however, it can cause severe bleeding as the thyroid gland is a vascular organ (Dowling, Johnson & Collier, 1962). Therefore, non-invasive investigations such as CT scan and MRI play an essential role to determine the diagnosis. In this case, CT scan of the neck and laryngoscopic examination helped detect and characterise the mass at the subglottic region. The patient was operated upon and a reddish, firm and vascular but non-pulsatile mass, suspicious of thyroid tissue, was excised. This mass was confirmed to be of thyroid in origin by histopathological examination, which is the gold standard for diagnosis.

CONCLUSION

Subglottic ectopic thyroid tissue should be considered as a possible diagnosis causing upper airway obstruction, especially in a patient that is clinically hypothyroid and has a concurrent goitre. Congenital airway mass and malignancy could be some of the different diagnoses. The CT scan and MRI of the neck should be considered as investigations of choice to locate the mass, characterise it and delineate its extent.

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