Axial CT with contrast showing innominate artery anterior to the trachea at the level of the thyroid.

Anomalous Innominate Artery in Thyroidectomy: A Cautionary Tale

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Abstract

Introduction: High-riding innominate artery results from a persistent proximal segment of the fourth aortic arch causing the artery's superior translocation, reported as high as the second tracheal ring. We present a case of a high-riding innominate artery found during thyroidectomy at the first tracheal ring.

Methods: We report a case of a 71-year-old female with multiple left thyroid nodules who presented to the otolaryngology clinic following FNA results revealing oncocytic follicular neoplasm and elected to undergo left hemithyroidectomy due to question of malignancy. Pre-operatively, a high-riding innominate artery anterior to the thyroid gland was noted on CT imaging of the neck, previously obtained for unrelated reasons. During the case, the artery was found overlying the first tracheal ring displacing the right thyroid lobe posteriorly and laterally. The artery was retracted safely out of the surgical field allowing for successful left hemithyroidectomy.

Results: Final pathology showed Hurthle cell carcinoma with encapsulated Papillary carcinoma. Given this diagnosis, completion thyroidectomy was recommended but poses a higher risk due to the aberrant innominate artery's proximity to the remaining right thyroid lobe.

Conclusions: This case highlights the importance of considering aberrant innominate artery anatomy during thyroidectomy. Its proximity to the thyroid gland and position over the anterior tracheal wall poses risk of inadvertent arterial injury. Consideration of this abnormality is imperative in thyroid surgery and presents a challenge, and possibly a relative contraindication for other anterior neck surgery such as tracheotomy. With careful palpation, review of available imaging, and maintaining awareness of aberrant arteries, surgeons can better anticipate challenging anterior neck surgeries. This can reduce the risk of inadvertent, and possibly catastrophic intraoperative arterial injury.

Objectives

- Highlight aberrant anatomy that was identified during a thyroidectomy.
- Identify how an anomalous innominate artery impacted this patient and other surgeries in the neck.

Introduction

- High-riding innominate artery results from a persistence of a proximal segment of the fourth aortic arch causing the superior translocation of the artery.
- The artery has been reported to be seen as high as the second tracheal ring.
- We present a case of a high-riding innominate artery found during thyroidectomy to the level of the first tracheal ring.

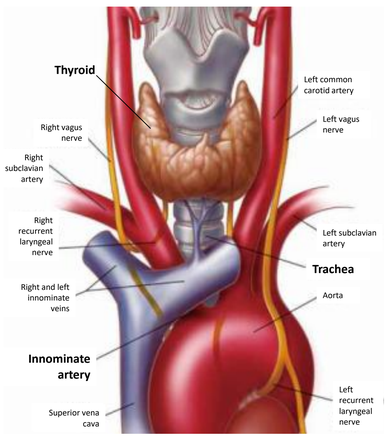

Figure 1: Schematic of normal innominate artery positioning.[1]

Case

- We report a case of a 71-year-old female with multiple left thyroid nodules who presented to the otolaryngology clinic.
- FNA results revealed oncocytic follicular neoplasm.
- The patient elected to undergo left hemithyroidectomy due to question of malignancy.
- Pre-operatively, a high-riding innominate artery anterior to the thyroid gland was noted on prior CT imaging of the neck, obtained for reasons unrelated to the thyroid management.
- During the case, the artery was found overlying the first tracheal ring displacing the right thyroid lobe posteriorly and laterally.
- The artery was identified and retracted safely out of the surgical field during the case.
- This allowed for successful left hemithyroidectomy.

Results

- Final pathology showed Hurthle Cell Carcinoma with encapsulated Papillary Carcinoma.
- Given this diagnosis, completion thyroidectomy was recommended and safely performed despite the risk of aberrant innominate artery injury given its proximity to the right thyroid lobe.

Figure 2a: Coronal CT with contrast demonstrating extension of innominate artery to the first tracheal ring.

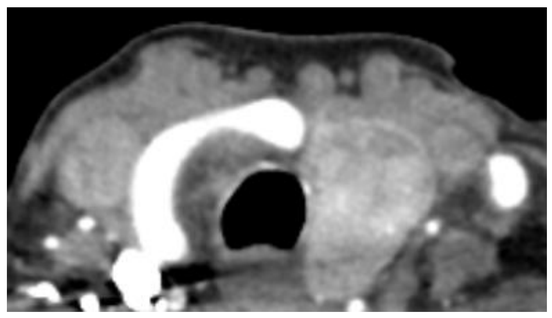

Figure 2b: CT with contrast axial view showing innominate well into the neck and anterior to the thyroid.

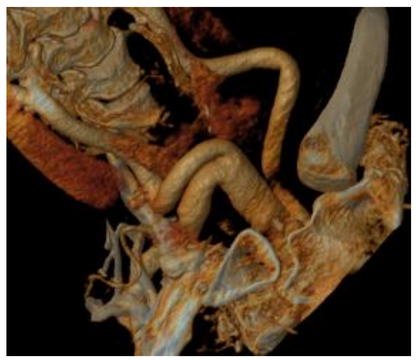

Figure 2c: 3D reconstruction showing the innominate artery crossing the trachea at the level of the thyroid.

Conclusions

- This case highlights the importance of recognizing aberrant innominate artery anatomy during thyroidectomy.
- Given the proximity to the thyroid isthmus and location directly over the trachea at the first tracheal ring, there was risk of inadvertent arterial injury.
- Consideration of this abnormality is imperative in thyroid surgery and presents a challenge, and in our patient's case, a relative contraindication for other anterior neck surgery such as tracheotomy.
- Tracheostomy placement near an aberrant innominate artery likely places a patient at higher risk of tracheoinnominate fistula formation.
- With careful palpation, review of available imaging, and awareness of possible aberrant arteries, surgeons can better anticipate and reduce risk of intraoperative arterial injury in challenging anterior neck surgeries.

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