



Case Report *Neuroradiology/Head and Neck Imaging*

Incidentally detected retropharyngeal cystic parathyroid adenoma in trauma imaging: A diagnostic challenge

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ABSTRACT

Computed tomography (CT) is often utilized for evaluation of patients presenting with traumatic injuries, and differentiating between traumatic and non-traumatic pathologies can be difficult, particularly for uncommon or atypically presenting disease. A 43-year-old male presented to the hospital as a restrained driver in a motor vehicle collision, and CT angiogram of the neck revealed a well-defined, mixed cystic and solid lesion, with enhancing components that were initially interpreted as a retropharyngeal hematoma with contained contrast extravasation. Serial laryngoscopes revealed stability of the lesion, and the mass was resected the following day without complication. Histopathology revealed this mass to be a cystic parathyroid adenoma. Diagnosis of a functional cystic parathyroid adenoma is difficult, and an atypical presentation like in our case is challenging to the radiologist when assessing trauma CTs. The typical findings of mixed solid and cystic component, intense enhancement of the solid component, and prominent inferior polar artery should increase suspicion for a cystic parathyroid adenoma. This case emphasizes the need for radiologists to maintain a broad differential diagnosis when reviewing trauma imaging, particularly in the head-and-neck region.

Keywords: Computed tomography, Cystic neck lesions, Cystic parathyroid adenoma, Head-and-neck imaging, Trauma

INTRODUCTION

Computed tomography (CT) is often utilized for the evaluation of patients presenting with traumatic injuries. While the aim of CT imaging is to rapidly detect life-threatening injuries, radiologists must also consider non-traumatic or incidental findings. Accurate detection of non-traumatic findings is important because it can improve long-term patient prognosis by detecting disease early that would otherwise go unnoticed until a more severe stage. Differentiating between traumatic and non-traumatic pathologies is difficult in certain cases, particularly when they present atypically. The authors present a case of an incidental finding with an atypical presentation, which raised concern in the setting of trauma.

CASE REPORT

A 43-year-old male presented to the hospital as a restrained driver in a motor vehicle collision. The patient endorsed right flank pain but was otherwise asymptomatic. Vital signs revealed

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tachycardia to 120 beats/min, and positive initial physical examination findings included right flank tenderness.

CT angiogram of the neck revealed a well-defined, mixed cystic and solid lesion, centered in the medial aspect of the right neck, extending across the midline to the left and measuring approximately $6.5 \times 5.8 \times 3.9$ cm in dimensions [Figure 1a-b]. The lesion caused local mass effect with lateral displacement of the right common carotid artery and right internal jugular vein, anterior displacement of the larynx and hypopharynx [Figure 1c], posterior displacement of the prevertebral muscles, medially abutted the left common carotid artery, and inferiorly caused anterolateral displacement of the superior right thyroid lobe and leftward deviation of the cervical esophagus. The solid component of the mass was located along the medial aspect of the cystic component and demonstrated intense enhancement with a prominent inferior polar artery [Figure 1b]. Interpretation of the CT angiogram was retropharyngeal hematoma with contained contrast extravasation.

The clinical team monitored the patient overnight and performed serial laryngoscopes, which revealed stability of the lesion. The patient underwent mass resection the following morning. Intraoperatively, no retropharyngeal hematoma was identified, and a large cystic mass was seen arising from the posterior aspect of the right thyroid lobe. The mass was resected without complication [Figure 2], and histopathology revealed a cystic parathyroid adenoma.

DISCUSSION

Accurate detection and evaluation of incidental findings on trauma CTs are important for the comprehensive care of patients.^[1] Central neck cysts are a relatively uncommon finding, particularly parathyroid cysts, which account for 1–5% of neck masses and only 0.5% of parathyroid gland pathology.^[2-5] Differential diagnoses for cystic neck lesions include dermoid cyst, thyroglossal duct cyst, second brachial cleft cyst, lymphatic malformation, arteriovenous malformation, abscess, and abnormal lymph nodes.^[6] Differentiating these lesions on imaging often relies on patient history, lesion location (e.g., thyroglossal duct cysts classically present midline), enhancement pattern, and intrinsic characteristics.

Typical incidental cystic parathyroid lesions are asymptomatic and contain clear colorless fluid with a high parathyroid hormone level. In approximately 10–30% of cases, cystic parathyroid lesions are functional and present with hyperparathyroidism.^[2,3,7-9] There are various causes to explain the development of parathyroid cysts, including degeneration or hemorrhage of a parathyroid adenoma,^[10] vestigial remnants of the Kursteiner canal,^[11,12] embryonic remnants of the branchial apparatus,^[7] retention of secretions in colloid vesicles or enlargement/coalescence of microcysts.^[13]

Cystic parathyroid adenomas are often larger than typical solid adenomas, predominantly non-secretory,^[14] often

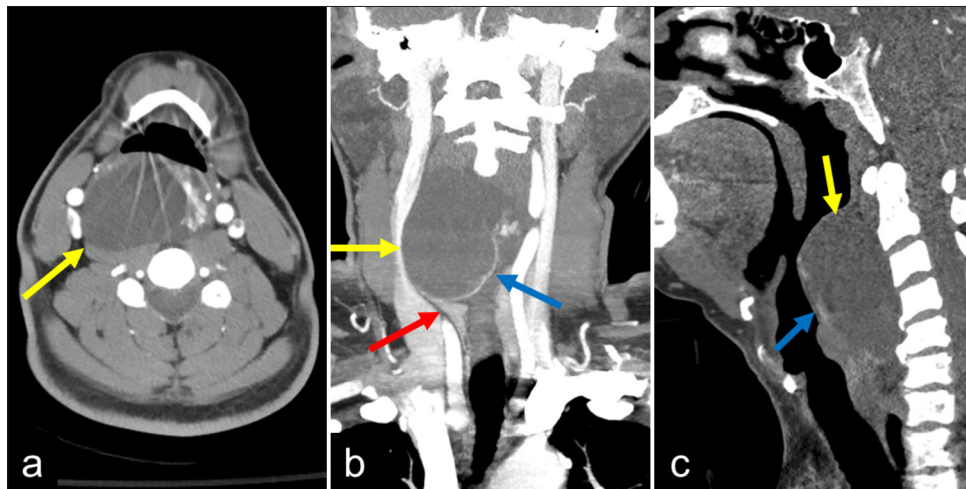


Figure 1: A 43-year-old male who presented to the hospital after a motor vehicle collision received a computed tomography angiogram of the neck. (a) Axial image demonstrated a mixed solid and cystic right neck mass (yellow arrow) which caused lateral displacement of the right common carotid artery and right internal jugular vein, anterior displacement of the larynx and hypopharynx, posterior displacement of the prevertebral muscles and cervical esophagus, and medially abutted the left common carotid artery. (b) Coronal reconstruction showed intense enhancement with a prominent inferior polar artery (blue arrow) of the neck mass (yellow arrow) which inferiorly displaced the superior right thyroid lobe (red arrow). (c) Sagittal reconstruction shows the cystic neck mass (yellow arrow) with a prominent inferior polar artery (blue arrow). This finding was initially thought to represent traumatic injury with possible retropharyngeal hematoma; however, histopathology later confirmed this lesion to be a cystic parathyroid adenoma.



Figure 2: A 43-year-old male who presented to the hospital after a motor vehicle collision. Resected retropharyngeal mass was a histopathologically confirmed cystic parathyroid adenoma.

asymptomatic and detected incidentally, as in our case, and rarely cause airway compression or severe hypercalcemia. Cystic parathyroid adenoma can be misdiagnosed as a parathyroid cyst, thyroid nodule, or other neck mass. These can sometimes be differentiated on imaging, such as if a characteristic polar vessel is identified in an adenoma; however, histopathology is often needed for diagnosis confirmation. Preoperative diagnosis is important to avoid intraoperative cyst rupture and subsequent parathyromatosis.^[15-17]

Histopathologically, parathyroid cysts demonstrate a thin layer of cuboidal or columnar epithelium that stains positively with glycogen, and the presence of parathyroid tissue in the cyst wall confirms the diagnosis.^[18] The distinction between cystic parathyroid adenoma and functional parathyroid cyst is made with the former containing a preponderance of chief cells and multilocular degenerative thick-walled cysts, and the latter consisting of unilocular thin-walled cyst.^[7]

Diagnostic workup for cystic parathyroid lesions includes US, technetium-99 sestamibi single photon emission CT (SPECT-CT) and 4-dimensional CT.^[9] On ultrasound, cystic parathyroid adenomas have thin-walled cystic features, mural nodular components, and presence of a polar feeding vessel.^[8,19] The solid component of the adenoma demonstrates increased activity on SPECT-CT whereas the cystic portion is hypoactive, decreasing the sensitivity of SPECT-CT^[20] as the radiotracer diffuses within the cystic component. Multiphasic CT may help distinguish the hypercellular solid component of the adenoma from the overall mass and may demonstrate a clear separation from the thyroid gland, which may be challenging on ultrasound.

CONCLUSION

Diagnosis of a functional cystic parathyroid adenoma is difficult, and an atypical presentation like in our case is challenging to the radiologist when assessing trauma CTs. The typical findings of mixed solid and cystic component, intense enhancement of the solid component, and prominent inferior polar artery increase suspicion for a cystic parathyroid adenoma; however, a broad differential diagnosis should always be considered. This case emphasizes the need for radiologists to maintain a broad differential diagnosis when reviewing trauma imaging, particularly in the head-and-neck region.

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