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Spontaneous Massive Extracapsular Hemorrhage in a Parathyroid Carcinoma

Running Head: A Case of Rapid-onset Spontaneous Neck Mass

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Parathyroid extracapsular hemorrhage is a serious, potentially fatal complication of parathyroid gland enlargement due to hyperplasia, adenoma or carcinoma.[1] The pathophysiological mechanisms behind non-traumatic bleeding probably stem from an imbalance between cell growth and blood supply, similar to apoplexy occurring in other endocrine neoplasia.[2] The patients present with ecchymoses, sudden onset of dysphagia, dyspnea or dysphonia, requiring urgent treatment.[3]

A 68-year-old white male patient was admitted to the otorhinolaryngology clinic after acute onset of dysphagia and dysphonia followed by a fast-growing neck mass measuring up to 8 centimeters in its cranio-caudal diameter in the projection of the left lobe and isthmus of the thyroid gland. Dyspnea was present only during physical strain. The symptoms started 12 hours prior to admission, with no apparent cause and no recent trauma in the patient's medical history. Nasal fiber-endoscopy showed a hematoma of the left hemilarynx and hypopharynx with paresis of the left vocal fold. (Figure 1A)

Laboratory findings showed hypercalcemia (3.97 mmol/L, normal range 2.02-2.32 mmol/L) corresponding to a hypercalemic crisis and increased serum parathyroid hormone (PTH) levels (412 pmol/L, normal range 10-65 pmol/L). Urgent ultrasonography (US) and computerized tomography (CT) showed a large neck mass (8x5x3 centimeters) located under the inferior part of left thyroid lobe, reaching the aortic arch inferiorly and causing tracheal deviation to the contralateral side. (Figure 2A) Single-photon emission computerized tomography (SPECT) and sestamibi scans were then performed. There was a focus of increased uptake in the expected location of the left inferior parathyroid gland. Fine-needle aspiration cytology (FNAC) was performed, and analysis showed abundant hemorrhagic content with PTH level exceeding 5000 pmol/L.

Surgical treatment was delayed in order to reduce serum calcium levels. The patient was treated with methylprednisolone sodium succinate intravenously (daily dose of 160 mg, tapering to 80 mg within 5 days), pamidronate and hydration until reduction of hypercalcemia below 3.00 mmol/L, as per current guidelines.[4] Dysphagia was reduced, enabling normal food intake, but dysphonia and strain-induced dyspnea remained present due to persistent left vocal fold paresis. Two weeks later, calcium blood level was 2.91 mmol/L and the patient was scheduled for surgery. A left-sided thyroid lobectomy and removal of an encapsulated node with extracapsular hemorrhage originating from the left inferior parathyroid gland was performed. Left laryngeal recurrent nerve compression was noted, but the nerve was preserved during surgery. Pathohistologic analysis revealed a parathyroid carcinoma with elevated mitotic count and aberrant mitoses, capsular and blood vessel invasion, desmoplastic stroma with fibrous bands, trabecular growth pattern, and thickening of the capsule.

Serum calcium level was stabilized, with an immediate postoperative level of 2.56 mmol/L and no further hypercalcemic symptoms. The patient continued to have normal serum calcium levels and no recurrence noted after clinical examination or neck ultrasonography 12 months after surgery. Dysphagia resolved completely after surgery, strain induced dyspnea was reduced, but the patient's vocal cord paralysis did not resolve following surgery, and the patient is currently under consideration for a left-sided medialization thyroplasty procedure.

After performing a literature search of PubMed and Google Scholar databases, thirty cases of spontaneous hemorrhage in parathyroid adenomas were identified, with only one previous report of spontaneous haemorrhage in a parathyroid carcinoma.[1,2,4,5,6] Our case report was assembled following CARE case report guidelines, with written informed consent obtained from the patient and the Institutional Review Board according to the Helsinki Declaration of 1983.

The most important element in this case report is the management of spontaneous extracapsular haemorrhage in a parathyroid carcinoma causing a rapidly growing neck mass and potential acute respiratory insufficiency. A thorough literature review shows that neck hematomas associated with parathyroid carcinomas have been extremely rare to date, and should be considered when the patient has dysphagia, cervical or thoraco-cervical ecchymoses and hypercalcemia.

When considering other possible causes of palpable neck masses with acute onset, as was the case in our patient, hypercalcemia and neck and/or chest ecchymosis are important clues, since a spontaneous rupture of a parathyroid carcinoma may be overlooked in patients who lack a prior diagnosis due to its rarity. Dysphagia, dysphonia and hoarseness alone may also be attributed to a dissecting aortic aneurysm, complications of medical procedures or thyroid malignancy.[3] The differential diagnosis of non-traumatic neck masses also involves thyroid lesions such as cysts or nodular goiter and acute or subacute thyroiditis. Ecchymotic or petechial changes on the overlying skin suggest internal compartment bleeding related to rupture of a carotid aneurysm that requires urgent surgical evaluation. The patient may also develop hypotension following massive intrathoracic bleeding or carotid compression. A parathyroid adenoma or carcinoma should be considered regardless of blood level calcium levels, although most, but not all parathyroid lesions draw clinical attention to the correct diagnosis due to overproduction of PTH.[1] Some parathyroid adenomas can be non-functional due to tissue necrosis or PTH secretion into the lumen of the cyst instead of the bloodstream.[2] When a hypercalemic crisis is also present, defined as rapid-onset, albumin-corrected serum calcium level > 3.5 mmol/L, intravenous fluid resuscitation and pharmacologic management are used to stabilize patients before expeditious parathyroidectomy.[3] An added difficulty is distinguishing between thyroid and parathyroid involvement, even with available CT and US findings. Neck hematomas associated with

parathyroid carcinomas are extremely rare, and should be considered when the patient has dysphagia, cervical or thoraco-cervical ecchymoses and hypercalcemia, alongside a firm parathyroid mass.[1,2,4,5,6]

This case presents a rare instance of spontaneous extracapsular haemorrhage in a parathyroid carcinoma causing a rapidly growing neck mass and potential acute respiratory insufficiency. Few surgical results have been published on similar cases, with almost all of them concerning parathyroid adenomas. There are no guidelines on treating malignant disease with an adjoining hemorrhagic complication.

The initial treatment if the patient is not threatened by respiratory insufficiency is conservative with delayed parathyroid surgical exploration, as was performed in our patient. Intraoperative rupture of a parathyroid carcinoma needs to be avoided as it may cause further dissemination of tumor cells and recurrence, with long-term follow-up advised in these patients.[2] The most effective treatment of this condition is surgical excision of the adenoma that includes the surrounding tissue several weeks following initial presentation.[4] This may be challenging, as the final diagnosis of parathyroid carcinoma is often established only several days after the initial surgery. Since histologic diagnosis relies on identification of unequivocal angioinvasion, preoperative fine-needle aspiration cytology and intraoperative frozen sections may not be sufficient to establish a diagnosis of carcinoma.[5]

Statement of Ethics

The authors have no ethical conflicts to disclose.

Data Availability Statement

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

Disclosure Statement

The authors have no conflicts of interest to declare.

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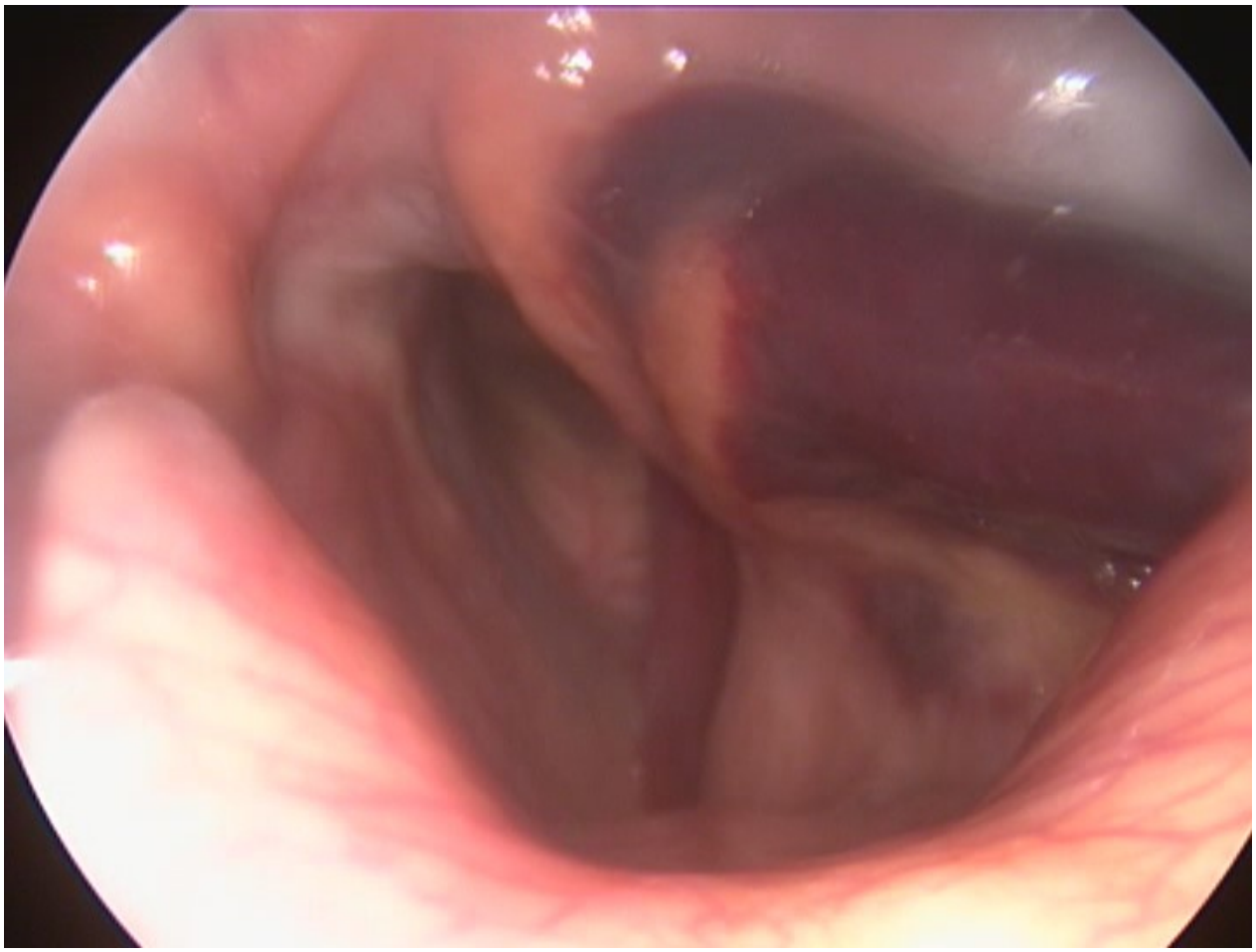
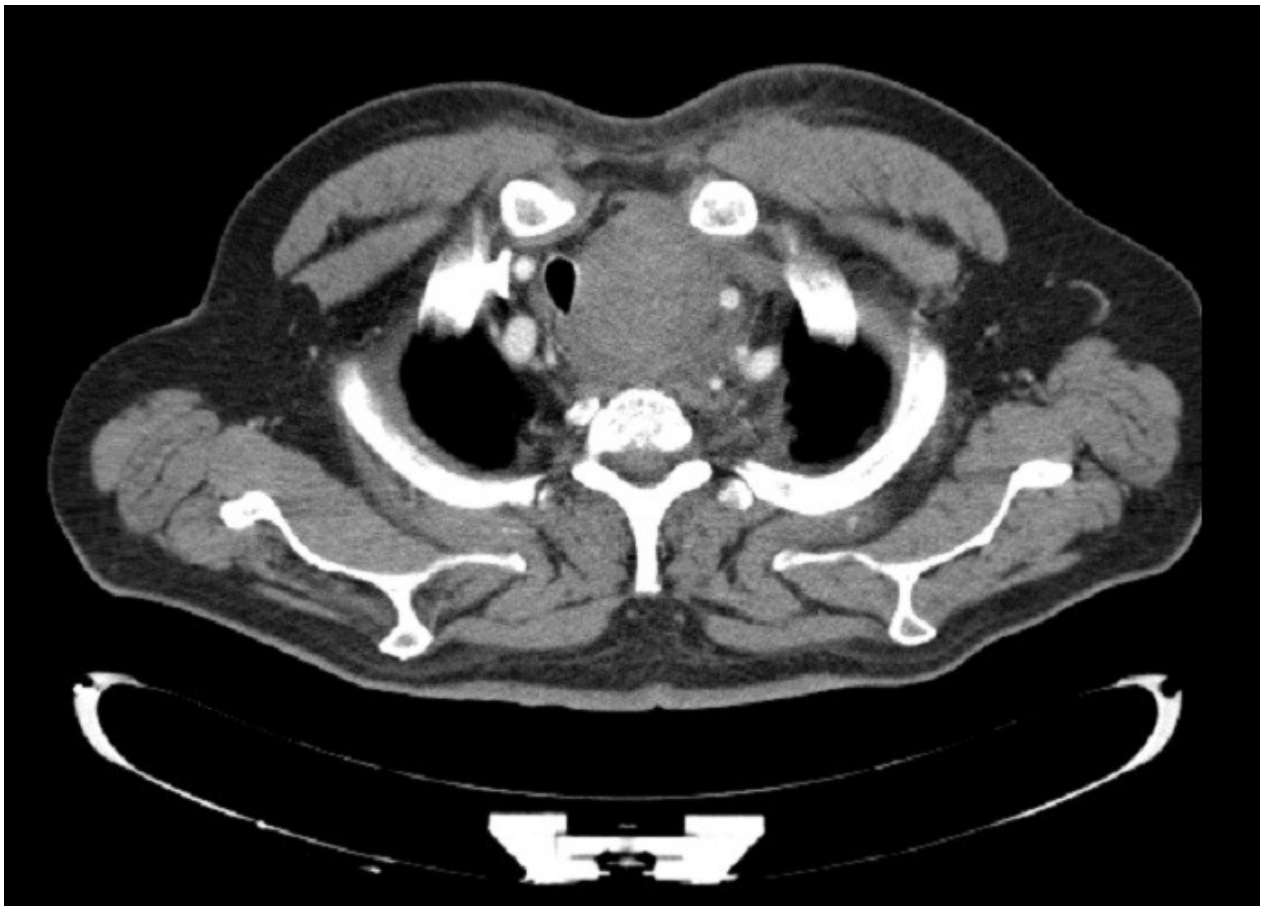
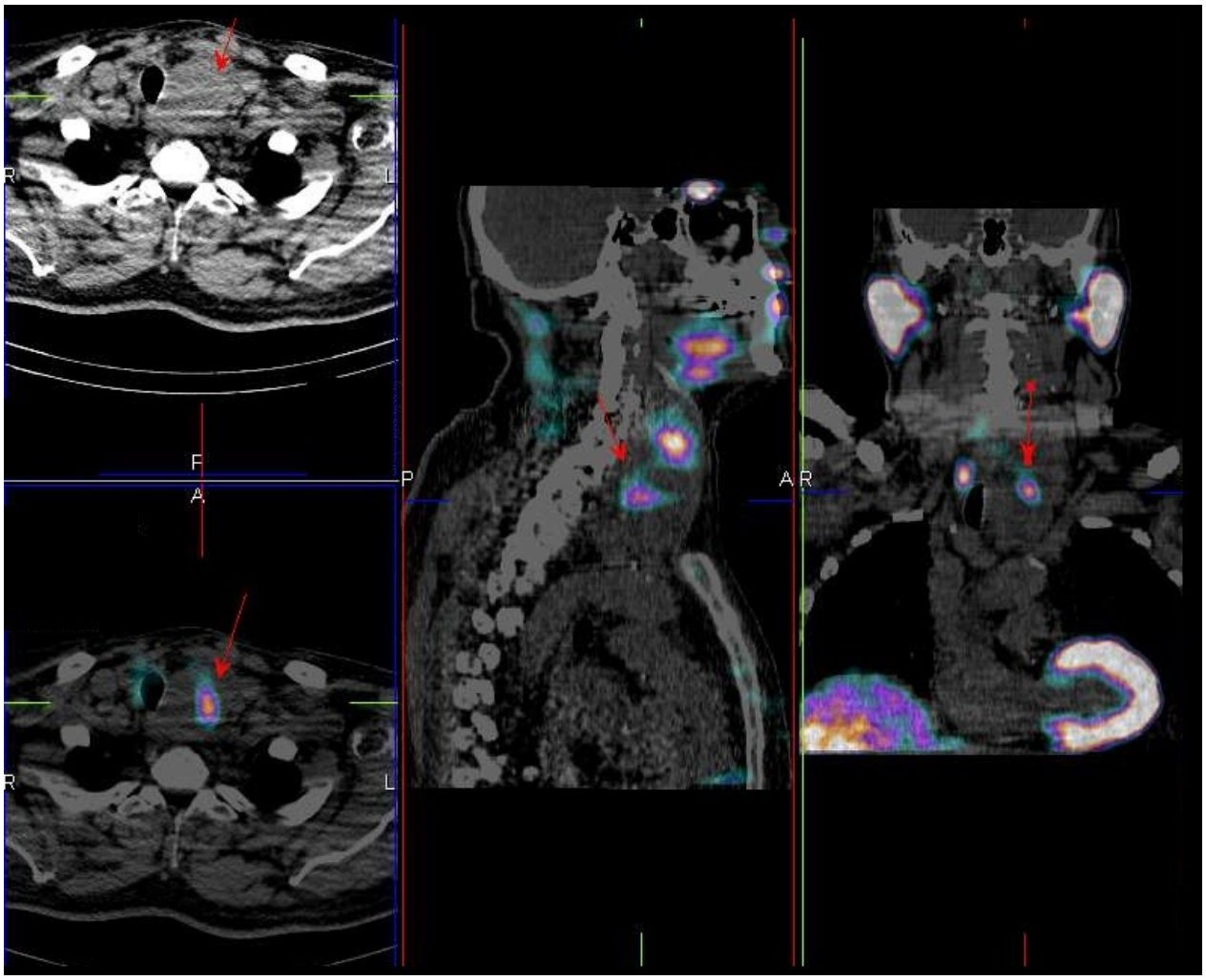
Figure Labels

Figure 1. A) Nasal fiberoptic laryngoscopy showed a hematoma of the left hemilarynx and hypopharynx with paresis of the left vocal fold causing dysphonia. B) Computed tomography scans showed an expansive mass in the left side of the neck, lateral to the larynx and the thyroid gland. Its density (45 HU) corresponds to a hematoma, compressing the larynx, trachea and the thyroid gland to the right, measuring up to 8.2 centimeters cranio-caudally and 5.5 centimeters in its transverse diameter.



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