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Mucoepidermoid carcinoma in a thyroglossal duct remnant

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ABSTRACT

INTRODUCTION: Thyroglossal duct cysts (TDC) are common midline neck swellings resulting from embryological remnants of the thyroglossal duct. They often contain ectopic thyroid tissue and malignant transformation has been reported, most commonly to papillary thyroid carcinoma. Mucoepidermoid carcinoma (MEC) usually occurs in the salivary glands and only rarely in the thyroid. This is the first case of a MEC occurring within a thyroglossal duct remnant.

PRESENTATION OF A CASE: A 73 year old lady presented with a thyroglossal duct cyst. She declined surgical excision, as she was adamant she wanted to avoid surgery. The neck mass rapidly enlarged at two years following initial diagnosis. Fine needle aspiration cytology was suspicious for carcinoma. She underwent total thyroidectomy and selective central compartment neck dissection with adjuvant radiotherapy. She remains alive and well two years post treatment.

DISCUSSION: Mucoepidermoid carcinoma is the most common malignant neoplasm of salivary glands, although it has rarely been reported in diverse locations including the thyroid, lung and pancreas. To the best of our knowledge, this is the first reported case of mucoepidermoid carcinoma arising from a thyroglossal duct remnant.

CONCLUSION: This case adds weight to the literature favouring surgical excision of thyroglossal duct remnants due to the risk of malignant transformation.

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1. Introduction

Thyroglossal duct cysts (TDC) are common midline neck swellings. Usually presenting in childhood, they can be also be found in up to 7% of the adult population [1]. They develop in rests of epithelium sequestered in migration during the formation and disappearance of the thyroglossal duct. Islands of epithelium may persist throughout life as ectopic thyroid tissue but often undergo cystic degeneration to form thyroglossal duct cysts [2]. The commonest site for such cysts is around the body of the hyoid bone. Malignant transformation occurs in 1% of TDC and is usually of the papillary carcinoma type [3]. There are two theories for how this occurs, either the tumour arises from the malignant transformation of ectopic thyroid tissue retained within the duct, or arises de-novo from cells lining the duct [4]. Mucoepidermoid carcinomas are best characterised in salivary glands, rarely occurring in other glandular tissue including lung, lacrimal glands, and thyroid. Of the 40 cases of thyroid MEC in the literature to date the majority are low

grade variants, for example, thyroid sclerosing mucoepidermoid carcinoma with stromal eosinophilia. High-grade mucoepidermoid carcinomas are found even less frequently in the thyroid gland. This is the first reported case of a mucoepidermoid carcinoma occurring within a thyroglossal duct cyst.

2. Case report

A 73-year-old lady of Bangladeshi origin initially presented to the endocrine surgeons with a two-year history of a gradually enlarging midline neck lump, which moved on tongue protrusion. There was no lymphadenopathy or abnormality within the thyroid gland itself, and thyroid function tests were normal. Additionally there were no suspicious clinical features; she was a non-smoker, with no history of alcohol consumption. Clinically, the neck lump was felt to be an uncomplicated thyroglossal duct cyst. Ultrasound scan showed a cystic lesion of 27 mm in maximal dimension, superior to and separate from the thyroid gland (Fig. 1), whilst fine needle aspiration cytology (FNAC), revealed features consistent with a thyroglossal duct cyst.

Surgical excision was recommended but the patient declined. She agreed to regular follow-up. The neck mass gradually enlarged over the course of 12 months, but the patient still declined surgery. Two years following her initial presentation, the neck mass rapidly

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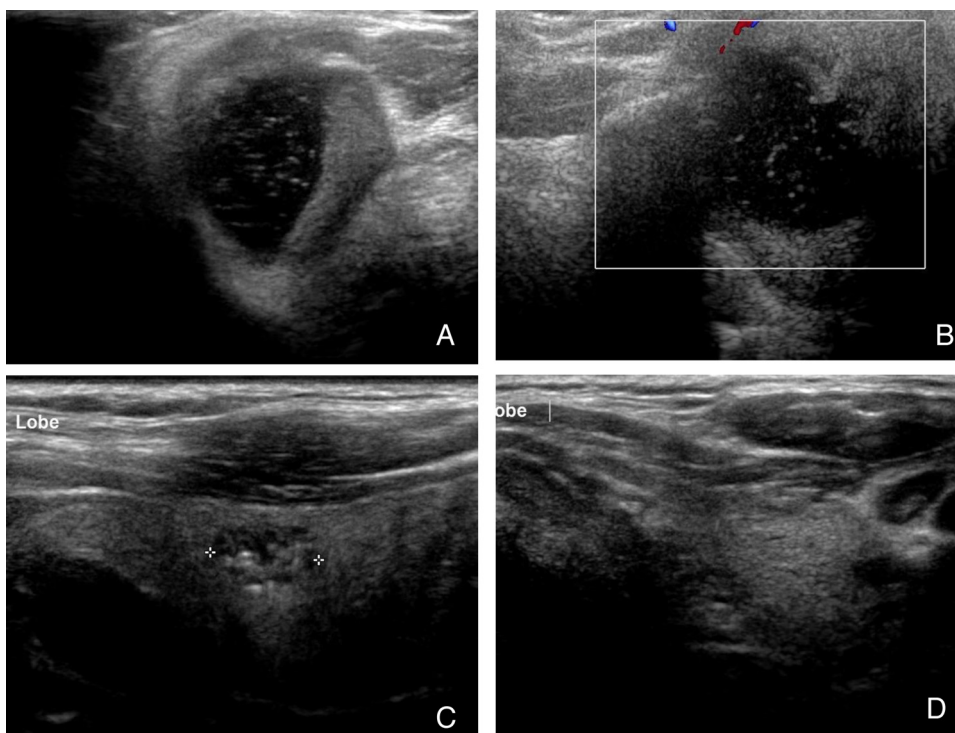


Fig. 1. Ultrasound images from initial clinic presentation.
 A: Midline view showing central cystic lesion.
 B: Doppler showing no evidence of increased vascularity.
 C: Right lobe of the thyroid showing evidence of colloid cyst, otherwise normal appearances.
 D: Left lobe of thyroid showing normal appearances of the gland.



Fig. 2. CT scan of the neck (sagittal view).
 A: Sagittal (non-contrast) view of the neck showing anterior midline neck mass extending from the suprasternal notch to the hyoid bone.

expanded in size and the patient was assessed urgently in the head and neck cancer clinic. At this time, a large hard mass with maximal dimension of 70 mm was palpable in the region of the thyroid gland. Clinically, there was no stridor or cervical lymphadenopathy. FNAC was highly suspicious for malignancy. A computed tomography (CT) scan of the neck confirmed the presence of a large anterior midline neck mass measuring, 50 mm × 70 mm × 66 mm, extending from the level of the thyroid to the hyoid bone (Fig. 2). CT scans of chest, abdomen and pelvis, did not show any evidence of distant metastases.

T2 weighted MRI axial (A) and coronal STIR (B) images demonstrating a 68 mm × 47 mm × 93 mm mixed T2 isointense/hyperintense infrahyoid lesion. It indents the superior thyroid gland and displaces the larynx and trachea posteriorly.

A T1/T2 weighted magnetic resonance imaging (MRI) of the face and neck with STIR and diffusion imaging was performed to evaluate the lesion further (Fig. 3). The mass measured 68 mm (long axial dimension) × 47 mm (short axial dimension) × 93 mm (cranio-caudal), extending inferiorly to the suprasternal notch, and superiorly to the level of the hyoid bone. A small volume of thyroid tissue was noted postero-inferior to the mass, and some slightly enlarged level IV lymph nodes (up to 13 mm).

Following discussion at the head and neck cancer multidisciplinary meeting, she underwent total thyroidectomy and level VI neck dissection, during which a partially necrotic tumour mass was excised (Fig. 4). Histological examination revealed a high-grade mucoepidermoid carcinoma above the gland consistent with origin in a thyroglossal duct remnant (Fig. 5). Six central compartment neck nodes were retrieved, with no evidence of metastasis. The carcinoma was investigated for MECT1/MAML2 (CRTC1/MAML2) translocation typical of mucoepidermoid carcinoma by fluorescence in-situ hybridisation using a MAML2 dual colour break apart probe (Zytovision GmbH, Bremerhaven, Germany). The carcinoma cells were negative for the translocation but showed a slightly increased copy number 2–4 throughout.

Apart from a return to theatre for evacuation of neck haematoma at one-week post surgery, she had an uneventful post-operative recovery. She underwent adjuvant radiotherapy (60 Gy in 30 fractions) in view of close surgical margins. She experienced radiotherapy related side effects including mucositis, which were managed conservatively with analgesia and steroids and is alive two years following completion of oncological treatment.

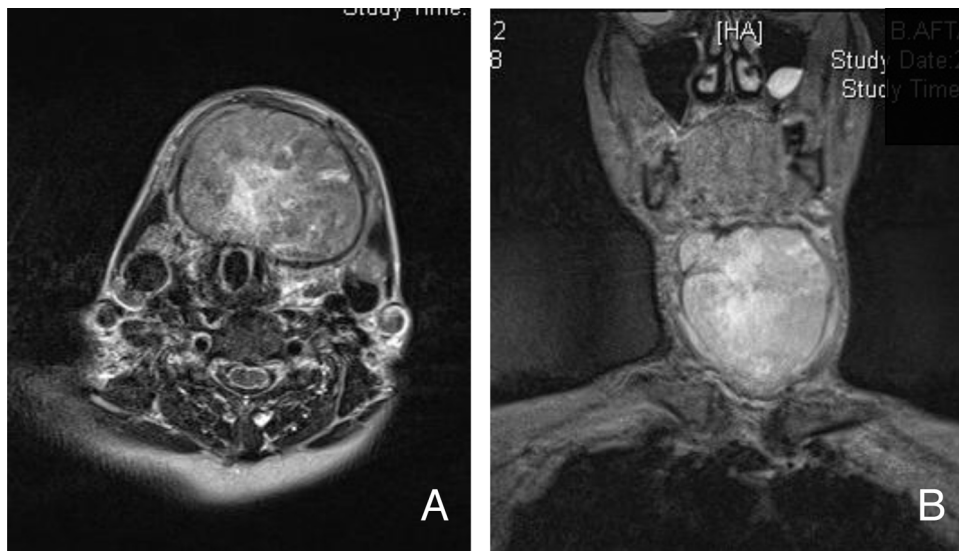


Fig. 3. T2 weighted MRI axial (A) and coronal STIR (B) images demonstrating a 68 mm × 47 mm × 93 mm mixed T2 isointense/hyperintense infrahyoid lesion. It indents the superior thyroid gland and displaces the larynx and trachea posteriorly.

To the best of our knowledge, this is the first reported case of MEC arising within an existing thyroglossal duct remnant. We present a review of the literature on mucoepidermoid carcinoma of the thyroid and recommend that surgical excision of these lesions should be performed due to the risk of malignant transformation.

3. Discussion

MEC are one of the most common malignant neoplasms of salivary glands in adults, but also arise in sites as diverse as the lung, breast, pancreas, oesophagus, lacrimal ducts and thyroid [5–10], where a high index of suspicion is needed for accurate diagnosis. In the medical literature to date there are only 40 reported cases of thyroid MEC, and no previous cases of mucoepidermoid carcinoma arising in a thyroglossal duct cyst [9,12–13].

MEC was first described by Stewart in 1945 [11]. Onset is usually in the 5th decade of life, and it usually presents with a fixed painless enlarging swelling [1]. Women are more commonly affected than men [2]. Typical histopathological features include the presence of epidermoid, mucinous and clear cells (see Fig. 5).

Mucoepidermoid carcinoma is consistently associated with a t(11;19)(q21;p13) translocation that produces a fusion protein combining the CREB-regulated transcription coactivator 1 (CRTC1/MECT1) with Notch coactivator mastermind-like gene 2 (MAML2) that constitutively activates the Notch signalling pathway important in development and oncogenesis [14,16,17]. This change was thought to be a causative oncogenic event, though it has since also been found in a minority of Warthin's tumours and hidradenocarcinomas [15]. In mucoepidermoid carcinomas of salivary glands the translocation is associated with low and intermediate grade carcinomas and a lower risk of recurrence,

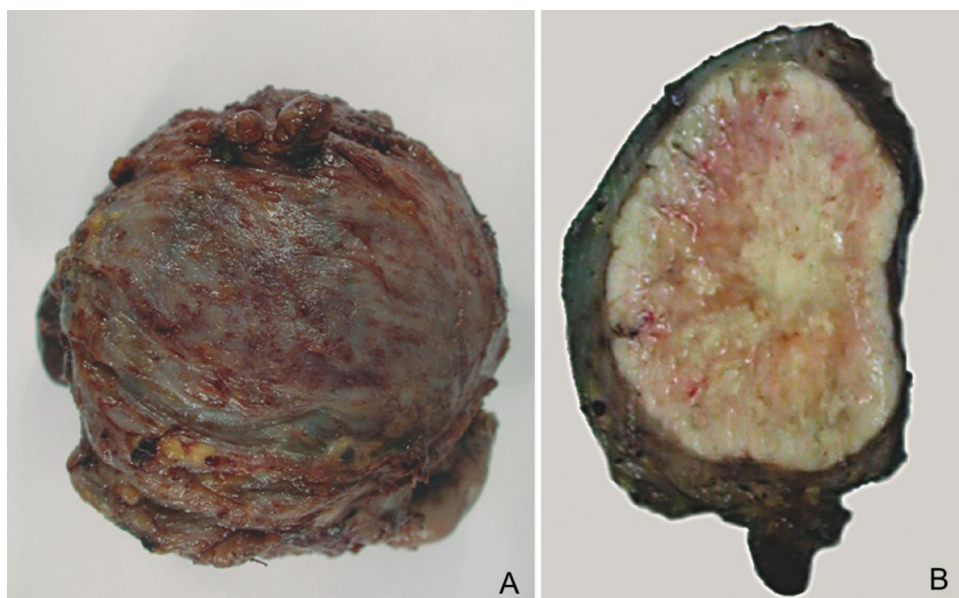


Fig. 4. Macroscopic histopathology.
 A: Macroscopic specimen from total thyroidectomy: a single spherical mass 89mm × 80mm × 55 mm without identifiable left or right lobes, or obvious thyroid capsule.
 B: Cut surface demonstrates well circumscribed, partly necrotic tumour mass

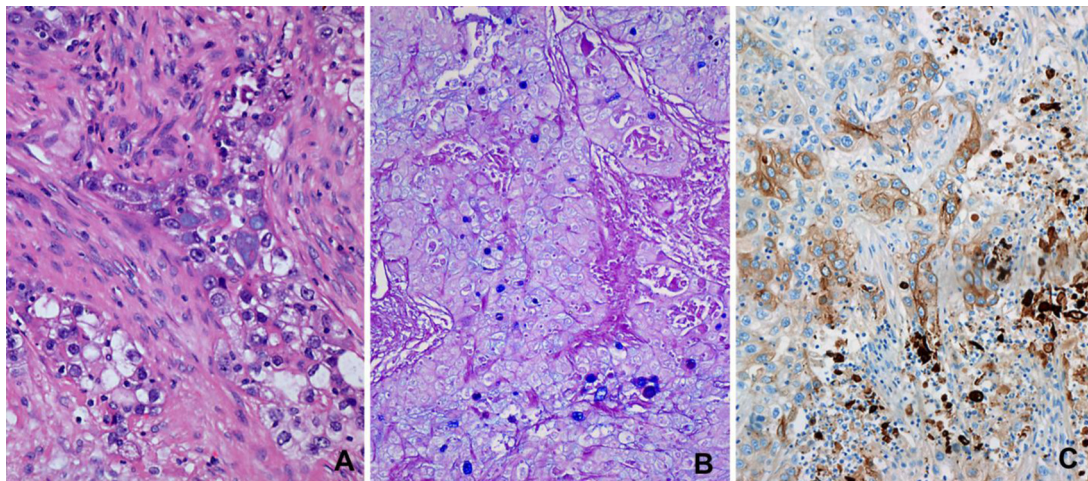


Fig. 5. Microscopic histopathology demonstrating mucoepidermoid tumour.
 A: High power image showing epidermoid, clear and mucinous cells.
 B: Cytokeratin 5/6 immunohistochemistry confirms epidermoid differentiation (brown stain).
 C: B/PAS stain reveals mucin secretion (blue).

metastasis and death than those without [16]. However, approximately only a quarter of high grade mucoepidermoid carcinomas contain the translocation, and those that are positive are thought to arise by high grade transformation from low grade carcinomas [17]. Our presented case did not contain the translocation, suggesting that, despite its mucoepidermoid differentiation, it did not arise through translocation as most low grade salivary gland carcinomas do.

There is paucity of knowledge on thyroid MEC, but three cases have been shown to be positive for the t(11;19)(q21;p13) translocation [16–19]. As the majority of thyroid MEC are low grade, the finding that this unusual high grade tumour lacks the translocation is interesting and suggests that, as in salivary gland neoplasms, the high grade carcinomas are a biologically and molecularly different group.

There are two main theories for the histogenesis of thyroid MEC; that it develops from solid cell nests (SCN) or thyroid follicular epithelial cells [10]. SCN share many histopathological features with MEC, including ductal structures lined by ciliated epithelium, and multipotent cells. These multipotent cells have been linked to several thyroid cancers, including papillary and MEC. Alternatively, it is thought that papillary carcinoma (the most common malignancy found in thyroglossal duct remnants), may undergo squamous and mucinous metaplasia resulting in MEC [21,22,13]. Prichard et al. report three cases where de-differentiation appears to have occurred from other thyroid neoplasms [13]. In addition, thyroid specific mRNAs including TTF-1 and PAX-8, which are exclusively found together in thyroid follicular cells were both detected in a metastatic axillary lymph node of MEC [21]. It is not clear, whether MEC in a thyroglossal duct remnant has arisen via the same means as a thyroid MEC, or via another as yet unspecified mechanism.

The sudden onset enlargement of our patient's presumed thyroglossal duct cyst and suspicion of nodal disease on pre-operative imaging lead to the decision for aggressive surgical management with total thyroidectomy and selective level VI neck dissection rather than the more conservative Sistrunk procedure. The available literature supports the use of adjuvant radiotherapy in cases of high grade tumours, which generally carry a poor prognosis [23–25]. In addition, the posterior extension of the tumour to the trachea, necessitated incomplete resection margins that would have potentially dictated a poorer outcome without additional treatment. Pritchard et al. [13] support the use of radioiodine

ablation due to the possible origins of these tumours having de-differentiated from other thyroid neoplasms. Thankfully, our patient is alive at two years following the completion of oncological treatment.

4. Conclusion

In conclusion, we report, to the best of our knowledge, the first case of mucoepidermoid carcinoma arising from a thyroglossal duct remnant. Whilst the majority of thyroglossal duct carcinomas are of papillary type, a high index of suspicion must be kept in case of more aggressive carcinomas. This case highlights the importance of removal of thyroglossal duct cysts at an early stage, and lends weight to the argument for a more radical surgical approach, and adjuvant treatment particularly for large carcinomas, or when clear margins cannot be assured.

Conflict of interest

None declared.

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None.

Ethical approval

Not required.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Elinor Warner: Data collection, literature review, presentation at international and national meetings, writing paper.
 Enyi Ofo: Writing paper and reviewing and editing drafts.
 Steve Connor: Radiological review of imaging, editing drafts.
 Edward Odell: Pathological review of histology, editing drafts.

Jean-Pierre Jeannon: Lead supervisor, recruitment of patient, consenting patient, review and editing of draft manuscript.

Guarantor

Mr Jean-Pierre Jeannon.

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