

## Mucoepidermoid carcinoma of the thyroid: a case report

Gita JAYARAM MD Path, MRCPATH, Kum Thong WONG MPath, MRCPATH and \*Mohd Amin Jalaludin FRCS

Departments of Pathology and \*Otorhinolaryngology, Faculty of Medicine, University of Malaya, Kuala Lumpur

### Abstract:

Primary mucoepidermoid carcinoma (MEC) of thyroid is an uncommon tumour and reports on its' cytology are consequently scanty. A 46-year-old male presented with a thyroid nodule of nine months duration. Fine needle aspiration (FNA) cytology of the nodule showed features of a malignant tumor that was different from the usual types of thyroid carcinoma. Monolayers and syncytial clusters of round and spindle tumour cells with large vesicular nuclei and single macronucleoli were present. A diagnosis of carcinoma was given with the comment that this was unlike any of the usual types of thyroid cancer and that a metastatic malignancy should be ruled out. The cytological picture of MEC may not always be distinctive enough for accurate tumour typing. Nevertheless the cytological features are usually sufficiently different to rule out all of the usual types of thyroid carcinoma. This distinction may be important from the point of view of differing prognosis in MEC of thyroid (as compared to differentiated thyroid cancers) and the need to exclude a metastatic carcinoma, especially from a primary in one of the salivary glands.

**Key words:** Fine needle aspiration, thyroid, neoplasms, cytology, mucoepidermoid carcinoma.

### INTRODUCTION

Primary mucoepidermoid carcinomas (MEC) of thyroid are uncommon tumours and only 31 cases have been reported until 1997.<sup>1-6</sup> They are believed to have their origin in ultimobranchial multipotential stem cells<sup>1</sup> and may occur in association with papillary carcinoma (PC),<sup>2,4</sup> as pure MEC,<sup>4</sup> or rarely in association with anaplastic carcinoma.<sup>7</sup> Sclerosing MECs of thyroid may also show prominent eosinophilic cellular infiltration of the tumour.<sup>8</sup> Cytological reports of MEC of the thyroid are scanty.<sup>5,6,8</sup> The purpose of this communication is to report a pure MEC of thyroid in which the initial diagnosis of carcinoma and distinction from the usual types of thyroid tumours were made on the basis of fine needle aspiration (FNA) cytology.

### CASE REPORT

A 46-year-old Chinese male presented to the otorhinolaryngology clinic of the University Hospital, Kuala Lumpur in May 1995 with a nine month history of dysphagia to solids, hoarseness of voice and a thyroid swelling. On examination, a hard, 4cm x 5cm. mass was present in the right lobe of the thyroid. There was no cervical lymphadenopathy, parotid or submandibular gland enlargement or any other organomegaly.

FNA of the thyroid mass was done by the cytopathologist (GJ) and smears were air-dried and stained with May Grunwald Giemsa (MGG). Smears were bloody with suboptimal cellularity and showed tumour cells in monolayers and syncytial pattern (Fig. 1). The cells were rounded or spindle with well defined cell margins and deeply basophilic cytoplasm. Nuclei were large, round to oval and vesicular with single macronucleoli (Fig. 2). Some of the cells appeared degenerate with scanty or no cytoplasm (Fig. 3).

Absence of micro-follicular or papillary patterns, nuclear grooves, intranuclear cytoplasmic inclusions and dissociated cells with cytoplasmic granules ruled out the usual types of thyroid carcinoma (follicular, papillary, Hurthle cell and medullary). No normal thyroid follicular epithelial cells, lympho-plasmacytic or eosinophilic components were present. A cytological diagnosis of carcinoma was given with the comment that the cytological picture did not resemble any of the differentiated thyroid neoplasms and that metastatic carcinoma and extension of laryngeal malignancy should be ruled out.

Laryngoscopic examination ruled out a laryngeal tumour but showed a paralytic right vocal cord. CT scan of the neck showed a 4x3 cm. right lobe thyroid mass that was compressing the upper part of the oesophagus. At operation (right

Address for correspondence and reprint requests: Gita Jayaram, MDPATH, MIAC, MRCPATH, Department of Pathology, Faculty of Medicine, University of Malaya, 50603 Kuala Lumpur, Malaysia

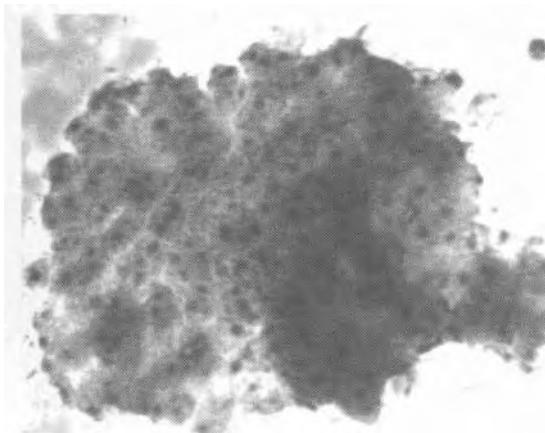


FIG. 1: Tumour cells in monolayers and showing prominent nucleoli. MGG x 300.

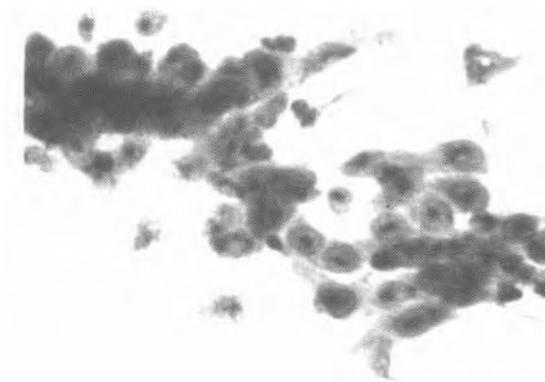


FIG.2: Cluster of malignant cells with macronucleoli. Cytoplasm is stretched and appears spindled out in some of the cells. MGG x 400.

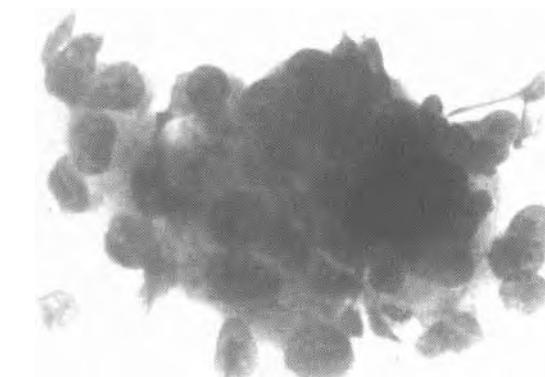


FIG. 3: Degenerate tumour cells with scanty or no cytoplasm. MGG x 500.

lobectomy) a hard 4x3 cm tumour mass was found arising from the right thyroid lobe, infiltrating the right recurrent laryngeal nerve and compressing the upper part of the oesophagus.

The lobectomy specimen was brown in colour and measured 5cm x 4cm x 2 cm. On cut section it showed a whitish firm growth measuring 3.7cm x 3 cm x 1.3 cm with irregular margins. Histological sections of the tumour were stained with H & E, Meyer's mucicarmine and periodic acid Schiff's stain. Immuno-histochemical staining was performed on formalin-fixed paraffin-embedded material, using the avidin-biotin-peroxidase technique with antibodies against thyroglobulin (Dako, 1:1000 dilution), neuron specific enolase (NSE, Dako, 1:500 dilution), cytokeratin (MNF116, Dako, 1:500 dilution) and carcino-embryonic antigen (CEA, Dako, 1:500 dilution). Histopathological examination showed the thyroid infiltrated by a tumour characterised by an admixture of epidermoid cells and mucocytes. The epidermoid component was dominant and consisted of solid groups, sheets and anastomosing trabeculae of cells with eosinophilic cytoplasm, large vesicular nuclei and single macro-nucleoli (Fig. 4). Some of these epidermoid cell complexes showed mucin-filled cysts between the epidermoid cells while others showed clear cell populations (Fig. 5). A desmoplastic reaction was present with foci of keratinising malignant cells (Fig. 6). Mucin-filled cystic structures of varying sizes lined by epidermoid cells, keratinising cells or attenuated epithelium were present. Occasional foci of tumour showed psammoma bodies. Areas of lymphoid infiltrates were present but there was no eosinophilic infiltration of either the tumour or of the non-neoplastic thyroid tissue nor any evidence of Hashimoto's thyroiditis (HT). Multiple sections studied showed no microfollicular structures suggestive of follicular carcinoma (FC), or papillary architecture, nuclear grooves and intranuclear cytoplasmic inclusions suggestive of papillary carcinoma (PC). Tumour cells expressed strong immuno-cytochemical reactivity to MNF116 but not to CEA or NSE. Some tumour cells at the interphase of the tumour with the uninvolved thyroid tissue showed mild reactivity to thyroglobulin. A diagnosis of mucoepidermoid carcinoma of the thyroid was made. The patient was well in May 1996 after which he was lost to follow-up.

## DISCUSSION

FNA cytological descriptions of MEC of thyroid

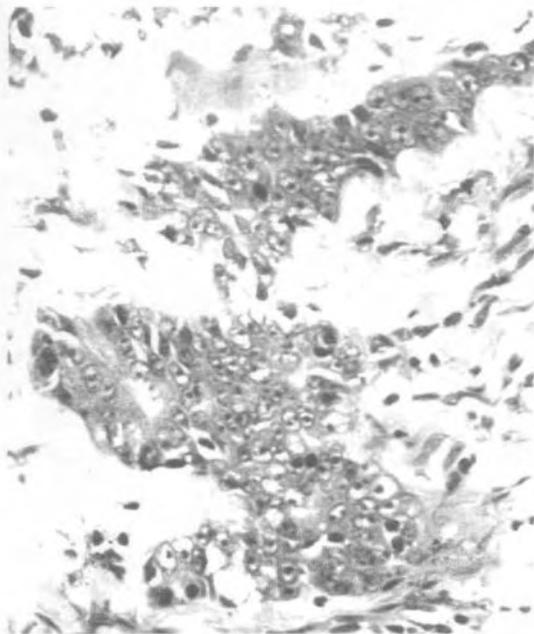


FIG. 4: Anastomising trabeculae of tumour cells with vesicular nuclei and macronucleoli. H&E x 200.

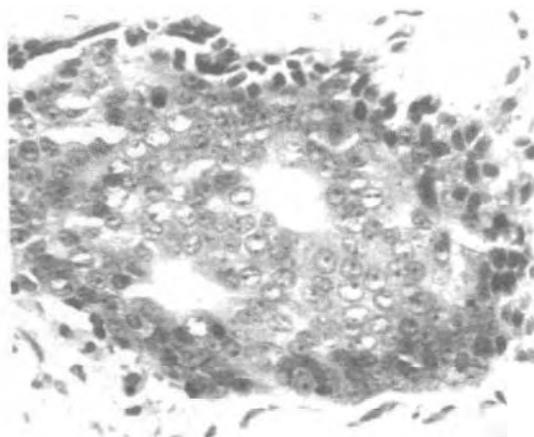


FIG. 5: Epidermoid cell complexes with mucin cysts. H&E x 200.

are scanty, due, no doubt, to the rarity of the tumour in this location.<sup>5,6,8</sup> In an aggressive, widely metastasising and rapidly fatal case of sclerosing MEC of thyroid with eosinophilia, Bondeson & Bondeson<sup>7</sup> described the tumour cells in the FNA smears as atypical but non-specific. The presence of eosinophils and lympho-plasmacytic cells in their case further confused the cytological picture bringing HT into their differential diagnostic list. On the other hand, Larson & Wick,<sup>6</sup> doing intra-operative FNA on a widely metastasising thyroid MEC,

and possibly aided by frozen section histology, could correctly categorise the tumour, based on the identification of mucin deposits that punctuated a neoplastic population comprising of overtly squamoid cells.

Cytological smears from MECs show one or more of three cell types; keratinising cells, mucinous cells and intermediate cells. Squamoid cells in MEC are present in clusters, show distinct cytoplasmic borders and may be vacuolated. The mucin-producing cells are round to polyhedral with abundant, finely granular or foamy cytoplasm and uniform nuclei and are not uncommonly mistaken for foam cells. Rarely signet ring forms may be seen. Intermediate cells, which have moderately increased nuclear:cytoplasmic ratio and centrally located nuclei with prominent nucleoli are the least diagnostic cells of MEC (especially if seen in isolation as is not uncommonly the case in FNA samples of MECs of salivary gland). Even in the usual location such as the salivary gland, the diagnosis of MEC is sometimes difficult, due to various reasons (hypocellularity due to cystic change, presence of only one or two of the cell types, etc.) On review, the cells in the cytological smears from the present case were considered to be representative of the intermediate cell type seen in MEC. Absence of more than one cell type and location in the thyroid were the reasons why a cytological diagnosis of MEC was not considered in this case.

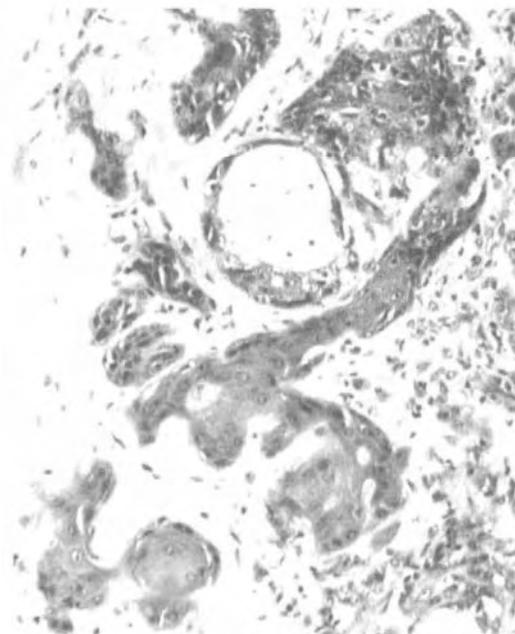


FIG. 6: Groups of keratinising malignant cells with horn cysts. H&E x 200

Nevertheless the presence of single macronucleoli in groups and syncytial clusters of large non-oxophilic cells was distinctive enough to enable us to rule out all of the usual types of thyroid carcinoma. Of the differentiated thyroid tumours, Hurthle cell tumours are most likely to show macronucleoli. However Hurthle cells are polygonal in shape, show oxyphilic features, frequent binucleation or multinucleation and may show cytoplasmic granularity as well as occasional dissociated forms. None of these features were present in our case. The absence of papillary and three-dimensional clusters, intranuclear inclusions and grooves ruled out a papillary carcinoma and lack of dissociated cells with cytoplasmic granules and amyloid ruled out a medullary carcinoma. Insular (poorly differentiated) thyroid carcinoma which shows small round cells with scanty cytoplasm in nesting pattern<sup>9</sup> was also excluded. Squamous cell carcinoma of the larynx may infiltrate the thyroid and cells from a poorly differentiated area of the tumour may resemble the intermediate cells of MEC. Hence it was deemed advisable to rule out a laryngeal primary before adopting the management protocol for a thyroid primary.

MEC is a common neoplasm of salivary glands, and may also occasionally be seen in other sites such as the respiratory tract, breast, pancreas and thyroid.<sup>6</sup> Chan<sup>7</sup> who described and documented eight cases of a sclerosing variant of thyroid MEC with eosinophilia, considered it to be a low grade malignancy arising from metaplastic follicles of HT. MEC has been known to occur in association with PC in many of the reported cases,<sup>1-4</sup> supporting the view that it may arise from metaplasia of follicular epithelium (which, being of endodermal origin, may be capable of differentiating into squamous, mucous secreting or even polypeptide secreting epithelium).<sup>3</sup> Cells of MEC have been shown to express immunocytochemical reactivity to high and low molecular weight cytokeratins, vimentin, S-100 protein, NSE and CAM 5.2.<sup>1,4</sup> Reactivity to thyroglobulin and polyclonal (but not monoclonal) CEA has also been reported in some cases.<sup>3-4</sup> Our case showed reactivity to low molecular weight cytokeratins, but not to CEA or NSE (we did not stain for high molecular weight cytokeratins). The tumour cells at the interface of tumour with non-neoplastic thyroid tissue showed reactivity to thyroglobulin, possibly similar to the pattern found at the interphase of the papillary and mucoepidermoid areas of Viciano's case.<sup>3</sup>

MEC has been considered in the past to be a slowly growing locally infiltrative neoplasm be-

having in much the same way as PC with frequent lymph node metastasis.<sup>7</sup> It has however been shown that even tumours with low grade histology may behave aggressively and metastasise widely.<sup>2,6</sup> In this context, awareness of the cytological features of MEC and of the possibility that MEC can occur as a primary tumour of the thyroid would help in pre-operative cytological identification of this tumour which in turn may guide the clinician in treatment protocol. In all cases before proceeding with surgery a thorough search for a possible primary in more common sites of MEC (especially salivary gland) should be done, to rule out a metastatic lesion.

## REFERENCES

1. Camiselle-Teijeiro J, Febles-Perez C, Sobrinho-Simoes M. Papillary and mucoepidermoid carcinoma of the thyroid with anaplastic transformation: a case report with histologic and immunohistochemical findings that support a provocative histogenetic hypothesis. *Pathol Res Pract* 1995;191:1214-21.
2. Miranda RN, Myint MA, Gnepp DR. Composite follicular variant of papillary carcinoma and mucoepidermoid carcinoma of the thyroid. Report of a case and review of the literature. *Am J Surg Pathol* 1995; 19:1209-15.
3. Viciano MJ, Galera-Davidson H, Martin-Lacave I, Segura DI, Loizaga JM. Papillary carcinoma of the thyroid with mucoepidermoid differentiation. *Arch Pathol Lab Med* 1996;120:397-8.
4. Wenig BM, Adair CF, Heffess CS. Primary mucoepidermoid carcinoma of the thyroid gland: a report of six cases and review of the literature of a follicular-epithelial derived tumor. *Hum Pathol* 1995; 26:1099-108.
5. Bondeson L, Bondeson AG. Cytologic features in fine-needle aspirates from a sclerosing mucoepidermoid thyroid carcinoma with eosinophilia. *Diagn Cytopathol* 1996;15:301-5.
6. Larson RS, Wick MR. Primary mucoepidermoid carcinoma of the thyroid. diagnosis by fine-needle aspiration biopsy. *Diagn Cytopathol* 1993; 9:438-43.
7. Chan JKC, Albores-Saavedra J, Battifora H, et al. Sclerosing mucoepidermoid thyroid carcinoma with eosinophilia. A distinctive low-grade malignancy arising from the metaplastic follicles of Hashimoto's thyroiditis. *Am J Surg Pathol* 1991; 15:438-48.
8. DeMay RM. The art and science of cytopathology. Chicago:ASCP Press; 1996. p. 741 & 763.
9. Suen KC. Atlas and text of aspiration biopsy. Baltimore, Williams & Wilkins; 1990. p. 35 & 38.