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CASE REPORT

Multiple Auer Rods in Fine-Needle Aspiration Smears of Medullary Thyroid Carcinoma: An Unusual Finding

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Background: Medullary thyroid carcinoma (MTC) is a rare tumor. Fine-needle aspiration (FNA) cytology is a popular method for the preoperative diagnosis of MTC.

Case Report: A 45-year-old man was referred to our center for a palpable thyroid nodule. Ultrasound-guided FNA was carried out for the patient. Cytology slides showed many isolated and small clusters of round to oval cells, some with a moderate amount of cytoplasm and red cytoplasmic granules. Rare cells showed multiple red Auer rods. Histology confirmed the diagnosis of MTC.

Conclusion: Cytologic findings of MTC in FNA are variable, and several rare cytologic findings have been reported. Cytoplasmic red granules are one of the usual findings, whereas detection of cells containing multiple Auer rods is an unusual finding, which has not been reported so far.

Keywords: medullary thyroid carcinoma, fine-needle aspiration, cytoplasmic multiple Auer rods

Introduction

Medullary thyroid carcinoma (MTC) is a rare neoplasm of thyroid. Accurate preoperative diagnosis of this tumor is important for proper clinical management. Patients with multiple endocrine neoplasia type 2 (MEN-2) may present with both MTC and pheochromocytoma. These patients need to undergo adrenalectomy before thyroidectomy. Also, preoperative measurement of calcitonin and carcinoembryonic antigen (CEA) is necessary for future follow-up of patients with MTC.[1]

Fine-needle aspiration (FNA) is a popular method for preoperative diagnosis of thyroid neoplasms. Cytologic criteria of MTC in FNA have been well established in previous studies.[2–5] Also, many unusual findings have been reported in patients with MTC.[6–10] In our case, we report cells with multiple Auer rods, which have not been reported before.

Case Report

A 45-year-old man presented with a palpable thyroid nodule. Ultrasonography showed a partially ill-defined hypoechoic nodule, measuring 29×20 mm in the right lobe. Ultrasound-guided FNA was carried out, and four smears were prepared. Two slides were air-dried and stained with the Wright method, and two slides were alcohol-fixed and stained using the Papanicolaou method.

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In the microscopic evaluation, hypercellular smears were arranged in dissociated cells and small cohesive clusters. Most cells had round to oval shapes, and many of them contained eccentric nuclei. Anisonucleosis, multinucleation, and some bizarre cells were also observed. Rare intranuclear cytoplasmic inclusions were present. Many cells contained a moderate amount of cytoplasm, and some cells contained red granules. In the background, small foci of pink materials resembling amyloid were present (Figure 1). In the cytoplasm of rare cells, multiple eosinophilic rods resembling Auer rods of neoplastic myeloblasts were also detected (Figure 2).

Diagnosis of MTC based on FNA was established. However, granulocytic sarcoma was in differential diagnosis. The patient did not have a history of myeloid neoplasm; also, bone marrow and peripheral blood were normal. He underwent total thyroidectomy. Pathology sections showed a neoplastic lesion composed of sheets of round cells with stippled chromatin and amyloid deposition (Figure 3). Congo red staining confirmed amyloid materials. Also, Immunohistochemical staining was done. Calcitonin and thyroid transcription factor 1 (TTF-1) were positive and thyroglobulin was negative. Accordingly, final diagnosis of MTC was confirmed.

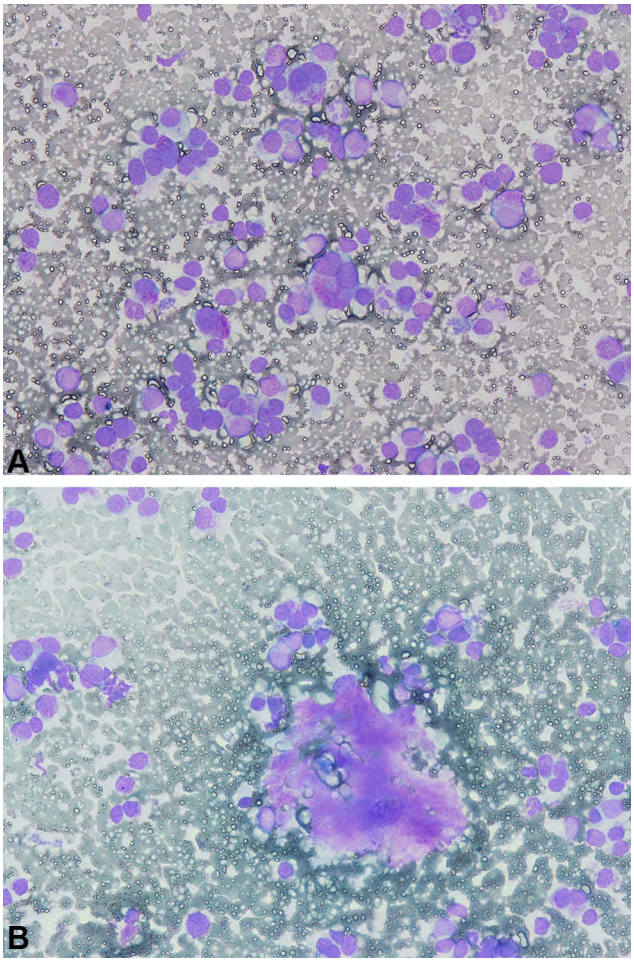

Figure 1 Cytologic smears. (**A**) Isolated mononucleated and binucleated cells, some with cytoplasmic granules (Wright stain, ×400). (**B**) Amyloid-like materials (Wright stain, ×400).

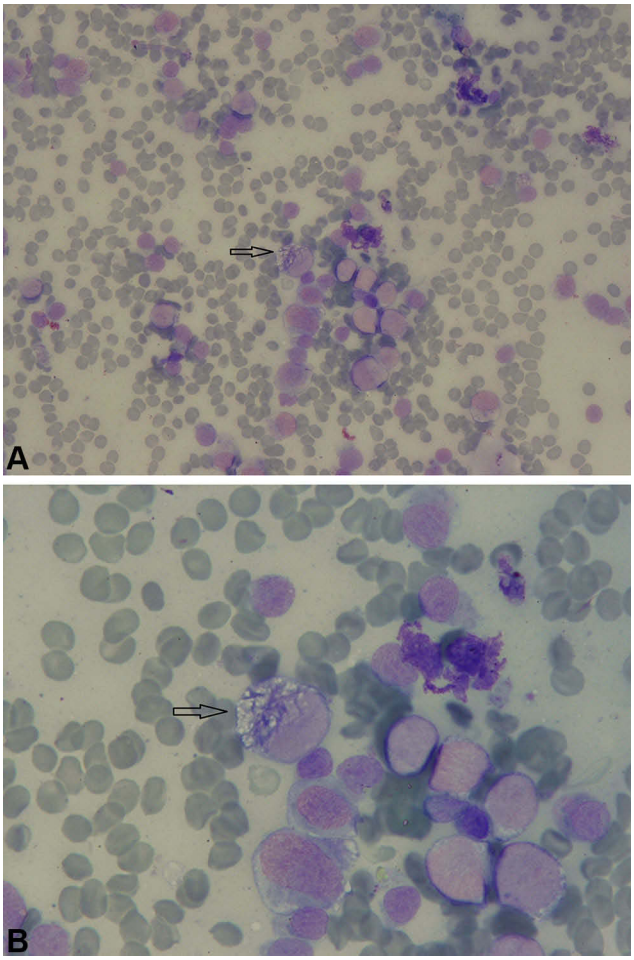

Figure 2 Cytologic smears. (**A** and **B**) Round cells with multiple Auer rods in the cytoplasm (arrow) (**A**, Wright stain, ×400 and **B**, Wright stain, ×1000).

Discussion

MTC is identified as a rare thyroid neoplasm. Accurate preoperative diagnosis of MTC is important for proper management. Until now, several studies have been carried out regarding the cytologic features of MTC in FNA cytology. According to these studies, there is extensive variability in cytologic findings; therefore, MTC may be misdiagnosed as other neoplasms.[3,4] In addition, some unusual findings have been reported.[6–10] In this regard, Kaushal et al evaluated thyroid FNA of 78 MTC cases and reported unusual findings, such as melanin pigments, vacuolated cytoplasm, intracytoplasmic lumina, and signet ring cells in rare cases.[6]

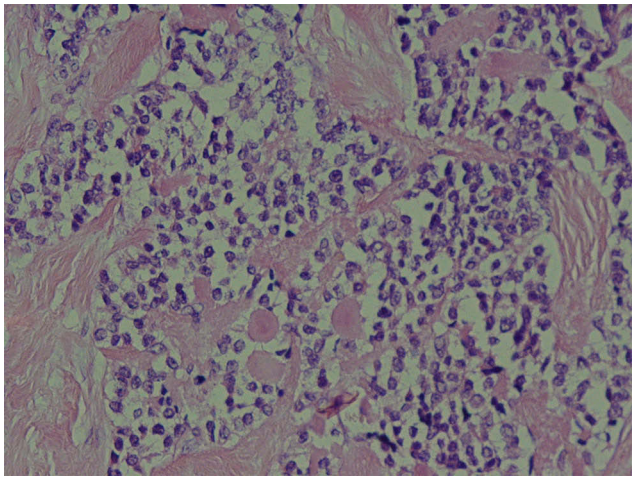

Figure 3 Histologic section. Sheets of neoplastic cells with stippled chromatin and amyloid deposition (H&E stain, ×400).

Eosinophilic cytoplasmic granule is a well-known feature of MTC on FNA cytology. Many studies have reported these granules.[2–4,6] In the present case, we found cells containing multiple red Auer rods resembling neoplastic myeloblasts. It was speculated that binding of granules produces these rods.

Rare cases of granulocytic sarcoma in thyroid have been reported but multiple Auer rods were not detected in these cases.[11,12]

It should be noted that cytologic features of FNA smears, including discohesive cells and small clusters, round to oval nuclei with mild to moderate pleomorphism, binucleation, intranuclear cytoplasmic inclusions, cytoplasmic red granules, and amyloid-like materials, lead us to the diagnosis of medullary carcinoma.

It can be concluded that cells with multiple Auer rods are rarely seen in MTC, and these cells should not be confused with neoplastic myeloblasts in granulocytic sarcoma.

Ethics

The patient has given his written informed consent to publish this work. Institutional approval was not required.

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Disclosure

The authors have no conflicts of interest to declare.

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