

ONCOCYTIC CARCINOID TUMOUR OF THE LUNG : Report of two cases

Ali VERAL, M.D.,

Funda YILMAZ, M.D.,

Özden GÜNEL, M.D.

Ege University School of Medicine, Department of Pathology, Bornova, İzmir
Gazi Medical Journal 2000; 11: 93-96

SUMMARY: *Oncocytic carcinoid tumour of the lung is a rare variant of pulmonary carcinoids which occur almost exclusively in adults in both sexes. This report presents two patients with oncocytic carcinoid tumour of the lung. Both patients were adults males. Oncocytic cells with abundant eosinophilic granular cytoplasm constituted more than 75% of the tumour of the first patient, whereas the tumour of the second patient was composed almost completely of oncocytic cells. The tumour of the first patient was found incidentally and had the features of a typical bronchial carcinoid tumour. The second patient presented with dry cough and hemoptysis. The histopathological features of the tumour of this latter patient were those of an atypical carcinoid tumour because of the presence of tumour necrosis and blood vessel invasion. To our knowledge, the second patient of this report is the first example of pulmonary oncocytic carcinoid tumour with atypical histological features.*

Key Words: *Carcinoid Tumour, Lung.*

INTRODUCTION

Neuroendocrine bronchopulmonary tumours represent a diverse spectrum of histologic types with typical carcinoid at the benign end, atypical carcinoid in the middle, and small cell lung carcinoma and large cell neuroendocrine carcinoma at the fully malignant end (1,2). Carcinoid tumours constitute about 1% to 2% of all lung tumours, and are often seen in younger patients when compared to other pulmonary malignancies (3). Many histological variants of carcinoid tumours have been described including the spindle cell, papillary, mucinous, clear cell, acinar cell-like, melanocytic and paragangliocytic types (3). Oncocytic type is

among the most unusual of all carcinoid tumours, with only 10 cases reported in the English literature up to date (4-13).

Arrigoni et al. (14), described four histologic criteria to discriminate carcinoid tumours as being typical or atypical, which are; (a) increased mitotic activity in the presence of a recognisable carcinoid pattern; (b) pleomorphism and irregularity of nuclei with prominent nucleoli, hyperchromatism, and abnormal nuclear-cytoplasmic ratios; (c) areas of increased cellularity with architectural disorganisation of growth pattern; and (d) areas of tumour necrosis. Two cases of oncocytic carcinoid tumour of the bronchus, one with typical and the other with atypical features are presented in the current report.

CASE REPORTS

Patient 1: A 45 year-old male underwent bronchoscopic examination for an incidentally found mass in the chest x-ray. At bronchoscopy a tumour mass in the left upper lobe bronchus was detected and a bronchoscopic biopsy was performed from which the diagnosis of carcinoid tumour was made. Physical examination and laboratory findings showed no abnormality. A left upper lobectomy was performed.

Gross examination: The tumour was in the peribronchial location, well circumscribed and measured 2x1.5x0.8 cm. The cut surface was slightly lobulated with a uniform pink colour.

Microscopic findings: On light microscopic examination the tumour was composed of solid nests, ribbons or trabeculae of polygonal cells containing round to oval nuclei with stippled chromatin. In more than 75% of the tumour cells abundant eosinophilic granular cytoplasm was observed. There was no evidence of cytological and architectural atypia, vascular invasion or tumour necrosis. Immunohistochemical investigation revealed neuron-specific enolase (NSE) and chromogranin A positivity within the cytoplasm of the tumour cells, whereas monoclonal carcinoembryonic antigen (CEA) and p53 were negative (Figure 1).

Patient 2: A 63 year-old male patient was admitted for dry cough and hemoptysis. The chest x-ray revealed a round well circumscribed shadow in the middle lobe of the right lobe. A

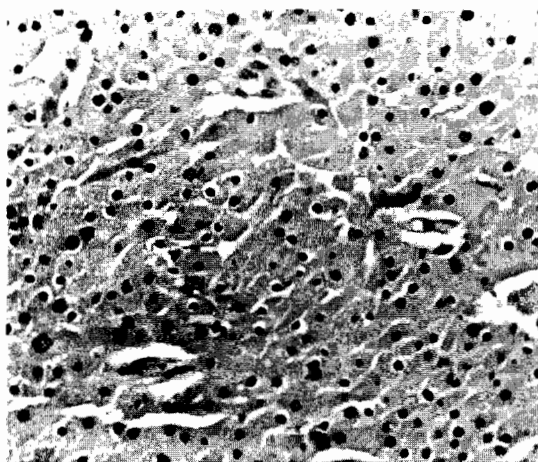


Fig. 1: Diffuse cytoplasmic chromogranin A positivity of the tumour of the first patient (Diaminobenzidine tetrahydrochloride, x400).

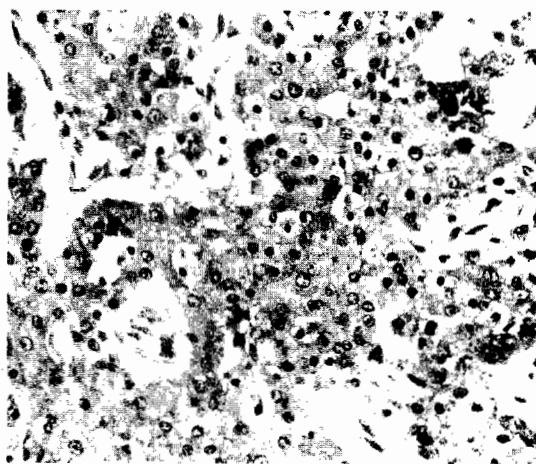


Fig. 2: Oncocytic cells with abundant eosinophilic granular cytoplasm in the tumour of the second patient (Hematoxylin-eosin, x200).

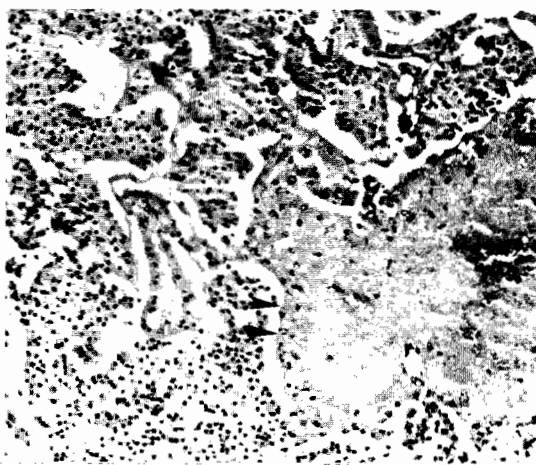


Fig. 3: Tumour necrosis (arrow heads) in the tumour of the second patient (Hematoxylin-eosin, x100).

bronchoscopy demonstrated a tumour mass occluding the right middle lobe bronchus and histologic examination of the bronchoscopic biopsy material was interpreted as carcinoid tumour. The patient underwent a right middle-upper lobectomy.

Gross examination: The middle lobe of the lung had a 4x3x3 cm tumour nodule, which extended through the wall of the main bronchus and into its lumen as a 1x1 cm intrabronchial mass. The tumour was well circumscribed with a friable, pink brown and focally necrotic cut surface.

Microscopic findings: The tumour was

composed almost completely of oncocyctic cells with abundant eosinophilic granular cytoplasm (Figure 2). The cells were organised in trabeculae and haphazardly arranged irregular nests. The nuclei of the tumour cells had a homogenous chromatin pattern and were uniform in size, with inconspicuous nucleoli. There were no mitotic figures, but extensive tumour necrosis and invasion of blood vessels were present (Figure 3).

Immunohistochemistry revealed positive cytoplasmic staining with NSE, chromogranin and synaptophysin, whereas CEA and p53 were negative. The architectural atypia and the invasive character of the tumour enabled it to be classified as atypical oncocyctic carcinoid tumour.

None of the patients had a history suggestive of carcinoid syndrome. In both cases, there was no evidence of stromal amyloid deposition or osseous metaplasia, and regional lymph nodes were free of tumour.

DISCUSSION

The number of reported oncocyctic bronchopulmonary carcinoid tumours is small (4-13). They have been reported exclusively in adults, in the fifth and sixth decades of life in both sexes. The majority of oncocyctic carcinoids occur as central lesions with gross features quite similar to those of typical pulmonary carcinoids in general. Histologically most of them have the typical appearance of low-grade neuroendocrine carcinomas, with oval to round uniform nuclei bearing granular chromatin. The cytoplasm is abundant, granular and eosinophilic.

Oncocyctic change owing to cytoplasmic mitochondrial hyperplasia has been reported to occur in 59% of bronchial carcinoid tumours, but pure oncocyctic carcinoid tumour is quite rare, with a reported incidence of 1.58% in a series of 63 cases of bronchial carcinoids (5). On the other hand, cases of true oncocyctoma of the lung without neurosecretory granules in the cytoplasm has also been reported, albeit rarely (13,15). The differential diagnosis of these two entities lies on the immunohistochemical demonstration of neuroendocrine markers and if available, electron microscopic confirmation of the neurosecretory granules. In the first patient of this current report, the histopathological differential diagnosis was not difficult because of the occurrence of areas of

typical carcinoid tumour. In the second patient, as the tumour was composed almost completely of oncocyctic cells, immunohistochemical demonstration of the neuroendocrine markers confirmed the diagnosis of carcinoid tumour. The diagnostic and prognostic value of CEA immunoreactivity in carcinoid tumours are debated. Although, Bishopric et al. (16) have reported that CEA positivity in carcinoid tumours indicates a more aggressive behaviour, this has not been confirmed by others (17). Both tumours in the current report were found to be negative for CEA immunohistochemistry.

Arrigoni et al. (14), stated that the existence of any one or a combination of the histologic criteria defining atypicality in carcinoid tumours was enough to characterise a tumour as atypical. In accordance with this statement, only one case of oncocyctic bronchial carcinoid tumour has been reported as being atypical, and this showed focal nuclear pleomorphism, without necrosis or appreciable mitotic activity (11). However some authors believe that criteria defined by Arrigoni et al. (14) are not sufficient or precise, and exact determination of the abnormal number of mitotic figures in carcinoid tumours together with addition of more criteria (i.e. tumour diameter, location and vascular invasion) are needed (18,19).

The tumour of the second patient in this report has been defined as atypical because of the occurrence of architectural atypia, necrosis and vascular invasion, although features of cytological atypia were lacking. As the number of reported oncocyctic carcinoid tumours is small, there is not much knowledge about the biologic behaviour and prognosis of these tumours. To our best knowledge, the second patient of the current report represents the first example of the atypical carcinoid, fulfilling the criteria for atypicality.

Correspondence to: Dr. Funda YILMAZ
Ege Üniversitesi Tıp Fakültesi
Patoloji Anabilim Dalı
35100 BORNOVA-İZMİR
Phone : 388 10 25
Fax : 373 61 43
E-mail : funday@alpha.med.ege.edu.tr

REFERENCES

1. Travis WD, Rush W, Flieder DB, Falk R, Fleming MV, Gal AA, Koss MN. Survival analysis of 200 pulmonary neuroendocrine tumors with clarification of criteria for atypical carcinoid and its separation from typical carcinoid. *Am J Surg Pathol* 1998; 22 : 934-944.
2. Vuitch F, Sekido Y, Fong K, Mackay B, Minna JD, Gazdar AF. Neuroendocrine tumors of the lung. Pathology and molecular biology. *Chest Surg Clin N Am* 1997; 7 : 21-47.
3. Colby TV, Koss MN, Travis WD. Tumors of the lower respiratory tract. Atlas of Tumor Pathology, 3rd series, Fascicle 13. Washington, DC, Armed Forces Institute of Pathology 1995 : 287-318.
4. Ogino S, al-Kaisi N, Abdul-Karim FW. Cytopathology of oncocytic carcinoid tumor of the lung mimicking granular cell tumor. A case report. *Acta Cytol*. 2000; 44 : 247-250.
5. Hasleton PS, al-Saffar N. The histological spectrum of bronchial carcinoid tumours. *Appl Pathol* 1989; 7 : 205-218.
6. Sklar JL, Churg A, Bensch KG. Oncocytic carcinoid tumor of the lung. *Am J Surg Pathol* 1980; 4 : 287-292.
7. Scharifker D, Marchevsky A. Oncocytic carcinoid of lung: An ultrastructural analysis. *Cancer* 1981; 47 : 530-532.
8. Ghadially FN, Block HJ. Oncocytic carcinoid of the lung. *J Submicrosc Cytol* 1985; 17 : 435-442.
9. Kuwahara T, Maruyama K, Mochizuki S, Seki Y, Sawada K. Oncocytic carcinoid of the lung. An ultrastructural observation. *Acta Pathol Jpn* 1984; 34 : 355-359.
10. Sajjad SM, Mackay B, Lukeman JM. Oncocytic carcinoid tumor of the lung. *Ultrastruct Pathol* 1980; 1 : 171-176.
11. Alvarez-Fernandez E, Folque-Gomez E. Atypical bronchial carcinoid with oncocytoid features. Its ultrastructure, with special reference to its granular content. *Arch Pathol Lab Med* 1981; 105 : 428-431.
12. Matsumoto S, Muranaka T, Hanada K, Takeo S. Oncocytic carcinoid of the lung. *Radiat Med* 1993; 11: 63-65.
13. Ritter JH, Nappi O. Oxyphilic proliferations of the respiratory tract and paranasal sinuses. *Semin Diagn Pathol* 1999; 16 : 105-116.
14. Arrigoni MG, Woolner LB, Bernatz PE. Atypical carcinoid tumors of the lung. *J Thorac Cardiovasc Surg* 1972; 64 : 413-421.
15. Santos-Briz A, Terron J, Sastre R, Romero L, Valle A. Oncocytoma of the lung. *Cancer* 1977; 40 : 1330-1336.
16. Bishopric GA Jr, Ordonez NG. Carcinoembryonic antigen in primary carcinoid tumors of the lung. *Cancer* 1986; 58: 1316-1320.
17. Grote TH, Macon WR, Davis B, Greco FA, Johnson DH. Atypical carcinoid of the lung. A distinct clinicopathologic entity. *Chest* 1988; 93 :370-375.
18. Yousem SA. Pulmonary carcinoid tumors and well-differentiated neuroendocrine carcinomas. Is there a room for an atypical carcinoid? [editorial]. *Am J Clin Pathol* 1991; 95 : 763-764.
19. El-Naggar AK, Ballance W, Karim FW, Ordonez NG, McLemore D, Giacco GG, Batsakis JG. Typical and atypical bronchopulmonary carcinoids. A clinicopathologic and flow cytometric study. *Am J Clin Pathol* 1991; 95 : 828-834.