Catecholamine Syndrome, Carcinoid Lung Tumor and Stroke

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A left lung lesion confirmed by thoracic CT scan; this tumor was peripherally located. A transbronchial biopsy ensured the diagnosis of an atypical carcinoid tumor. On electron microscopy, abundant dense-core granules were seen (fig. 1). A quantitative immunohistochemical analysis was performed both on neoplastic and healthy tissue; norepinephrine, adrenaline and dopamine levels reached 767 ug/g, 26.6 ug/g and 120 ug/g, respectively, in the neuroendocrine carcinoid tissue, whereas the norepinephrine level in healthy parenchyma was only 37 ug/g. Adrenalin and dopamine levels were not determined, abdominal computed tomography ruled out any tumor of the adrenal glands, bone scintigraphy was normal. Psychiatric and vasomotor symptoms cleared after surgery, and the patient’s blood pressure normalized. The urinary catecholamine level returned to a normal value. The long-term outcome was uneventful; 3 years later, there were no mood disturbances and his blood pressure was in the normal range.

Fig. 1. Electron micrograph showing large dense-core granules in the tumor (arrows) x 15,000.
Discussion

The histological characteristics of atypical endocrine tumors were described by Arrigoni et al. [1]; their incidence among lung cancers ranged from 2.7 to 9.3% [2, 3]. These tumors grow slowly, have a tendency to be localized at the time of diagnosis, and are amenable to long-term control by surgical resection [3]. Our patient’s clinical record is consistent with these data, since the initial chest X-ray failed to show any lesion and only later demonstrated a well-limited lung tumor. The endocrine nature of these tumors was advocated over 15 years ago [4]. At that time, the concept of the dispersed neuroendocrine system (APUD) evolved based on the discovery that closely related or identical biogenic amines and peptide hormones could be found in the central nervous system and in epithelial cells of numerous organs and tissues [5]. More recently, it became apparent that the bronchopulmonary tract has a rich and complex component of neuroendocrine cells. Gould and Chejfec [6] were able to demonstrate catecholamine activity associated with two large-cell, ‘undifferentiated’ carcinomas that contained dense-core granules. Furthermore, bronchopulmonary components and pheochromocytoma are considered to be neoplastic lesions arising from the dispersed neuroendocrine system [5, 7].

In pheochromocytoma, the incidence of neuropsychiatric symptoms ranged from 22 to 43% [8]. Moreover, a wide variety of cerebrovascular complications has also been reported [8]. Our patient’s behavioral change occurred during his stroke course. An early vascular screening failed to demonstrate any cause. There is a possible link between the neurological event and catecholamine production as the complete removal of the tumor resulted in cessation of mental and vasomotor disturbances and urinary catecholamine returned to a normal value.

References
