

Limited resection procedure for metachronous lung neoplasm

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SUMMARY. A 57 year-old male smoker presented with weight loss and hypertrophic osteoarthropathy. Imaging studies revealed a solid mass (maximum diameter 4.2 cm) located in the left lung and left upper lobectomy was carried out. Histopathology showed low differentiated adenocarcinoma and the patient received adjuvant chemotherapy. Bronchoscopy performed 3 years later to exclude specific infection revealed complete obstruction of the posterior segment of the right upper lobe by a highly vascular, smooth margined mass. At thoracotomy the frozen section was negative for malignancy and histopathological examination revealed a typical carcinoid tumour. The excellent prognosis of this histological type of tumour allowed avoidance of a major surgical procedure and the lesion was resected by bronchotomy with reconstruction of the bronchial gap. *Pneumon 2012, 25(4):428-431.*

INTRODUCTION

Bronchial carcinoids are well differentiated neuroendocrine tumours which represent 1-2% of all lung neoplasms¹. They are traditionally distinguished into typical and atypical on the basis of their clinicopathological characteristics, according to their differing clinical and biological behaviour. Surgical removal is the management of choice of typical carcinoid because of its excellent prognosis, even in the presence of metastases. Metachronous carcinoids are rare, and the initial neoplasm may be neuroendocrine in nature or otherwise. The case is presented here of a patient who, 3 years after curative treatment of an adenocarcinoma of the left lung, presented with a typical carcinoid tumour in the right lung.

CASE REPORT

A 57 year-old male smoker presented with weight loss (10 kg in 2 months), digital clubbing and intense arthralgia compatible with hypertrophic osteoarthropathy. Chest X-ray revealed a homogenous, well-defined opacity in the left upper lung field, which did not obliterate the homolateral hilum

or mediastinal borders. A subsequent computed tomography (CT) scan of the chest confirmed the presence of a solid lesion (4.2 x 3.3 x 3.5 cm) with lobulated margins, in the apico-posterior segment of the left upper lobe of the lung (Figure 1A). Abdominal and brain CT scan and bone scintigraphy were negative for secondary metastases, while PET/CT scan (Figure 1B) revealed pathological ^{18}F -FDG uptake ($\text{SUV}_{\text{max}}=10$) by the pulmonary lesion, indicating the malignant nature of the mass, but no lymph node involvement.

The patient underwent left upper lobectomy with lymphadenectomy at stations 10 and 11. Histopathologi-

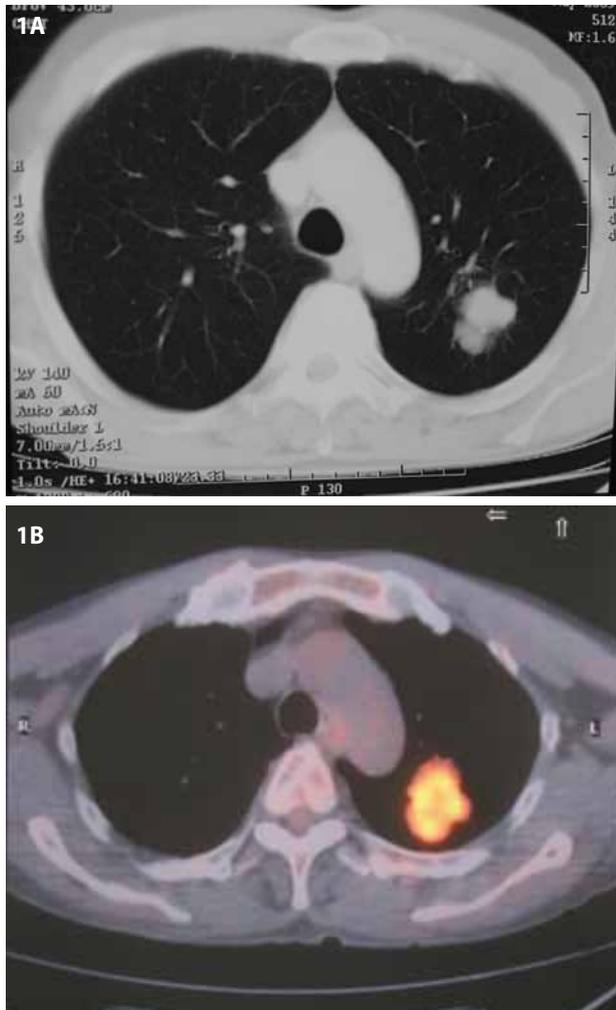


FIGURE 1. Adenocarcinoma of the left lung. 1A: Chest CT showing a radio-opaque mass (dimensions: 4.2x3.3x3.5 cm) with lobulated margins, located in the posterior-apical segment of the left upper lobe; 1B: PET/CT scan of the same mass, showing abnormal ^{18}F -FDG uptake ($\text{SUV}_{\text{max}}=10$).



FIGURE 2. Metachronous carcinoid of the right lung. Endobronchial image of carcinoid tumour completely obstructing the orifice of the posterior segment of the right upper lobe.



FIGURE 3. Surgically removed carcinoid tumour with a margin of healthy bronchial wall.

cal examination of the lesion revealed a mixed-type low differentiated adenocarcinoma without involvement of the regional lymph nodes (p-stage $\text{T}_2\text{N}_0\text{M}_x$ c-stage $\text{T}_2\text{N}_0\text{M}_0$). Subsequently, the patient received adjuvant chemotherapy consisting of cisplatin and etoposide on the basis of the histological type and the tumour size (maximum dimension $> 4\text{cm}$)^{2,3}. At regular follow-up the CT scans and tumour markers were within normal limits.

Three years after surgery, chest CT scan showed new ill-defined nodular lesions in both lungs converging towards the right pulmonary apex. Specific infection was suspected and bronchoscopy revealed complete obstruction of the orifice of the posterior segmental bronchus of the right upper lobe by a highly vascular, smooth margined round mass, with flattening of the corresponding secondary carina. Bronchoalveolar lavage (BAL) of the apical segment was conducted and the resultant fluid was found negative for common bacteria, mycobacteria and pathological cytological features.

The patient was referred for surgical management and a right thoracotomy was performed, exposing the bronchus of the right upper lobe. The endobronchial lesion was removed via a longitudinal bronchotomy, with a margin of healthy tissue. Rapid examination of a frozen section revealed neoplastic tissue without morphological characteristics of malignancy, and the bronchial gap was reconstructed using Prolene 4-0. Histopathological examination showed a typical carcinoid tumour. Additional investigation by octreotide whole body scintigraphy was negative. The patient received antibiotics for 10 days and imaging 2 months after the second operation showed that the nodular lung lesions had regressed.

DISCUSSION

The approximate rate of development of a new primary lung cancer after curative-intent treatment for a non-small-cell lung cancer (NSCLC) is 0.5 to 2% per patient per year⁴, which over time can reach 14%^{5,6}. According to ACCP Clinical Practice Guidelines (2nd. Edition, 2007), a metachronous lung cancer is defined as a second primary lung cancer where the two tumours are of different histological types. Two malignancies of the same histological type (comprising 2/3 of cases) are defined as metachronous when there is no evidence of systemic metastases and an interval of at least 4 years separates the two diagnoses⁷. In the present case, it is of note that the patient did not have a preoperative bronchoscopic examination in the medical department where he was initially admitted for investigation of the primary adenocarcinoma. This is a clear drawback of the preoperative evaluation at that time and the possibility that the right bronchial carcinoid was already present cannot be excluded. The present bronchoscopy performed to investigate the cause of right upper lobe infiltrates incidentally revealed the presence of the carcinoid. The endoscopic image of a highly vascular-

ized smooth margined mass, which is compatible with bronchial carcinoid, has been considered as a deterrent to biopsy by some authors^{8,9}, and significant hemorrhage has been rarely reported recently^{10,11}. The authors believe that biopsy of suspected carcinoid tumours is more safely performed when rigid bronchoscopy or other interventional techniques applied by flexible bronchoscopy are available, in case of severe haemorrhage.

Surgical management is the treatment of choice for the second neoplasm, provided that the tumour is resectable and the performance status (PS) of the patient permits. The 5-year survival after resection of a second (metachronous) tumour ranges from 20 to 50%, which is more favourable than that of patients who present local recurrence or metastases of the first tumour. The prognosis depends on: the histological type of the lesion, the stage of the second neoplasm (better survival for stages I and II) and the time elapsed since the diagnosis of the first malignancy^{5,7,12-15}.

In rare cases, such as that presented here, a metachronous lung carcinoid can develop, and the primary tumour is usually a carcinoid^{16,17} or extremely rarely a NSCLC¹⁸. The majority of typical carcinoids (70-80%) develop in a central location of the lung and affect the large airways, and only a few are located peripherally¹⁹. They have an excellent prognosis due to slow development and their long term survival rates, even in the presence of metastases, and for this reason surgical management is mandatory. It is recommended that tumour resection should be accompanied by radical lymph node dissection, since the reports of larger studies conclude that recurrence appears to be related primarily to the histological type and only secondarily to the presence of lymph node metastases^{10,20}. This patient, however, had only one lobe (left lower) ventilation intraoperatively, after interruption of right lung ventilation, and it was considered unsafe to prolong the operation in order to proceed to radical dissection of lymph nodes that had been evaluated as normal by inspection, palpation and imaging studies. It should be taken into account that the 5- and 10-year survival rates after surgical treatment of typical carcinoid have been reported to exceed 95%, even in the presence of lymph node involvement²⁰.

The surgical management of carcinoids includes major lung operations (lobectomy-pneumonectomy), bronchoplastic procedures (simple or combined with lobectomy), sleeve resection and segmentectomy²⁰. The choice of the type of operation depends on the tumour location, the cardiopulmonary reserves (assessed by FEV1, FVC, DLCO

or VO₂max and predicted values after resection), the PS of the patient²¹ and the extent of the previous surgery^{10,20}. In a small series of patients with a documented history of prior pneumonectomy, lobectomy for metachronous malignancy did not improve the survival rate compared with minor operations²². Despite the fact that this patient did not present impaired lung function, bronchotomy was chosen in order to preserve as much lung tissue as possible, as he had already undergone left upper lobectomy and given the fact that the frozen section was not indicative of malignancy.

Endoscopic techniques, such as Nd:YAG laser, electrocoagulation, cryotherapy and mechanical removal, when performed in departments specialized in interventional bronchoscopy, constitute an alternative approach to curative resection of typical bronchial carcinoids. The prerequisites for endoscopic treatment suggested by most of the relevant studies are the following: a tissue diagnosis of typical carcinoid, a strictly intraluminal position, a central location of the tumour with no signs of peribronchial extension (bronchial wall, lymph nodes) or distant metastases, as documented by CT scan, octretotide scan or endobronchial ultrasound. The success rates and survival rates of endoscopic methods are comparable to those of the "gold standard" of surgical resection^{23,24}.

In conclusion, metachronous carcinoids of the lung are rare. The choice of the appropriate surgical procedure is of vital importance for combining the radical removal of the lesion with avoidance of major lung resection, in order to maintain the optimal quality of life for the patient.

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