How Should Synchronous Multiple Primary Adenocarcinomas of the Lung Be Resected?

Manabu Yasuda, MD, PhD, Akira Nagashima, MD, PhD, Akira Haro, MD, PhD, and Genkichi Saitoh, MD, PhD

Department of Chest Surgery, Kitakyushu Municipal Medical Center, Kitakyushu, Japan

We often encounter patients with multiple primary lung cancers with ground-glass opacity. However, there are no established guidelines regarding the optimal extent of resection for multifocal lung adenocarcinoma, so it is necessary to determine the most suitable strategy for each case. A 62-year-old man visited our hospital with 7 lesions in the lung field. We evaluated the structural information using high-resolution computed tomography (HRCT) and the aggressiveness of the tumors using fluorodeoxyglucose–positron emission tomography/CT (FDG-PET/CT) and then developed a surgical strategy. Using FDG-PET/CT in addition to HRCT might improve the selection of appropriate surgical strategies for patients with multifocal lung adenocarcinoma.

(Ann Thorac Surg 2014;97:e151–3)

© 2014 by The Society of Thoracic Surgeons

Computed tomography (CT) and high-resolution CT (HRCT) have led to increased detection of multifocal lung adenocarcinoma. However, there are no established guidelines regarding the treatment of synchronous multiple primary lung cancers. The question remains regarding which tumors should be followed without resection and which tumors should be resected. Consideration of the radiologic findings and location of the tumors, as well as the patient’s pulmonary function and systemic condition, is necessary to determine the most suitable strategy for each case. Recently, preoperative positron emission tomography/CT (PET/CT) assessment in addition to HRCT has proved useful to develop strategies for the surgical treatment of patients with solitary small lung adenocarcinoma [1]. The information from both HRCT and fluorodeoxyglucose (FDG)-PET might also enable the selection of an appropriate extent of resection for each lesion in cases of multifocal lung adenocarcinoma.

Technique

An asymptomatic 62-year-old man visited our hospital for an examination of abnormal shadows detected on a chest roentgenogram. He was a former smoker and had no familial history of malignancy. A computed tomographic scan showed 7 lesions in the lung field (4 on the right side and 3 on the left side) (Fig 1). There was no radiologic evidence of mediastinal lymphadenopathy or distant spread. A brain scan by magnetic resonance imaging was normal. We first examined the structural information of the 7 tumors obtained from the HRCT findings. The tumor in the right S8 segment of the lower lobe was mostly solid, and the other tumors included partial solid components with areas of ground-glass opacity (Fig 1). The size of the tumor in the right S6 segment (3.2 × 2.3 × 1.8 cm) was the largest, the tumor in the left S4 segment (0.4 × 0.4 × 0.3 cm) was the smallest of the 7 tumors, whereas 6 tumors were larger than 1.0 cm. We next evaluated the aggressiveness of the 7 tumors using FDG-PET/CT. The FDG uptake during PET scans showed a maximum standardized uptake value of 3.8 in the right S8 segment of the lower lobe, 1.8 in the right S6 segment of the lower lobe, and no accumulation in the other tumors (Fig 2). According to information from both the HRCT findings and FDG-PET, we concluded that the tumor in the right S8 region of the lower lobe had the most malignant behavior of all the tumors, and we developed a strategy for its resection. Lobectomy with lymph node dissection was needed for the tumor in the right S8 segment of the lower lobe because of the solid components detected by HRCT and the FDG accumulation detected by PET. Limited resection was considered to be suitable for the other 6 tumors because they had solid components detected by HRCT without FDG accumulation. The patient had no preoperative respiratory complications and was thought to be able to tolerate the operation based on the estimated postoperative respiratory function. We performed right lower lobectomy with lymph node dissection through a video-assisted thoracic operation and also performed wedge resection in the right S2 segment of the upper lobe and the right S4 segment of the middle lobe during the first operation, followed by wedge resection of the left S1 and S2 segments and S4 segment of the upper lobe and the S9 segment of the lower lobe in a second operation. The
Histopathologic diagnosis was papillary adenocarcinoma without lepidic growth in the right S8 segment of the lower lobe. No lymphovascular permeation or metastasis of the dissected lymph nodes was seen. One lesion was diagnosed as an atypical adenomatous hyperplasia (left S4 segment of upper lobe). The other 6 lesions were adenocarcinomas with lepidic growth (90% in the right S2 segment, 30% in the right S4 segment, 60% in the right S6 segment, 100% in the left S1 and S2 segments, and 10% in the left S9 segment). Based on the pathologic findings, these tumors were characterized as 7 synchronous primary lung adenocarcinomas. The postoperative recovery was favorable, and the patient has been well without recurrence for 1.5 years after the last operation.

Comment

Although the distinction of synchronous primary lung cancers from primary lung cancer with pulmonary metastasis has been discussed extensively, we often encounter multiple primary lung cancers with ground-glass opacity. It is difficult to treat these patients in clinical practice because guidelines for the treatment of such multiple lung cancers do not exist.

There have been a few reports describing surgical strategies for multiple lung cancers [2, 3]. Because of the preoperative conditions—such as the number of tumors and estimated postoperative respiratory function—limited resection is inevitable for patients with synchronous multiple primary lung adenocarcinomas. Nakata and colleagues [2] indicated that the area of ground-glass opacity on HRCT images could be a useful criterion for selecting surgical procedures and that wedge resection could be valid for pure ground-glass opacity lesions. Trousse and coworkers [3] reported that pneumonectomy should be avoided and that residual pulmonary function...
is an independent prognosticator of long-term survival. Recently, in cases of solitary small lung adenocarcinoma, information obtained from both FDG-PET/CT and HRCT has enabled the selection of limited surgical intervention with good outcomes [1]. In contrast to the anatomical images obtained by CT, PET with FDG quantitatively images glucose metabolism, which reflects the metabolic activity and proliferative potential of malignant tumors.

In our case, because the patient was considered to be able to tolerate a surgical approach for multiple lesions, we decided on the surgical extent for each tumor based on the information from both the HRCT findings and FDG-PET. We concluded that the tumor in the right S8 region, which appeared solid by HRCT and had high FDG accumulation by PET, had the most malignant behavior. Lobectomy with lymph node dissection was needed for the tumor, whereas limited resection was considered to be suitable for the others, which showed solid components on HRCT and low FDG accumulation by PET. Pathologically, 1 lesion (right S8 segment in the lower lobe) removed by lobectomy with lymph node dissection was found to be an invasive papillary adenocarcinoma, and the other lesions (excluding the right S6 segment in the lower lobe) removed by limited resection were noninvasive adenocarcinomas. One lesion (left S4 segment), which was diagnosed as an atypical adenomatous hyperplasia, was the smallest at approximately 4 × 4 mm (the other 6 tumors were larger than 10 mm).

In addition to the information from both HRCT and FDG-PET, the tumor size may also be an important factor determining the malignant behavior. Because there was a short postoperative observation period, further follow-up is needed to ascertain whether our approach is suitable for synchronous multiple primary lung adenocarcinomas.

Guidelines detailing the optimal treatment for multiple lung cancers are needed. Based on our experience, we recommend that preoperative HRCT, in addition to FDG-PET, be performed to provide information that is helpful for deciding on the optimal surgical approach for patients with synchronous multiple primary lung adenocarcinomas.

References