Lung Carcinoma with Polypoid Growth in the Main Pulmonary Artery: Report of Two Cases

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Invasion into the lumen of the main pulmonary artery is an uncommon mode of extension in lung carcinoma and its prognostic significance remains unclear. We describe here two resected cases of lung carcinoma that showed such a rare tumor spread. Although a preoperative evaluation, such as angiography or perfusion scan of the lung, had shown a significant decrease in circulation, we could not diagnose the intraluminal tumor growth preoperatively. Pneumonectomy was finally needed to perform a curative operation. The tumors were centrally located and showed polypoid growth in the main pulmonary artery. Postoperative pathological examination revealed the tumors to be adenosquamous carcinoma of the lung in both cases. No intrapulmonary metastases were detected. One patient is doing well with no signs of recurrence after a follow-up period of 10 years. Although intra-arterial polypoid growth of lung carcinoma is extremely rare, such tumor extension should be considered preoperatively to perform a curative surgical resection, especially when the tumor is centrally located. While arterial invasion is generally an ominous prognostic factor, curative surgical resection would offer a good prognosis, even for lung carcinoma invading the main pulmonary arterial trunk.

Key words: adenosquamous carcinoma – prognosis – resection

INTRODUCTION

Whereas microscopic vascular invasion by lung carcinoma is frequently observed, polypoid growth into the lumen of the main pulmonary vessels is quite rare. Several authors have reported that lung carcinoma could extend through the major pulmonary vein and up to the left atrium (1,2). However, such tumor growth into the lumen of the pulmonary artery has been documented infrequently (3–5). In this paper, we describe two resected lung carcinoma cases that showed such a rare growth pattern.

CASE REPORTS

CASE 1

A 66-year-old man, complaining of dry cough, was referred to our hospital with a diagnosis of lung carcinoma. He had smoked five cigarettes per day for 40 years. On physical examination, no abnormality was detected. Chest X-ray revealed an irregular shadow in the middle lobe, measuring 6 cm maximum tumor dimension. A computed axial tomographic (CAT) scan showed a centrally located lung tumor and significantly decreased circulation to the middle and right lower lobe was noted on pulmonary angiogram (Fig. 1). Preoperative
evaluation revealed no distant metastases and surgical resec-
tion of the tumor was planned. On thoracotomy, right middle
and lower lobectomy was initially intended because the tumor
was centrally located in the middle lobe and appeared to invade
the basal trunk of the pulmonary artery. However, intraluminal
tumor growth was found when we divided the intermediate
trunk of the pulmonary artery and therefore we selected intra-
pericardial pneumonectomy for complete resection. Macro-
scopically, the tumor invaded the intermediate trunk of the
pulmonary artery and extended into its lumen proximally up to
the right main trunk (Fig. 2). Although the tumor was divided
once at the level of the intermediate trunk, the surgical margin
was finally free from cancer invasion. Histologically, the
tumor was diagnosed to be adenosquamous carcinoma of the
lung with small foci of a spindle cell component. The spindle
cell component was mainly observed in the polypoid part of
the tumor which extended into the trunk of the pulmonary
artery. The dominant histology was squamous cell carcinoma.
Pathological stage was T2N1M0, stage IIB. The postoperative
course was uneventful and the patient is doing well with no
signs of recurrence 10 years after the operation.

Figure 2. Resected specimen (case 1). Tumor extension is noted in the inter-
mediate trunk of the right pulmonary artery (white arrow).

Figure 3. Perfusion lung scan, suggesting a severe decrease in circulation to
the left lower lobe (case 2). Only 17% of the total circulation was supplied to
the left lung.

Figure 4. Resected specimen (case 2). Polypoid tumor growth is found in the
left main pulmonary artery (white arrow).

CASE 2
A 55-year-old woman with a complaint of dry cough was
referred to our institute. She had a 26-year smoking history.
Chest X-ray and a CAT scan showed an irregular mass
centrally located in the left upper lobe, which measured about
5 cm maximum tumor dimension. The tumor was suspected to
have invaded the superior segment of the lower lobe. Preoper-
ative work-up revealed the tumor to be non-small cell lung
carcinoma with no distant metastases. Perfusion lung scan
suggested a severe decrease in circulation to the lower lobe and
only 17% of the total circulation was supplied to the left lung
(Fig. 3). First, we tried to perform a left upper lobectomy;
however, pneumonectomy was necessary for complete resec-
tion because of tumor invasion to the pulmonary arterial trunk.
Postoperative macroscopic investigation revealed a polypoid
tumor growth in the main pulmonary artery (Fig. 4). The
surgical margin was cancer-negative. Histologically, the tumor
had directly invaded the hilar lymph nodes and extended to the
pulmonary arterial trunk through them (Fig. 5). Histological
typing was adenosquamous carcinoma of the lung and it also
had small foci of a spindle cell component. The dominant
histology was adenocarcinoma (Fig. 6). Pathological stage was
T2N1M0, stage IIB. The patient had been free from any recur-
rent signs for 8 months, but she complained of a partial seizure
of her right hand due to multiple brain metastases which was
diagnosed by magnetic resonance imaging. She is now under-
going whole brain irradiation.

DISCUSSION
Lung carcinoma frequently invades pulmonary vessels histo-
logically and such vascular invasion has been reported to be an
ominous prognostic factor (6–9). On the other hand, macro-
scopic tumor growth into the lumen of the major pulmonary
vessels is relatively rare (1,2). In the case of the major pulmo-

ary artery, such intraluminal polypoid tumor extension is
extremely rare and very few cases have been reported (3–5). In
both of the cases reported here, the tumor had not only invaded
the pulmonary artery, but also extended proximally up to the main pulmonary artery against the bloodstream. Even such a rare pattern of tumor growth should be considered whenever lung cancer is centrally located and reduced circulation to the diseased lung is suspected; otherwise, incomplete resection and a subsequent fatal thromboembolic event might occur during the operation. Intraoperative ultrasonography could be useful for preventing such a disastrous event (10,11).

In the present cases, the histological typing of the tumor was adenosquamous carcinoma. This lung cancer subtype has been reported to be more aggressive than adenocarcinoma or squamous cell carcinoma of the lung (12). The characteristics of this tumor might be associated with intraluminal polypoid growth. The resistance of the main pulmonary artery, which is a strong barrier against other histological types of lung cancer, may not be strong enough to oppose adenosquamous carcinoma of the lung. However, since we present only two such cases, the relationship between adenosquamous histology and polypoid tumor growth in the main pulmonary artery remains to be clarified. Although the prognosis of adenosquamous carcinoma of the lung is reportedly worse than that of other types of lung carcinoma, one of our cases has survived for more than 10 years. Thus, even when macroscopic tumor invasion to the main pulmonary artery is observed, complete surgical resection of the tumor may offer an excellent prognosis.

The rarity of this tumor growth pattern makes it difficult to define its prognostic impact and pathological implications. For example, polypoid tumor growth in the pulmonary artery is thought to lead to dissemination of the tumor in the pulmonary circulation, resulting in multiple intrapulmonary metastases. However, in our two cases, such pathological findings were not observed. Peripheral pulmonary infarction or embolization might have occurred, but was not found in our cases.

In summary, we have presented two cases of lung carcinoma with polypoid growth into the lumen of the main pulmonary artery. This mode of tumor extension is rare and its prognostic significance remains unclear. Such tumor extension should be considered preoperatively to perform a curative surgical resection, especially when the tumor is centrally located. Although arterial invasion is generally an ominous prognostic factor, curative surgical resection should offer a good prognosis, even for lung carcinoma invading the main pulmonary arterial trunk.

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References