Ciliated Muconodular Papillary Tumor of the Lung: A Newly Defined Low-grade Malignant Tumor with CT Findings Reminiscent of Adenocarcinoma

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INTRODUCTION

A ciliated muconodular papillary tumor has been reported to be a peripheral low-grade malignant tumor, consisting of ciliated columnar cells and goblet cells with basaloid cell proliferation. Although ciliated muconodular papillary tumors have not yet been classified according to the World Health Organization classification, they can pose diagnostic and therapeutic problems. Here we report a resected case of ciliated muconodular papillary tumor with computed tomography findings reminiscent of adenocarcinoma, showing a small irregular nodule adjacent to the intersegment pulmonary vein. There was no uptake of F-18 fluorodeoxyglucose positron emission tomography. The patient underwent surgical resection, and a lobectomy was performed because intraoperative needle biopsy suggested neoplastic proliferation. No EGFR mutations were detected. No recurrence was noted during 24-month follow-up after lobectomy.

Key words: ciliated muconodular papillary tumor – cystic neoplasms – lung cancer – CT – FDG-PET – EGFR

CASE REPORT

A 76-year-old woman presenting with cough was referred to our hospital with a peripheral lung nodule. She had never smoked. Chest CT showed an irregular nodule 7 mm in diameter in the left upper lobe, adjacent to the intersegment pulmonary vein of V3a and seeming to extend across the left upper and lingular segments, suggesting malignant progression (Fig. 1a). No F-18 fluorodeoxyglucose (FDG) uptake was seen on FDG positron-emission tomography. Although the follow-up CT did not reveal any marked enlargement during a 23-month follow-up.

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over 6 months, the well-differentiated adenocarcinoma could not be excluded. Intraoperative needle aspiration cytology revealed many clusters of cells with enlarged nuclei, mitosis and mucoid material. Ciliated cells were also seen in these clusters. These findings suggested neoplasia, but were not definitive for malignancy. A left upper lobectomy and mediastinal lymph node dissection were performed. The resected specimen was characterized as a papillary tumor with central fibrosis, proliferating along the alveolar walls, surrounded by mucus lakes, and consisting of ciliated columnar cells (arrow) and goblet cells with basaloid cell proliferation.

Table 1. CT findings and treatment of reported cases of peripheral lesion with cilia

<table>
<thead>
<tr>
<th>Author</th>
<th>Diagnosis</th>
<th>Age/sex</th>
<th>CT findings</th>
<th>Size (mm)/location</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ishikawa</td>
<td>CMPT</td>
<td>50/f</td>
<td>ND (nodule)</td>
<td>15/RUL</td>
<td>Lobectomy</td>
</tr>
<tr>
<td>Harada</td>
<td>CMPT</td>
<td>62/m</td>
<td>Irregular-shaped nodule</td>
<td>9/LLL</td>
<td>Partial resection</td>
</tr>
<tr>
<td>Sato</td>
<td>CMPT</td>
<td>67/m</td>
<td>Nodule with GGO</td>
<td>8/RUL</td>
<td>Partial resection</td>
</tr>
<tr>
<td>Present case</td>
<td>CMPT</td>
<td>76/f</td>
<td>Irregular-shaped nodule</td>
<td>7/LUL</td>
<td>Lobectomy</td>
</tr>
<tr>
<td>Nakamura</td>
<td>Ex w/d Ad</td>
<td>65/m</td>
<td>Well-circumscribed nodule</td>
<td>11/LLL</td>
<td>Lobectomy</td>
</tr>
<tr>
<td>Aida</td>
<td>Papilloma</td>
<td>75/m</td>
<td>Mass with infiltrative shadow</td>
<td>10/LLL</td>
<td>Lobectomy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>53/f</td>
<td>III-defined nodule</td>
<td>14/LUL</td>
<td>Partial resection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>72/m</td>
<td>III-defined nodule</td>
<td>11/LUL</td>
<td>Partial resection</td>
</tr>
</tbody>
</table>

CMPT, ciliated muconodular papillary tumor; Ex w/d Ad, extremely well-differentiated adenocarcinoma with prominent cilia formation; papilloma, solitary peripheral ciliated glandular papilloma; ND (nodule), not described but nodule supposed; GGO, ground grass opacity; RUL, right upper lobe; RLL, right lower lobe; LUL, left upper lobe; LLL, left lower lobe.

**DISCUSSION**

Ishikawa (1) first proposed the new clinical entity of CMPT, characterized as a papillary tumor of the peripheral lung consisting of ciliated columnar and goblet cells, and possessing some pathological features suggesting malignant potential. There has been some discussion of this entity and the associated diagnostic problems. Including the patient described here, a total of five cases of CMPTs have now been reported in the literature (1–3). Ishikawa (1) maintained that the pathological findings suggesting malignant potential are (i) destroyed alveolar structures and central fibrosis, (ii) proliferation along the alveolar walls and skip lesions, (iii) no encapsulation, (iv) staining for carcinoembryonic antigen and (v) a micro-papillary pattern. Harada et al. (2) postulated that malignant potential was indicated by cell proliferation along the alveolar walls and the existence of skip lesions such as those seen in the bronchioalveolar cell carcinoma. On the other hand, the tumor cells had a low Ki-67 index and few cellular atypia. Sato et al. (3) reported immunostaining positive for carcinoembryonic antigen, thyroid transcription factor-1 and cytokeratin 7 but not for cytokeratin 20. These findings are almost identical to those observed for adenocarcinoma.
Another four cases of peripheral papillary tumor with cilia have been reported, three of which were solitary glandular papillomas of the peripheral lung (5), and one extremely well-differentiated adenocarcinoma with ciliated epithelial and goblet cells (4). Although light microscopic findings for solitary glandular papilloma were similar to CMPTs, immunohistochemical details of malignant characteristics were unclear. Differential diagnosis of these three similar entities is difficult, whereas nuclear atypia and mitosis are prominent in extremely well-differentiated adenocarcinoma.

Radiological or macroscopic findings for these nine peripheral papillary tumors with cilia, CMPT, solitary glandular papilloma and extremely well-differentiated adenocarcinoma are typically an irregular-shaped small (ca. 1 cm) nodule in eight cases and a ground grass opacity lesion with a central cavity (3) (Table 1). Enlargement during the follow-up was reported in two cases (3). Lobectomy was performed in four patients and partial resection in five. All survived without recurrence. Although partial resection or segmentectomy might be sufficient for these low-grade malignant or borderline tumors, pre- and intra-operative diagnosis was difficult and standard lobectomy remains the treatment of choice. With the increasing availability of thin-section CT, small lesions may be more frequently detected and further data collection is required for clarifying the radio-clinicopathological characteristics of these tumors.

**Conflict of interest statement**

None declared.

**References**