

[ CASE REPORT ]

## Endobronchial Small-cell Lung Cancer with Intraluminal Growth Pattern Showing “Finger-in-glove” Appearance

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### Abstract:

Invasion of the endobronchial mucosa by cancer cells is frequently seen in small cell lung cancer (SCLC), but an intraluminal polypoid growth pattern is extremely rare. We herein describe the case of a 69-year-old woman with limited-stage SCLC who had a pedunculated mass in the orifice of the right upper bronchus. Thin-section CT of the lung showed an endobronchial protruding mass accompanied by tubular and branching opacities (the so-called finger-in-glove sign) in the right upper lobe bronchus, which were enhanced by contrast media. She responded well to chemotherapy with concurrent radiation therapy. Although very rare, SCLC patients can have intraluminal polypoid growth, as was observed in this case.

**Key words:** chest computed tomography (CT), mucoid impaction, intraluminal polypoid mass, tubular and branching opacities

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### Introduction

The differential diagnosis of endobronchial lesions may include various disorders, including primary lung carcinoma, endobronchial metastasis from extra-pulmonary tumors, and non-malignant conditions. Patients with small cell lung cancer (SCLC) frequently show invasion of the endobronchial mucosa with an adjacent parenchymal mass or lymph node metastasis (1); however, an intraluminal growth pattern is extremely rare (2, 3). We herein describe the case of a 69-year-old woman with this type of SCLC showing a finger-in-glove appearance without an adjacent parenchymal lung mass on chest computed tomography (CT).

### Case Report

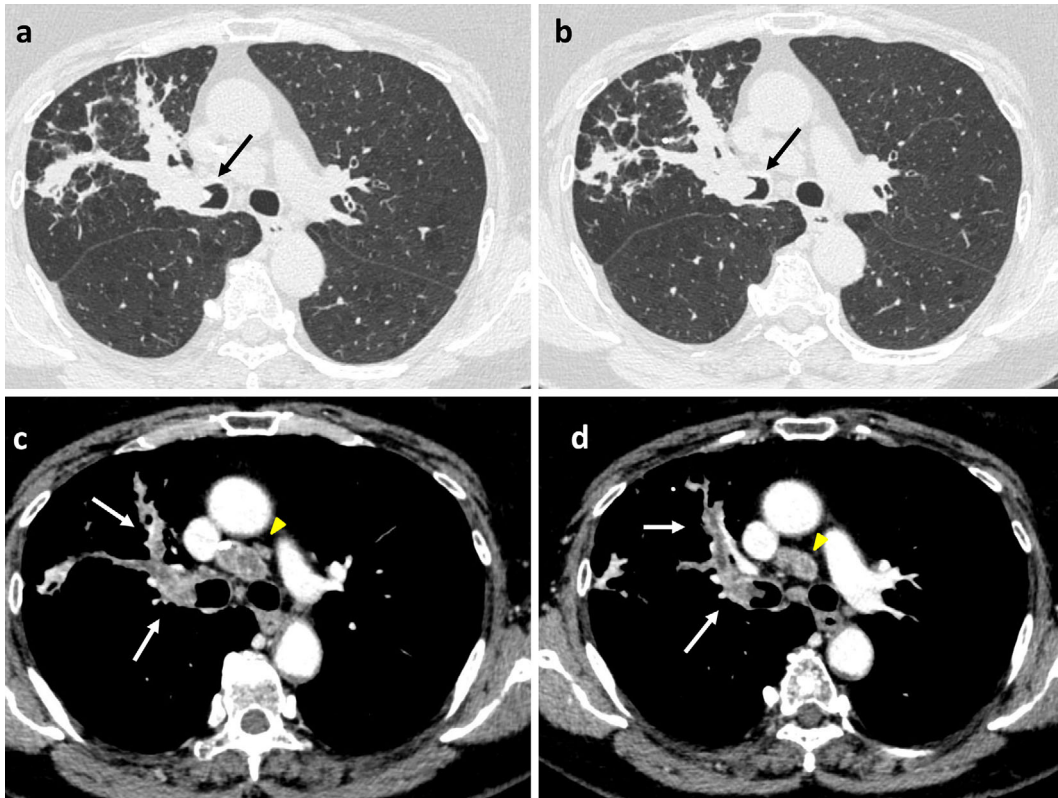
A 69-year-old woman with a 39 pack-year smoking history was referred to our hospital with dry cough and wheezing, which had persisted for 1 month. A physical examina-

tion revealed no superficial lymphadenopathy, and crackles were not audible on auscultation. The serum level of neuron-specific enolase was slightly elevated to 16.4 ng/mL, but the pro-gastrin releasing peptide level was within the normal range. Chest CT (Fig. 1) showed an endobronchial protruding mass in the right main bronchus. It was accompanied by tubular branching opacities in the right upper lobe bronchus (Fig. 1), the so called “finger-in-glove” appearance (1). These findings were partially enhanced by contrast media (Fig. 1c, d) and progressed rapidly within 4 weeks. Bronchoscopic examinations revealed a pedunculated mass in the orifice of the right upper bronchus (Fig. 2a), but there were no abnormal mucosal lesions around the polypoid mass. Transbronchial biopsy was performed from the polypoid mass. A histopathological examination revealed clusters of small atypical cells with scant cytoplasm and dark-blue hyperchromatic nuclei, which showed a coarse chromatin pattern and inconspicuous nucleoli (Fig. 3a). Immunohistochemistry was positive for CD56, chromogranin, and synaptophysin (Fig. 3b-d), but negative for leukocyte-common an-

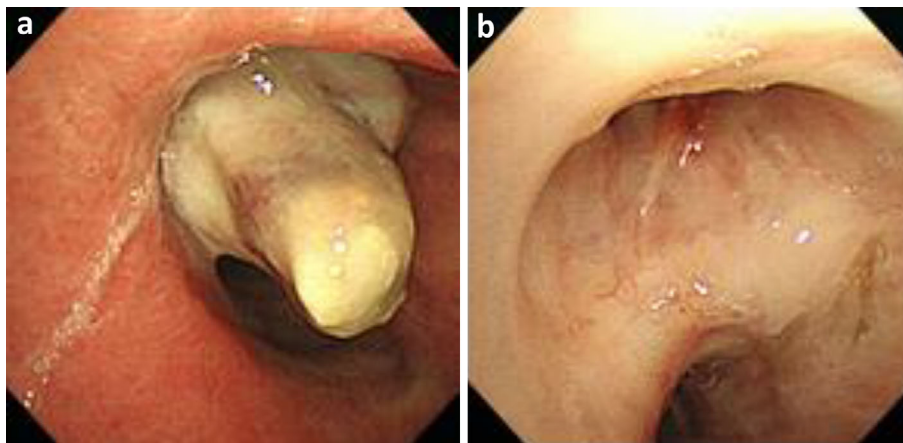
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**Figure 1.** Chest CT revealing an endobronchial protruding mass in the right main bronchus (black arrows) with tubular, branching opacities along the bronchioles (a, b: lung windows). Contrast-enhanced CT of the chest (c, d: soft-tissue windows), showing the partially enhanced intraluminal tumor (white arrows) and mediastinal lymph node swelling (yellow arrowheads).



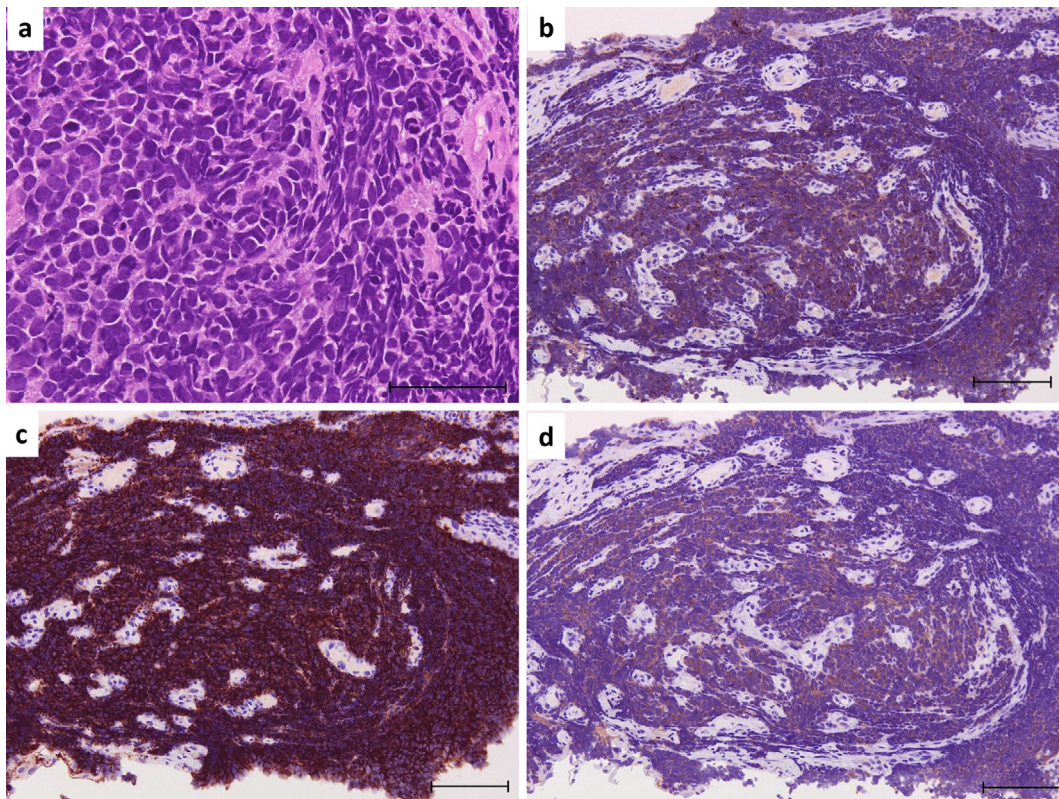
**Figure 2.** (a) Bronchoscopy revealed a pedunculated mass in the orifice of the right upper bronchus, obstructing over 90% of the lumen. (b) After chemoradiotherapy, the intraluminal tumor was markedly reduced.

tigen. These pathological findings were consistent with small-cell carcinoma, but not with carcinoid tumor or large cell neuroendocrine carcinoma. Mediastinal lymph node metastasis was diagnosed by endobronchial ultrasound-guided transbronchial needle aspiration from the #4R lymph nodes. Contrast enhanced brain magnetic resonance imaging, abdominal CT, and bone scintigraphy did not identify any other metastatic lesions. She was therefore diagnosed with limited-stage SCLC. She received chemotherapy consisting

of four courses of cisplatin (80 mg/m<sup>2</sup>, day 1) and etoposide (100 mg/m<sup>2</sup>, days 1-3) with concurrent radiation therapy (total dose, 45 Gy). Post-treatment images (Fig. 4) and bronchoscopic findings (Fig. 2b) showed marked resolution.

## Discussion

SCLCs mainly arise from the lobar or main bronchi; the most common manifestation is a centrally located mass in



**Figure 3.** (a) A histopathological examination of the endobronchial tumor revealed clusters of small atypical cells with dark-blue hyperchromatic nuclei and scant cytoplasm, consistent with small-cell carcinoma. The nuclei showed a coarse chromatin pattern with inconspicuous nucleoli. Hematoxylin and Eosin staining; bar indicates 50 $\mu$ m. Immunohistochemistry was positive for chromogranin (b), CD56 (c) and synaptophysin (d). Scale bars indicate 100 $\mu$ m.

the lung parenchyma with hilar and mediastinal lymph node swelling (4). Approximately 80% of SCLC patients are reported to have endobronchial mucosal invasion by cancer cells at the initial diagnosis (1). The bronchoscopic findings in these cases usually reveal a narrowed bronchus or obstruction with a reddened and edematous mucosa and sessile lobulated nodules. Our case is rare in that endobronchial lesions of SCLC showed an intraluminal growth pattern with a well-circumscribed smooth surface and a movable polypoid mass without an adjacent parenchymal lung tumor. There have been few reports about these bronchoscopic findings in patients with SCLC (2, 3).

Thin-section chest CT in our case depicted tubular and branching opacities which radiated from the hilum toward the periphery of the lung. These radiological findings are classically described as the “finger-in-glove sign” (5). When mucus and other secretions are retained in the airway by obstruction of the intraluminal tumor, CT images may show low-attenuation materials along the airway. On the other hand, some parts of the tubular and branching opacities were slightly enhanced, in addition to the low attenuation that was observed in our patient. This may indicate that in addition to the central obstruction of the airway and mucus filling in the distal aspect, the intraluminal tumor growth itself may have a finger-in-glove appearance on chest CT.

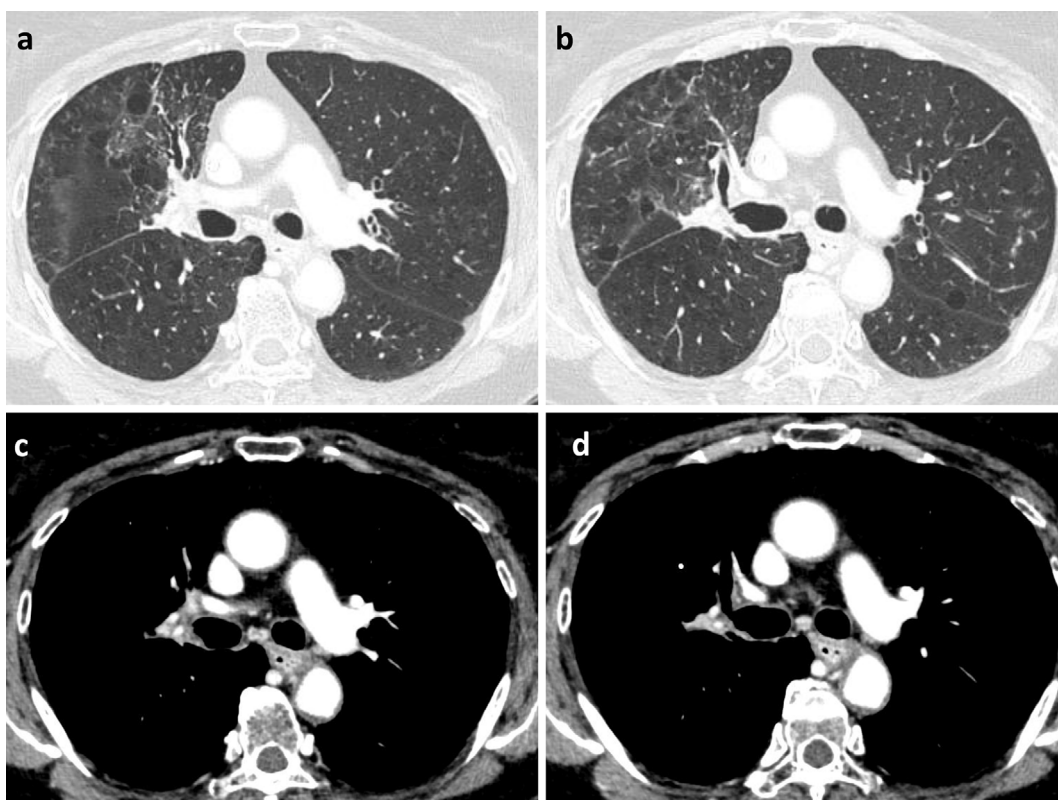
A previous study reported a much higher rate of recur-

rence and a worse response to chemotherapy in SCLC patients with endobronchial mucosal invasion by cancer cells (1). Our patient had intraluminal polypoid growth of tumor cells, but no abnormal mucosal lesions were observed around the polypoid mass on bronchoscopy. Because we did not perform mucosal biopsy, it was unclear whether mucosal invasion by cancer cells had occurred around and distal to the polypoid mass. Our patient responded well to chemotherapy with concurrent radiation therapy. After four courses of chemotherapy, the almost complete disappearance of the tumors was confirmed on bronchoscopy and chest CT. A complete response has been maintained for 6 months without further treatment. It is not clear whether the good response to initial treatment was a peculiarity of this case or not. Further study is needed to investigate whether SCLC with an intraluminal polypoid growth pattern respond better to chemotherapy and radiotherapy than SCLC with submucosal invasion.

### Conclusion

Although very rare, SCLC patients can have intraluminal polypoid growth, as was observed in this case. Standard treatment should be performed, even for patients with SCLC who develop this type of growth pattern.

**The authors state that they have no Conflict of Interest (COI).**



**Figure 4.** Chest CT after two courses of chemotherapy with concurrent radiation therapy, revealing the marked resolution of the tubular, branching opacities (a, b: lung windows). Contrast enhanced CT of the chest (c, d: soft-tissue windows) revealed the marked resolution of the tubular, branching opacities.

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