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CASE REPORT

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Minute pulmonary meningothelial-like nodule that was difficult to differentiate from lung adenocarcinoma due to specific computed tomography findings changes: A case report

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Abstract

Minute pulmonary meningothelial-like nodules (MPMNs) are benign lesions characterized by the appearance of ground-glass nodules (GGN) on computed tomography (CT). In the present case, an MPMN gradually developed into a substantial component during chest CT follow-up, and the GGN gradually transformed into a part-solid nodule. The imaging course described in this case is quite unique. Such CT images are characteristic of malignant tumours, especially, highly differentiated adenocarcinomas, which are difficult to differentiate preoperatively. Therefore, it is important to report this case.

KEYWORDS
adenocarcinoma, case report, computed tomography, ground-glass nodules, MPMN

INTRODUCTION

Minute pulmonary meningothelial-like nodules (MPMNs) are small, benign lung lesions. Korn et al. first reported this condition in 1960.[1] We encountered an MPMN that initially appeared as a pure ground glass nodule (GGN) on chest computed tomography (CT) and changed to a part-solid nodule after a certain observation period. This course is difficult to distinguish from that of an adenocarcinoma. We consider this to be an important case and report it here.

CASE REPORT

A 58-year-old woman was revealed with a 10-mm pure GGN in S6 of the right lower lobe on chest CT during a medical check-up (Figure 1A). Laboratory examination showed that serum Carcinoembryonic Antigen (CEA) was 1.8 ng/mL, Pro-gastrin-releasing peptide (Pro-GRP) was 49.0 pg/mL, and Cytokeratin 19 fragment (CYFRA) was 1.9 ng/mL, all of which were normal. Since benign disease was likely but malignant disease could not be ruled out, the patient underwent chest CT every 6 months. Subsequently, 1 year after the initial examination, the GGN changed to a part-solid GGN with a solid pattern of approximately 1 mm in the center of the GGN (Figure 1B), and the solid pattern was further enlarged by 1 year and 6 months after the initial examination (Figure 1C). Pecting a highly differentiated adenocarcinoma, we planned a surgical biopsy 1 year and 8 months after the initial diagnosis.

A video-assisted thoracic surgery (VATS) was performed. The lesion was resected using wedge resection, and a frozen section diagnosis was made. Histologically, the lesion might have been an MPMN. However, some cells showed nuclear enlargement, and malignancy could not be ruled out. Considering the chest CT and clinical background, the possibility of malignancy, especially highly differentiated adenocarcinoma, could not be ruled out, and VATS S6 segmentectomy and mediastinal lymph node

Takuya Ohashi and Mitsumasa Kawago contributed equally to this work.

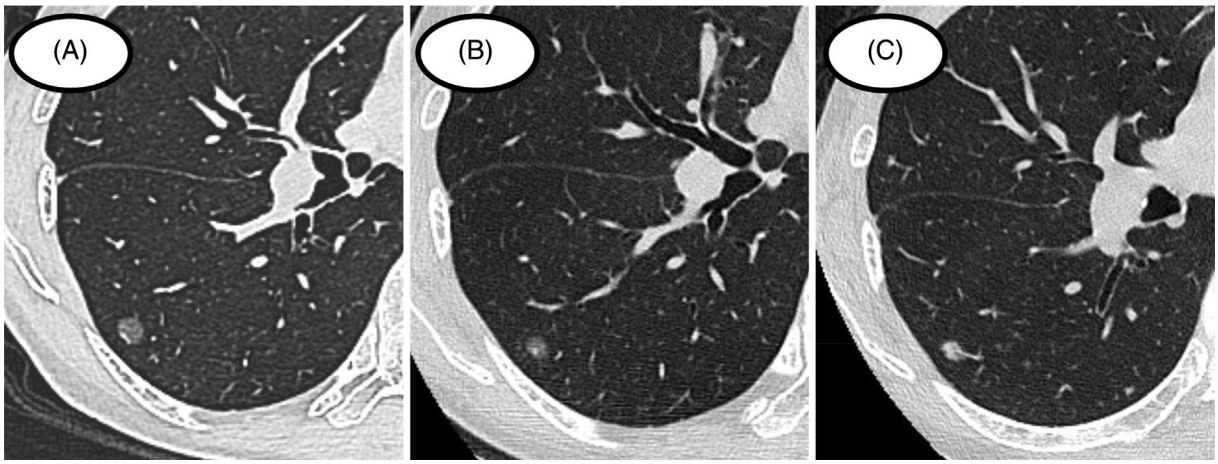

FIGURE 1 Chest computed tomography (A) at initial visit, (B) 1 year months later, and (C) 1 year and 6 months later.

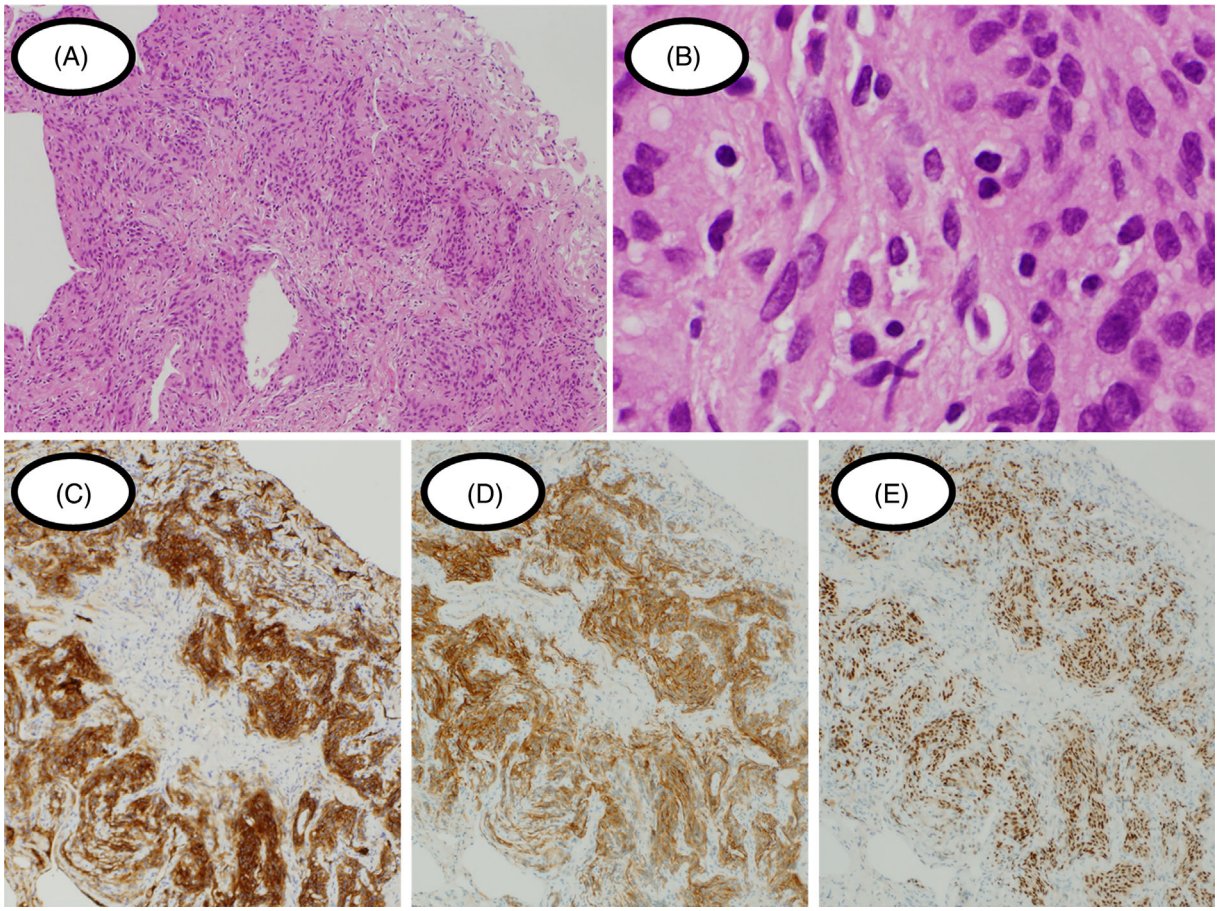

FIGURE 2 Haematoxylin Eosin staining (A) low magnification (×40), (B) high magnification (×400). Immunohistochemistry staining showed positivity for EMA (C), CD56 (D), and PgR (E).

dissection were performed. The patient was calm postoperatively and was discharged 5 days after surgery.

The resected specimen showed the presence of meningocutaneous nodules at low magnification (Figure 2A) and was composed of spindle-shaped epithelial cells at high magnification (Figure 2B). Immunohistochemistry revealed that the cells were positive for the epithelial membrane antigen (EMA), CD56, and progesterone receptors (PgR) (Figure 2C–E). Based on these findings, the patient was diagnosed with an MPMN.

DISCUSSION

An MPMN is a lesion that appears as a small nodule (1–5 mm) and is present in approximately 7% of surgical specimens.[2] Zhang et al. reported that over half of the cases diagnosed with MPMN were incidentally present in the resected lung after surgery for another disease. The MPMN was not recognized preoperatively on CT and was recognized only after pathological examination of the lungs. Of the 46 patients with preoperative CT evidence, 43 had only incidental evidence of MPMN during follow-up of neoplastic lesions or inflammatory lesions, such as pneumonia or tuberculosis. MPMN is diagnosed incidentally postoperatively in many cases. In very few cases, surgeons recognize the possibility of MPMN preoperatively on CT.

CT findings of MPMN often show pure GGN, although some reports have shown part-solid and solid nodules. Characteristic imaging findings, such as central cavitation and ring-like lucency, have also been reported.[3] These findings are seen only in a limited number of cases, and diagnosing MPMN using imaging alone is difficult.

The differential diagnosis when a GGN is observed on CT may include various diseases, including atypical adenomatous hyperplasia (AAH), neoplastic lesions such as minimally invasive adenocarcinoma (MIA), invasive adenocarcinoma, metastatic lung tumours, and inflammatory lesions such as miliary tuberculosis and pneumonitis. Differentiation of neoplastic lesions is very important.

Kakinuma et al.[4] followed 1229 patients with GGN on CT for 4.3 years: 12 of the 91 patients (13.2%) who underwent surgical resection were diagnosed with invasive adenocarcinoma. In addition, of the 49 cases that changed to part-solid nodules and underwent surgical resection, 12 were invasive adenocarcinomas (9 lepidic, 2 acinar, and 1 solid), 10 were MIA, and 10 were AIS. 48 of the 49 patients had noninvasive or invasive adenocarcinomas. The change from GGN to part-solid nodules is likely a characteristic of adenocarcinoma.

There are only a few reports of long-term follow-up of MPMN. Zhang et al.[5] reported that diffuse GGNs remained unchanged in size and morphology over a follow-up imaging period of approximately 2 years and 7 months.

Thus, typically, MPMN are benign lesions not associated with imaging changes. There have been few reports of an increase in the number of MPMN in multiple lesions over time. Although rare, Murata et al.[6] reported an increase in the number of diffuse GGN at 4 months, which were difficult to distinguish from metastatic lung tumours on CT imaging.

This case is an MPMN that showed a change in shading from pure GGN to part-solid nodules during CT follow-up. To the best of our knowledge, there have been no previous reports of a similar change; thus, we consider this case meaningful.

Diagnosis of frozen sections indicated the possibility of MPMN. However, the possibility of adenocarcinoma was not ruled out because the frozen section diagnosis did not completely rule out malignancy and had diagnostic limitations.[7] Therefore, segmentectomy was performed. We consider our decision reasonable, but it is important to report this case because it may have influenced our decision to treat the patient if the existence of an MPMN with a course similar to that of this case had been known to the public.

As mentioned above, GGN changes to a part-solid nodule during the course of the disease are imaging findings that strongly suggest adenocarcinoma. When making treatment decisions, it should be considered that MPMN with a course similar to that observed in this case may also exist.

AUTHOR CONTRIBUTIONS

Takuya Ohashi and Mitsumasa Kawago were involved in study design and data interpretation. Masahiro Sakaguchi, Hideto Iguchi and Yoshiharu Nishimura were involved in the data analysis. Kanako Sagan and Fumiyoshi Kojima examined the pathology. All authors critically revised the report, commented on drafts of the manuscript, and approved the final report.

CONFLICT OF INTEREST STATEMENT

None declared.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

The authors declare that appropriate written informed consent was obtained for the publication of this manuscript and accompanying images.

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