Lung Adenocarcinoma Presenting With Enlarged and Multiloculated Cystic Lesions Over 2 Years

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We report a case of lung adenocarcinoma in which cystic lesions enlarged and multiloculated over 2 years. Histological examination of the resected specimen found proliferation of nonmucinous adenocarcinoma cells along the alveolar walls, revealing bronchioloalveolar cell carcinoma type extension. In cystic lesions, particularly those not associated with inflammation, lung adenocarcinoma, particularly bronchioloalveolar cell carcinoma type, should be a diagnostic consideration.
Key words: adenocarcinoma, bronchioloalveolar cell carcinoma, multilocular, cyst, cavitation. [Respir Care 2004;49(12):1522–1524.

Introduction

Cyst formation is occasionally observed in lung cancer. However, multilocular cysts are extremely rare in this type of carcinoma. We report a case of lung adenocarcinoma presenting with cystic lesions that enlarged and become multiloculated over 2 years, as a consequence of bronchioloalveolar-carcinoma-like development.

Case Summary

An asymptomatic 67-year-old woman was admitted to Hokkaido University Medical Hospital for evaluation of pulmonary cystic lesions in the left lower lobe that had enlarged and become multiloculated over 2 years. She was a lifelong nonsmoker and reported no unusual travel history or occupational exposure.

At presentation she appeared to be in good health. Physical examination and routine laboratory investigations (that included tumor markers) revealed no abnormalities. Tuberculin reaction was negative. A chest computed tomogram performed as part of a screening program at another institution about 2 years before had shown, for the first time in this patient, a solitary cystic lesion surrounded by ground-glass opacities in the left lower lobe (Fig. 1A). No preexisting cystic lesion had been identified in her until that time. Over the 2 years since that first tomogram, the cystic lesion had enlarged and become multiloculated, but without volume loss of the left lower lobe (Fig. 1B and 1C). However, there was no hilar or mediastinal lymphadenopathy. Cytological examination of transbronchial brushings and washings, and transbronchial biopsy specimens from the lesions revealed adenocarcinoma. Left lower lobectomy was subsequently performed. Macroscopic examination of the resected lung revealed multiloculated cystic lesions associated with poorly demarcated white-gray consolidations around the cysts (Fig. 2). Histological examination showed nonmucinous adenocarcinoma cells had proliferated along the alveolar walls, revealing bronchioloalveolar carcinoma type extension. Papillary type adenocarcinoma was seen only in the central portion of the

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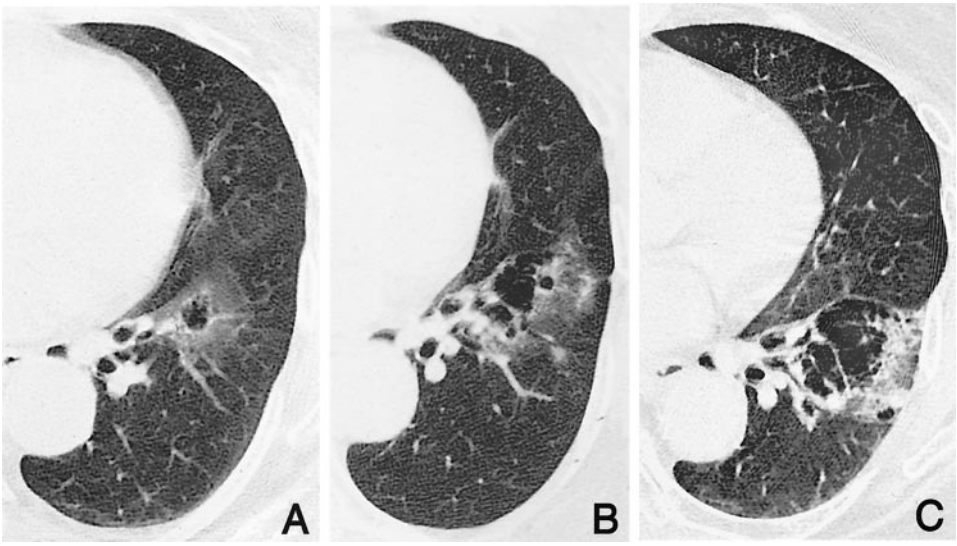

Fig. 1. Chest computed tomograms (A: August 2000, B: November 2001, C: September 2002) reveal that a solitary cystic lesion surrounded by ground-glass opacities in the left lower lobe enlarged and became multiloculated over a 2-year period.

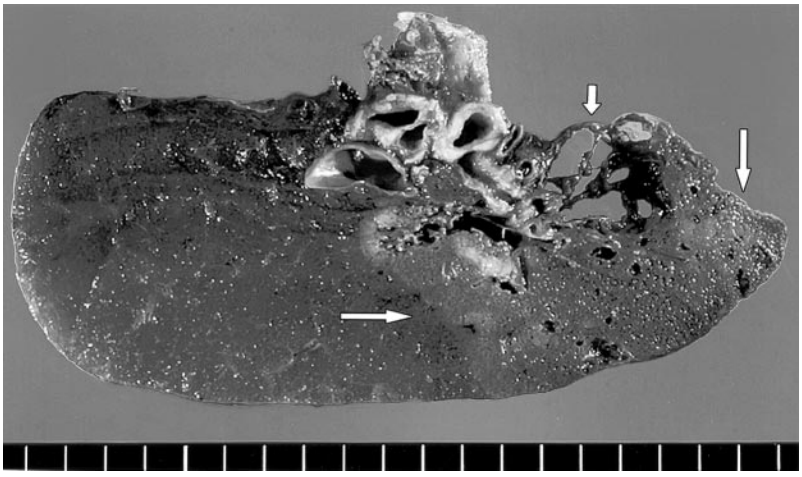

Fig. 2. Macroscopically, multiloculated cystic lesions (short arrow) were associated with poorly demarcated white-gray consolidations around the cysts (long arrows).

tumor (Fig. 3A and 3B). The multiloculated cystic lesions turned out to be enlargement of air space, with emphysematous appearance; the wall of the air space was composed of tumor cells (Fig. 3C).

Discussion

In primary lung cancers the pathogenesis of cavitation and/or cyst formation is generally considered to have the following mechanisms: (1) central necrosis within the tumor, (2) check-valve obstruction of the conducting bronchus by tumor cells, (3) disruption of the alveolar wall by tumor cells, (4) development in preexisting cystic lesions such as bullae, cysts, or honeycombing, (5) rupture of the alveolar wall due to mucus retention, (6) autophagocytosis of tumor cells, and (7) cyst formation, representing an intrinsic property of the tumor.[1–3] The present case is extremely rare in that enlarged and multiloculated cystic lesions were observed in bronchioloalveolar-carcinoma-like development of lung adenocarcinoma.

Bronchioloalveolar carcinoma is defined as a generally well-differentiated peripheral primary lung adenocarcinoma that does not disrupt the overall lung architecture.[4] The tumor cells typically displace the preexisting alveolar epithelium and proliferate along the alveolar walls, with preservation of bronchial patency, unlike other types of primary lung cancer that invade and destroy the lung parenchyma. The most common radiologic manifestation in bronchioloalveolar carcinoma is lobar or diffuse consolidation, and some cases have solitary nodules or multiple

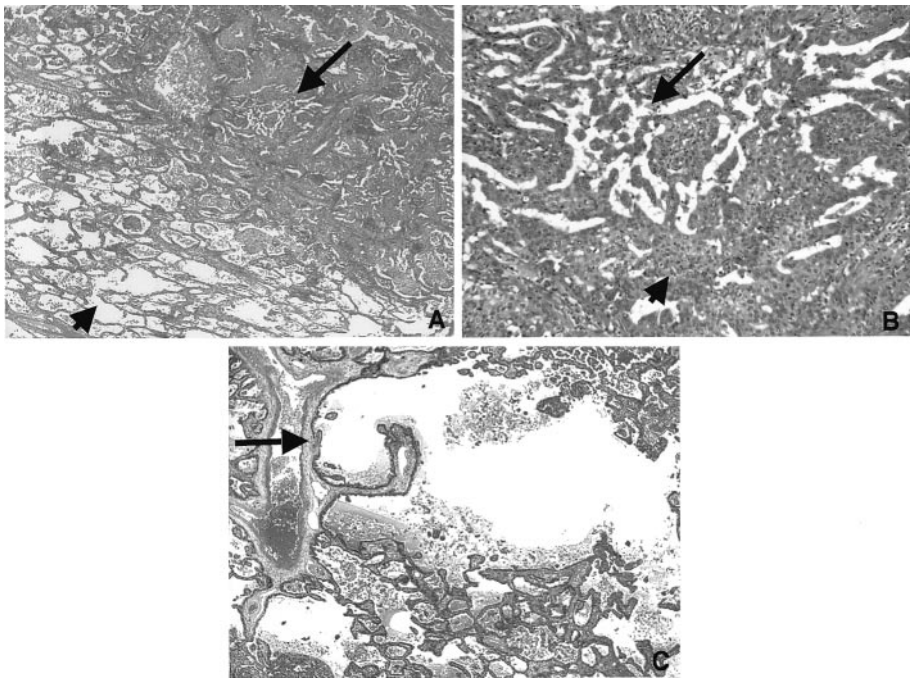

Fig. 3. Histological examination demonstrated (A) nonmucinous adenocarcinoma cells proliferated along the alveolar walls, revealing BAC type extension (short arrow) and papillary type adenocarcinoma were seen only in the central portion of the tumor (long arrow) (hematoxylin and eosin staining, × 40), (B) papillary type adenocarcinoma were seen (long arrow) and tumor cells partly filled the alveolar space (short arrow) (hematoxylin and eosin staining, × 100), and (C) adenocarcinoma cells extended along the air space (arrow) (hematoxylin and eosin staining, × 40).

nodules.[5] However, cavitation is unusual in bronchioloalveolar carcinoma,[6–8] having been reported to occur in only 7% of patients in 2 large series.[7,8] Furthermore, multilocular cysts are extremely rare in bronchioloalveolar carcinoma and, to the best of our knowledge, only a small number of cases with multiloculated cysts have been reported.[9,10] Cyst enlargement in bronchioloalveolar carcinoma can generally be caused by check-valve obstruction at the conducting bronchus, disruption of the cyst wall by tumor cell proliferation or mucus retention, or elastic traction by surrounding lung tissues. In the present case the cystic lesion exhibited enlargement of air space, with emphysematous appearance; the wall of the air space was composed of adenocarcinoma cells.

However, our patient had neither check-valve obstruction at the conducting bronchus nor mucus retention. Furthermore, neither cystic nor fibrotic change was found in the lung tissue, except in the tumor, and no preexisting lung disease was evident. Therefore, we speculate that, over a period of 2 years, adenocarcinoma cells extended along the alveolar walls and destroyed the alveoli without disrupting overall lung architecture, resulting in enlarged and multiloculated cystic lesions.

In summary, this report describes a case of pulmonary adenocarcinoma presenting with cystic lesions that had enlarged and multiloculated over 2 years. In cystic lesions, particularly those not associated with inflammation, lung adenocarcinoma, particularly bronchioloalveolar-carcinoma-type, should be a diagnostic consideration.

REFERENCES

1. Adams DO. The granulomatous inflammatory response: a review. Am J Path 1976;84(1):164–191.
2. Ohba S, Takashima T, Hamada S, Kitagawa M. Multiple cystic cavitary alveolar-cell carcinoma. Radiology 1972;104(1):65–66.
3. Imai S, Sekigawa S, Yamamoto H, Tsubura Y, Miyanaga M, Narita N, et al. Bronchioloalveolar adenocarcinoma with multiple cysts. Acta Pathol Jpn 1982;32(4):677–682.
4. Travis WD, Colby TV, Corrin B, Shimosato Y, Brambilla E. Histological typing of lung and pleural tumours, 3rd ed. Geneva: World Health Organization;1999:36–38.
5. Aquino SL, Chiles C, Halford P. Distinction of consolidative bronchioloalveolar carcinoma from pneumonia: do CT criteria work? AJR 1998;171(2):359–363.
6. Berkmen YM. The many faces of bronchiolo-alveolar carcinoma. Semin Roentgenol 1977;12(3):207–214.
7. Greco RJ, Steiner RM, Goldman S, Cotler H, Patchefsky A, Cohn HE. Bronchoalveolar cell carcinoma of the lung. Ann Thorac Surg 1986;41(6):652–656.
8. Hill CA. Bronchiolo-alveolar carcinoma: a review. Radiology 1984; 150(1):15–20.
9. Weisbrod GL, Chamberlain D, Herman SJ. Cystic change (pseudocavitation) associated with bronchioloalveolar carcinoma: a report of four patients. J Thorac Imaging 1995;10(2):106–111.
10. Prichard MG, Brown PJ, Sterrett GF. Bronchioloalveolar carcinoma arising in longstanding lung cysts. Thorax 1984;39(7):545–549.