

Rupture of a Large Cell Neuroendocrine Carcinoma, Causing Early Local Recurrence

Kazuo Yoshida, MD,¹ Keiichiro Takasuna, MD,² Kazutoshi Hamanaka, MD,¹
Gaku Saito, MD,² Masayuki Haniuda, MD,³ and Jun Amano, MD¹

We present a case of large cell neuroendocrine carcinoma (LCNEC) requiring an urgent operation due to a rupture-induced shock. Primary lung cancers rarely rupture. This event could have spread malignant cells. Our patient died of pleural dissemination at day 81 after the operation. We had difficulty diagnosing the lesion before rupture despite various examinations including biopsy. In cases of a large, growing, cavitating mass, we should consider the possibility of malignant tumor, and a surgical approach to prevent rupture. A ruptured malignant tumor may also be treated by adjuvant therapy rather than resection. (Ann Thorac Cardiovasc Surg 2006; 12: 56–9)

Key words: lung cancer, rupture, surgical approach, large cell neuroendocrine carcinoma, recurrence

Introduction

Spontaneous pneumothorax or hemopneumothorax occurs occasionally in patients with primary lung cancer. In lung cancer cases, we encounter these at 0.4-4%.^{1,2)} However, ruptured tumors are not commonly seen. Tumors involving the lung/pleura may cause this event. Perioperative rupture could later cause dissemination in a pleural cavity and the opposite bronchial tree. The prognosis in these cases is poor. We present a case where the preoperative rupture of a large cell neuroendocrine carcinoma (LCNEC) resulted in an early recurrence.

Case

A 60-year-old male presented at a community hospital with a 39°C fever on December 11, 2002. He had smoked

20 cigarettes a day for 18 years. A chest x-ray showed a mass shadow, 11×9 cm, in his right upper lung field (Fig. 1), and he was admitted for investigation to our hospital. Chest CT imaging showed a 9.5 cm diameter, heterogeneous, regular-shaped mass with an enhanced capsule and diffusely enhanced content (Fig. 2). The serum level of the tumor markers (CEA, SCC, NSE, proGRP, CYFRA) were not elevated. Bronchoscopic brushing, sputum cytology and ultrasonic-guided biopsy failed to show malignant cells. These findings indicated that this lesion was a pulmonary abscess. Even though antibiotics (SBT/ABPC, MEPM) reduced the fever, and WBC and CRP improved, the mass enlarged slightly. On January 19, 2003, he suddenly had a major hemoptysis and went into shock. His physical examination was : BP 70/50 mmHg; HR135/min; breath sounds were diminished in the right upper field. Chest x-ray revealed considerable hemopneumothorax. A rupture of the lesion in right upper lobe (RUL) was suspected. An urgent thoracotomy was performed through a posterior-lateral incision. There was a lot of hemorrhage in the pleural cavity. In the RUL there was widespread necrosis and a rupture 5 cm in length (Fig. 3). The RUL was resected. The Pleural cavity was washed out with saline before closure.

Macroscopically, the RUL was ruptured with necrotic contents (Fig. 3). Microscopic examination showed that

From ¹Department of Surgery, Shinshu University, School of Medicine, Matsumoto, ²Department of Thoracic Surgery, Ina Central Hospital, Ina, and ³Department of Chest Surgery, Aichi Medical University, Aichi, Japan

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Address reprint requests to Kazuo Yoshida, MD: Department of Surgery, Shinshu University, School of Medicine, 3-1-1 Asahi, Matsumoto, Nagano 390-8621, Japan.



Fig. 1. Chest X-ray showed a large mass shadow (11×9 cm) in right upper lung field.

the tumor consisted of hemorrhage and abscess with necrosis mostly, and a LCNEC with large nuclei, oat-shaped cells and rosetta formations (Fig. 4). Immunohistochemistry revealed cells positive for Synaptophysin, but negative for LCA and CGA.

The patient suffered ARDS due to aspiration pneumonia on day 11 after the operation. Management by ventilation with nitric oxide inhalation and medication overcame this episode. He was weaned from the respirator on day 46. He had right anterior chest pain, and a chest CT on day 63 showed an enormous mass in the right upper pleural cavity. We could not perform a biopsy for this mass because an informed consent could not be obtained. This mass enlarged very rapidly. Pain and general condition deteriorated. The patient died following a massive hemoptysis on day 81.

Discussion

Spontaneous pneumothorax and/or hemothorax are not uncommonly seen in patients with primary lung cancer and secondary lung cancer.^{1,2)} These events occur in 0.4-4% with primary lung cancer. O'Connor et al.,³⁾ suggests that the group composed of those known to have a lung neoplasm who suffer spontaneous pneumothorax later probably has two categories: Those responding to treatment, and progressive malignancy. Our patient is in this latter category. However, these cases include mostly mi-



Fig. 2. Chest CT imaging showed a 9.5 cm diameter, heterogeneous, regular-shaped mass with an enhanced capsule and diffusely enhanced content.



Fig. 3. Macroscopic findings of resected right upper lobe (RUL). Tumor (T) ruptured and visceral pleura was torn in 5 cm (arrows).

nor ruptures rather than serious ruptures causing shock. All primary lung cancer cell types may rupture. Takagi et al. reported 35 cases of squamous cell carcinoma; 19 of adenocarcinoma; 10 of large cell carcinoma; and 5 of small cell carcinoma.⁴⁾ There are also various origins of metastatic lung cancer with hemopneumothorax.⁵⁻⁷⁾ Ruptures in patients with lung cancer can be attributed to the following mechanisms: direct invasion of the pleura by malignancy, or rupture of dilated alveoli distal to an obstructing neoplasm into the pleural space.^{1,8)} Laurens et al.²⁾ also described spontaneous pneumothorax in primary cavitating lung carcinoma. Uneven blood supply or the obstruction of a feeding artery by a growing tumor is

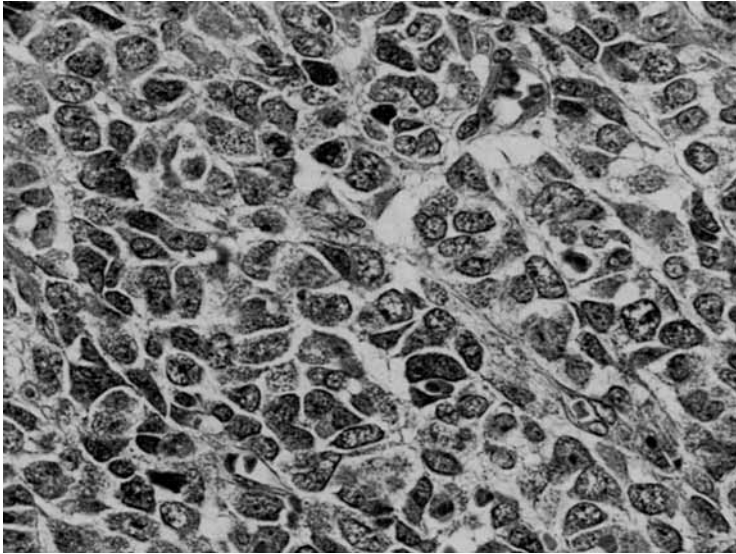


Fig. 4. Microscopic findings revealed large nuclei, oat-shaped cells and rosetta formations. (HE, $\times 40$)

thought to be critical for cavitation. LCNEC are likely to rupture, as in our case, because they feature extensive necrosis that could produce a fragile cavity. However, ruptures that cause shock (as our case), rarely arise. Some authors reported ruptured non-primary pulmonary tumors. Akamatsu et al.⁶⁾ reported a case of pulmonary rupture with pulmonary leiomyosarcoma that required urgent operation. Akimaru et al.⁷⁾ described a ruptured lung metastasis of hepatocellular carcinoma that caused shock. Few cases of rupture of primary lung cancers cause serious problems. We could not exclude the possibility of a lung abscess pre-operatively, in our case, since examinations including biopsy did not indicate malignancy. Chemotherapy with antibiotics, therefore, was given first priority. Obstruction by carcinoma resulted in local infection. Then, increased internal space pressure caused by fluid content, and direct invasion by the tumor, may have caused the rupture. The large mass with the long ruptured wound resulted in blood loss and acute in shock. We should have considered surgical treatment for the large growing cavitating mass as well as administering chemotherapy, even though biopsy failed to prove malignancy.

The spread of malignant cells by rupture of a primary lung carcinoma is an uncommon occurrence. Van Damme et al.⁵⁾ reported two peri-operatively ruptured hemangiopericytoma cases that caused early local recurrence, as in our case. There is little information on available treatment to prevent spreading malignant cells in case of rupture. Some authors describe the beneficial effect of

intrapleural hyperthermo-chemotherapy for pleural dissemination.^{9,10)} This adjuvant therapy may also be appropriate for a ruptured malignant tumor. Because malignant cells may not be adherent in the pleural space in a peri-operative ruptured case, this therapy may be more effective than in a case with existing pleural dissemination. However, since there are few peri-operative rupture cases reported, further studies are clearly required. Although we considered these therapies during operation, the patient's poor condition precluded them.

Conclusion

We report a case of a serious rupture in a primary lung carcinoma that caused tumor cell spreading. This event resulted in early recurrence. We should consider a surgical approach for large, growing, cavitating mass to prevent rupture. In addition, if a malignant tumor ruptures peri-operatively, adjuvant therapy, such as intrapleural hyperthermo-chemotherapy, should be considered.

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