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Chest wall implantation of lung cancer following chest tube drainage of a pleural effusion

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Abstract

A 67-year-old man with a lung mass developed a large painful chest wall swelling adjacent to a chest drainage tube site. The swelling occurred after a second chest drain was performed for a rapidly relapsing pleural effusion, and the biopsy showed that it was an adenocarcinoma. We conclude that chest wall tumour implantation was caused by the chest tube drainage of the malignant pleural effusion, and that this accelerated the patient's

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deterioration. Our case illustrates the possibility of chest tube seeding of tumour cells from pleura to chest wall.

Keywords

Thoracentesis; chest tube; pleural effusion; adenocarcinoma; lung cancer; chest wall implantation.

Introduction

Iatrogenic chest wall implantation of lung cancer by procedures such as percutaneous fine needle aspiration^[1-3] is rare but well documented. However, chest wall implantation caused by thoracentesis of a pleural effusion in primary lung cancer is seldom reported. We report a case of a 67-year-old man with a lung opacity who developed a chest wall swelling following the removal of an intercostal chest tube inserted to drain the pleural effusion. A biopsy of the swelling revealed adenocarcinoma. We conclude that chest wall tumour implantation had occurred during thoracentesis of the malignant pleural effusion, and that this had accelerated his deterioration.

Case report

On 3 June 2003, a 67-year-old man of Chinese origin was admitted to a university teaching hospital with complaints of breathlessness, cough and weight loss for 1 month. He was cachexic and had reduced chest expansion over the right side, associated with a dull percussion note and absent breath sounds. Chest X-ray showed a large right-sided pleural effusion (Fig. 1(a)). A size 20G chest intercostal tube was inserted on the same day for diagnostic and therapeutic purposes, and removed 3 days later. A chest X-ray done prior to discharge on 9 June 2003 showed successful drainage of the pleural effusion and an underlying lung opacity over the right lower lung field (Fig. 1(b)). A flexible bronchoscopy

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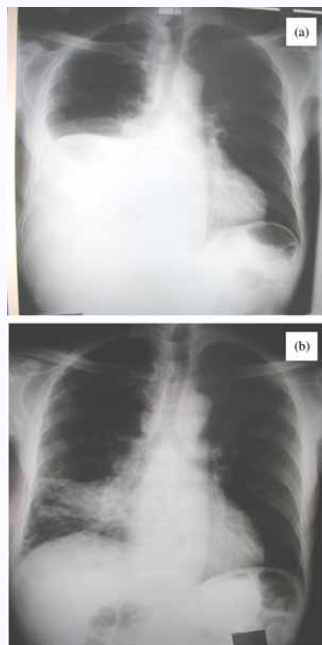


Fig. 1. Chest X-rays done during the first hospital admission: (a) before and (b) after thoracocentesis. After drainage of the right-sided pleural effusion, there was a heterogenous opacity over the right lower lung field.

performed on 20 June 2004 as an outpatient procedure showed an enlarged carina between the orifices of right upper and middle lobe bronchi. In addition, the mucosa of the right lower and middle lobe bronchi was abnormal, irregular and bled easily (Fig. 2). Pleural fluid and bronchial washings revealed highly pleomorphic atypical cells suggestive of malignancy.

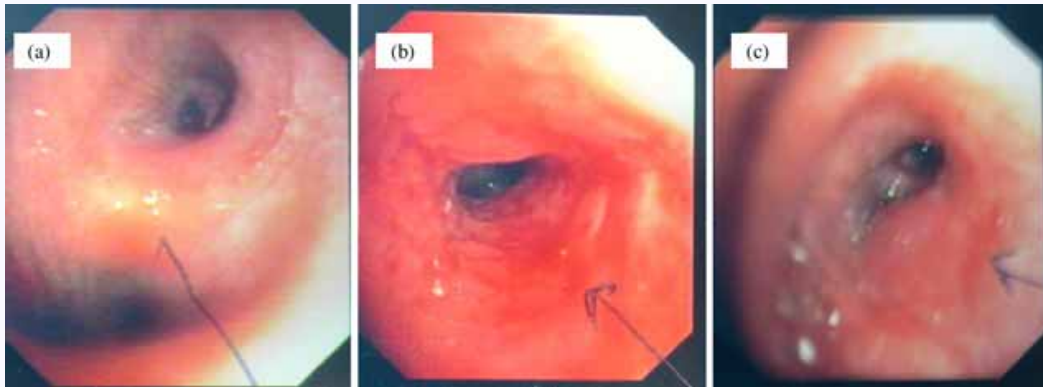


Fig. 2. Bronchoscopic views of (a) an enlarged carina between the orifices of the right upper lobe bronchus and bronchus intermedius; (b) abnormal, irregular, and easily bleeding mucosa of a narrowed right middle lobe orifice, and (c) abnormal and irregular mucosa of a narrowed right lower lobe orifice.

On 4 July 2004, about 1 month after the first hospital admission, the patient was re-admitted because of breathlessness due to re-accumulation of the pleural effusion. Thoracocentesis was performed again using an intercostal drain and all the pleural fluid was successfully drained. A day after his discharge on 14 July 2004, the patient noted a painful swelling on the chest wall adjacent to the chest tube insertion site. However, he did not seek medical advice until 6 days later, when he developed severe breathlessness again. On this third admission, a huge bony-hard swelling spanning the 6th to the 10th ribs at the postero-lateral aspect of the right chest wall, adjacent to the earlier chest insertion site, was noted (Fig. 3(a)). The swelling was painful, immobile, non-translucent, and measured 15 × 17 cm. A chest X-ray confirmed re-accumulation of the right-sided pleural effusion and the presence of a chest wall soft tissue swelling (Fig. 3(b)). A fine-needle aspiration for cytology followed by a trucut biopsy of the chest wall swelling confirmed the presence of an adenocarcinoma (Fig. 4). In view of elevated levels of serum ^{125}Ca and carcino-embryonic

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Fig. 3. (a) Photograph showing a large, bony-like swelling over the postero-lateral aspect of right chest wall. (b) Chest X-ray showing near-complete whitening of right hemi-thorax and presence of a soft-tissue shadow over the chest wall.

antigen at 1011 U/ml and 160.8 ng/ml, respectively, upper gastrointestinal endoscopy and colonoscopy were performed. The results were unremarkable except for a rectal polyp which proved on biopsy to be a tubular adenoma. Serum prostatic-specific antigen was normal at 1.24 ng/ml. Computerised tomography showed a right lower lobe mass and pleural effusion, and there was no evidence of metastases in the liver or adrenal glands. Taken together, we concluded that the patient had a stage 4 primary lung carcinoma with metastasis to the pleura and chest wall. Except for palliative radiotherapy to the chest wall metastasis, the patient did not receive any other cancer-specific therapy due to his poor general health. He passed away peacefully at home on 3 August 2003. The duration of survival from onset of symptoms was 3 months.

Discussion

We report a case of chest wall implantation from lung cancer following chest tube drainage of a pleural effusion. Such cases are seldom reported. To the best of our knowledge, there

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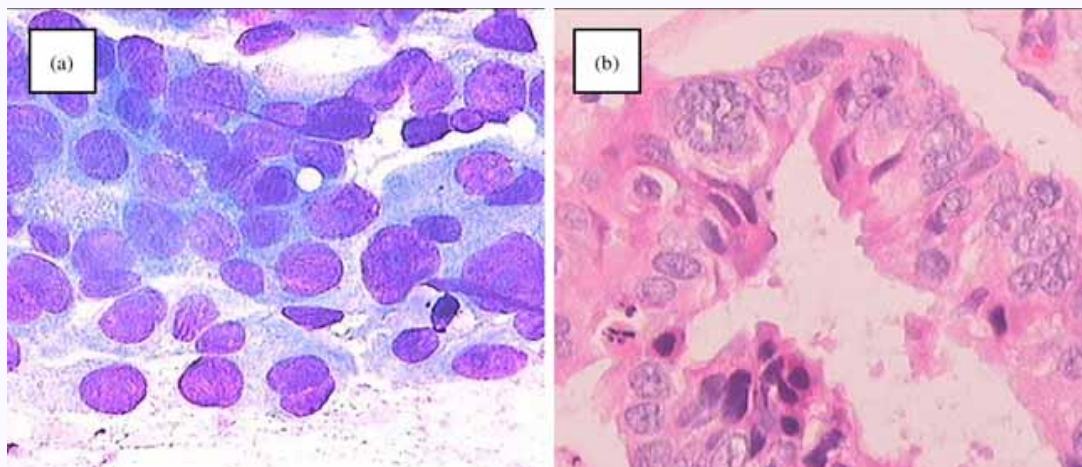


Fig. 4. Slides from (a) fine-needle aspiration and (b) trucut biopsy of the chest wall swelling, showing moderately differentiated adenocarcinoma.

is only one case report of chest wall implantation of lung cancer at the chest tube site in the literature^[4], which occurred 4 months after a thoracotomy for resection of lung cancer, and the tumour seeding was believed to have occurred during thoracotomy, and facilitated by the presence of a post-operative chest drain. There have also been reports of tumour seedings occurring after thoracoscopic lung biopsy^[5] and mediastinoscopy^[6].

Interestingly, percutaneous fine-needle aspiration of malignant lung lesions leading to chest wall implantation has received more attention in the literature. Although rare, with an incidence of probably less than 0.1%^[1-3], it has a major clinical implication in that an early stage operable lung tumour can be iatrogenically converted into late stage inoperable disease. By contrast, chest wall implantation from chest tube drainage of a pleural effusion can only occur if the tumour has already involved the pleura. As such, the lung cancer

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is already inoperable in almost all cases. Nevertheless, it still implies that there was unnecessary dissemination of the tumour by a procedure.

Tumour seeding in percutaneous fine-needle aspiration of lung cancer is believed to be due to the passage of the needle into and out of the lung lesion, leading to tumour spread along the needle tract. As such, multiple punctures with a single needle, or the use of cutting or large-bore needles is best avoided^[3]. Since chest tube tracts are larger than those of fine needles, theoretically there should be a higher risk of tumour seeding to the chest wall than has been observed or reported. One plausible explanation is the lack of a 'repeated' passage into and out of the pleural cavity with a chest drain, compared to fine-needle aspiration. As a result, the opportunity for tumour seeding is greatly reduced. In our patient, it is uncertain whether the tumour implantation in the chest wall occurred during the second thoracocentesis, as the rapid development of a chest wall swelling in less than 10 days supports the possibility that the chest wall implantation might have already occurred during the first thoracocentesis.

The prognosis in our patient with stage 4 disease was poor^[7]. The rapid relapse of the pleural effusion reflects the aggressive nature of the lung cancer. We have little doubt that the chest wall metastasis accelerated his deterioration. Our case illustrates the possibility of chest wall implantation of lung cancer caused by chest drain insertion for drainage of a pleural effusion. It is, however, difficult to ascertain whether choosing a smaller size chest tube or simply draining the pleural fluid by needle aspiration alone, would reduce this risk of chest wall implantation. Our case may represent one of the very few reports in the literature of such occurrence.

Teaching point

Implantation of tumour cells in the chest wall after drainage of a malignant pleural effusion is very uncommon. The application of a little local radiotherapy to the chest drain site might reduce the incidence of this complication.

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