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Case report

Implantation metastasis caused by fine needle aspiration biopsy following curative resection of stage IB non-small cell lung cancer

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Abstract

Fine needle aspiration is a useful procedure in the diagnosis of lung cancer, however controversy still remains as to whether it should be employed particularly in patients with operable lung cancer. We report herein a case of metastatic tumor at the site of transthoracic needle biopsy following a curative resection in a patient with stage IB bronchogenic carcinoma. The patient was managed with aggressive chest wall resection and subsequent musculocutaneus flap transposition, however he died 11 months after the initial operation. The tumor implantation risk and the related complications should be considered in patients with operable bronchogenic carcinoma undergoing a tranthoracic needle aspiration biopsy. © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Transthoracic needle biopsy; Lung cancer; Recurrence

1. Introduction

Fine-needle aspiration biopsy is a well-established and useful procedure in the diagnosis of lung cancer. Besides the well-known but seldom complications such as pneumothorax, bleeding and infection, tumor dissemination following a transthoracic needle biopsy also has been shown to be a potential risk [1,2]. Thus, controversy still remains, particularly among the thoracic surgeons, whether as a diagnostic procedure, transthoracic needle biopsy should be employed for patients with operable lesions.

We report herein a case of stage IB bronchogenic carcinoma, which was found to have developed a metastatic tumor at the site of previously performed transthoracic needle biopsy following a curative resection.

2. Case report

A 68-year-old man was referred to our department with a diagnosis of bronchogenic adenocarcinoma, which was obtained by a transthoracic fine needle biopsy using a 22 Gauge (22 G × 90 mm) spinal needle (Uniever, Tokyo, Japan) at another hospital. He had productive cough and fever attacks for five months duration. He had an unremarkable medical history. On physical examination, sibilant ronchi were notable in the lower zones of the right hemithorax. Laboratory data showed no abnormality. Pulmonary function tests and blood gas analyses were within the normal limits. Chest X-ray showed a right hilar enlargement. Computed tomography (CT) revealed a paravertebrally located 5 × 4 cm mass with necrotic features in the posterobasal segment of the right lower lobe without any evidence of enlarged mediastinal lymph nodes. Metastatic work-up including abdominal ultrasonography, bone scan and cranial CT was negative. Bronchoscopy revealed no endobronchial lesion.

The patient underwent a right lower lobectomy with mediastinal lymphadenectomy. Histological examination revealed moderately differentiated squamous cell carcinoma without any involvement of mediastinal-hilar lymph nodes and resection margins (T2N0M0). The pleura showed thickening but no involvement by the tumor. He had an uneventful postoperative course and was discharged on the 13th postoperative day.

He had a cardiac arrhythmia (atrial flutter) that required cardioversion and acute iliac artery thrombosis, which was managed with femoropopliteal by-pass within 2 months after his discharge. At 6-month follow-up the patient presented with a right-sided back pain. A firm, paraverte-

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brally located, 7-cm, quickly enlarging and painful mass was noticed at the site of the previous needle biopsy, projecting the ninth vertebra, inferior to the thoracotomy incision. The overlying skin neither showed any changes nor any adjacent satellite lesions. Needle biopsy, which revealed squamous cell carcinoma, correlated with the original tumor and confirmed the implantation metastasis. He received 3000 rads of radiotherapy. The tumor showed no clinical regression and the patient presented with a severe back pain following radiotherapy. Control CT revealed a mass with necrotic areas located in the paravertebral muscles and destructing the vertebra. Magnetic resonance imaging (MRI) showed invasion of the right facet articulation of the eighth vertebra but no invasion to the corpus of the related vertebra (Fig. 1).

Chest wall resection, including 7-8-9 ribs with the tumor, was performed. The tumor invaded the adjacent eighth vertebra, thus requiring a vertebral curettage with posterior instrumentation and fusion as to avoid collapse of the vertebral column, however, inevitably remnants of tumor tissue were left behind in the vertebra. In the postoperative period, presumably due to the irradiation, wound healing delayed and eventually resulted in necrosis and complete dehiscence (Fig. 2). Debridement and irrigation of the wound with proper antibiotics were employed before musculocutaneus flap transposition using right latissimus dorsi and trapezius muscles to cover the wound. His wound problems recurred after the operation and eventually he lost his consciousness without any definitive underlying cause. Cranial CT, MRI and examination of the cerebrospinal fluid showed no abnormal finding. We did not perform an autopsy, but the patient did not have any complaints or symptoms, which could be attributed to a distant metastasis when he died eleven months after the initial operation.

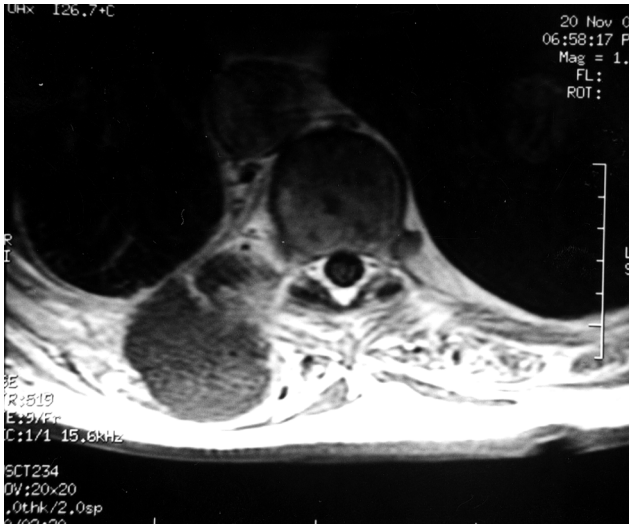


Fig. 1. On T1-weighted axial MR image, a soft tissue mass appeared in close association with the transverse process of the eighth vertebra.



Fig. 2. Catastrophic view of the operation site resulting from necrosis and complete dehiscence of the wound following chest wall resection. Implants of posterior instrumentation on the vertebral column are visible with the resected segments of the 7-8-9-ribs (arrows).

3. Discussion

The significance of tumor seeding along the needle tract during a transthoracic biopsy to clarify the histologic nature of suspicious lung lesions and the overall impact of the procedure on the patient's prognosis has yet to be defined. Although, aspiration biopsy particularly with a fine needle was suggested not to carry a significant hazard for an implantation metastasis [3,4], needle track seeding has been shown possible in experimental models [5,6] and have been emphasized by numerous publications [1,2,7,8]. It was proposed that the true incidence of tumor implantation along needle is underestimated because not all cases are diagnosed, nor are they reported and many of the patients die before these metastases become clinically apparent [1].

As tumor implantation appears to depend on the tract size, the use of a large-bore needle carries a relatively greater risk of tumor cell seeding. Tumor implantation has occurred with the use of a large-bore Vim–Silverman cutting needle in most of the reported cases, however tumor-seeding following a fine needle aspiration also has been documented

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as in our case [1,7,8]. In addition, core biopsy devices, numerous passes and an involved pleura by the tumor also has a potentially greater risk. Thus, it is suggested a golden rule for needle biopsy as one pass with a fine needle (22 gauge or larger) and through normal parenchyma [9].

It was claimed that a needle track implantation had no effect on patients's management and it was needless to fear transformation of a curable lesion into an incurable one by aspiration biopsy [10], whereas implantation metastasis in the presented case necessitated a complex surgical procedure. In addition, although patients operated on for early stage of bronchogenic carcinoma have long-term survival, implantation metastasis resulted in low quality of life and short term of survival in our case. The patient suffered from back pain and had a deteriorated condition until he died eleven months after the initial operation.

Transthoracic lung biopsy is an effective alternative procedure to exploratory thoracotomy for histological diagnosis of lung masses, however true positive diagnosis by means of a transthoracic needle biopsy never reaches up to 100%. Moreover, yield of a negative biopsy has no meaning. Although, the initial diagnosis obtained by fine-needle aspiration biopsy at an outside hospital was an adenocarcinoma in the presented case, we did not observe an adenocarcinoma component. We could not obtain the cytologic specimen for reexamination and we concluded that the cytologic diagnosis was a misinterpretation. As some authors advocate [1,2,8], our policy regarding to patients with a possible clinical and radiological diagnosis of potentially curable bronchogenic carcinoma is surgical intervention and frozen section diagnosis without any preoperative transthoracic biopsy procedure.

We emphasize that the potential risk of needle aspiration biopsy for tumor implantation with subsequent catastrophic complications should be considered, particularly in patients with resectable, early-stage lung tumors who are likely to have a potential cure following surgery.

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