

Lung cancer seeding along needle track after CT guided transthoracic fine-needle aspiration biopsy - case report

Zasevki pljučnega raka v punkcijskem kanalu po CT vodeni transtorakalni tankoigelni aspiracijski biopsiji - prikaz primera

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Abstract

Background: Transthoracic fine needle aspiration biopsy (FNAB) is an important diagnostic method in the evaluation of lung malignancies. The incidence of chest wall implantation metastases after FNAB is extremely rare. However, we report a case of cancer seeding along needle track after a CT-guided transthoracic FNAB.

Case report: We diagnosed squamous cell carcinoma of the lung, stage T₃N₀ in a 71-year old male, ex-smoker, by transthoracic FNAB. A small metastasis was discovered in the left humerus after PET-CT. The patient was treated by chemotherapy and irradiation of bone metastasis. Four months after initial evaluation we repeated CT scan of the thorax. A tumour progression with tumour growth from the primary site was found in the left upper lobe to the pectoral muscle along the needle biopsy track.

Conclusions: Although the frequency of chest-wall implantation metastasis after transthoracic FNAB of lung malignancies is very rare, attentive follow up is recommended. Early intervention with resection and irradiation is often curative in previously radically treated patients.

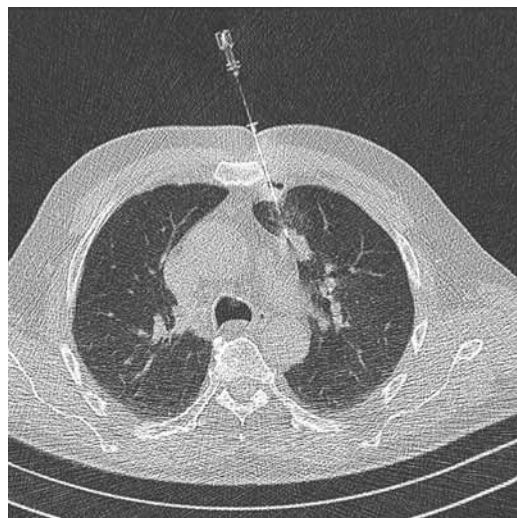
Izvleček

Izhodišča: Transtorakalna tankoigelna aspiracijska biopsija je pomembna diagnostična metoda pri obravnavi pljučnih malignomov. Pojav implantacijskih zasevkov v prsni steni po takšnem posegu je zelo redek. Kljub temu predstavljamo primer zasejanja pljučnega tumorja vzdolž biopsijskega kanala po transtorakalni tankoigelni aspiraciji, vodeni s CT.

Prikaz primera: Pri 71-letnem moškem, bivšem kadilcu, smo s transtorakalno igelno biopsijo, vodeno s CT, dokazali ploščatocelični karcinom pljuč v stadiju T₃N₀. S PET-CT smo naknadno našli manjši zasevek v levem humerusu. Bolnika smo zato zdravili s kemoterapijo in z obsevanjem kostnega zasevka. Štiri mesece po transtorakalni igelni biopsiji smo ponovili CT prsnega koša. Vidno je bilo napredovanje tumorja z vraščanjem v biopsijski kanal s primarnega mesta v levem zgornjem pljučnem režnju do prsne mišice.

Zaključki: Čeprav je pogostost zasevkov v biopsijskem kanalu po transtorakalni igelni aspiraciji pljučnih malignomov zelo redka, priporočamo pozorno sledenje teh bolnikov. Zgodnje ukrepanje z odstranitvijo implantacijskih zasevkov in obsevanjem je pogosto zdravilni poseg pri prej radikalno zdravljenih bolnikih.

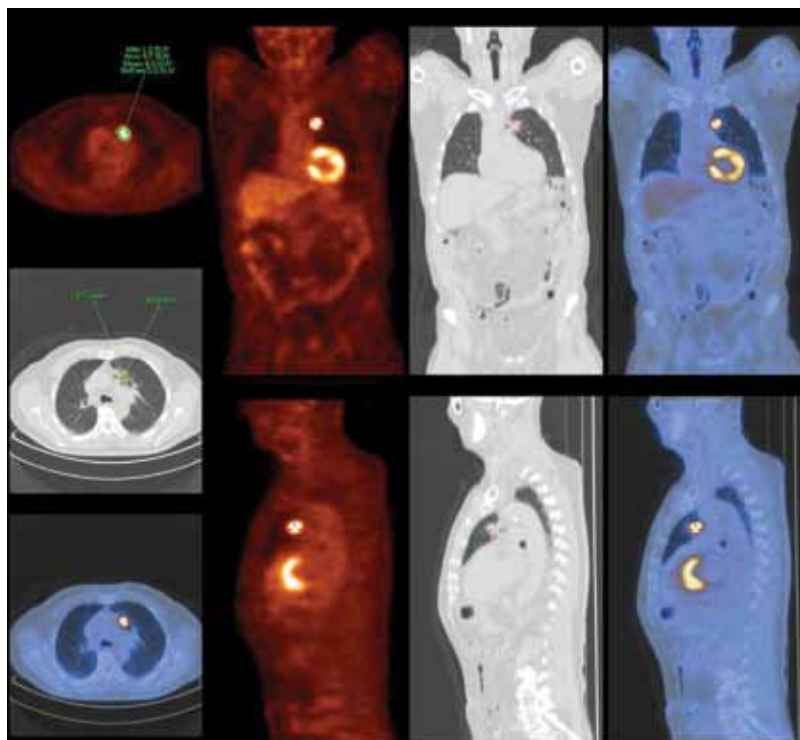
Figure 1: Low-dose CT scan of the thorax shows a 22 G aspiration biopsy needle with the tip in a small tumor in the left upper lobe. The tumor is invading the mediastinal fat.



Introduction

Transthoracic fine needle aspiration biopsy (FNAB) is a recognized and reliable diagnostic method in the management of pulmonary nodules and lung cancer, and it is relatively safe.^{1,5} Pneumothorax is the most frequent complication and chest-tube thoracostomy is occasionally required.^{2,3,5} Seeding of malignant cells along biopsy needle track is an extremely rare but serious complication.^{6,7,8} We describe a case of lung cancer with malignant cell implantation in the FNAB track.

Figure 2: PET-CT scan shows an increased uptake of fluorodeoxyglucose (FDG) in the small tumor in the left upper lobe (max. SUV 9,7). Physiological uptake in heart muscle is also seen.



Case report

A 71-year old male, ex-smoker, presented with a persistent cough after respiratory tract infection. A coin lesion in the left upper lobe was accidentally found on the chest X – ray. On the CT scan of the lungs a tumour in the left upper lobe measuring 2 cm in diameter was clearly seen together with signs of mediastinal fat invasion (Figure 1). Radiological stage was estimated as T3 tumour. CT scanning of the thorax, abdomen and head did not reveal any regional or distant metastases. The patient underwent flexible bronchoscopy with transbronchial biopsy for histological confirmation of the tumour, but a diagnostic specimen was not obtained.

Consequently, a FNAB was performed as the next step in the diagnostic workup. FNAB was performed with a 22-gauge needle in the left parasternal position (Figure 1). One single-pass aspiration biopsy was done and revealed the diagnosis of squamous cell carcinoma. Preoperative PET-CT scan showed an increased uptake of FDG in the tumor in the left upper lobe (Figure 2) and also a small focal uptake in the distal part of the left humerus (Figure 3), which was at first sight erroneously interpreted as extravasation of radiopharmaceutical, but latter on an osteolytic metastasis was confirmed on x-ray.

The patient was treated by systemic chemotherapy and local irradiation of the metastasis in the left humerus. After 3 completed cycles of chemotherapy (cisplatin, gemcitabine), 4 months after the transthoracic biopsy, the patient noticed a painful swelling in his chest wall at the site of needle biopsy, by the left side of the sternum. CT was repeated and showed tumor progression in the left upper lobe with invasion of the mediastinum and a growth in the path of the previous biopsy needle canal (Figure 4). A small osteolytic destruction of the left side of the sternum and thickening due to tumor infiltration of the left pectoral muscle was also seen (Figure 4). A new metastasis was also discovered in the liver.

The patient received a second-line chemotherapy and regional radiotherapy of the

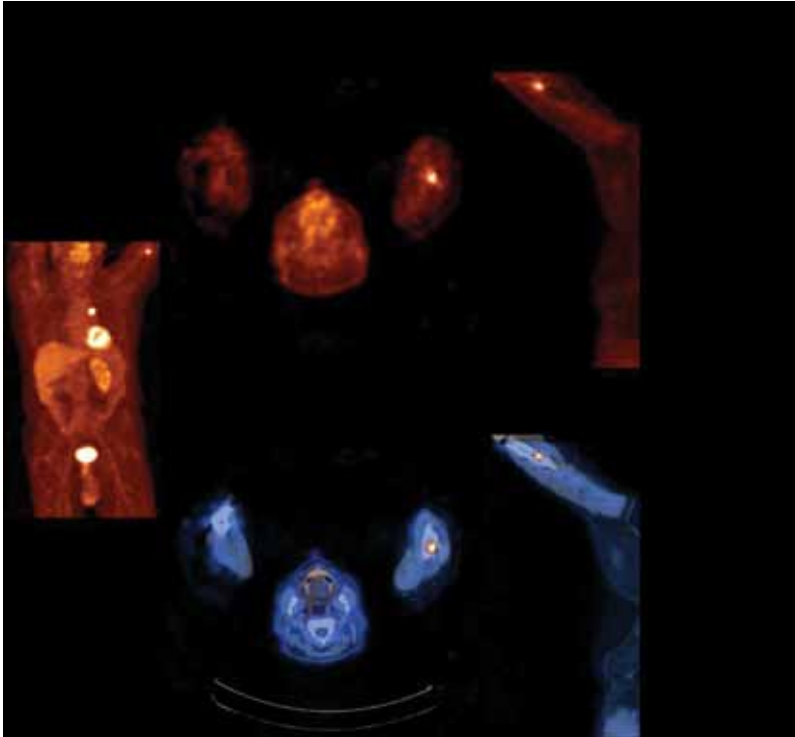


Figure 3: PET-CT scan of the same patient shows an increased FDG uptake in the small metastasis in the distal part of the left humerus.

tumor in the lungs. Despite the therapy, multiple metastases in the lungs and progression of liver metastases were seen on follow up after 3 months.

Discussion

Cytopathologic diagnosis of lung tumours is necessary for proper treatment planning. Transthoracic FNAB is a well established method for obtaining pulmonary tissue for pathologic examination and it is the method of choice for diagnosing small peripheral tumours.^{1,3,5} The accuracy of CT guided FNAB for the diagnosis of malignant disease is more than 90 %^{3,4,5} and its routine use contributes to better management of lung cancer patients.¹⁴ Pneumothorax is the most frequent complication and chest-tube thoracostomy is occasionally required.^{2,3,5} Fatal complications due to systemic air embolism, pericardial tamponade and haemorrhage have been reported, but these are rare.¹

Seeding of lung cancer along the biopsy needle track is an extremely rare but serious complication.^{6,7, 8} Tomiyama reports an incidence of 0.061 %—6 cases out of 9783 biopsies in Japan, similarly Kim found 8 cases among 4365 patients in South Korea;^{6,7} however, the total number of biopsies in this

series included patients with benign disease and patients with multiple procedures whose needle biopsies have been nondiagnostic. The described case is the only one known in our hospital, where more than 600 CT-guided biopsies were done in the last 6 years; in 3/4 of biopsies malignoma was found.⁵

Tumour dissemination appears to be more frequent with large bore needles or when the procedure involves several passes through the cancer,⁹ but tumour seeding has been also described when fine needles were used.^{7,8,10} In our hospital fine needles with a 22-gauge diameter are used for aspiration of cytological samples and only occasionally larger 20- or 18-gauge cutting needles for histological biopsy are used, when cytological sample is inconclusive. Most lung cancers that are biopsied transthoracically are diagnosed with FNAB. The risk of tumour seeding after fine needle aspiration may be reduced by performance through a cover of normal parenchyma, by maintaining suction during needle withdrawal and by examining samples for quality during the procedure.⁹

The exact mechanism of metastasis implantation is still unclear. Researchers reported tumour cells remaining in the pleural space after needle biopsy in a tumour model¹⁰ and showed that malignant cells could be found in high percentage of needle biopsy tracks,¹¹ but clinical implications of these findings are unknown.^{10,11}

The treatment of chest wall metastasis implantation comprises a radical and wide surgical resection in conjunction with irradiation in patients with an initial early stage cancer who were previously treated radically. With successful resection, the patient's prognosis seems to depend on the primary cancer.⁷ In initially advanced stage lung cancers that were not resected, as in our case, palliative irradiation is the only local treatment option.

Our case also confirms the usefulness of preoperative PET-CT imaging in the management of patient with lung cancer, as a metastasis in the left humerus could easily be missed.

Because of its rare incidence, however, this complication should not affect the use of needle aspiration biopsy in broncho-

Figure 4: CT scan of the thorax with contrast medium application 4 months after the biopsy shows tumour progression with a growth along the biopsy needle track. The tumour is invading the left pectoral muscle, which is thickened and a small osteolytic destruction of the sternum is seen (arrow).



nic carcinoma, as it has been shown that it does not affect relapse rate and prognosis in surgically treated early stage lung cancer patients,¹² and neither it is associated with an increased risk of death.¹³

Our case confirms that although lung cancer seeding after FNAB is a very rare complication, care should be undertaken during the procedure. Attentive follow up of patients after needle biopsy is recommended for about 2 to 3 years, since the reported interval between FNAB and implanted tumour development ranged from 2 to 26 months.⁷

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