superDimension™ Navigation System Paired with Tattooing Guides VATS Pulmonary Resection

Bezzi M¹, Novali M¹, Toninelli C¹, Tironi A², Benvenuti M³, Foccoli P¹
Spedali Civili di Brescia, Italy

INTRODUCTION:
Traditionally ground glass opacities (GGO) of the lung can be difficult to reach with fluoroscopy-guided transbronchial biopsies; however the superDimension™ navigation system provides the ability to navigate to very small and even ground glass peripheral nodules to aid in the diagnosis and treatment preparation. GGO are therefore becoming more easily accessible both for transbronchial needle aspiration and biopsies and for video assisted thoracic surgery (VATS).

Using the superDimension™ system to tattoo GGO and small nodules allows precise locatability of the target area and also directs pulmonary VATS procedures. This case report describes how the superDimension™ system permits less invasive procedures, expanding treatment options for patients.

1. Interventional Pulmonology, Spedali Civili di Brescia, Italy
2. Pathology, Spedali Civili di Brescia, Italy
3. Thoracic Surgery, Spedali Civili di Brescia, Italy
CASE REPORT:
75-year-old man, current smoker (80 packs/year) with a medical history significant for ischemic cardiomyopathy, aneurysm of the aorta and GOLD Stage 3 COPD with an FEV1 of 0.85 L (45% predicted). A CT-scan was performed in May 2012 for follow-up of the aneurysm. An incidental finding of the CT-scan was a 15mm ground glass opacity in the left upper lobe (LUL). At follow-up in November 2012 the GGO was unchanged. The patient was referred for pulmonary consultation. At his first visit the patient was on Clopidogrel™ which discontinuation of might cause severe consequences due to his recent vascular surgery. A PET scan was performed which showed that the nodule in the left upper lobe had an SUV of 2.3.

Initial recommendation was observation. A follow-up CT-scan in June 2013 showed the GGO had increased in diameter (17 x 12mm, reduplication interval 1,112 days). According to the PET and CT-scan characteristics and its evolution, this GGO could be considered an in situ adenocarcinoma or a microinvasive carcinoma. No hilar or mediastinal enlarged lymph nodes were detected on CT-scans or PET scan.

DISCUSSION:
The slow growth of the nodule accounted for a low grade malignancy (adenocarcinoma in situ or microinvasive carcinoma). It was decided to biopsy the lesion. Clopidogrel™ was suspended and replaced by acetylsalicilic acid. It was felt that because of the nodule’s relationship with the airways (bronchus sign) and the patient’s previous diagnosis of COPD, a bronchoscopy would be the safest way to establish a diagnosis.

Since the pulmonary ground glass nodule in the LUL was not visible at fluoroscopy, an Electromagnetic Navigation Bronchoscopy™ procedure (also known as an ENB™ procedure) was planned to aid in the the early diagnosis while it was still at a size that allowed for limited resection. TBNA was done with a 22-gauge WANG™ needle and biopsies of the nodule confirmed the diagnosis of invasive adenocarcinoma of the lung with enough tissue obtained for immunohistological stains.

Following completion of pulmonary rehabilitation, ENB™ procedure was repeat-
ed and the LUL GGO was marked with indigo carmine dye to aid in VATS pulmonary resection. One hour later the patient underwent a LUL atypical resection with lymph node dissection using VATS technology. Due to the minimally invasive technique used, the patient was discharged on post-operative day four. The final pathology report showed a T1 (<3cm) micro invasive adenocarcinoma with negative lymph nodes corresponding to a stage Ia (T1N0M0) disease.

CONCLUSION:
Due to the size and ground glass appearance of this nodule, the diagnostic yield from fluoroscopy-guided conventional bronchoscopy would have been very low. The patient also did not have the physiologic reserve to tolerate a lobectomy. Therefore, the superDimension™ navigation system aided an early detection which allowed an atypical resection while the lesion was still small. In addition, the ability to mark the lesion during the ENB™ procedure enabled him to undergo a minimally invasive VATS resection to lessen his post-operative morbidity. When the superDimension™ system is paired with tattooing, a powerful combination of an enhanced minimally invasive diagnostic aid and treatment options can now be offered to patients.

Michala Bezzi, MD, Mauro Novali, MD, Carlo Toninelli, MD, Andrea Tironi, MD, Mauro Benvenuti, MD, Pierfranco Foccoli, MD

COVIDIEN, COVIDIEN with logo and “positive results for life” are trademarks of Covidien AG. Other brands are trademarks of a Covidien company. All other product and brand names are registered trademarks of their respective owners. © 2013 Covidien AG. All rights reserved.

DMK00007 Rev. A 2013/11