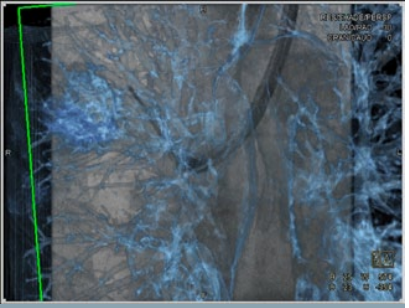

Case Study

Navigation in the Lung

Supported by *syngo* DynaCT Cardiac

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Navigation in the Lung

Courtesy of Dr. Wolfgang Hohenforst-Schmidt, Institute of Cardiology-Angiography-Pneumology, Klinikum Coburg, Germany

Patient History
A 70-year-old-old female.

Diagnosis
The patient was diagnosed with moderately differentiated lung adenomatous carcinoma four years ago and initially treated with chemotherapy. Currently the patient presents with multiple intrapulmonary nodules, metastases in the sternum and multiple osteoplastic metastases in the thoracic spine. Additionally the patient has cerebral metastases.
The patient was admitted for an update to diagnose the response to chemotherapy. In general the patient suffers from moderate dyspnea.

Treatment
A rapid data acquisition was performed with *syngo* DynaCT Cardiac under deep sedation and jet ventilation. In this intra-procedural 3D-dataset the tumor is clearly visible. Navigation through the bronchi is possible in different ways:

1) The 3D volume is overlaid with live fluoroscopy. This way, the physician can see live on the movement of the biopsy forceps toward the tumor and make sure the biopsy captures the tissue (figure 1).

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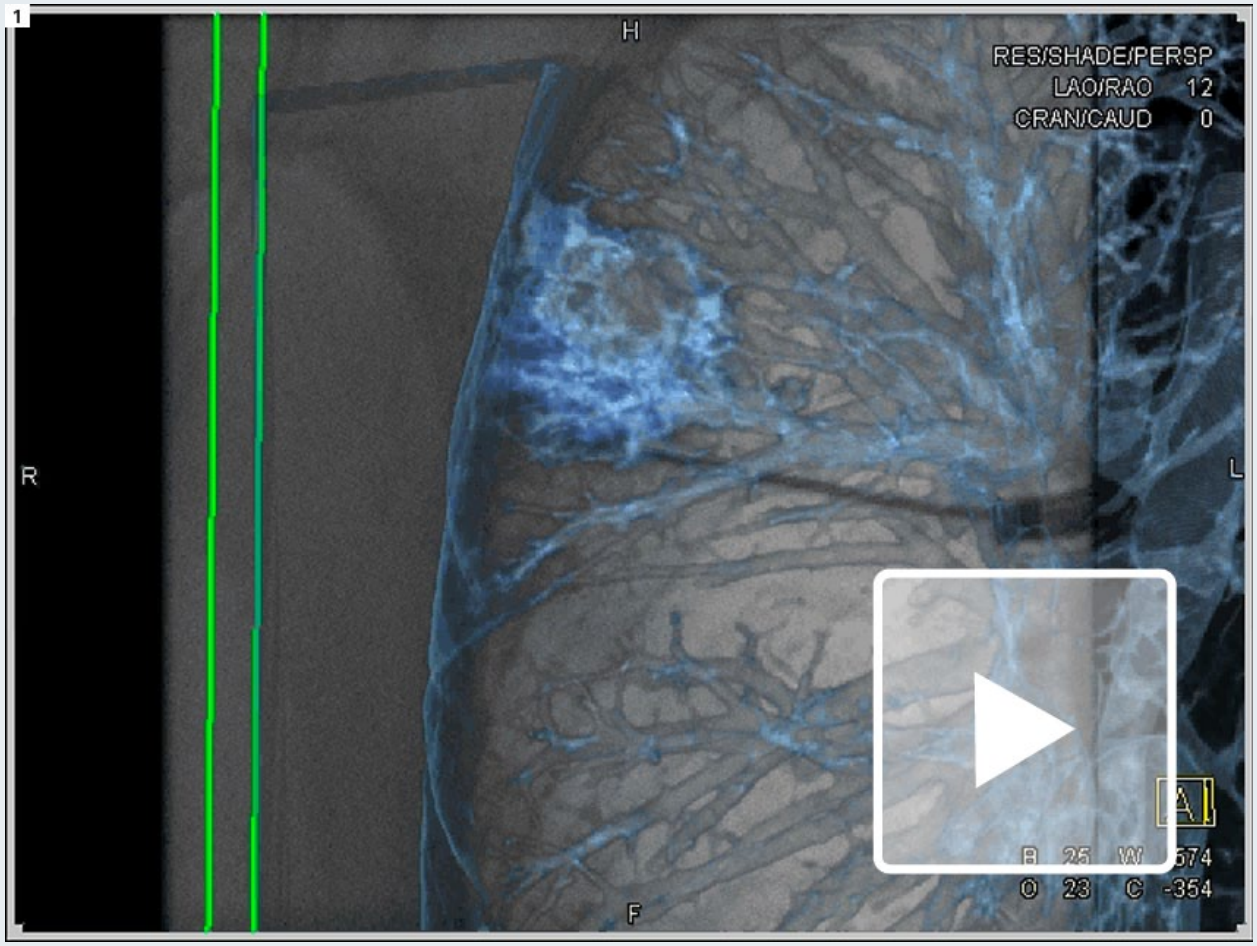

1 3D volume of the lung (*syngo* DynaCT Cardiac) with live fluoroscopy overlay (*syngo* iPilot).

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2) In addition to option 1, it is possible to manually mark a path through the bronchi as well as the volume of the tumor on the workstation. This path can then again be overlaid and followed when advancing the forceps to the tumor (figure 2).

3) Another option is to do a virtual bronchoscopy. The software currently allows navigation up to the 9th debranching of the bronchial tree (figure 3).

Comments

Intra-procedural 3D imaging of the bronchial tree with *syngo* DynaCT Cardiac together with other software applications (*syngo* iPilot, *syngo* iGuide Toolbox and *syngo* FlyThrough) supports biopsies of early-stage lung cancer. The open structure of the C-arm is well suited for interventions and proves to be useful in the field of pneumology.

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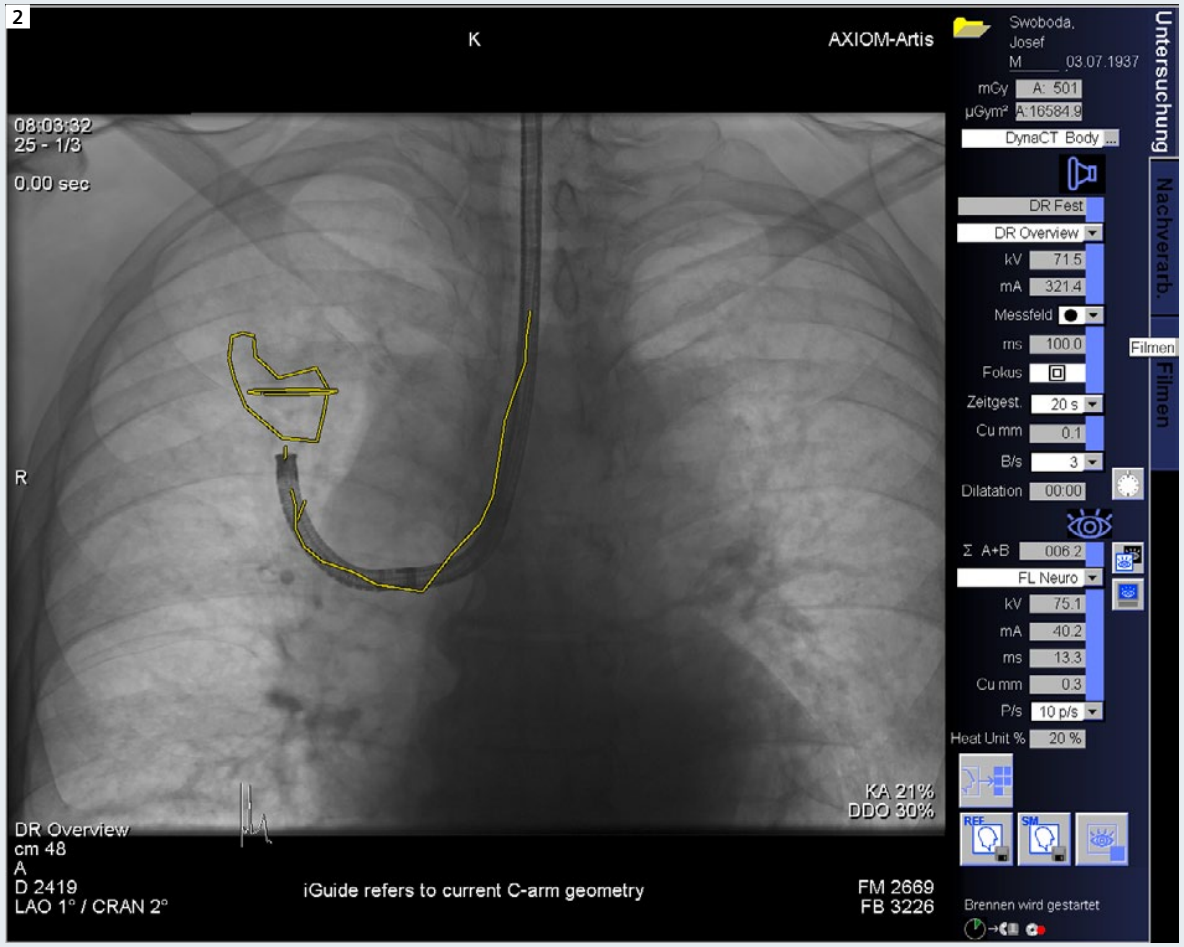

2 Manually marked path (*syngo* iGuide Toolbox) through the bronchi and marked tumor volume.

Navigation in the Lung

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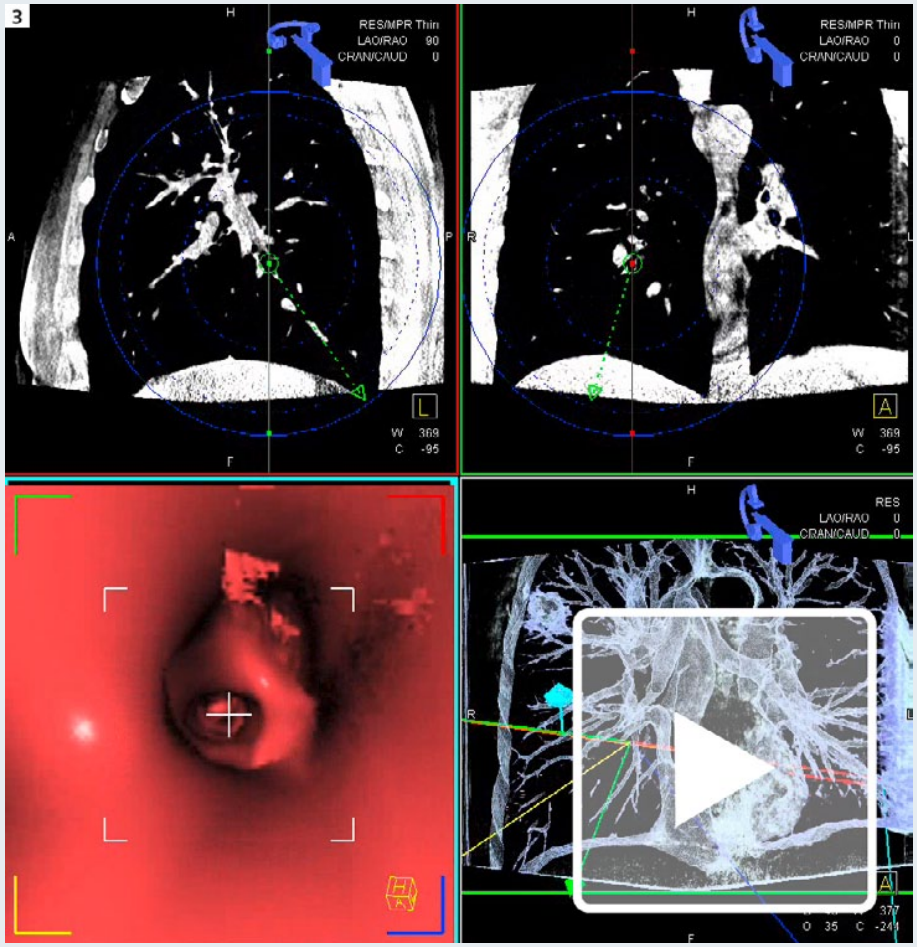
In the above demonstrated case, however, shows an overlay of the tumor in the 3D data set and the real-time fluoroscopy is very precise due to the fact that the whole procedure – 3D data acquisition and bronchoscopy – is done in the same suite at the same time and nearly in the same position of the diaphragm, guaranteed by the apnea under deep sedation (not general anesthesia) and jet ventilation.
We conclude that with *syngo* DynaCT Cardiac rapid onsite navigation in the lung could soon be a routine application in the bronchoscopy suite. *syngo* DynaCT Cardiac has the power to be the central part of a hybrid interventional pneumology/thoracic surgery suite.



3 Virtual bronchoscopy with *syngo* FlyThrough.
Clinical images are from different cases.

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