

# Puncture of a Pleural Empyema Using iGuide CAPP Electromagnetic Needle Guidance

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## Patient history

54-year-old male presented with a pleural fluid collection after partial lung resection of the right upper lobe with worsening under calculated intravenous antibiotic therapy.

## Pre-treatment Imaging

MDCT of the chest showed a right apical fluid collection (arrows in Fig. 1 and Fig. 2). As the patient was in poor general condition presenting with increasing infection parameters, we decided to puncture the potential empyema to allow for drainage and specific antibiotic therapy.

## Treatment

The patient was placed on a vacuum mattress on his right side. For puncture planning, imaging with *syngo* DynaCT was performed (Fig. 3). A dorsal paravertebral approach with a slightly double-angulated puncture to avoid the intercostal vessels path was chosen. The iGuide CAPP electromagnetic tracking system superimposes the puncture path as well as the needle and a virtual needle extension on the *syngo* DynaCT data set to enable a precise needle placement (Fig. 4). After needle placement, the final position achieved according to the electromagnetic tracking system was confirmed by another *syngo* DynaCT run (Fig. 5 and 6). A sample was collected and a drainage catheter was placed over the wire. The duration of the intervention was 14 minutes from the first *syngo* DynaCT data acquisition to the confirmatory



Dr. Bernhard Meyer, interventional radiologist at Charité Hospital, University of Berlin is convinced about iGuide CAPP; he has used the system for more than one year.

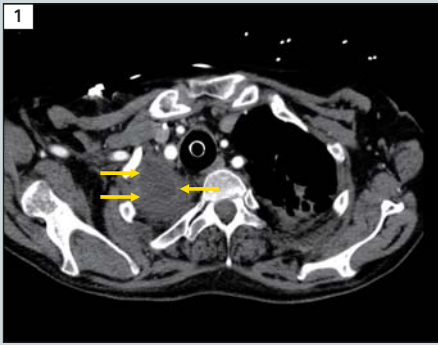
post-procedural *syngo* DynaCT after needle placement including image reconstruction, data transfer to the navigation device, puncture planning, local anesthesia and puncture. The navigated needle propagation alone took 35 sec.

## Comments

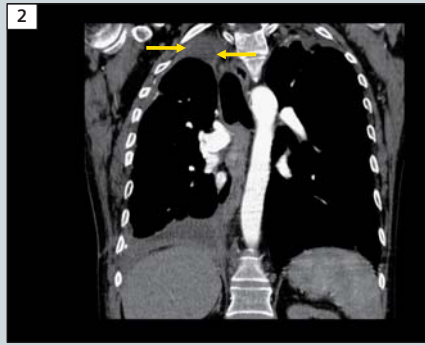
The electromagnetic tracking system in combination with *syngo* DynaCT facilitates needle placement for biopsies and drainages. The combination of the MPR views and a schematic ring figure makes hand-eye coordination very intuitive. By matching two small rings (Fig. 4), the entry point can easily be located. Correct angulation of the needle is obtained by matching the two big rings (Fig. 4). This allows for double-angulated punctures to be performed without any additional effort when compared to in-plane puncture paths.

## Contact

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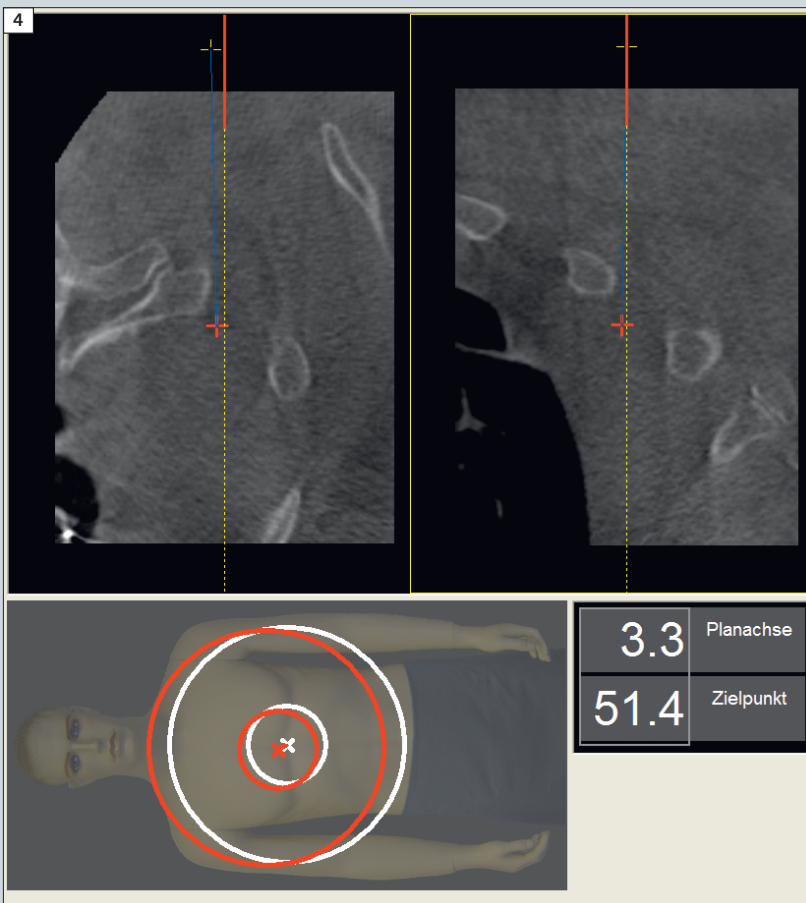
**1** Axial MDCT of the chest.



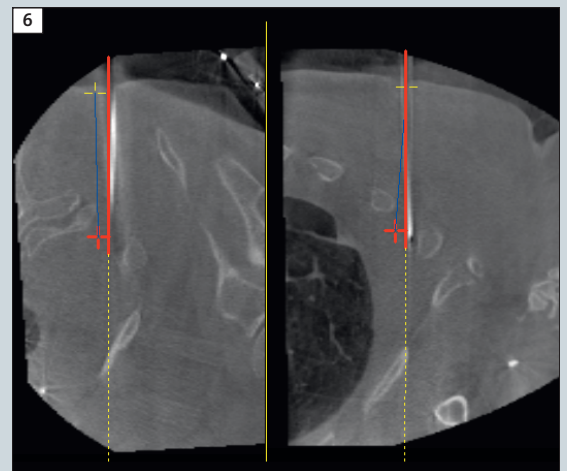
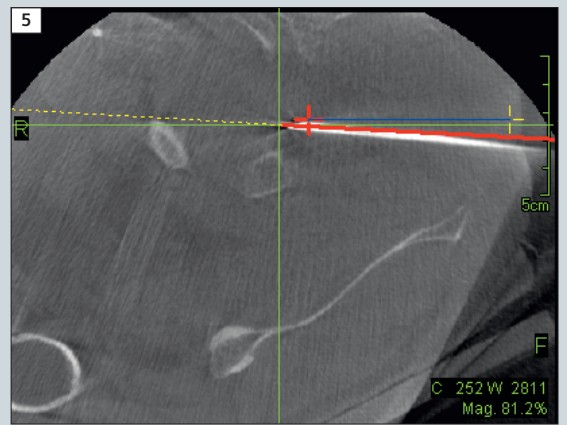
**2** Sagittal MDCT of the chest.



**3** *syngo* DynaCT acquired for puncture planning.



**4** iGuide CAPP superimposes the planned puncture path (blue line) as well as the needle (red line) and a virtual needle extension (yellow dotted line) on the *syngo* DynaCT data set to enable a precise needle placement. By matching two small rings the entry point can easily be located. Correct angulation of the needle is obtained by matching the two big rings. This way needle navigation becomes very intuitive.



**5+6** The successful needle placement was confirmed by a second *syngo* DynaCT acquisition.