Accuracy Far Beyond Conventional Pneumological Practice

Worldwide, cancer is a leading cause of death, with lung cancer causing more deaths than stomach, liver, colon and breast cancer. Taking biopsies from small lung nodules to diagnose cancer at an early stage poses an opportunity and a challenge at the same time. The smaller the nodule, the higher the survival rate of the patient, but the more difficult the biopsy. An efficient solution lies in guided navigation. With no artificial contrast medium but air the tumor is clearly visible with syngo DynaCT.

According to the WHO the lung tumor group is often diagnosed in the advanced stages, resulting in poor prognosis. However, a study from the American Cancer Society shows that if smoking behavior as well as its size: biopsy. The likelihood of a lesion being one percent of cases. Those measuring 8 to 10 millimeters have a 1 to 20 percent chance of being malignant and 50 percent of lesions over 20 millimeters are cancers, making clarification essential.

Challenge: Increase Accuracy of Tissue Samples

However, Schreiber found out that the accuracy of tissue samples taken from lesions of this size is relatively low: 33 percent in the case of lesions less than 20 mm as opposed to 62 percent for lesions over 20 millimeters. Small pulmonary nodules (SPN) tend to be benign rather than malignant, but they require more invasive treatment because conventional bronchoscopies on lesions of this size result in a low accuracy rate. Thus tissue samples can be false-negative. Dr. Wolfgang Hohenforst-Schmidt, Senior Physician at the Department of Cardiology, Angiology and Pneumology (Head of the Depart- ment Prof. Dr. Johannes Brachmann) at the Coburg Hospital in Germany says: “This poses a real problem. If the tissue sample proves to be malignant, I hit the lesion without doubt. But in the case of benign results the main question is, if I ought to believe these results. We urgently need an enhanced solution for the diagnostic clarification of small, peripherally located lung lesions in order to prevent false-negative results. This is only feasible via navigation.” According to Hohenforst-Schmidt, the solutions lies in guided navigation with syngo DynaCT. As the pulmonary medi- cine unit is located in the Department of Cardiology, Angiology and Pneumol- ogy the lung specialist has access to an angiography suite equipped with a ceiling-mounted angiography system. The syngo DynaCT application generates a CT-like dataset within a few seconds. Real-time fluoroscopic images are superimposed on this during the bronchoscopie, facilitating navigation within the bronchial tree. Hohenforst-Schmidt ensures that the diagram remains in a fixed position via jet ventilation during deep sedation. He uses no artificial contrast medium but air to make the tumor clearly visible with syngo DynaCT. According to the lung specialist, the major benefit of this approach is that it is a real-time procedure. Both stages – the acquisition of the syngo DynaCT data set and the bronchoscopie under fluoro- scopic guidance – are performed at the same time, in the same place and with the diagram in the same position.

“The increase in the hit rate around to two thirds poses a seismic shift,” says the lung specialist. “But the problem of false-negative results is still conspicuous. To solve this, we want to bring additional instruments, such as needles, brushes, suction-cytology and 20-Mhz-miniprobes to the lesion in the near future. The expectation from other studies is that the additional use of these instruments will bring another 10 - 15 % of detection rate.”

Hohenforst-Schmidt has also done several transbronchopulmonary biopsies using syngo DynaCT and syngo iGuide, the live and integrated needle guidance software. Tissue samples taken during transbron- choscopic biopsy is often a bigger dataset and the bronchoscopie under fluoro- scopic guidance – are performed at the same time, in the same place and with the diagram in the same position. Therefore more accurate diagnosis is possible. syngo DynaCT enables the ver- ification of the correct needle position and thus makes transbronchial needle procedures more effective.

Furthermore, the lung specialist has demonstrated that it is possible to dye small lesions so that they are more visible and easier to remove during subsequent surgical interventions. Addi- tionally, Hohenforst-Schmidt believes syngo DynaCT can become a powerful tool to make progress in local ablative therapy modalities like radiofrequency ablation, microwave ablation, laser induced thermotherapy or intratumoral chemotherapy. “Intratumoral chemo- therapy can considerably extend the lifespan of patients and I am convinced that syngo DynaCT can contribute to doing so more precisely.”

Other types of ablation, such as RFA, microwave and LITT or endoluminal brachytherapy also depend on exact navigation. Depending on the tumor size, these “total” local ablations are expedient in the context of a therapy using systemic chemotherapy, since affected lymph tracts and lymph nodes can absorb the outflowing che- mothapeutic agent in significantly higher concentrations than is the case with systemic administration. Undis- covered residual tumors in lymph tracts and lymph nodes are not reached by the local ablation, however, they are reached by intratumoral chemotherapy.

syngo DynaCT in the Hybrid Room

When asked which departments could benefit from angiographic imaging, the lung specialist answers that it is mainly suited to hospitals with a high patient circulation, in which at least 800-1,000 biopsies are performed annually. “I believe hybrid rooms are the future of medicine. In such multi-level rooms, where angiography and surgery take place on the same table, cardiologists as well as pulmonologists, hepatologists and surgeons can gain from the benefits of intra-procedural imaging.”

by Lena Schnabl

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