

Personalize your clinical workflow with Lung VCAR

- PACS reviewer
- Selective use of DCA
- Nodule classification
- Earlier validation of nodule growth

A workflow definition by:
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The Department of Diagnostic and Interventional Radiology, Marien Hospital Düsseldorf, Germany, serves a busy oncology center. Detection, staging, guidance of interventional procedures and follow-up of tumor patients as well as cross sectional imaging of the chest for other reasons is performed using a 16 slice multidetector-row GE scanner (LightSpeed® 16 with Xtream™). The routine chest protocol uses 16 x 1.25mm collimation, followed by reconstruction of 3.75mm slices with both soft tissue and lung kernels. In addition, 1.25mm slices are reconstructed and stored on the CT scanner. They are erased from the CT image data store on a "first in, first out" basis after several days.

Reporting of chest CT is routinely done using soft copies in a PACS environment (GE Centricity®) including clinical conferences based on digital projection of images.

For this purpose both sets of 3.75mm slices are stored in the PACS.

Dedicated workstations (GE Advantage Workstation™) are used for post processing of image data including detailed analysis of pulmonary nodules using Lung VCAR™ software.

As routine reporting is done on PACS workstations, that do not yet include all available software applications, Lung VCAR is not applied routinely in every chest case and not even in every case with pulmonary nodules.

Instead, Lung VCAR is used in specific situations in which the software that is available on PACS workstations is not sufficient.

In these cases the 1.25mm image set is either sent to the Advantage Workstation from the CT scanner or is loaded on to the work station which can access the CT store.

Computer-assisted visualization is used in cases in which either highlighting of every single nodule is mandatory (e.g. patient schedules for pulmonary metastasectomy) utilizing the increase in sensitivity compared to individual radiologists.

The volumetry tool is used for nodule classification:

- In incidentally detected nodules in subjects with no known malignancy, particularly in smokers, volumetry is used to detect possible nodule growth more precisely or even earlier. Follow-up intervals are based on the maximum baseline nodule diameter:
 - < 5mm: 12 months
 - 5-7mm: 6 months
 - 8-10mm: 3 months
 - > 10: usually immediate work-up including biopsy
- In patients with known malignancy and pulmonary nodules at the baseline CT scan that could both represent pulmonary metastases or benign nodules (e.g. granulomas) volumetry is used to detect growth most likely representing metastases more precisely or earlier usually applying follow-up intervals of 8 weeks.
- Rarely, in patients with known metastases undergoing systemic therapy volumetry is used to detect the effect of therapy more precisely or earlier (loss of volume at follow-up), again usually using intervals of 8 weeks.

Volumetry is performed at the baseline scan on the basis of 1.25mm thin slices and images of the segmented nodules are stored in the PACS system. Follow-up studies are performed using the same scan parameters and volumetry is repeated and compared to the results and images stored in the PACS. As the storage on the workstations is sufficient to store 1.25mm image data of pulmonary nodules for longer than 8 weeks, the original thin slice data set is usually still available for repeat analysis on the work station.

Because of the known limitations of volumetry tools the result is interpreted in the context of manual measurements on the monitor, the visual impression and possible other findings.

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