

Lung VCAR clinical case study

Routine benefits in the management of pulmonary nodules

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Case study 1

Patient aged 74 who underwent a CT examination in the context of the DEPISCAN lung cancer screening programme. The initial examination revealed the presence of a small non-specific parenchymatous strip and a 3mm mixed nodule in the upper right lobe, using GE Lung VCAR™.

During the control CT scan, a nodule with air bronchogram, suspected of being malignant, was discovered on the site of the initial non-specific density (slide series 1); the mixed nodule had however disappeared (slide series 2). A PET-scan was performed with negative results; this can be explained by the drop in diagnostic performance of PET for lesions of less than 10mm, which was the case for this patient. A control CT scan after antibiotic treatment seemed to demonstrate an increase in tissue density but this was impossible to evaluate properly with 2D measurements.

Although the density of the strip was not detected by Lung VCAR, retrospective synchronisation based on detection of the nodule on the control scan allowed change over time to be analyzed. It is noteworthy that this volume/time comparison could be performed between a "ground glass" (non-solid) density and a tissue density. Note the inclusion of a vascular structure in the dense strip; this interfered with initial volume calculations and consequently the calculation of doubling time.

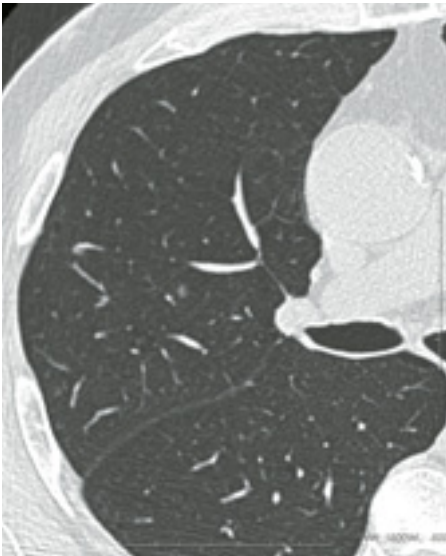


Figure 1a

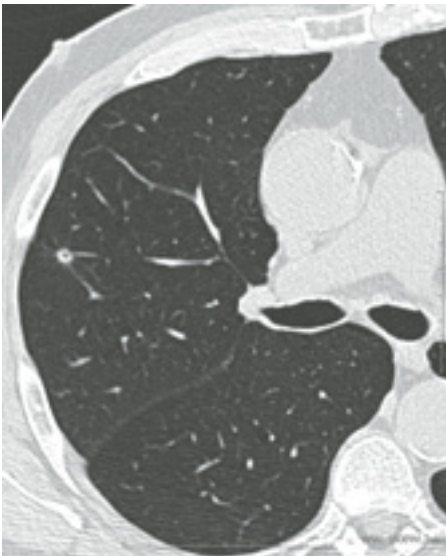


Figure 1b

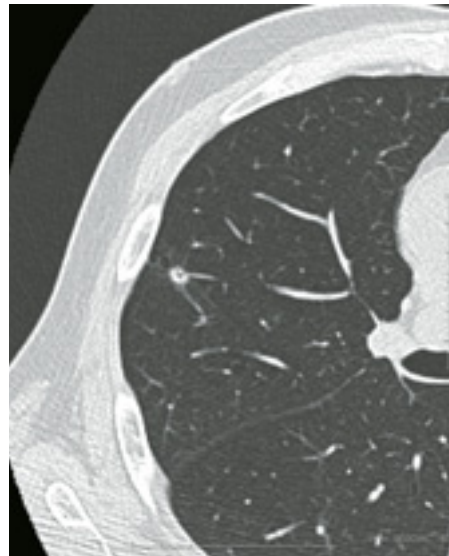


Figure 1c

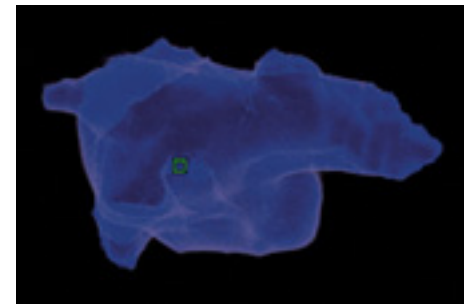


Figure 2a

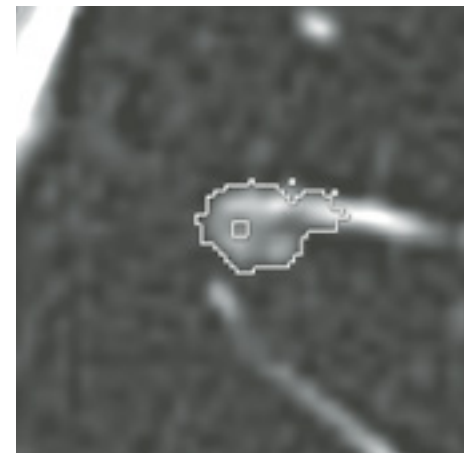


Figure 2b

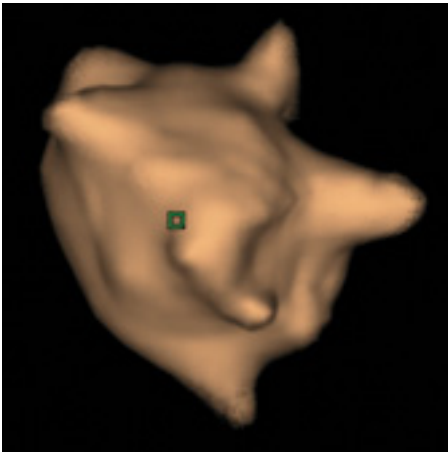


Figure 3a

(TV) 154 mm³ DT1: 3 years 265 days %G1: 51%
 Scan Inter(vol1;3): 26 months 22 days
 Size (mm) L-R: 9.5 A-P: 10.5 I-S: 10.8
 max=363 av=-132 std=205,3

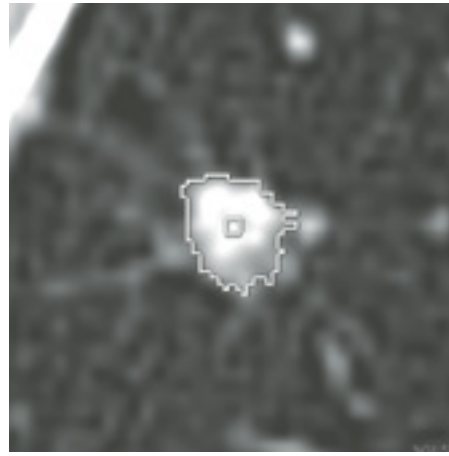


Figure 3b

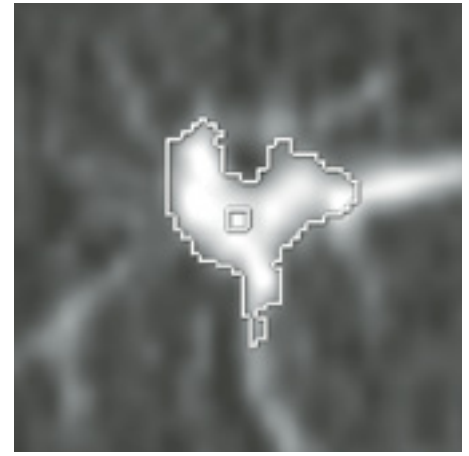


Figure 3c

Growth however was definitely established by the software and was consistent with the doubling time of a malignant lesion.

The doubling time of most malignant solid nodules is between 30 and 400 days. Surgery confirmed that this was a primary pulmonary adenocarcinoma.

The disappearance of the mixed nodule underlines the possibly inflammatory or infectious nature of these abnormalities. This reinforces the necessity of follow-up 1 month after trial treatment by antibiotherapy; malignancy should be suspected if the lesion remains.

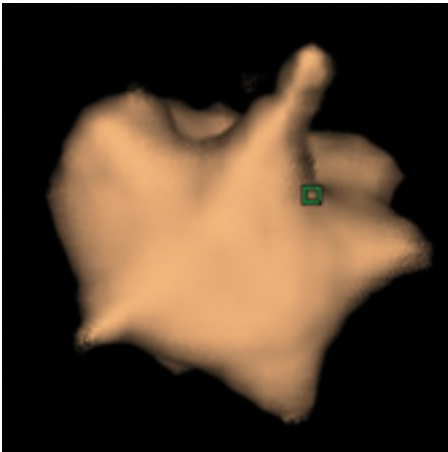


Figure 4a

Mar 11 2005 - N1 (S)
 (TV) 122mm³
 Size (mm) L-R: 9.0 A-P: 10.6 I-S: 8.7

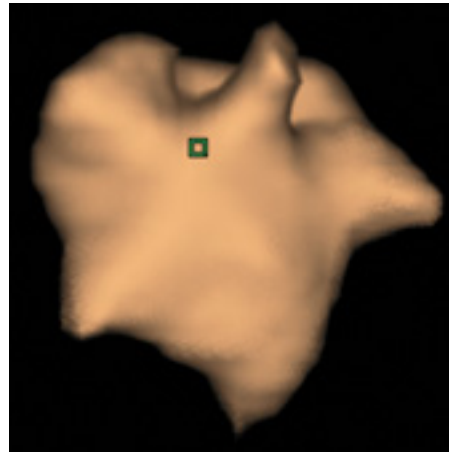


Figure 4b

Jun 03 2005 - N1 (S)
 (TV) 154mm³
 Scan Inter(vol1;2): 2 months 24 days
 Size (mm) L-R: 9.1 A-P: 10.5 I-S: 10.8

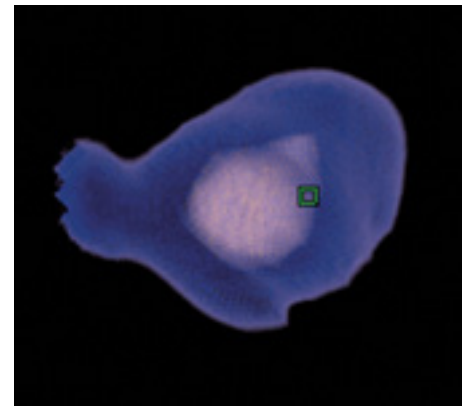


Figure 6a

N2 (PS) 38% solid
 (NS) 18 mm³
 (S) 11 mm³
 (TV) 29 mm³

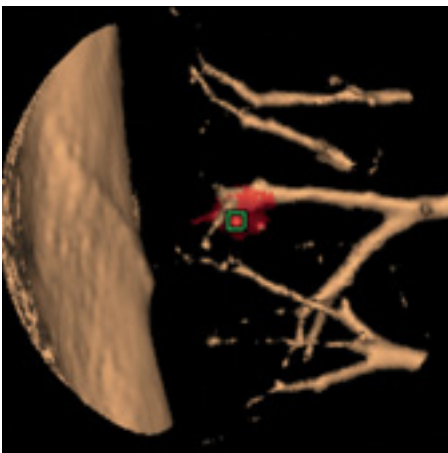


Figure 5a

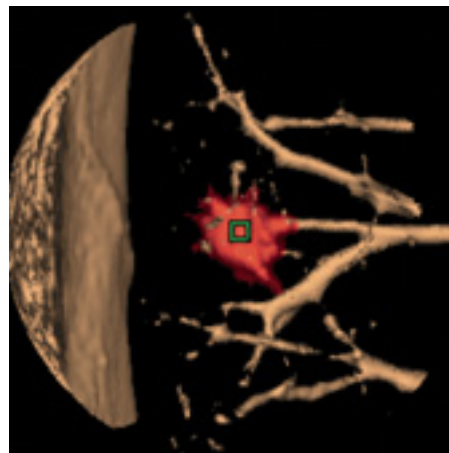


Figure 5b

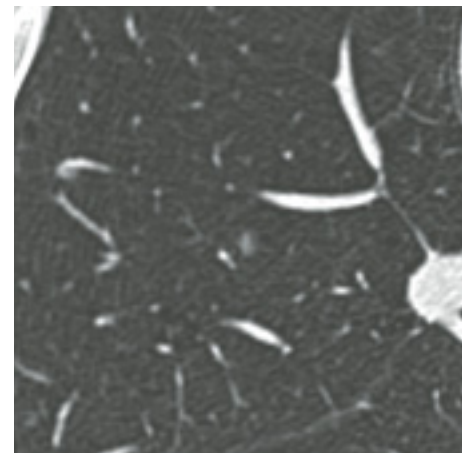


Figure 6b

Case study 2

Man aged 32 who underwent CT scan of the thorax on account of lower chest pains. A nodule of non-solid density was detected and, in view of the very low prevalence of broncho-pulmonary cancer in persons under 35, kept under observation. Despite the stability of this nodule over 4 years, it was decided to operate on account of the non-solid density of the nodule (-301 HU) and its size (almost one centimetre).

Possible etiologies were non-tumoral (sites of desquamative interstitial pneumonitis or pulmonary fibrosis), benign tumoral (atypical adenomatous hyperplasia, considered as a precancerous dysplasia, generally smaller than 6mm) or malignant tumoral (bronchiolo-alveolar adenocarcinoma or carcinoma). The final diagnosis was primary pulmonary adenocarcinoma.

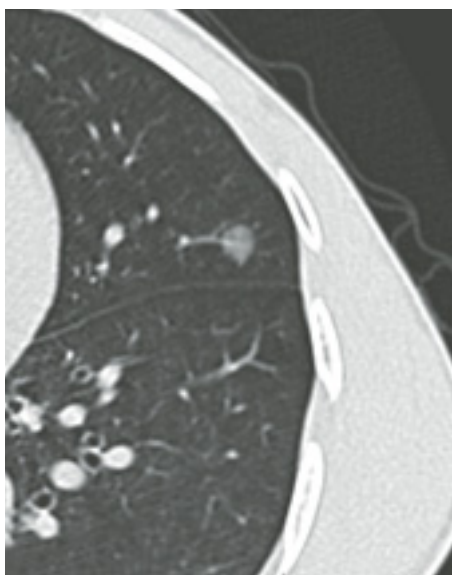


Figure 1b

This case illustrates that for “ground glass” nodules change over time represents only one of the criteria for judgement, and one which has much less value than in the case of a solid nodule. Average volume-doubling times of 813 days have thus been reported for “ground glass” tumoral nodules.

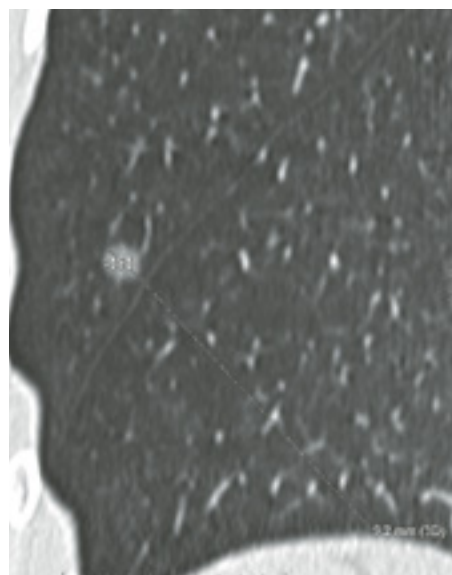


Figure 1c

Assessment of density, and in particular the search for a tissue component and its quantification, appear much more relevant in the follow-up of this type of nodule, which is encountered with increasing frequency.

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