

# A Solitary Pulmonary Micronodule in Melanoma Staging – Metastasis?

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## History

A 38-year-old male patient had undergone resection of a melanoma found on his upper left chest. Prior to surgery, he was asymptomatic and a chest X-ray in two planes was required for primary staging. An ultra-low-dose native CT scan was performed instead, with patient consent, and a solitary pulmonary micronodule, 1 mm in diameter, was visualized in the right upper lobe. No lympho-nodal or distant organ metastases were found. 16 months later, the patient returned for a follow-up and an ultra-low-dose native CT examination was once again performed.

## Diagnosis

In comparison to the prior examination, CT images showed no changes of the solitary pulmonary micronodule in the right upper lobe. The micronodule was therefore characterized as

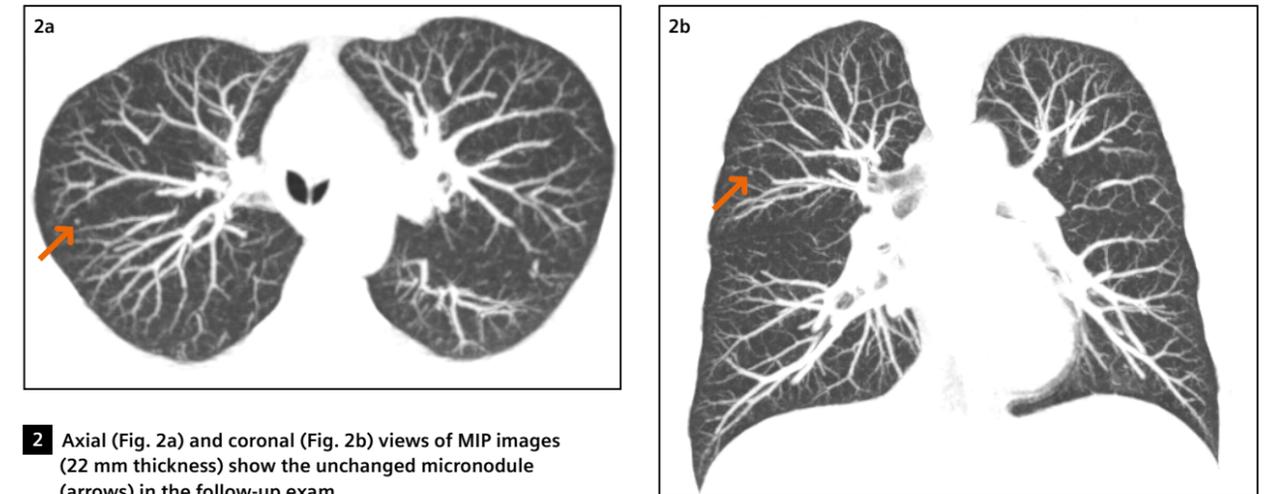
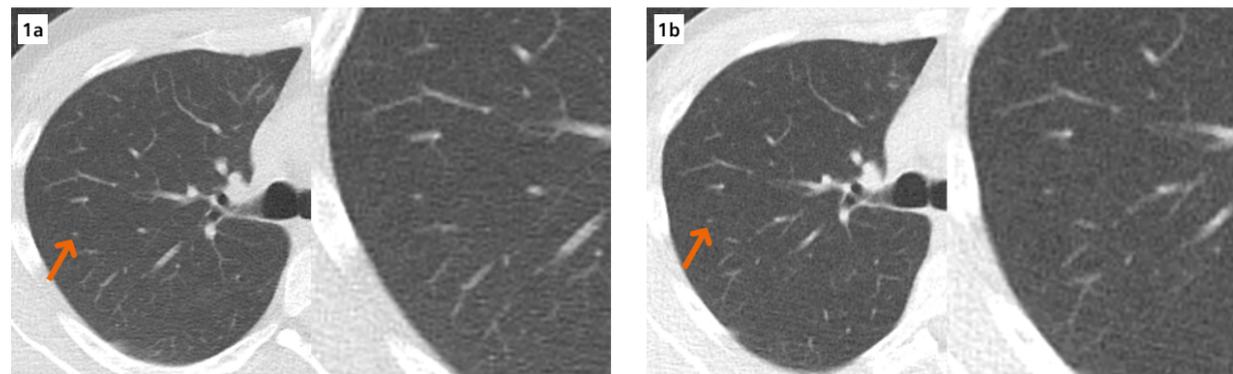
a small post-infection scar and thus non-malignant. No pulmonary metastases or enlarged lymph nodes were seen in either the axillae or the mediastinum. The resection scar on the upper left chest was no longer visible and there were no other suspicious cutaneous lesions.

## Comments

A melanoma is a malignant skin cancer deriving from the pigment-containing melanocytes. The increasing incidence rate [1] demands a staging tool that can detect even small lesions and which is also cost-efficient and has a positive risk-benefit ratio. [2] The radiation exposure level of a standard posteroanterior and lateral chest X-ray is in average 0.1 mSv. [3] This is similar to that of an ultra-low-dose CT. [4] The reduction in exposure is enabled by an advanced tin

filter technology, which optimizes the X-ray spectra and significantly improves the air / tissue contrast. In this case, using SOMATOM go.Top, a pulmonary micronodule with a diameter of only 1 mm is visualized at an effective dose level of 0.17 mSv in primary staging. In the follow-up evaluation, the effective dose level is further reduced to 0.11 mSv using SOMATOM X.cite. Lymph nodes in the axillae and mediastinum could also be evaluated, which is not possible on a regular chest X-ray examination. ●

**1** Axial images demonstrate no changes in a micronodule (arrows) in the right upper lobe when comparing the primary staging (Fig. 1b) to the follow-up exam (Fig. 1a).



**2** Axial (Fig. 2a) and coronal (Fig. 2b) views of MIP images (22 mm thickness) show the unchanged micronodule (arrows) in the follow-up exam.

## References

- [1] Rastrelli M, Tropea S, Rossi CR, Alaibac M. Melanoma: epidemiology, risk factors, pathogenesis, diagnosis and classification. In Vivo. 2014; 28:1005–1011
- [2] Dinnes J, Ferrante di Ruffano L, Takwoingi Y, Cheung ST, Nathan P, Matin RN, Chuchu N, Chan SA, Durack A, Bayliss SE, Gulati A, Patel L, Davenport C, Godfrey K, Subesinghe M, Traill Z, Deeks JJ, Williams HC, Cochrane Skin Cancer Diagnostic Test Accuracy Group. Ultrasound, CT, MRI, or PET-CT for staging and re-staging of adults with cutaneous melanoma. Cochrane Database of Systematic Reviews 2019, Issue 7. Art. No.: CD012806.
- [3] Mettler Jr FA, Huda W, Yoshizumi TT, Mahesh M. Effective doses in radiology and diagnostic nuclear medicine: a catalog. Radiology. 2008; 248(1):254–63.
- [4] Messerli M, Kluckert T, Knitel M, Wälti S, Desbiolles L, Rengier F, et al. Ultralow dose CT for pulmonary nodule detection with chest x-ray equivalent dose – a prospective intra-individual comparative study. Eur Radiol. 2017;1–10.

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## Examination Protocol

Scanner	SOMATOM go.Top	SOMATOM X.cite
Scan area	Thorax	Thorax
Scan mode	Spiral scan	Spiral scan
Scan length	328 mm	325 mm
Scan direction	Cranio-caudal	Cranio-caudal
Scan time	1.8 s	3.1 s
Tube voltage	Sn110 kV	Sn140 kV
Effective mAs	35 mAs	6 mAs
Dose modulation	CARE Dose4D	CARE Dose4D
CTDI <sub>vol</sub>	0.30 mGy	0.24 mGy
DLP	12 mGy cm	8 mGy cm
Effective dose	0.17 mSv	0.11 mSv
Rotation time	0.33 s	0.3 s
Pitch	1.2	0.8
Slice collimation	64 × 0.6 mm	64 × 0.6 mm
Slice width	1 mm	0.8 mm
Reconstruction increment	0.7 mm	0.6 mm
Reconstruction kernel	Br60f (ADMIRE3)	Br60f (ADMIRE3)