

Frequency of New Pulmonary Neoplasm Incidentally Detected by Computed Tomography Angiography in Acute Stroke Patients—A Single-Center Study

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Background: Incidental findings of suspect lung opacities are common in computed tomography (CT)-based thorax examinations, especially in high-risk patients, such as stroke patients. Screening with CT of the thorax has detected lung cancer in approximately .31%-1.20% of high-risk populations. The aim of the present study was to report the frequency of suspect lung opacities on routine acute stroke imaging. *Methods:* Seven hundred and fifty-seven consecutive stroke patients evaluated for intravenous thrombolysis treatment within 4.5 hours of symptom debut, from June 2009 to December 2011, were included in a prospective registry on which this analysis was based. On admission, CT angiography from the aortic arch to vertex was performed, including the lung apices, corresponding to 1/3 of the total lung volume. A senior neuroradiologist reviewed all scans registering suspect lung opacities, which subsequently were characterized as either malignant, presumed malignant, presumed benign or benign, based on radiologic parameters of malignancy, positron emission tomography scan, histology, and clinical features. *Results:* Suspect lung opacities appeared on the CT angiography in 20 patients (2.6%). Five suspect lung opacities were categorized as malignant and 3 suspect lung opacities were categorized as presumed malignant. This corresponds to an incidence of 1.1% (8 of 750). *Conclusions:* Malignant lung opacities were found in approximately 1% of this high-risk population, whereas our findings do not support full CT of the thorax as routine on stroke patients. **Key Words:** Incidental findings—lung neoplasm—stroke—computed tomography—screening.

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Incidental findings of malignant lung opacities range from .31%-1.20%, in computed tomography (CT)-based diagnostic cardiac examinations involving 10%-70% of the total lung volume.^{1,2}

The corresponding incidence in a stroke population is not well described, although the risk of thromboembolic events increases in the presence of malignancy.³

The aim of the present study was to report the frequency of suspect and malignant lung opacities in the involved lung fields found at CT-based routine imaging in an acute stroke population.

Materials and Methods

Seven hundred and fifty-seven consecutive stroke patients evaluated for intravenous thrombolysis treatment

within 4.5 hours of symptom debut at Copenhagen University Hospital, Bispebjerg, from June 2009 to December 2011, were included in a prospective registry on which this analysis was based.

Our institution has a catchments area of 1.7 million (The Capital Region of Denmark) for acute stroke admissions within 4.5 hours of symptom onset on even dates. All patients are evaluated by a stroke specialist and referred to acute stroke imaging including CT and computed tomography angiography (CTA) unless contraindications including contrast allergy, pregnancy, or kidney failure are present.

The study was approved by the Danish Data Protection Agency, file number 2009-41-3824.

Radiologic Imaging and Follow-up

Standard neuroimaging includes a noncontrast CT cerebrum and a CTA from the aortic arch to vertex. Latter includes anatomically the lung apices, corresponding to a third of the total lung volume.

Imaging was performed using a 64-section multidetector computed tomography with noncontrast CT cerebrum (120 kVp, 500 mAs, 5-mm slice thickness reconstruction) and CTA (120 kVp, 295 mAs, collimation 64 × .625-mm isotropic voxel resolution) with contrast bolus injection (Iohexol 350 mg/mL, 5 mL/second), monitored by bolus tracking in the descending aorta and scanned with fixed 3 seconds post-tracking delay and reconstructed in .9-mm slice thickness.

A senior radiologist observer, blinded to all clinical data, reviewed all CTA scans in the registry systematically—analysis included description of the lung apices for the presence of tumor suspect lung opacities. The identified opacities were subsequently evaluated by a senior thorax radiologist observer and characterized in accordance to criteria for malignancy^{4,5} (described in Fig 1).

In accordance with current guidelines, patients with suspect lung opacities were referred to further examinations (positron emission tomography scan and histology) unless

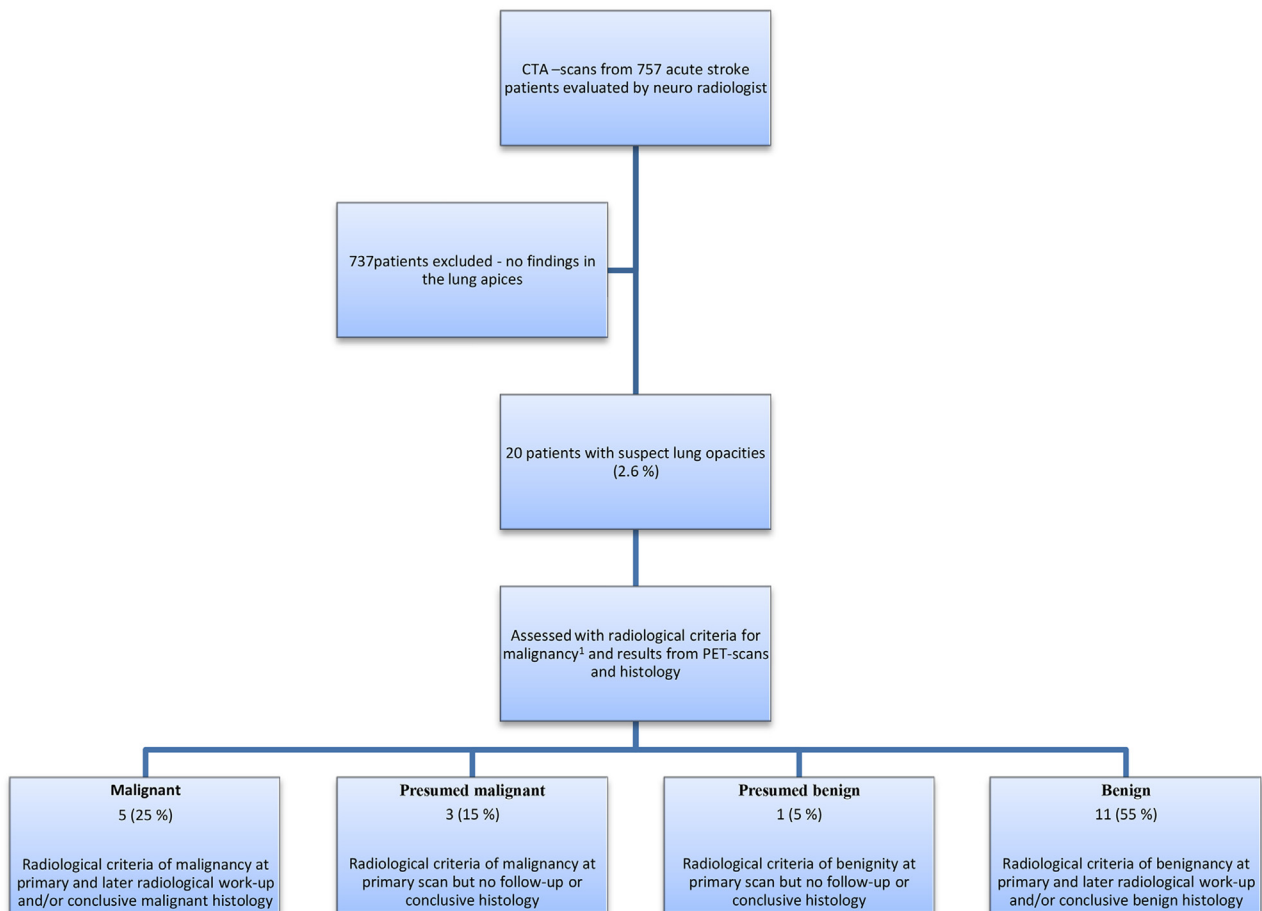


Figure 1. Flowchart illustrating the evaluation of CTA scans from 757 patients with acute stroke and assessment of suspect lung opacities into 4 groups: ¹Assessed with radiologic criteria for malignancy by thorax radiologist. The radiologic criteria of malignancy used were opacity larger than 30 mm or independent of size being either lobulated or speculated and solid. Larger irregular but well-defined part-solid opacity were assessed high-suspect malignant. Moderate-suspect malignant lesions were defined as focal opacities or ill-defined laminar opacities. Low-suspect malignant findings were either smaller than 5 mm with smooth, well-defined texture, solid or semi-solid, or well-defined calcified opacities or laminar partly calcified opacities without mass effect. Abbreviation: CTA, computed tomography angiography.

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