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Edited by Dr. Bhavin Jankharia

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What is the Smallest Lung Nodule that can be Biopsied?

In 2012 we published an Inner Spaces issue titled "What is the Smallest Lung Nodule that can be Biopsied" and showed three examples of nodules measuring 8.5 mm, 7.9 mm and 7.5 mm (Fig. 1) respectively.

Since then, the biopsy of even smaller nodules (Fig. 2) has become reasonably routine, including those measuring around 5 mm in diameter (Fig. 3).

Recently we had an anxious 48-years old lady with a diagnosis of buccal carcinoma, whose PET/CT showed multiple lung nodules measuring between 3.5 to 6 mm in diameter, mainly in the upper lobes. She had difficulty understanding commands and though there were 5 and 6 mm nodules in the anterior aspects of the upper lobes, the only way to do the biopsy properly was by placing her in the prone position. In this position, the best nodule available for biopsy was 3.5 mm in diameter.

A biopsy of small nodules requires a CT fluoroscopy add-on, with which virtually real-time imaging can be performed to help position the needle correctly. What is also needed is good patient breath control where the patient has to maintain a regular shallow pattern so that there is good hand-eye-brain coordination. Once the needle is placed at the edge the nodule, the gun is deployed, often by keeping the canula of the coaxial system a little outside the nodule. Often firing the gun even if it is not in the nodule creates a little hemorrhage and fixes the nodule. In this case, the hemorrhage occurred after the biopsy through the nodule itself and was not needed to fix the nodule.

The final diagnosis was granulomatous disease.

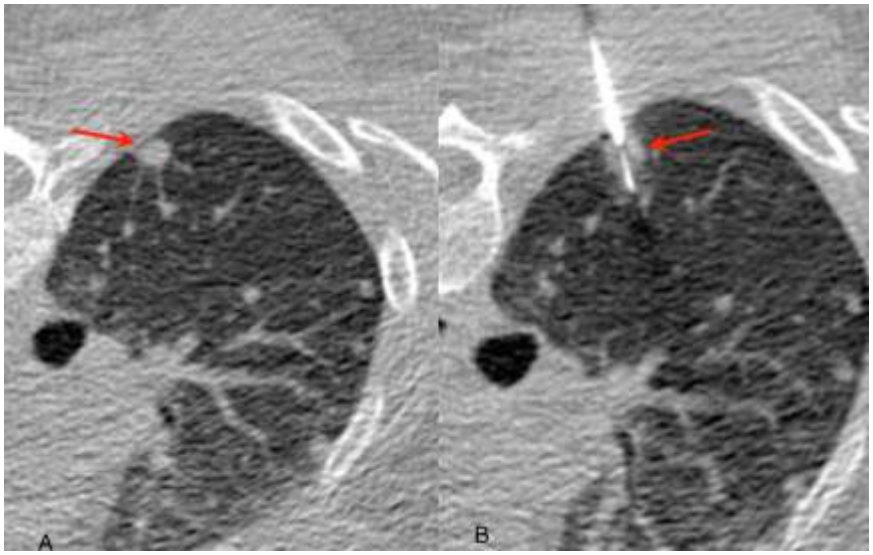

Fig. 1: (Case from 2012). Tuberculosis. This patient had multiple lung nodules and had one failed FNAC as well. A 7.5 mm nodule in the right lower lobe was selected (arrow in A) and was successfully speared by the cannula (arrow in B).

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At a glance:

- Small lung nodules (< 8 mm), often need to be biopsied to understand their exact etiology, in diverse clinical situations
- The use of CT fluoroscopy has helped make it possible to biopsy even sub 5 mm nodules
- The smallest nodule that we have now biopsied is a 3.5 mm nodule

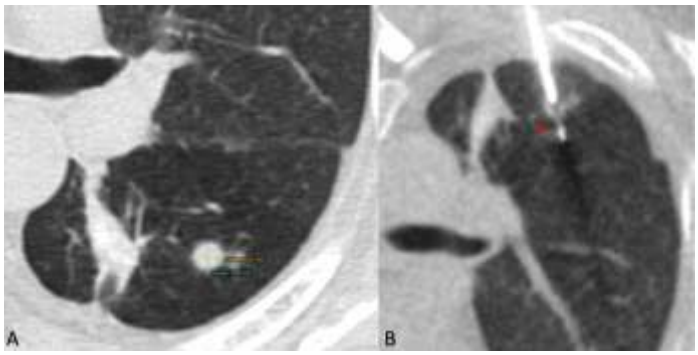

Fig. 2: Tuberculosis. A 60-years old lady with Ca breast developed a new 6.6 x 5.9 mm nodule in the superior segment of the left lower lobe. Biopsy showed granulomatous disease consistent with tuberculosis.

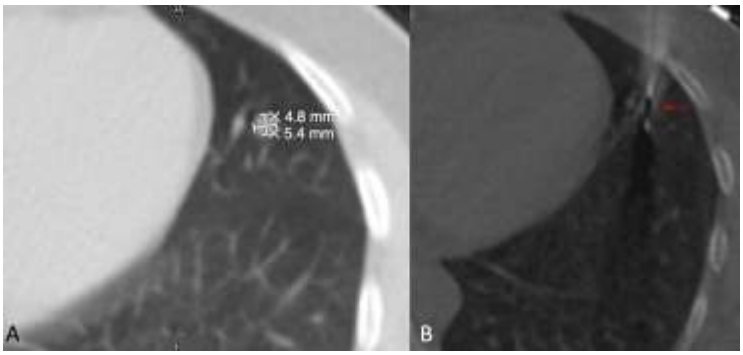

Fig. 3: Metastasis from Ca rectum. A 48-years old lady with a recent diagnosis of Ca rectum had multiple lung nodules. The largest was in the inferior lingula measured 4.8 x 5.4 mm in diameter. Biopsy showed metastasis from Ca rectum.

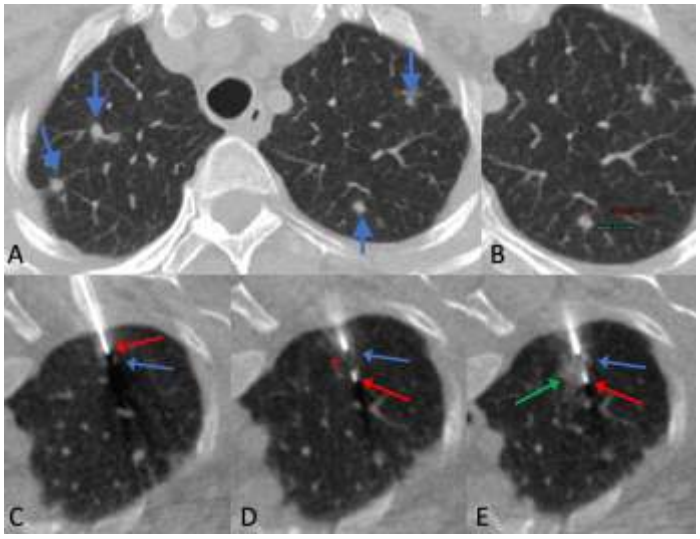

Fig. 4: Granulomatous disease. 48 years old woman diagnosed recently to have buccal cancer. PET/CT showed multiple lung nodules (blue arrows in A). A 3.5 x 3.6 mm nodule in the left upper lobe was identified (B) so that the biopsy could be done in the prone position. The blue arrow in images C, D and E shows the nodule, while the red arrow shows the tip of the cannula in C and the tip of the deployed gun in D and E. The green arrow in E shows the small peri-nodular hemorrhage.

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Bhaveshwar Vihar, 383, S.V.P. Road, Prarthana Samaj, Charni Road, Mumbai 400 004.