

# Advances in Cytopathology for Lung Cancer

## The Impact and Challenges of New Technologies

Harmanjatinder S. Sekhon, MD, PhD<sup>a</sup>,  
Carolina A. Souza, MD, PhD<sup>b</sup>, Marcio M. Gomes, MD, PhD<sup>a,\*</sup>

### KEYWORDS

• Lung cancer • Cytology • Fine-needle aspiration biopsy • Immunohistochemistry

### KEY POINTS

- The impact of new imaging technologies and sampling procedures.
- How multidisciplinary care and subspecialization are changing the face of cytopathology.
- The new techniques and ancillary tests for the diagnosis and management of lung cancer.
- Current cytologic diagnostic algorithm, techniques, and diagnostic values.

### INTRODUCTION

Lung cancer remains one of the most prevalent cancers in both men and women. Despite new and improved therapies the outcome remains very poor in both genders. Along with progress in treatment modalities, the improved imaging techniques, new sampling procedures, pathologic ancillary tests, and identification of molecular targets have also evolved. With the development of new technologies and changes in the epidemiology and treatment of lung cancer, significant advances have been made in cytopathology. Among them, this article highlights fine-needle aspiration (FNA), which has emerged as a safe, cost-effective, and less invasive procedure without compromising the sensitivity, specificity, and accuracy of the diagnosis compared with histology specimens.<sup>1</sup> This article focuses on the impact of such new technologies, and the role of cytology in diagnosing lung cancer and facilitating multidisciplinary patient

care. In addition, the current diagnostic cytologic techniques and their diagnostic values are briefly reviewed. A thorough review of cytologic techniques and diagnosis is beyond the scope of this article.

### ***New Imaging Technologies and Sampling Procedures***

#### ***Multidetector computed tomography and computed tomography-guided lung biopsy***

The advances in cytopathology in the last 2 decades were made possible by advances in medical imaging technology. In particular, the advent of multidetector computed tomography (MDCT) has revolutionized thoracic imaging, allowing faster acquisition and multiplanar reconstruction (MPR), thus providing high-quality images. MDCT allows more accurate evaluation of lung lesions, hence assisting biopsy planning and the decision of biopsy approach and needle path, which influences both diagnostic yield and

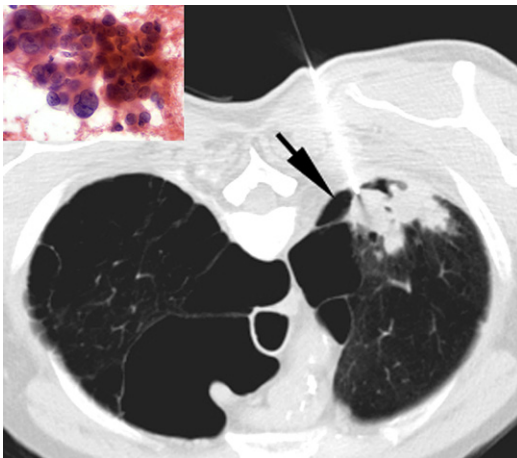
<sup>a</sup> Department of Pathology and Laboratory Medicine, The Ottawa Hospital, University of Ottawa, 501 Smyth Road, Ottawa, Ontario, Canada K1H 8L6; <sup>b</sup> Department of Diagnostic Imaging, The Ottawa Hospital, University of Ottawa, 501 Smyth Road, Ottawa, Ontario, Canada K1H 8L6

\* Corresponding author.

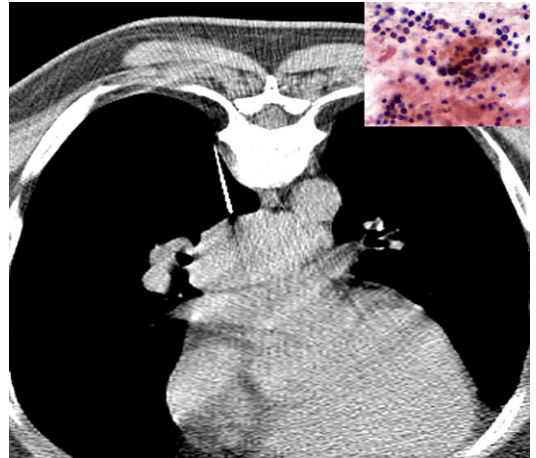
E-mail address: [mgomes@toh.on.ca](mailto:mgomes@toh.on.ca)

risk for complications.<sup>2-5</sup> Computed tomography (CT) is currently the modality of choice for imaging-guided biopsy in most centers and has largely replaced fluoroscopy alone or ultrasonography to guide percutaneous biopsies of parenchymal lung lesions.<sup>1</sup> CT has made transthoracic biopsy more accurate and safer, and has expanded the scope of lesions amenable to percutaneous biopsy (Figs. 1 and 2). CT is widely available, cost-effective, and allows radiologists to target smaller and deep-seated lesions with a better yield compared with transbronchial biopsy (Figs. 3 and 4).<sup>6</sup> The role of CT-guided biopsy has recently been established in the diagnosis of early adenocarcinoma (ADC) presenting as part-solid lesions (ie, lesions containing both ground-glass and solid components). The solid component in these lesions often correlates with the presence of tumor invasion on pathology.<sup>7,8</sup> Under CT guidance, the biopsy needle can be placed accurately within the solid component, thus increasing diagnostic accuracy (Fig. 5).

CT-guided biopsy is usually performed with coaxial technique, which involves imaging-guided placement of an introducer needle directed to the edge of the target lesion. Once adequate location of the introducer needle is confirmed with CT scan, tissue sampling is obtained with a biopsy needle through the introducer. With coaxial technique, several samples may be obtained through the same introducer, precluding

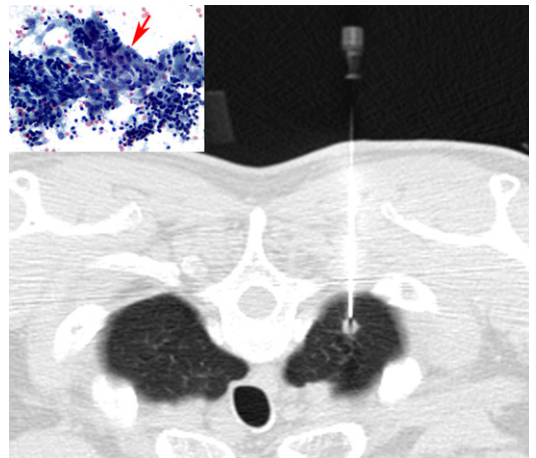


**Fig. 1.** CT-guided transthoracic biopsy of a large spiculated lesion in the left upper lobe. Using coaxial technique, the needle is accurately placed within the lesion, avoiding the large emphysematous bullae (arrow) adjacent to it, thus considerably decreasing the risk of pneumothorax. The smear shows markedly atypical tumor cells with large nuclei and high nuclear/cytoplasmic ratio, consistent with a poorly differentiated adenocarcinoma (inset).



**Fig. 2.** CT-guided transthoracic biopsy in a 63-year-old man. Despite the challenging location for percutaneous biopsy, the subcarinal mass was targeted with precision using coaxial technique. The smear shows small cells with scanty cytoplasm and inconspicuous nucleoli in a necrotic background, typical of small cell lung carcinoma (SCLC - inset). Because SCLC are usually central, they were not frequently diagnosed by transthoracic FNA before CT-guided technique became widely available.

the need for repositioning the biopsy needle for each sample and avoiding several punctures of the pleura surface, thus decreasing procedure time and risk of complications.<sup>2,3</sup>



**Fig. 3.** CT-guided transthoracic FNA of a solid nodule in the left upper lobe of a 51-year-old man. Thin-slice CT scan allows accurate placement of the biopsy needle in the center of a subcentimeter (8 mm) nodule. The smear shows aggregates of histiocytes (arrow) and lymphocytes, indicating a granulomatous infection (inset). These lesions were not amenable to transthoracic FNA before the advent of CT-guided biopsies and the diagnosis depended on either wedge resection or radiological follow-up.

Download English Version:

<https://daneshyari.com/en/article/4217169>

Download Persian Version:

<https://daneshyari.com/article/4217169>

[Daneshyari.com](https://daneshyari.com)