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MEDICAL INSIGHTS

Peripheral cryobiopsy for solitary pulmonary nodules

1.1 mm flexible single-use cryoprobe for the diagnosis of sub-solid lesions

Localisation process and biopsy using endobronchial ultrasound and 1.1 mm cryoprobe through a guide sheath. Depending on the bronchoscope Jiang et al. conducted cryobiopsies with or without a guide sheath.

Background

Solitary pulmonary nodules (SPNs) are referred to as radiological appearances which can harbor a primary lung malignancy, distant metastasis or benign conditions (e.g. infectious, congential)[1]. SPNs are divided into solid and sub-solid lesions. Ground-glass opacity lesions (GGOs) are a subgroup of sub-solid lesions.

A valid diagnosis of SPNs by tissue examination is important to define the further management of the patient.

In their present retrospective, single-center trial ***A pilot study of the ultrathin cryoprobe in the diagnosis of peripheral pulmonary ground-glass opacity lesions***, Jiang et al. from Shanghai Chest Hospital evaluated 20 consecutive patients undergoing peripheral cryobiopsy for GGOs with the 1.1 mm flexible single-use cryoprobe[2].

Challenges and goals

Ground-glass opacity lesions (GGOs) respresent a subgroup of sub-solid lesions, which are characterized by an increased opacity of lung tissue on high-resolution computed tomography[1,2].

Different techniques have been described in the literature for biopsy of peripheral lesions (transthoracic needle aspiration, transbronchial forceps biopsy or cryobiopsy and surgical lung biopsy). Using interventional pulmonological procedures, GGOs can be harder to diagnose compared to solid lesions[2].

Jiang et al. conducted the first study evaluating the clinical use of the 1.1 mm flexible single-use cryoprobe on peripheral cryobiopsy specifically for the diagnosis of GGOs[2].

Method

At Shanghai Chest Hospital, 20 consecutive patients with 23 GGOs underwent peripheral cryobiopsy.

The diagnostic yield was defined as the rate of correct diagnoses taking into account a comprehensive analysis of histology, microbiology and clinical follow-up.

Before bronchoscopy, high-resolution computed tomography was used to evaluate the GGO. During bronchoscopy, virtual bronchoscopic navigation and endobronchial ultrasound were applied for localisation of the lesion.

Implications

Although all lesions showed risk factors for transbronchial interventions resulting in a poor diagnostic yield, Jiang et al. demonstrated high diagnostic efficacy, feasibility and safety in sampling GGOs with the 1.1 mm flexible single-use croyprobe[2].

Bending into the apical lung segments was necessary in 18 of 23 nodules. With the 1.1 mm flexible single-use cryoprobe, Jiang et al. reported that they could easily bend around sharp angles in the airway (e.g. distal left or right superior bronchus)[2].

The large sample size, preserved-cellular architecture and presence of pathologically altered areas contrasted by normal tissue in the same sample facilitated histopathological diagnosis[2]. These observations are supplemented by the latest results on the diagnostic advantages of cryobiopsy samples for next-generation sequencing. Thereby, cryobiopsy can have a deciding impact especially in molecular targeted therapy for non-small cell lung cancer (NSCLC)[3].

The authors stress that further data is needed to confirm the safety and diagnostic value of the 1.1 mm flexible single-use cryoprobe.

Results and key findings

Selected lesion characteristics are depicted in Table 1. The median number of biopsies per lesion was three. Average sample size was 3.65 mm. The diagnostic yield was 82.61 %. 19 out of 23 lesions were correctly diagnosed by peripheral cryobiopsy. Two adenocarcinomatous lesions were misdiagnosed as chronic inflammation, a further two provided unqualified samples.

No pneumothorax or severe hemorrhage occured.

Characteristics	Proportion
Lesion size under 20 mm	14/23
Location in right or left upper lobe	18/23
Bronchus sign visible on HRCT	23/23
Invisible on fluoroscopy	14/23

Table 1: selected radiological features of the lesions

References

1. *Ito M et al. Management pathways for solitary pulmonary nodules. J Thorac Dis. 2018 Apr;10(Suppl 7):S860-S866. doi: 10.21037/jtd.2018.01.07.*
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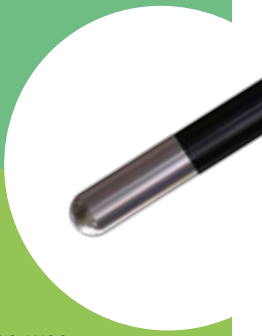
3. *Tone M, Inomata M, Awano N, Kuse N, Takada K, Minami J, Muto Y, Fujimoto K, Kumasaka T, Izumo T. Comparison of adequacy between transbronchial lung cryobiopsy samples and endobronchial ultrasound-guided transbronchial needle aspiration samples for next-generation sequencing analysis. Thorac Cancer. 2020 Dec 3. doi: 10.1111/1759-7714.13770.*



Products

The Erbe 1.1 mm flexible single-use cryoprobe was used (20402-402). The authors used freezing times between 3 and 5 seconds with ERBECRYO® 2.

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