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THE HONG KONG 香港醫訊
MEDICAL DIARY

VOL.31 NO.1 January 2026

Interventional Pulmonology

OFFICIAL PUBLICATION FOR THE FEDERATION OF MEDICAL SOCIETIES OF HONG KONG ISSN 1812 - 1691

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Contents

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The Cover Shot

From Gustav Killian's pioneering bronchoscopy at Freiburg University in 1897 to today's cutting-edge innovations, Germany's Baden-Württemberg has remained a cradle of interventional pulmonology. Nearly three decades ago, Dr H. Becker of Heidelberg introduced the radial EBUS catheter, a milestone that transformed navigational bronchoscopy and enhanced access to peripheral lung lesions. About twenty years later, the Hetzel family in Stuttgart advanced the field further with airway cryobiopsy, enabling superior tissue sampling and greater diagnostic accuracy. While medical centres across the United States, Japan, and Asia continue to drive progress globally, Baden-Württemberg's enduring legacy and ongoing contributions keep Heidelberg firmly at the heart of interventional pulmonology- a fitting emblem for its iconic cover image.

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Published by
The Federation of Medical Societies of Hong Kong

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Design and Production
A-PRO MULTIMEDIA LTD www.apro.com.hk

Editorial

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Co-editors

Dr Wai-lam LAW Dr Terence CC TAM

It is our great honour to be the co-editors of this issue of Medical Diary featuring the theme of Interventional Pulmonology (IP). IP integrates advanced techniques and tools to diagnose and treat a wide range of pulmonary diseases using minimally invasive endoscopic methods. Over the past decade IP has continued to have rapid development facilitated by technological advances. In the era of artificial intelligence and robotics, more innovations of IP procedures will be expected in the near future.

Lung nodules are frequently detected through widespread CT imaging and screening programmes. Pulmonologists are all along pursuing bronchosopic techniques with high diagnostic yield and accuracy including for those difficult-to-reach lung nodules. Navigation bronchoscopy and real time imaging techniques are one of the hot topics in recent years. Dr Terence Tam will update the current status and advances in navigational bronchoscopy. In addition, robotic bronchoscopy is one of the advanced technologies in both diagnostic and therapeutic modality for managing lung nodules. Dr Calvin Ng will provide us with a full account of such technique, particularly the application in lung nodule ablation. Chronic obstructive pulmonary disease is a chronic respiratory disease with significant morbidity and mortality. Dr Bing Lam will share with us the application of bronchoscopic lung volume reduction for the treatment of this chronic disease. Endobronchial ultrasound has been used in diagnosis and staging for lung cancer for many years. Dr Fifian Chiang and Dr SL Fung will provide some updates for the procedure including the application of endoscopic ultrasound using bronchoscope-guided fine needle aspiration inside oesophagus. Lastly Dr WL Law will update the use of cryotechniques in various respiratory diseases including cryobiopsy in interstitial lung disease and mediastinal lymphadenopathy.

We would like to express our gratitude to all the contributing authors for their invaluable support. We sincerely hope our readers will find this issue informative and helpful.

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Navigational Bronchoscopy : Current Status and Advances

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Dr. Terence CC TAM

This article has been selected by the Editorial Board of the Hong Kong Medical Diary for participants in the CME programme of the Medical Council of Hong Kong (MCHK) to complete the following self-assessment questions in order to be awarded 1 CME credit under the programme upon returning the completed answer sheet to the Federation Secretariat on or before 31 January 2026.

INTRODUCTION

Lung nodules are increasingly detected through widespread CT imaging and screening programmes, posing a clinical challenge in diagnosis and management. This manuscript reviews navigational bronchoscopy for lung nodules, highlighting recent technological advances and challenges, and provides a concise clinical update for physicians.

LUNG NODULE MANAGEMENT GUIDED BY IMAGING, STAGING NEEDS, AND RISK STRATIFICATION

Lung nodules appear in about 0.2% of chest X-rays and up to 13% of chest CTs, with prevalence rising sharply in those over the aged 50 - up to 50% may have at least one nodule[1]. Clinical evaluation begins with assessing for lymph node or distant metastasis; if this is suspected, the sampling site that best enables a definitive diagnosis and accurate pathologic staging should be chosen [e.g., combined Central-Endobronchial ultrasound (C-EBUS) for mediastinal lymph node and peripheral nodule biopsy]. For patients without evidence of distant involvement, management is guided by risk stratification using prediction models (e.g., Brock, Mayo, and Herder)[2]. Based on the calculated risk, options include surveillance for low-risk (risk < 10%) small nodules, minimally invasive sampling for intermediate risk (risk 10-70%), and direct surgical resection for high-risk lesions (risk > 70%). A summary of this initial approach to lung nodules is shown in Figure 1. Circulating tumour DNA (ctDNA) testing appears to be a promising adjunct in lung nodule evaluation, but further validation is required before its routine clinical use can be adopted[3].

COMPARISON BETWEEN TRANSTHORACIC AND BRONCHOSCOPIC APPROACH

Transthoracic Needle Biopsy (TTNB) is a minimally invasive, highly accurate procedure for lung nodule sampling, especially when the lesion is accessible without rib obstruction, away from critical structures, and situated within a reasonable distance from the pleural surface[4]. It is traditionally preferred by generalists due to its high diagnostic yield. However, it should be recognised that the bronchoscopic approach offers several advantages, including the ability to screen the airway (unsuspected endobronchial involvement can be found in 4.4% of malignancies), simultaneous evaluation and staging of mediastinal lymph nodes, and allows bilateral sampling when required. It also carries lower risks of pneumothorax and tumour seeding[5]. While bronchoscopy's diagnostic yield was once lower (65-75%), recent studies (2024-2025) have shown that advanced bronchoscopy now matches CT-guided FNA accuracy for peripheral nodules[6].

IMPORTANCE OF GOOD SEDATION IN BRONCHOSCOPIC PROCEDURES

Effective sedation significantly contributes to procedural success and patient safety. A study on electromagnetic navigational bronchoscopy (ENB) using deep sedation with propofol reported an overall diagnostic yield of 89%, representing a 10-25% increase compared to light or moderate sedation (e.g., with midazolam)[7]. Additionally, improved sedation enhances patient comfort and cooperation, minimising interruptions and thereby shortening procedure times by up to 40%[8]. This combination of benefits highlights the critical role of optimal sedation in improving bronchoscopy outcomes and safety.

CHOICE OF BRONCHOSCOPIC PROCEDURE AND THE AIRWAY-TARGET RELATIONSHIP

The bronchus sign - identified on CT as a bronchus leading directly to a lung nodule - is present in 40-60% of peripheral nodules and plays a significant role in guiding bronchoscopic diagnostics[9] (Fig. 2). Its presence facilitates easier bronchoscopic navigation and targeted sampling, correlating with increased diagnostic yields. In contrast, targets lacking a bronchus sign pose greater challenges, typically requiring advanced navigation technologies or alternative biopsy modalities to improve diagnostic success[10].

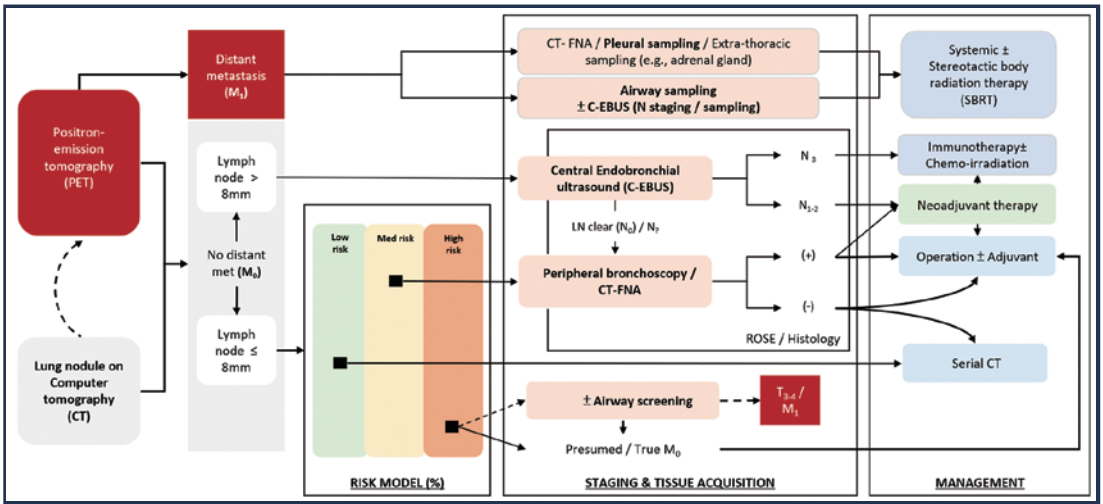

Fig. 1: Upon detection of a lung nodule, the need for PET-CT should be evaluated. If distant metastasis is suspected, the sampling site that best enables a definitive diagnosis and accurate pathologic staging should be chosen. In the absence of distant metastases, all lymph nodes exceeding 8 mm should be evaluated using C-EBUS and sampled as appropriate to confirm N-staging. If no suspicious lymphadenopathy is present, a validated model should be applied to estimate the malignancy risk of the nodule, guiding the decision between surveillance, minimally invasive sampling (by bronchsocopic or trans-thoracic approach), or surgical resection. (Developed by the author)

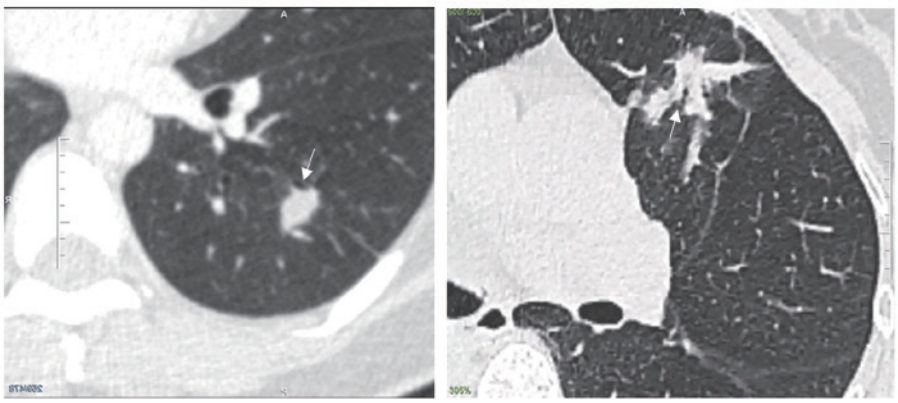

Fig. 2: Two examples of lung pathologies are shown as white densities within the lung parenchyma, each demonstrating a positive bronchus sign where a visible airway leads directly into the lesion (indicated by the white arrow). (Personal collection)

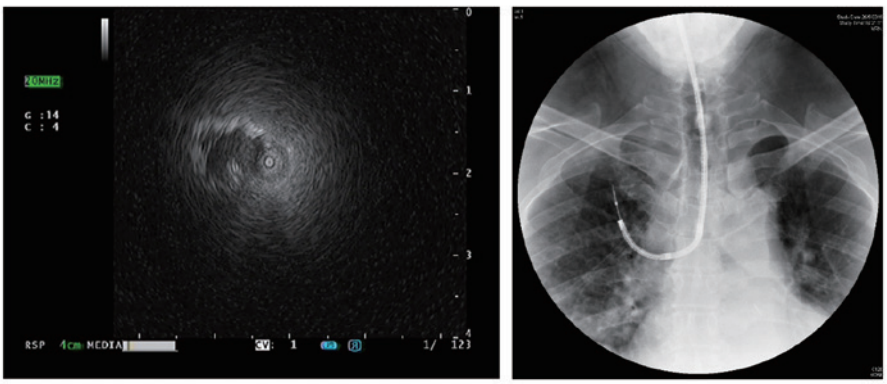

Fig. 3: Positive radial EBUS signal (left) showing the lung nodule as an ~8mm x 5mm hypo-echoic area at the 9 o'clock position relative to the probe. The corresponding fluoroscopic image (right) displays the position and maximum depth of a thin bronchoscope, approximately 3 cm away from the target, alongside the radial EBUS probe's location when the positive ultrasound signal was detected. (Personal collection)

BRONCHOSCOPIC APPROACHES FOR TARGETS EXHIBITING A LEADING BRONCHUS

Peripheral Endobronchial Ultrasound (p-EBUS) procedure utilises a radial ultrasound probe passed through the working channel of a bronchoscope to locate peripheral lung lesions that are not visible by conventional bronchoscopy[11] (Fig. 3). When combined with a guide sheath that allows repeated sampling, p-EBUS can achieve diagnostic yields ranging between 60-74% for lesions smaller than or equal to 20mm[12]. Both **Virtual Bronchoscopic Navigation (VBN)** and **Electromagnetic Navigation Bronchoscopy (ENB)** assist in procedural planning by creating a three-dimensional airway reconstruction from pre-procedure CT scans. Intraoperatively, VBN uses pattern recognition while ENB relies on real-time location sensors to guide tools to the location of interest. Combined with radial EBUS and fluoroscopy, VBN achieves diagnostic yields of approximately 70-75%[13], while ENB yields range from 75-80% (Fig. 4)[14]. Diagnostic accuracy improves with better sedation, operator experience, and larger nodules[15].

BRONCHOSCOPIC APPROACHES FOR TARGETS WITHOUT A LEADING BRONCHUS

For nodules that are difficult to access or lack a bronchus sign, newer techniques such as **Bronchoscopic Trans-parenchymal Nodule Access (BTPNA)** have been developed. These methods involve directly piercing through the lung parenchyma from the distal airway to the target lesion, offering access where traditional bronchoscopic routes are insufficient (Fig. 5). The diagnostic yield varies across studies but ranges 69-86%. Recently, **robotic-assisted bronchoscopy platforms** have emerged as a minimally invasive procedure that uses a robotic arm and a flexible, camera-equipped catheter to navigate deep into the lungs for precise biopsy of nodules. Controlled by the doctor via a console, it combines 3D CT imaging with advanced navigation technology, enhanced scope control, stability, and imaging integration. These systems significantly improve manoeuvrability and tool stability; in a recent meta-analysis of twelve studies with 838 nodules, the diagnostic yield of robotic bronchoscopy was 81.9%[16].

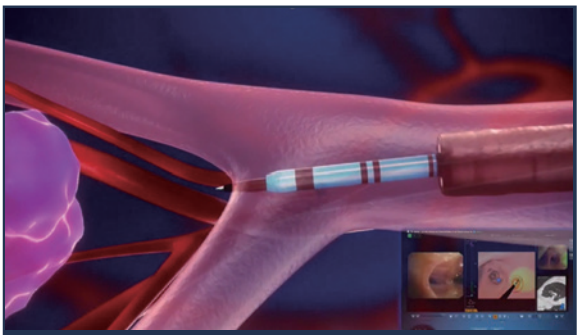

Fig. 5: Conceptual illustration of the BTPNA principle: instead of navigating solely through established airways, a puncture site is identified preoperatively. Once reached bronchoscopically, a dedicated tool is passed through the bronchoscope's working channel to create an airway puncture and establish a "tunnel" to the target. The sheath (blue) is then left in place, allowing repeated sampling tools to be passed through for multiple biopsies. (Reproduced from Broncus™)

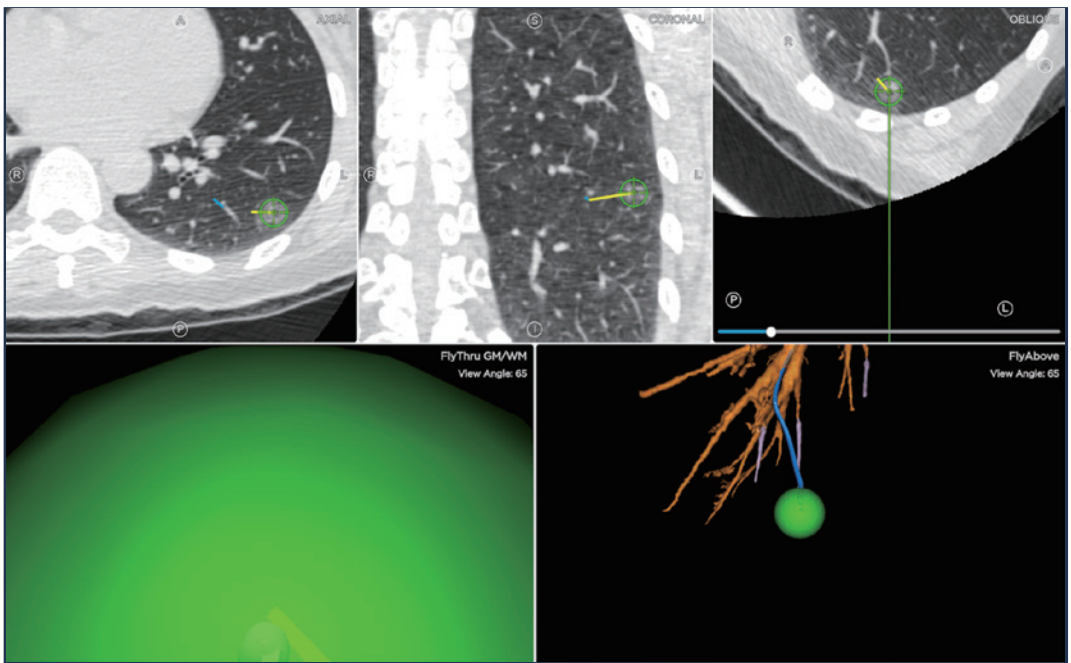

Fig. 4: Example of Electromagnetic navigation. (Top three panels) The green target represents the site corresponding to the planned target on the CT scan. The blue line indicates the identified airway leading close to the target, while the yellow line shows the straight path from the end of the airway to the target. (Bottom panel) Intraoperatively, when the sensor-enabled tool reaches the pre-planned site, the target indicator turns green, signifying a suitable location for sampling. (Personal collection)

CT-TO-BODY DIVERGENCE AND TOOL-IN-LESION CONFIRMATION

CT-to-body divergence (CTBD) refers to the mismatch between the preoperative virtual target location derived from CT imaging and the actual lesion position during a procedure, often caused by lung movement and anatomical changes. This discrepancy lowers biopsy accuracy in peripheral lung navigation. To address this, intra-procedural imaging modalities [e.g. Cone-Beam CT (CBCT), C-arm based tomography (CABT), and Digital Tomosynthesis (DTS)] allow real-time image capture and reconstruction, enabling update of the target location, verification of sampling tool positioning and navigation adjustments (Fig. 6)[17]. Combining these imaging approaches with robotic bronchoscopy has achieved diagnostic yields up to 95%, reducing false negatives and the need for repeat procedures[18].

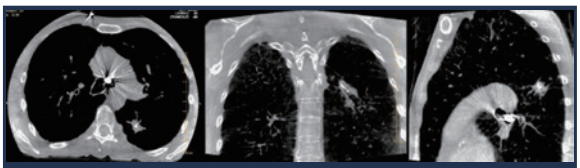

Fig. 6: Tool-in-lesion confirmation showing tool (hyperdense signal with streak artefact) with centre strike through the middle one-third of the lesion in 3 orthogonal planes. Left to right: axial, coronal and sagittal multiplanar reformat views. (Courtesy of Dr Michael Pritchett)

ADVANCED BIOPSY MODALITIES AS AN ADJUNCT

Once the tools reach the target, the precise relationship between the tissue of interest and the instrument determines whether additional advanced biopsy modalities are required to enhance diagnostic yield. Transbronchial cryobiopsy (TBCB) offers the advantage of obtaining larger and higher-quality tissue samples, especially in eccentric lesions that are otherwise challenging to sample[19] (Fig. 7).

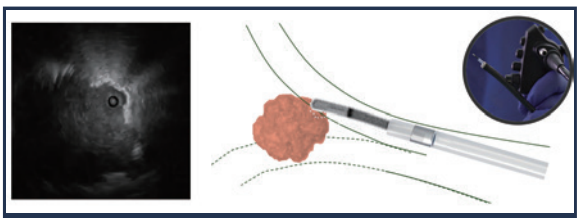

Fig. 7: The principle of transbronchial cryobiopsy relies on the cryoprobe's ability to rapidly freeze tissue, creating strong adhesion through cryoadhesion. When activated in place, the probe's freezing action allows for the extraction of large, high-quality tissue samples, even in cases where traditional forceps may struggle to obtain adequate specimens. (Personal collection)

EMERGING TECHNOLOGIES

The **iNod real-time radial EBUS (r-EBUS) sampling tool** is a recently developed device that functions similarly to a standard radial-EBUS procedure but offers the significant advantage of enabling transbronchial needle aspiration (TBNA) sampling under real-time ultrasound imaging. This increases procedural efficiency and precision by eliminating the need for repeated device repositioning. Ongoing studies are evaluating whether this real-time imaging capability translates into improved diagnostic yield and clinical outcomes[20].

AI-assisted rapid on-site evaluation (ROSE) is now available for both cytology (e.g., from needle aspirates) and tissue assessment (e.g., from transbronchial biopsies) during bronchoscopic procedures. The advantages of AI-driven ROSE include real-time feedback for sample adequacy to reduce the number of passes and procedure time without the need for an on-site pathologist, significantly improving diagnostic workflow and safety[21].

ADDITIONAL APPLICATIONS FOR NAVIGATIONAL BRONCHOSCOPY

Navigational bronchoscopy has a range of important clinical applications beyond lung nodule sampling, including facilitating precise dye marking for surgical localisation during minimally invasive thoracic surgeries[22], enabling targeted biopsies in diffuse parenchymal diseases to improve diagnostic yield while minimising risks, and guiding bronchoscopic ablation therapies to ensure accurate lesion targeting and treatment safety[23]. This versatility highlights its expanding role in both diagnostic and therapeutic pulmonary medicine.

SUMMARY AND CLINICAL IMPLICATIONS

Navigational bronchoscopy has become an essential tool for diagnosing lung nodules detected through widespread CT screening. It offers a safer, minimally invasive alternative to transthoracic biopsy, with the added benefits of airway visualisation and lymph node staging. Advances such as electromagnetic navigation, virtual bronchoscopic navigation, bronchoscopic trans-parenchymal access, and robotic platforms have significantly improved diagnostic yield, even for difficult-to-reach nodules. Real-time imaging techniques help overcome CT-to-body divergence, enhancing biopsy accuracy and reducing false negatives. Beyond diagnosis, navigational bronchoscopy supports applications such as surgical localisation, targeted biopsies for interstitial lung disease, and bronchoscopic ablation therapies. Overall, this expanding technology offers a versatile, effective approach to lung nodule management, with ongoing innovations promising even better clinical outcomes.

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MCHK CME Programme Self-assessment Questions

Please read the article entitled "Navigational Bronchoscopy : Current Status and Advances" by Dr Terence CC TAM and complete the following self-assessment questions. Participants in the MCHK CME Programme will be awarded CME credit under the Programme for returning completed answer sheets via fax (2865 0345) or answer link: https://forms.gle/98eSB2aFMjb8pdha7 or by mail to the Federation Secretariat on or before 31 January 2026. Answers to questions will be provided in the next issue of The Hong Kong Medical Diary. (Address: Duke of Windsor Social Service Bldg., 4/Fl., 15 Hennessy Rd., Wan Chai. Enquiry: 2527 8898)

Questions 1 - 10: Please answer T (true) or F (false)

1. **Lung nodules are detected more frequently on chest CT than on chest X-ray, and their prevalence increases significantly in individuals over 50 years of age.**
2. **For patients with suspected mediastinal involvement, peripheral lung nodule biopsy should always be prioritised over lymph node sampling to establish the diagnosis.**
3. **Prediction models are used to stratify lung nodule malignancy risk and guide decisions between surveillance, minimally invasive sampling, and surgical resection.**
4. **Compared with transthoracic needle biopsy, bronchoscopy sampling offers advantages such as airway inspection, lymph node staging, and lower pneumothorax risk.**
5. **Deep sedation during electromagnetic navigational bronchoscopy has been associated with higher diagnostic yield compared with light or moderate sedation.**
6. **The presence of a CT bronchus sign is associated with higher bronchoscopy diagnostic yield and easier navigation to the target lesion.**
7. **Virtual bronchoscopic navigation and electromagnetic navigation bronchoscopy rely solely on live fluoroscopy without using pre-procedure CT data for airway reconstruction.**
8. **Robotic-assisted bronchoscopy platforms are designed to improve scope stability and reach, and provide diagnostic yields in the range of 60% for pulmonary nodules.**
9. **CT-to-body divergence can reduce the diagnostic accuracy, and intra-procedural imaging, such as cone-beam CT, is used to verify tool-in-lesion position and update navigation.**
10. **AI-assisted rapid on-site evaluation (ROSE) aims to provide real-time assessment of sample adequacy, potentially reducing the number of passes and procedure time without requiring an on-site pathologist.**

ANSWER SHEET FOR JANUARY 2026

Please return the completed answer sheet to the Federation Secretariat on or before 31 January 2026 for documentation. 1 CME point will be awarded for answering the MCHK CME programme (for non-specialists) self-assessment questions.

Navigational Bronchoscopy : Current Status and Advances

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Answers to December 2025 Issue

An Update on HIV Testing Recommendations

1. F 2. F 3. T 4. F 5. F 6. T 7. F 8. F 9. F 10. T

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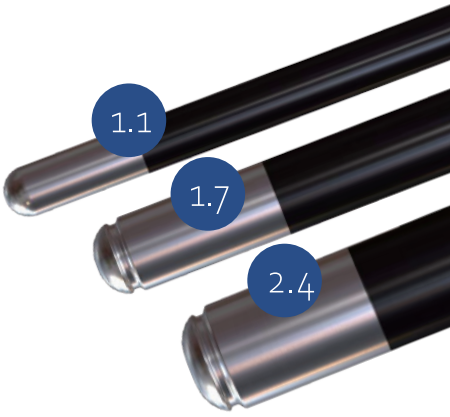

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Bronchoscopic Lung Volume Reduction: A Minimally Invasive Approach for Advanced Emphysema

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Dr Bing LAM

ABSTRACT

Bronchoscopic lung volume reduction (BLVR) is a minimally invasive procedure for selected patients with advanced chronic obstructive pulmonary disease (COPD) and severe emphysema. This paper reviews two core BLVR techniques: endobronchial one-way valves (EBVs) and bronchoscopic thermal vapour ablation (BTV) emphasising their mechanisms, efficacy, and safety. The patient selection criteria and contraindications are also discussed.

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a leading cause of morbidity and mortality worldwide[1], with emphysema representing a major phenotypic variant. Emphysema is characterised by the irreversible destruction of alveolar walls and loss of lung elastic recoil, leading to hyperinflation, air trapping, and progressive dyspnoea. The burden of this disease is substantial, significantly impairing patients' quality of life, exercise capacity, and ability to perform daily activities. It places a heavy economic strain on healthcare systems through frequent hospitalisations, long-term oxygen therapy, and the need for multidisciplinary care[2]. For patients with advanced disease despite maximal medical therapy (including bronchodilators, corticosteroids, and pulmonary rehabilitation), treatment options have historically been limited to lung transplantation, which is constrained by donor availability and patient comorbidities.

THE FOUNDATION: THE NATIONAL EMPHYSEMA TREATMENT TRIAL (NETT)

The surgical approach to emphysema, Lung Volume Reduction Surgery (LVRS), was rigorously evaluated in the landmark National Emphysema Treatment Trial (NETT). This multicentre, randomised controlled trial compared LVRS with maximal medical therapy. The results, published in 2003, demonstrated that LVRS could provide significant benefits for a specific subset of patients[3]. Specifically, patients with predominantly upper-lobe emphysema and low exercise capacity post-rehabilitation experienced improved survival, lung function, exercise capacity, and quality of life. However, NETT also highlighted the significant perioperative morbidity and a high mortality risk in certain subgroups, such as those with very low FEV1 and either homogeneous emphysema or a very low diffusing capacity. These findings underscored the need for effective, less invasive alternatives, paving the way for the development of bronchoscopic lung volume reduction (BLVR) techniques. BLVR uses endobronchial tools to target and collapse hyperinflated lung regions, restoring respiratory mechanics with lower invasiveness.

CORE BLVR TECHNIQUES

BLVR encompasses several minimally invasive techniques designed to achieve lung volume reduction without the need for surgery. The Global Initiative for Chronic Obstructive Lung Disease Report (GOLD) has recommended three BLVR techniques: one-way endobronchial valve (EBV), reduction coil and thermal vapour ablation (BTV)[4]. However, the reduction coil has been withdrawn from the market, therefore this paper will only discuss the use of EBV and BTV in the management of emphysema.

ENDOBRONCHIAL ONE-WAY VALVES (EBVs)

EBVs are typically silicone-based devices placed in the segmental or subsegmental bronchi supplying the most destroyed parts of the lung. These valves allow air and secretions to exit the targeted lobe during expiration but prevent air from entering during inspiration. This leads to progressive atelectasis (collapse) of the hyperinflated lobe, reducing overall lung volume and restoring a more functional position of the diaphragm and chest wall.

Efficacy: The pivotal LIBERATE trial showed that EBV-treated patients had significant improvements in forced expiratory volume in 1 second (FEV_1: +15-20% vs. placebo) and 6-minute walk distance (6MWD: +30-40 meters) at 12 months[5].

Patient Selection Criteria: Ideal candidates should have severe emphysema (FEV1 15-45% predicted) with significant hyperinflation (Residual Volume > 175% predicted), are on optimal medical therapy, and have completed pulmonary rehabilitation. The single most critical criterion is the absence of collateral ventilation (CV)[6]. CV is the flow of air between lung lobes through pathways other than the airways, which would prevent the target lobe from collapsing. CT software can evaluate the completeness of the interlobar fissure, a marker of collateral ventilation. In those with a score of 80-95, the Chartis® Pulmonary Assessment System is often used pre-procedurally to confirm the absence of CV.

Contraindications: Active respiratory infection, significant pulmonary hypertension, inability to tolerate procedural sedation, active smoking, and the presence of significant collateral ventilation to the target lobe.

Complications: The most common complication is a post-procedural exacerbation of COPD. A unique and serious complication is haemoptysis, which is typically self-limiting. The most significant risk is pneumothorax, which occurs in approximately 10-20% of cases, often within the first 72 hours. Patients who develop a pneumothorax also experience meaningful clinical benefits once the pneumothorax is resolved. Timely resolution of a post-valve treatment pneumothorax requires skilled and adequate pneumothorax management[7].

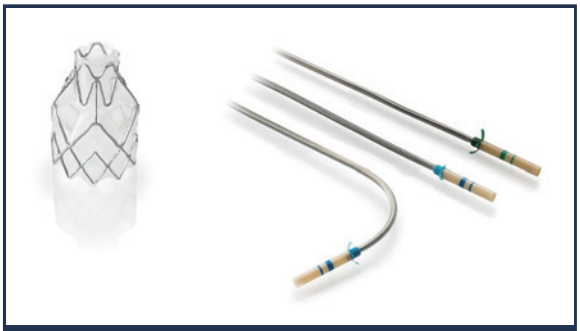

Fig. 1: One way endobronchial valve and delivery catheter (Clinical photo from Pulmonx Corporation)

BRONCHOSCOPIC THERMAL VAPOUR ABLATION (BTV)

BTV uses the energy of heated water vapour to induce a localised inflammatory response and subsequent scar tissue formation in the emphysematous lung parenchyma (Fig. 2). This controlled remodelling leads to volume reduction over several weeks to months without relying on lobar isolation.

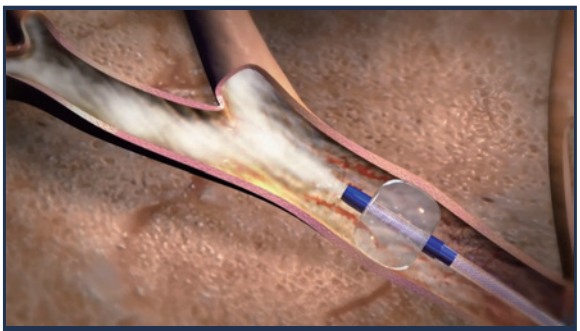

Fig. 2: Bronchoscopic thermal vapour treatment (Clinical photo from Broncus Medical)

Efficacy: Clinical trials demonstrated FEV_1 improvements (+12-14%) and dyspnoea reduction (mMRC score ↓0.8) at 12 months, even in patients with CV (a major advantage over EBVs)[8,9].

Patient Selection Criteria: Similar to valve therapy, candidates have heterogeneous emphysema with severe airflow obstruction and hyperinflation. A key difference is that BTV is effective even in the presence of collateral ventilation. This makes it a suitable option for patients with incomplete fissures on CT scan, who would be ineligible for valve treatment. It is specifically indicated for patients with upper-lobe predominant disease[10].

Contraindications: Include previous lobectomy, giant bullae (> 1/3 hemithorax), active infection, severe pulmonary hypertension, and DLCO < 20% predicted.

Complications: The procedure reliably induces a post-procedural inflammatory response characterised by COPD exacerbation, pneumonia, and a transient systemic inflammatory response (fever, leukocytosis). Haemoptysis is also common but is usually mild and self-resolving. The risk of pneumothorax is lower than with valve therapy.

DISCUSSION AND CONCLUSION

Bronchoscopic lung volume reduction represents a paradigm shift in the management of severe, heterogeneous emphysema. Building upon the principles established by the NETT trial, techniques like endobronchial valves and thermal vapour ablation offer a less invasive means of achieving meaningful physiological and clinical improvements. Careful patient selection is paramount, with the choice between modalities heavily influenced by the pattern of emphysema and the presence or absence of collateral ventilation. While not without risks, these interventions provide a valuable option for a specific and debilitating patient population, improving lung function, exercise tolerance, and quality of life beyond what is achievable with medical management alone.

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- In children 6 to 11 years old as add-on maintenance treatment for severe asthma with Type 2 inflammation^

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† Candidates for systemic therapy
* Characterised by raised blood eosinophils and/or raised FeNO, who are inadequately controlled with high dose ICS plus another medicinal product for maintenance treatment.
^ Characterised by raised blood eosinophils and/or raised FeNO, who are inadequately controlled with medium to high dose ICS plus another medicinal product for maintenance treatment.
# For whom therapy with systemic corticosteroids and/or surgery do not provide adequate disease control.
‡ Those who are inadequately controlled by, are intolerant to, or who are not candidates for conventional medicinal therapy.
§ Characterised by raised blood eosinophils, on a combination of an inhaled corticosteroid (ICS), a long acting beta2-agonist (LABA), and a long-acting muscarinic antagonist (LAMA), or on a combination of a LABA and a LAMA if ICS is not appropriate.

Abbreviations: AD=atopic dermatitis; COPD = chronic obstructive pulmonary disease; CRSwNP= chronic rhinosinusitis with nasal polyps; EoE= eosinophilic esophagitis; FeNO=fractional exhaled nitric oxide; ICS=inhaled corticosteroids; LABA = long acting beta2-agonist; LAMA = long acting muscarinic antagonist; PN=prurigo nodularis.

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Presentation: Dupilumab solution for injection in a pre-filled syringe with needle shield. **Indications:** Atopic Dermatitis (AD): Moderate-to-severe AD in adults and adolescents ≥12 years who are candidates for systemic therapy; severe atopic dermatitis in children 6 months to 11 years old who are candidates for systemic therapy. Asthma: In adults and adolescents ≥12 years as add-on maintenance treatment for severe asthma with type 2 inflammation characterised by raised blood eosinophils and/or raised FeNO, who are inadequately controlled with high dose ICS plus another medicinal product for maintenance treatment. In children 6 to 11 years old as add-on maintenance treatment for severe asthma with type 2 inflammation characterised by raised blood eosinophils and/or raised FeNO, who are inadequately controlled with medium to high dose ICS plus another medicinal product for maintenance treatment. For 300 mg only – Chronic rhinosinusitis with nasal polyposis (CRSwNP): As an add-on therapy with intranasal corticosteroids for the treatment of adults with severe CRSwNP for whom therapy with systemic corticosteroids and/or surgery do not provide adequate disease control. Prurigo Nodularis (PN): Moderate-to-severe PN in adults who are candidates for systemic therapy. Eosinophilic esophagitis (EoE): In adults and adolescents ≥12 years, weighing ≥40 kg, who are inadequately controlled by, are intolerant to, or who are not candidates for conventional medicinal therapy. Chronic obstructive pulmonary disease (COPD): In adults as add-on maintenance treatment for uncontrolled COPD characterised by raised blood eosinophils on a combination of ICS, LABA, and LAMA, or on a combination of LABA and LAMA if ICS is not appropriate. **Dosage & Administration:** Subcutaneous injection. AD adults: Initial dose of 600 mg (two 300 mg injections), followed by 300 mg Q2W. AD adolescents (12-17y/o): Body weight <60 kg- initial dose of 400 mg (two 200 mg injections), followed by 200 mg Q2W. Body weight ≥60 kg- same dosage as adults. AD children (6-11y/o): Body weight 15kg–<60 kg- initial dose of 300 mg on Day 1 follow by 300 mg on Day 15, then 300mg Q4W. Body weight ≥60 kg- same dosage as adults. * The dose may be increased to 200 mg Q2W in patients with body weight of 15 kg–< 60 kg based on physician's assessment. AD children (6 months-5y/o): Body weight 5kg–<15 kg- initial dose of 200 mg, then 200 mg Q4W. Body weight 15kg–<30 kg- initial dose of 300 mg, then 300 mg Q4W. Dupilumab can be used with or without topical corticosteroids. Topical calcineurin inhibitors may be used, but should be reserved for problem areas only, e.g. face, neck, intertriginous and genital areas. Consider discontinuing treatment in patients who have shown no response after 16 weeks. Asthma adults and adolescents: Initial dose of 400 mg, followed by 200 mg Q2W. For patients with severe asthma and on oral corticosteroids or with severe asthma and co-morbid moderate-to-severe AD or adults with co-morbid severe CRSwNP- initial dose of 600 mg, followed by 300 mg Q2W. Asthma children (6-11y/o): Body weight 15kg–<30 kg- 300 mg Q4W. Body weight 30kg–<60 kg- 200 mg Q2W; or 300 mg Q4W. Body weight ≥60 kg- 200 mg Q2W. For paediatric patients (6-11y/o) with asthma and co-morbid severe atopic dermatitis, as per approved indication, the recommended dose should follow AD children (6-11y/o). Patients receiving concomitant oral corticosteroids may reduce steroid dose gradually once clinical improvement with dupilumab has occurred. The need for continued dupilumab therapy should be considered at least annually as determined by a physician. CRSwNP: Initial dose of 300 mg, followed by 300 mg Q2W. Consider discontinuing treatment in patients who have shown no response after 24 weeks. PN: Initial dose of 600 mg (two 300 mg injections), followed by 300 mg Q2W. Dupilumab can be used with or without topical corticosteroids. Consider discontinuing treatment in patients who have shown no response after 24 weeks. EoE: 300 mg QW. Dupilumab 300 mg QW has not been studied in patients with EoE weighing <40 kg. Dosing beyond 52 weeks has not been studied. COPD: 300 mg Q2W. Consider discontinuing treatment in patients who have shown no response after 52 weeks. For Missed dose instructions, please refer to the full prescribing information. **Contraindications:** Hypersensitivity to dupilumab or any of the excipients. **Precautions:** Not be used to treat acute symptoms, acute exacerbations of asthma or COPD, acute bronchospasm or status asthmaticus. Do not discontinue corticosteroids abruptly upon start of dupilumab. Reduction should be gradual and performed under supervision of a physician; it may be associated with systemic withdrawal symptoms and/or unmask conditions previously suppressed by systemic corticosteroid therapy. Biomarkers of type 2 inflammation may be suppressed by systemic corticosteroid use. If systemic hypersensitivity reaction occurs, discontinue dupilumab and initiate appropriate therapy. Be alert to vasculitic rash, worsening pulmonary symptoms, cardiac complications, and/or neuropathy presenting in patients with eosinophilia. Treat pre-existing helminth infections before initiating dupilumab. If patients become infected while receiving dupilumab and do not respond to anti-helminth treatment, discontinue dupilumab until infection resolves. Cases of enterobiasis were reported in children 6 to 11 years old in the paediatric asthma development program. Advise patients to promptly report new onset or worsening eye symptoms. Patients who develop conjunctivitis, dry eye and keratitis that does not resolve following standard treatment should undergo ophthalmological examination. Sudden changes in vision or significant eye pain that does not settle warrant urgent review. Patients with comorbid asthma should not adjust or stop asthma treatments without consultation with physicians. Carefully monitor patients after discontinuation of dupilumab. Avoid using live and live attenuated vaccines concurrently with dupilumab. Patients should be brought up to date with immunisations before starting dupilumab. **Drug Interactions:** Immune responses to TdaP vaccine and meningococcal polysaccharide vaccine were assessed. Patients receiving dupilumab may receive concurrent inactivated or non-live vaccinations. **Pregnancy and lactation:** Should be used during pregnancy only if potential benefit justifies potential risk to foetus. Unknown whether dupilumab is excreted in human milk or absorbed systemically after ingestion. Decision must be made whether to discontinue breast-feeding or dupilumab taking into account benefit of breast feeding for the child and benefit of therapy for the woman. **Undesirable effects:** Most common adverse reactions reported- injection site reactions, conjunctivitis, conjunctivitis allergic, arthralgia, oral herpes, eosinophilia and injection site bruising. Safety profile observed in adolescents and children 6 months to 11 years old consistent with that seen in adults. For other undesirable effects, please refer to the full prescribing information. **Preparation:** 2 x 300mg/2ml in pre-filled syringe with needle shield, 2 x 200mg/1.14ml in pre-filled syringe with needle shield. **Legal Classification:** Part 1, First & Third Schedules Poison **Full prescribing information is available upon request.**

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Application of Bronchoscopic Cryotechniques in Respiratory Medicine

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INTRODUCTION

The therapeutic use of cold temperature has been described since at least 3000 BC, when cold compresses were used to treat compound skull fractures and infected wounds in Ancient Egypt[1]. The use of ice-salt solution as a kind of cryotherapy for tumour bleeding and pain was also described in 1800s[2]. Neurosurgeons firstly used cryoprobe to localise injury in the brain before resection[3]. Not until the late 1960s pulmonologists started to use cryoprobe for destruction of abnormal tissue visualised in the airways through repeated freeze thaw cycles that cause tissue sloughing which is then removed on subsequent days[4]. After the introduction of flexible cryoprobe in the early 2000s, it allowed not only the therapeutic application but also the inception of diagnostic transbronchial cryobiopsies in 2009[5].

The cryo-equipment consists of the console, compressed gas or cryogen such as carbon dioxide (CO2) or nitrous oxide (N2O) and the flexible cryoprobe. The cryoprobe, inserted through working channel of flexible bronchoscope, is placed in contact with the target tissue to be sampled or treated. The mechanism of action of cryotechniques relies on the rapid freezing of tissues, achieved through the expansion of cryogen within the cryoprobe. This phenomenon, known as Joule-Thomson effect, causes a rapid drop in temperature to -79^{O}C to -89^{O}C at the probe's tip, which directly contacts and freezes the surrounding tissue. The frozen tissue adheres to the probe, allowing for tissue acquisition or biopsy. When aiming at therapeutic cryoablation, the repeated freeze thaw cycles can induce intracellular crystal formation, vasoconstriction, endothelial injury, platelet plug formation leading to microthrombi with subsequent cellular death and tissue necrosis. This ischemic effect goes beyond the area of direct probe contact to affect the surrounding tissue. It explains why the more vascular malignant tissue is vulnerable to cryotherapy.

TRANSBRONCHIAL LUNG CRYOBIOPSIES (TBLC) IN INTERSTITIAL LUNG DISEASES (ILD)

ILD comprises a large range of heterogeneous groups with parenchymal lung diseases. Given this wide spectrum of disease with variable degrees of inflammation and fibrosis, different clinical courses, progression and prognosis, individual response to anti-fibrotic agent or immunosuppressants, determination of cause or disease type is crucial in the management of ILD. One subtype of fibrosing ILD, the idiopathic pulmonary fibrosis (IPF), can be defined from radiological pattern of usual interstitial pneumonia (UIP) and does not warrant tissue diagnosis prior to treatment initiation[6]. However, in cases of high-resolution computed tomography (HRCT) findings of probable UIP, indeterminate UIP or an alternate diagnosis, lung biopsy is often warranted after multi-disciplinary discussion (MDD).

Traditionally the gold standard modality of biopsy for ILD evaluation has been surgical lung biopsy (SLB) given that large biopsy samples with well-preserved lung architecture can be obtained for histological examination[6]. SLB provides a diagnosis in 88% of unspecified ILD cases. It is generally recommended for patients who can tolerate single-lung ventilation and whose clinical conditions, lung function and co-morbidities do not render the procedure unsafe. Unfortunately, SLB has a risk of serious complications, including in-hospital mortality ranging from 1.7% for elective cases and up to 16% for patients undergo SLB during non-elective admissions[7]. The risk factors of older age, non-elective nature of the procedure and requiring long term oxygen therapy are unsurprisingly associated with higher mortality, yet this is the patient cohort commonly encountered in medical ward and in greatest need of histological diagnosis for guidance of treatment.

As such less invasive modality of sampling, the transbronchial lung cryobiopsy (TBLC), has emerged as a promising alternative, offering a favourable safety profile and comparable diagnostic yield, as compared to SLB. One of the first studies of TBLC illustrated that the samples obtained via TBLC were about three times larger than that obtained via forceps (15.11 vs 5.82 mm^2, P< 0.01)[5]. Since then, evidence supporting TBLC in ILD diagnosis has steadily grown. The histopathological diagnostic yield ranged from 75% to 98% according to meta-analysis of 11 studies of TBLC for ILD evaluation in 2016[8]. COLD-ICE trial featuring the same patients undergoing sequential TBLC and SLB, followed by blinded review of specimens by pathologists. The mean size of TBLC and SLB specimens were 7.1 mm and 46.5 mm respectively. The reported pathological concordance was 70.8% and increased to 76.9% following MDD[9].

TBLC for ILD should be performed through rigid bronchoscopy or endotracheal tube under deep sedation or general anaesthesia[10, 11]. This approach can secure the airway to manage potential severe bleeding after

biopsy. After the flexible bronchoscope was directed to the target bronchial segment, bronchial blocker would be placed prophylactically proximal to target segment. (Fig. 1) Cryoprobe (1.7 or 1.9 mm), inserted through working channel of flexible bronchoscope, is further directed and positioned approximately 1 cm proximal to the pleura under fluoroscopic guidance. Once activated, the cryoprobe freezes and adheres to the surrounding lung tissue. After a few seconds of freezing time, the retrieval of cryobiopsy sample requires the cryoprobe and bronchoscope to be withdrawn together. Balloon inflation of bronchial blocker immediately after each cryobiopsy can tamponade any significant bleeding while the bronchoscope is out of the airway. The freezing time can be started with 3-4 seconds and adjusted according to the biopsy size obtained, preferably be at least 5 mm in the longest axis. At least 3 to 5 biopsies should be obtained at each affected site, while sampling at least two affected sites, either in different segments or different lobes can increase diagnostic yield. Pneumothorax occurred in 9.6% of cases, with over half of those requiring pleural drainage, whereas severe bleeding requiring interventions occurred in less than 1% of cases. The post-procedure mortality rate was reported to be 0.9% in a meta-analysis involving 6,386 patients[12].

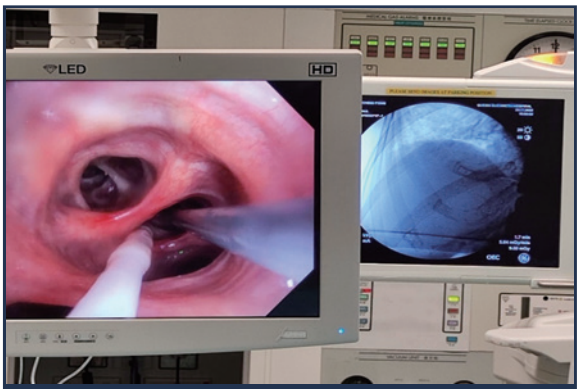

Fig. 1: Prophylactic placement of bronchial blocker (white) in close proximity to the target segment before cryobiopsy with cryoprobe (grey) under fluoroscopic guidance. (Clinical photo from personal collection)

TRANSBRONCHIAL LUNG CRYOBIOPSY (TBLC) FOR PERIPHERAL LUNG NODULES

There has been an increasing incidence of lung nodule detection nowadays owing to the ubiquitous use of CT in other practices such as CT coronary angiogram and lung cancer screening in high-risk populations. While most of these incidental lung nodules are benign, appropriate surveillance or further evaluation with histological proof are still warranted in many cases. Although the transthoracic needle aspiration or biopsy under CT guidance has a high diagnostic yield and accuracy (around 90%), it carries a high occurrence rate of pneumothorax up to 25%. Bronchoscopic transbronchial approach, with a much lower pneumothorax rate, should be considered first in all cases. Moreover, there are currently promising navigation guidance systems e.g. virtual bronchoscopy navigation (VBN), electromagnetic navigation bronchoscopy (ENB) or even robotic bronchoscopy (RAB), together with the tool-in lesion confirmation modalities such as radial endobronchial ultrasound (rEBUS) or cone-beam computed tomography (CBCT) before biopsy sampling.

The diagnostic yield is most influenced by the relationship between the nodule and the bronchus. If the nodule is situated adjacent to the bronchial airway, the sensitivity of traditional transbronchial forceps biopsy and brushing was only 42%, as compared to 87% sensitivity when the nodule is within the airway[13]. With its ability to increase diagnostic yield, especially in nodules that are adjacent to the airway and also the introduction of thinner 1.1 mm single-use cryoprobes, transbronchial lung cryobiopsy (TBLC) is becoming more commonly used in sampling of peripheral lung nodules[14, 15]. It allows larger tissue samples with better cellular architecture preservation and fewer crush artefacts via tangential- lateral biopsy. It also increases the detection rate of molecular genetic alterations in lung cancer[16].

TRANSBRONCHIAL MEDIASTINAL CRYOBIOPSIES (TBMC) FOR MEDIASTINAL LYMPH NODE

Mediastinal lymphadenopathy is a common clinical problem with various underlying aetiologies including metastasis from lung cancer or other tumours, lymphoma, and granulomatosis due to tuberculosis or sarcoidosis. Minimally invasive techniques such as Endobronchial Ultrasound-guided Transbronchial Needle Aspiration (EBUS-TBNA) and Endoscopic Ultrasound with Bronchoscope-guided Fine Needle Aspiration (EUS-B-FNA) have good diagnostic yield with primary thoracic malignancy and is considered the first step of lung cancer staging. However, there is a diagnostic limitation of needle aspiration in benign conditions and lymphoproliferative disorders, which often relies on a larger histological sample for evaluation. EBUS-guided Transbronchial Mediastinal Cryobiopsy (EBUS-TBMC) demonstrated superior diagnostic yield than EBUS-TBNA in these conditions[17,18]. The incidence of adverse events did not differ between EBUS-TBMC and EBUS-TBNA.

The procedural technique of EBUS-TBMC involves a crucial step of creation of a hole or puncture-site access (Fig. 2) in the tracheobronchial wall under direct visualisation by either multiple TBNA needle puncture or 1.9 mm high-frequency needle knife. The 1.1 mm cryoprobe is then inserted through the hole into the lymph node. Ultrasound with doppler imaging would confirm that the cryoprobe tip is within the lymph node without any vasculature nearby. (Fig. 3) The EBUS bronchoscope and cryoprobe are removed together after freezing to retrieve the biopsy.

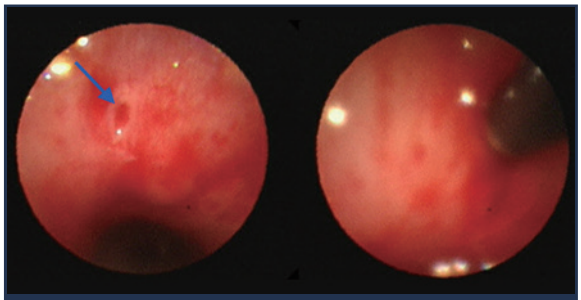

Fig. 2: Endoscopic view of the puncture site (blue arrow) created by 19G EBUS-TBNA needle. 1.1 mm cryoprobe entering the puncture site under direct visualisation (right). (Clinical photo from personal collection)

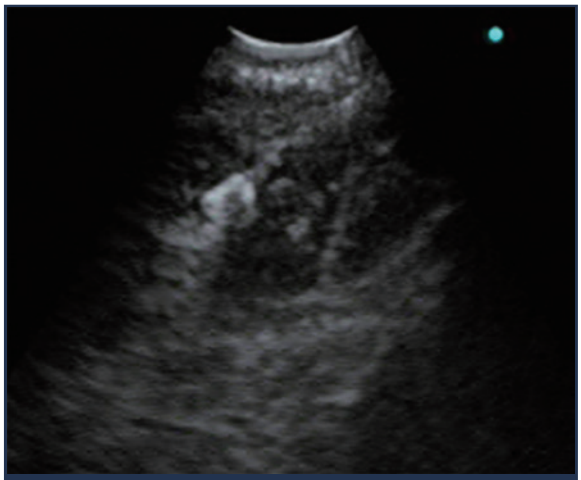

Fig. 3: Position of cryoprobe tip (hyperechoic and bright distal end with distinct acoustic shadow) within the lymph node is confirmed under real-time EBUS imaging. (Clinical photo from personal collection)

CRYODEBULKING FOR MALIGNANT CENTRAL AIRWAY OBSTRUCTION

Central airway obstruction (CAO), defined as a limitation to airflow in the trachea, mainstem bronchi or bronchus intermedius, can be life-threatening and result in death from atelectasis, respiratory failure or pneumonia. It is commonly caused by tumour invasion from bronchogenic carcinoma, small cell lung cancer, nearby malignancy such as oesophageal carcinoma, endobronchial metastasis from extrathoracic malignancies or rarer primary tracheobronchial tumours such as adenoid cystic carcinoma. Bronchoscopy plays a crucial role in the diagnosis and therapeutic management of malignant CAO with the aim of restoring airway patency which could be life-saving and result in palliation of symptoms. After airway stabilisation with intubation or rigid bronchoscopy, tumour debulking to relieve CAO can be performed by laser or argon plasma coagulation (APC) with mechanical endoscopic debridement. But there is a risk of airway fire when applying laser or APC which requires oxygenation or FiO2 less than 40%. This could be challenging in CAO patients who often present with respiratory failure requiring high oxygenation. Cryotherapy offers the advantage of maintaining oxygenation throughout the procedure without any risk of airway fire. Cryoprobe is placed in contact with tumour tissue and frozen to the surface, followed by swift removal of bronchoscope and cryoprobe, resulting in piecemeal tumour removal or cryodebulking. The technique had been shown to relieve CAO at high success rate with symptoms palliation, lung function and quality of life scores improvement[19, 20].

CRYOEXTRACTION FOR BLOOD CLOT AND FOREIGN BODY

Massive pulmonary haemorrhage can cause tracheobronchial obstruction from blood clots and life-threatening ventilatory failure. Bronchoscopic cryoextraction via flexible or rigid bronchoscopy can facilitate the removal of blood clots and provide improvement in ventilation[21]. The cryo-adhesive effect on objects with water content can facilitate the extraction of foreign bodies from airways[22]. Foreign bodies without enough water content can be extracted by spraying saline on the object followed by immediate freezing by the cryoprobe.

CONCLUSION

Cryo-procedures are rapidly emerging with high diagnostic yield and good therapeutic value. However, these procedures are complex and not free from complications. The proceduralist and the assisting team should be trained in dealing with potentially life-threatening complications. The technique should be part of the training and should be performed by skilled and competent proceduralists.

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Presentation: Budesonide/Formoterol Turbuhaler. **Indications:** In adults and adolescents (12 years and older), for the treatment of asthma, to achieve overall asthma control, including the relief of symptoms and the reduction of the risk of exacerbations. Symptomatic treatment of moderate to severe COPD in adults. **Dosage:** **Asthma** ***1) Symbicort anti-inflammatory reliever therapy (patients with mild disease) 160/4.5 mcg Turbuhaler*** *Adult & Adolescent ≥ 12yr:* 1 inhalations as needed in response to symptoms. If symptoms persist after a few minutes, 1 additional inhalation should be taken. No more than 6 inhalations should be taken on any single occasion. A total daily dose of more than 8 inhalations is normally not needed, however a total daily dose of up to 12 inhalations can be used temporarily. ***2) Symbicort maintenance and reliever therapy*** *Adult & Adolescent ≥ 12yr:* Patients should take 1 inhalation of Symbicort Turbuhaler 160/4.5 mcg as needed in response to symptoms to control asthma. If symptoms persist after a few minutes, 1 additional inhalation should be taken. No more than 6 inhalations should be taken on any single occasion. Recommend maintenance dose is 1 inhalation b.d. and some may need 2 inhalations b.d.. A total daily dose of more than 8 inhalations is normally not needed, however a total daily dose of up to 12 inhalations can be used temporarily. ***3) Symbicort maintenance therapy 160/4.5 mcg Turbuhaler*** *Adult & Adolescent ≥ 12yr:* 1-2 inhalations b.d.. Max daily dose is 4 inhalations. **COPD** ***160/4.5 mcg Turbuhaler*** *Adult:* 2 inhalations b.d.. Max daily dose is 4 inhalations. **Contraindications:** Hypersensitivity to budesonide, formoterol or lactose. **Precautions:** Should be used for the shortest duration of time required to achieve control of asthma symptoms. Should only be used long-term in patients whose asthma cannot be adequately controlled on asthma controller medications. Not be used to initiate treatment with inhaled steroids in patients being transferred from oral steroids. It is recommended that the maintenance dose be tapered when long-term treatment is discontinued. Potential systemic effects of ICS, HPA axis suppression and adrenal insufficiency, bone density, growth, visual disturbance, infections/tuberculosis, sensitivity to sympathomimetic amines, cardiovascular disorders, hypokalaemia, diabetes, pneumonia, lactose, pregnancy & lactation. Not recommended for children below 12 years of age. Incidence of candidiasis can be minimized by having patients rinse their mouth out with water after inhaling their maintenance dose. **Interactions:** CYP3A4 inhibitors, beta-receptor blocking agents, other sympathomimetic agents, Xanthine derivatives, mineralocorticosteroids and diuretics, Monoamine oxidase inhibitors, tricyclic antidepressants, quinidine, disopyramide, procainamide, phenothiazines and antihistamines. **Undesirable effects:** Palpitations, Candida infections in the oropharynx, headache, tremor, mild irritation in the throat, coughing, hoarseness. **Full local prescribing information is available upon request.** API.HK.SYM.0721

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Symbicort budesonide/formoterol **EFFICACY WHEN IT MATTERS**

Innovative Treatment in Lung Cancer - the Art of Bronchoscopic Lung Ablation

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INTRODUCTION

Advances in medical technology have significantly transformed lung cancer management, particularly through minimally invasive techniques that aim to improve outcomes and reduce risks. Bronchoscopic lung ablation (BLA) has emerged as an innovative approach to treating both primary and metastatic lung tumours. It leverages precise bronchoscopic navigation combined with energy modalities like radiofrequency (RF), microwave (MW), cryoablation (CA), and others, enabling localised tumour destruction with minimal invasiveness[1]. While surgical resection remains the gold standard for early-stage lung cancer, many patients are inoperable due to comorbidities or limited pulmonary reserves. Stereotactic body radiation therapy (SBRT) is often used as an alternative treatment modality, but carries risks such as radiation pneumonitis, especially for central tumours or repeated treatments[2]. These limitations underscore the need for alternative therapies with better tolerability. As a result, BLA was developed to address these challenges, especially with recent advances in imaging and navigation guidance, such as intraprocedural cone-beam CT (CBCT) and electromagnetic navigation bronchoscopy (ENB), which enhance procedure accuracy and safety. This article aims to provide a comprehensive overview of the current state of BLA, highlighting recent technological advancements, clinical applications, and future perspectives that may shape the next generation of thoracic oncology.

TYPES OF LUNG ABLATION AND THEIR MECHANISMS

BLA employs both thermal and non-thermal energies, each based on unique physical principles. RF uses high-frequency currents (375-500 kHz) to generate heat, causing coagulative necrosis, but its effectiveness depends on tissue conductance and impedance, which can limit ablation zone size and predictability[3]. MW employs electromagnetic waves (300-3000 MHz) that cause rapid oscillation of water molecules, producing larger, more uniform necrotic zones more quickly and less affected by heat sink or impedance[3,4]. CA involves rapid freezing using argon or nitrogen gases, forming ice crystals that damage cell membranes, leading to apoptosis and necrosis at temperatures below -40°C. It allows real-time visualisation of the ice ball, minimising collateral injury, but requires longer procedures due to freeze-thaw cycles[3].

Non-thermal modalities, such as irreversible electroporation using pulsed electric field (PEF), which deliver short-duration, high-voltage electrical pulses to create permanent nanopores in cell membranes, disrupting cellular homeostasis and inducing apoptosis without significant heat generation. PEF preserves the extracellular matrix and critical structures, such as blood vessels and airways, reducing collateral damage. Additionally, a treat-and-resect study using PEF ablation for non-small cell lung carcinomas (NSCLC) has suggested that PEF may induce the formation of tertiary lymphoid structures within the ablated tumours. Hence, PEF may enhance the tumour's immune response to immunotherapy[5].

INDICATIONS AND CLINICAL EFFICACY OF LUNG ABLATION

According to the latest clinical guidelines, lung ablation is primarily indicated for patients with localised lung tumours who are unsuitable candidates for surgical resection or SBRT, serving as a minimally invasive alternative to traditional treatments[6]. The most common applications include early-stage NSCLC, where ablation offers local disease control for patients with significant comorbidities, advanced age, poor cardiopulmonary reserve, or those who have refused other forms of treatment. It is also commonly used to treat oligometastases, aiming for minimally invasive local control and thereby improving quality of life in selected patients[3]. Nowadays, indications for lung ablation are ever-changing. For instance, with the advancement in medical imaging, more multifocal ground-glass opacities have been diagnosed. BLA has potential as a one-stop treatment for multiple lesions, enabling concomitant procedures and allowing repeat

treatments for recurrences. Emerging technology such as PEF may expand indications further into advanced disease stages by targeting larger tumours with minimal collateral damage and stimulating immune responses.

A growing body of clinical evidence indicates that BLA with various energies provides effective local tumour control while offering an excellent safety profile, primarily by avoiding pleural breach, major surgical risk, and radiation toxicity[7]. In recent years, the bronchoscopic approach has been popularised for its superior risk profile and comparable local control efficacy. A multicentre study consisting of 126 patients who underwent bronchoscopic RF ablation reported complete ablation and intrapulmonary progression-free survival rates of 90.48% and 88.89%, respectively, at 12-month follow-up. Two patients died during the follow-up period, while the rates of pneumothorax and haemoptysis were 3.97% and 6.35%[8]. Similarly, another retrospective cohort consisting of 46 patients who underwent bronchoscopic RF ablation for early-stage lung cancer, the local control progression-free survival at 1-, 2-, and 3-year were 87.5%, 73.4%, and 69.8%, respectively[9]. RFA's efficacy depends on impedance and conductance, which tend to result in a smaller, less predictable ablation zone. On the other hand, MW, which is less dependent on impedance and less affected by the heat sink effect, can produce larger, more uniform ablation zones and has demonstrated local control rates similar to or superior to those of other modalities. A two-centre study on bronchoscopic MW ablation in lung malignancies was the NAVABLATE study published in 2024. Among 30 nodules treated by bronchoscopic MW ablation, the technical success rate and one-month treatment efficacy were 100% respectively. 13.3% of complications were reported, none of which were severe[10].

As the technology evolves, newer energy modalities such as cryoablation and PEF are under ongoing investigation. A study involving nine patients with early-stage lung cancer or oligometastases who underwent transbronchial cryoablation showed a 100% technical success rate. Among nine tumours, two of them exhibited incomplete ablation, which later progressed locally at 6-month. Only one case of mild complication occurred[11]. This landmark study showcases the feasibility of bronchoscopic cryoablation in peripheral lung cancers. Another newer energy, PEF, offers local ablation and has the potential to upregulate the immune response, augmenting the treatment effect of immunotherapy. Jimenez et al. reported a cohort of 36 patients who underwent percutaneous or bronchoscopic PEF ablation for suspected or confirmed early-stage NSCLC before surgical resection, with no adverse events reported. Histopathological examination of these ablated tumours showed either decreased or absent tumour cellularity. Also, tertiary lymphoid structures were observed within the ablated tumours, suggestive of immune system activation[12].

Overall, the efficacy of BLA may vary according to tumour and patient characteristics. Nonetheless, accumulated evidence supports its role as a feasible and effective option for local tumour control, especially in patients unsuitable for surgery or SBRT.

EXPERIENCE IN HONG KONG - PRINCE OF WALES HOSPITAL

At the authors' institution, BLA using MW has been integrated into the multi-disciplinary thoracic oncology programme as a minimally invasive treatment for selected lung tumours. A typical MW ablation procedure in the hybrid operating room (HOR) (Fig. 1) begins with preoperative 3D planning of the bronchoscopic route using computed tomography (CT) (Fig. 2). Under general anaesthesia, the patient is intubated, and an initial cone-beam CT (CBCT) provides current imaging of the lesion. Using electromagnetic navigation bronchoscopy (ENB) or robotic-assisted bronchoscopy (RAB) systems with real-time fluoroscopic guidance, the bronchoscope is navigated toward the target (Fig. 3A-B). A second CBCT confirms the navigation accuracy. A needle or dilator is then inserted to create a transbronchial tract, which is then exchanged to the ablation catheter, and a third CBCT verifies its position. Microwave energy is then delivered, with the energy output tailored to produce an ablation zone that completely covers the target lesion with adequate margins. Afterward, a post-ablation CBCT confirms the ablation zone and margins (Fig. 4). Re-ablation is performed if the coverage is inadequate. Alternatively, concomitant ablation of multiple tumours[13], concomitant dye marking localisation[14], and concomitant surgical lung resection[15] can be performed if indicated to manage complex cases with multiple lesions.

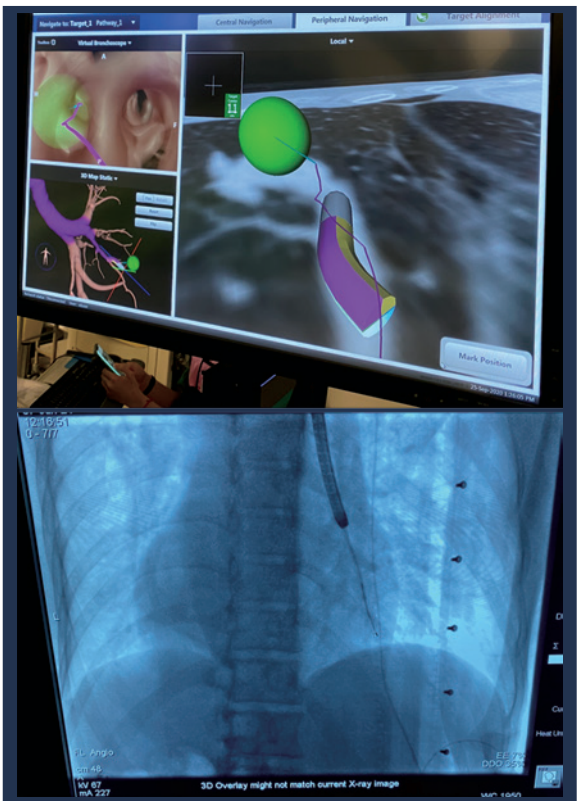

Fig. 1 & Fig. 2: A typical MW ablation procedure in the hybrid operating room (HOR) begins with preoperative 3D planning of the bronchoscopic route using computed tomography (CT) (Clinical photos from personal collection)

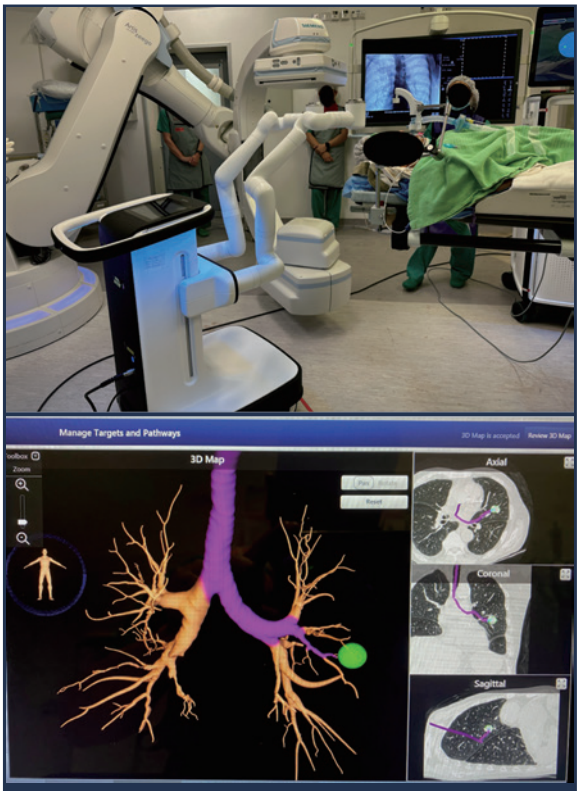

Fig. 3 A-B: Using electromagnetic navigation bronchoscopy (ENB) or robotic-assisted bronchoscopy (RAB) systems with real-time fluoroscopic guidance, the bronchoscope is navigated toward the target (Clinical photos from personal collection)

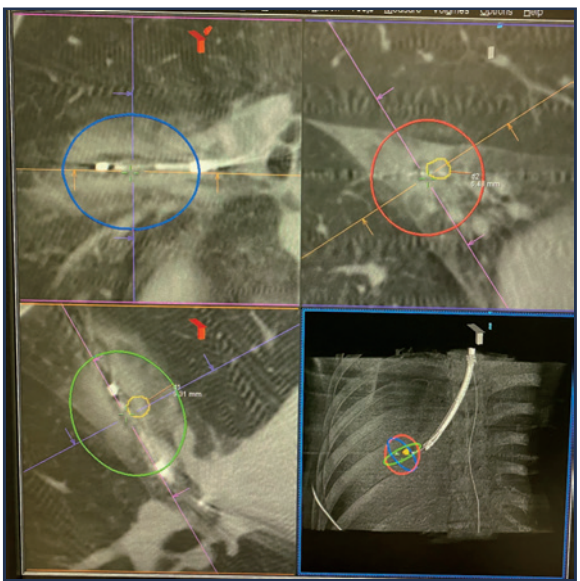

Fig. 4: A post-ablation CBCT confirms the ablation zone and margins (Clinical photos from personal collection)

Since 2019, the author's institution has performed more than 218 bronchoscopic MW ablations and treated more than 293 lung nodules. The technical success rate was 100%, and the 1-month complication rate was 21.6% (47 complications). Among the 47 complications, 34 (15.6%) were Clavien-Dindo grade 1, which resolved with conservative management alone. No grade 4 or 5 complications were reported. This showcases the outstanding safety profile of bronchoscopic MW ablation. In 2024, the five-year mid-term results for this cohort (including 223 ablated nodules with mid-term follow-up) were published. Among these 223 lung nodules (mean maximal diameter 11.8 mm) treated with bronchoscopic MW ablation, the mean hospital stay was 1.56 days, and more than 77% of patients were discharged on postoperative day 1. With a mean follow-up of 25.3 months, 5.8% of local site recurrences were reported and treated with either re-ablation, SBRT, or surgery[16]. These encouraging results support the safety and efficacy of this technique in carefully selected patients. Interestingly, among patients with subpleural nodule ablation[17], those who have had concomitant surgery[15], or those who have had concomitant ablation of multiple nodules in the same session[13], data suggested that all approaches are feasible and safe. Thus, BLA has the potential to provide a wide range of multi-disciplinary management options for lung cancer patients, especially those with multifocal lung lesions.

FUTURE DIRECTIONS

The future of BLA is driven by technological advancements and a deeper understanding of tumour biology. Emerging energy modalities, such as PEF ablation, hold promise for treating more advanced tumours with minimal collateral damage and may augment the effectiveness of adjuvant oncological treatment in advanced lung cancer[5,12]. (Fig. 5) Another emerging option for BLA is photodynamic therapy (PDT). It involves administering a cancer-specific photosensitiser that selectively accumulates in the tumour tissue, followed by activation with a specialised light wavelength. This activation produces free radicals within the cancer cells, leading to their destruction. Recently, researchers have begun exploring bronchoscopic PDT for peripheral lung cancers through phase 0 trials, which have shown no significant immediate complications, suggesting it could become a safe and minimally invasive therapeutic option in the future[18].

Additionally, integrating artificial intelligence (AI) automation into bronchoscopic navigation enables more precise steering within complex airways. For example, AI-human shared control algorithms, developed using reinforcement learning based on expert operator data, can predict the operator's intended steering actions. The AI co-pilot can autonomously maintain the tip of the bronchoscope in the airway centre, thereby reducing human operational errors. Recent studies published in 2024 demonstrate the effectiveness of this technology in simulated airway models and in live porcine lungs, showing that AI can detect image errors and significantly lower the incidence of navigation errors across operators with varying levels of experience[19]. Notably, this technology enhances safety by minimising the risk of incidental airway injury and makes complex procedures more accessible to less experienced bronchoscopists.

Fig. 5: Emerging energy modalities, such as PEF ablation, hold promise for treating more advanced tumours with minimal collateral damage and may augment the effectiveness of adjuvant oncological treatment in advanced lung cancer margins (Clinical photos from personal collection)

CONCLUSION

Bronchoscopic lung ablation is a promising minimally invasive treatment for primary and metastatic lung tumours, especially in patients unfit for surgery or SBRT. Its use of various energy modalities - thermal and non-thermal - allows for personalised treatment with favourable short-term outcomes and minimal complications. While challenges remain, emerging innovations like PEF and AI integration hold promise to expand its applications, improve safety, and enhance efficacy. As research advances, BLA is expected to become a key component in personalised, multi-disciplinary lung cancer management.

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Advances in Endobronchial Ultrasound

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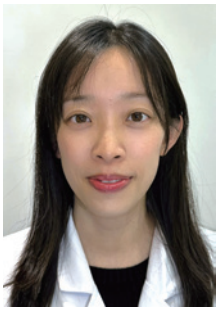

Dr Siu-leung FUNG Dr Fifian Ka-yan CHIANG

INTRODUCTION

Endobronchial ultrasound (EBUS) is a bronchoscopic technique that allows visualisation of structures beyond the airway[1]. Two types of EBUS are used in clinical practice: the convex probe EBUS and the radial probe EBUS. Convex probe EBUS has been developed for lung cancer diagnosis and staging with real time transbronchial needle aspiration of intrathoracic lymph nodes (EBUS-TBNA) and will be further discussed in the current review. Radial probe EBUS enables localisation of peripheral pulmonary lesions to facilitate sampling, though not in a real time manner.

Nowadays, EBUS is a commonly performed pulmonary procedure, but innovations and advances aiming at improving the diagnostic yield and broadening its clinical applications are continuously emerging to meet the ever-increasing clinical need.

ADVANCES IN ENHANCING DIAGNOSTIC YIELD

Despite EBUS-TBNA has a high histological diagnostic yield for malignant intrathoracic lymphadenopathy, adequate tissue for next generation sequencing (NGS) and PD-L1 testing is essential for formulating personalised treatment plan contemporarily. On the other hand, the yield of EBUS-TBNA for benign pathologies like tuberculosis and sarcoidosis is much less favourable compared with the malignant counterpart.

Studies on the use of specially designed TBNA needles, EBUS-guided intranodal forceps biopsy and EBUS-guided transbronchial mediastinal cryo-biopsy have been conducted to enhance the diagnosis of both malignant and benign lesions. Furthermore, modalities for guiding biopsy sites like elastography and contrast enhanced EBUS have been evaluated.

Special EBUS-TBNA Needles

TBNA needle with core trap (Fig. 1) has a side-cutting window and a reverse bevel which helps to acquire a larger tissue core[2]. Specimens adequate for PD-L1 analysis could be obtained in 19 out of 22 EBUS-TBNA procedures performed by such needle in a single centre prospective interventional study[3].

Franseen needle (Fig. 2) is a 3 beveled-edge device which could cut in a trephine fashion, producing core tissue biopsies[4]. EBUS-TBNA with Franseen needle has 95.6% and 94.4% diagnostic yield for malignant disease and granulomatous lymphadenopathy respectively[5]. NGS tissue adequacy was 83% by Franseeen needle compared with 46% by conventional EBUS-TBNA needle[4].

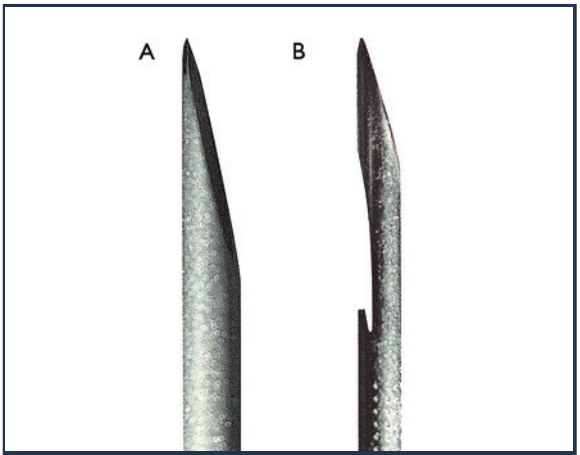

Fig. 1: (A) Conventional TBNA needle and (B) Needle with core trap. (Excerpted from Skrzypczak P, Gąsiorowski Ł, Sielewicz M, et al. Does needle-type increase the diagnostic yield of malignancies in endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA)? -a prospective comparative study. J Thorac Dis. 2022 Apr;14(4):884-891.)

Fig. 2: Franseen needle (Excerpted from Aboudara MC, Saettele T, Tawfik O. Endobronchial ultrasound bronchoscopy Franseen fine needle biopsy tool versus standard fine needle aspiration needle: Impact on diagnosis and tissue adequacy. Respir Med. 2023 Mar;208:107131. doi: 10.1016/j.rmed.2023.107131. Epub 2023 Jan 30.)

EBUS-guided Intranodal Forceps Biopsy (EBUS-IFB)

EBUS-IFB is a procedure complementary to EBUS-TBNA (Fig. 3). After EBUS-TBNA, mini-forceps could be passed into the target lymph node along the tract created by TBNA needle or with the help of an electrocautery knife. A meta-analysis of EBUS-TBNA alone versus combined EBUS-IFB and EBUS-TBNA for intrathoracic lymphadenopathy showed the following findings: diagnostic yield for sarcoidosis was 58% for EBUS-TBNA alone and 93% for the combined modality; for lymphoma it was 30% for TBNA alone and 86% for the combination[6].

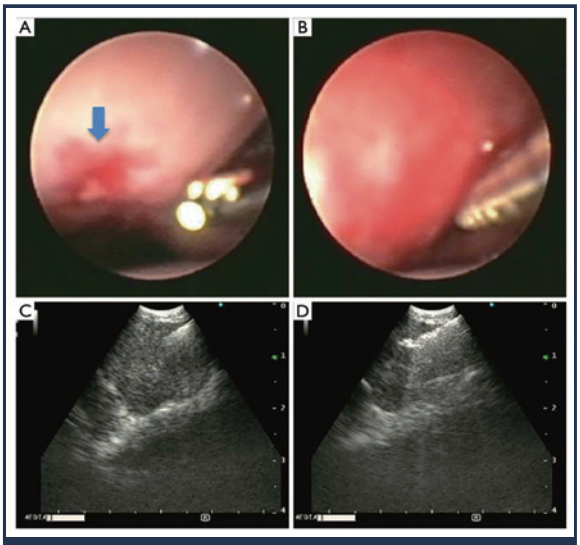

Fig. 3: (A) Endobronchial view of mini-forceps, blue arrow points to the puncture site formed by TBNA needle. (B) Mini-forceps penetrate into the airway wall. (C) Endobronchial ultrasound view of the mini-forceps inside the lymph node. (D) The mini-forceps advanced and opened inside the target lymph node and ready to take biopsy (Excerpted from Cheng G, Mahajan A, Oh S, et al. Endobronchial ultrasound-guided intranodal forceps biopsy (EBUS-IFB)-technical review. J Thorac Dis. 2019 Sep;11(9):4049-4058. doi: 10.21037/jtd.2019.08.106.)

EBUS-guided Transbronchial Mediastinal Cryo-biopsy (EBUS-TMC)

For EBUS-TMC, a cryo-probe is inserted into the lymph node through the tract made by TBNA needle or electrocauterisation as for EBUS-IFB. After triggering the cooling process, the probe is retracted along with the EBUS scope en-bloc, with the frozen biopsy tissue attached at the tip of the cryo-probe for processing (Fig. 4)[7].

A meta-analysis revealed that for mediastinal lesions, EBUS-TMC had significantly higher diagnostic yield for lymphoma and benign disorders (86% versus 27% for lymphoma; 88% versus 60% for benign disorders) compared with EBUS-TBNA without serious complications[8]. EBUS-TMC allowed characterisation of lymphoma subtypes and obtained adequate tissue for genetic studies and immunohistochemical determination of PD-L1 in almost all (97%) specimens as shown by a systematic review[9].

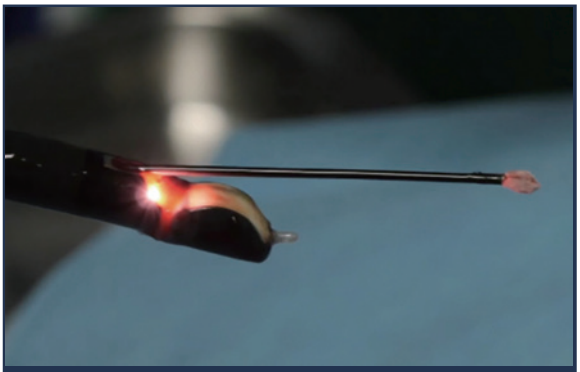

Fig. 4: The frozen biopsy tissue attached at the tip of the cryo-probe after retracting with the EBUS-scope en bloc (Excerpted from Ariza Prota MA, Pérez Pallarés J, Barisione E, et al. Proposal for a standardised methodology for performing endobronchial ultrasound-guided mediastinal cryobiopsy: a four-step approach. Mediastinum. 2024 Apr 29;8:30. doi: 10.21037/med-23-65. eCollection 2024.)

SELECTING OPTIMAL SITES FOR BIOPSY: ELASTOGRAPHY AND CONTRAST ENHANCED EBUS

EBUS elastography could help differentiate benign from malignant intrathoracic lymph nodes. It provides a colour-coded image indicating tissue stiffness, with malignant areas typically appearing stiffer (blue) (Fig. 5) and softer benign areas appearing non-blue (red, yellow, green) (Fig. 6). A meta-analysis showed EBUS elastography had a pooled sensitivity of 0.90 and specificity of 0.78 in predicting malignant lymphadenopathy[10]. EBUS elastography could not replace tissue sampling by EBUS-TBNA as malignant lymph nodes could be soft with necrosis while benign nodes might be hard due to fibrosis and anthracosis. However, elastography could help bronchoscopists select the most suspicious sites (stiffer areas, avoiding necrotic tissue) of the target lymph nodes.

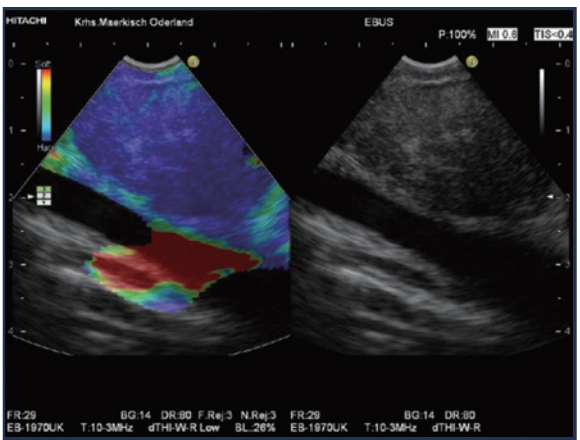

Fig. 5: Malignant mediastinal lymph node with diffuse infiltration by lung cancer with homogeneously blue appearance. (Excerpted from Dietrich CF, Jenssen C, Herth FJ. Endobronchial ultrasound elastography. Endosc Ultrasound. 2016 Jul-Aug;5(4):233-8.)

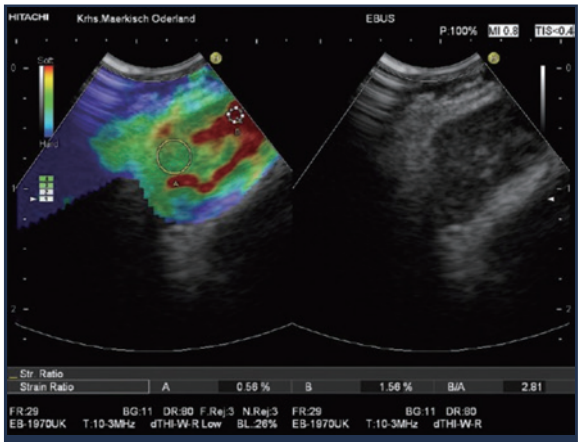

Fig. 6: Sarcoid lymph node with homogeneously green appearance and softer hilum in red (Excerpted from Dietrich CF, Jenssen C, Herth FJ. Endobronchial ultrasound elastography. Endosc Ultrasound. 2016 Jul-Aug;5(4):233-8.)

Contrast enhanced EBUS combines conventional EBUS with the administration of a contrast agent (sulfur hexafluoride) to enhance visualisation of blood flow within the lymph nodes and identification of intranodal necrotic areas. In a retrospective observational study, there was no statistically significant difference in diagnostic yield on the use of EBUS-TBNA alone and contrast-enhanced EBUS-TBNA for intrathoracic malignant lymphadenopathy. However, for bulky lymph nodes or with extensive areas of necrosis inside the nodes, the contrast-enhanced EBUS group showed a higher success rate in acquiring sufficient tissue for molecular testing (82% versus 33%)[11].

ADVANCES IN BROADENING THE CLINICAL APPLICATION OF EBUS

Pulmonary Vascular Disease

EBUS could help bronchoscopists visualise extra-bronchial structures, including blood vessels. In a prospective pilot study, EBUS could detect 96% of the 101 pulmonary emboli documented by computed tomography pulmonary angiography. The 4 emboli missed by EBUS were located at the middle lobe and left upper lobe pulmonary arteries, which were beyond reach of EBUS scope[12]. Systematic assessment of the main pulmonary arteries is feasible during EBUS with median procedure time of two minutes only. The positive predictive value of detecting pulmonary embolus is 100% and the number needed to scan is 50 to detect one case of pulmonary embolism[13].

Endoscopic Ultrasound with Bronchoscope-guided Fine Needle Aspiration (EUS-B-FNA)

Conventionally, EBUS is a bronchoscopic procedure with the EBUS endoscope inserted via the airway. There are mediastinal lymph nodes (para-oesophageal and pulmonary ligament) that could not be reached by EBUS. Furthermore, EBUS-TBNA is not possible for extrapulmonary sites such as the liver and adrenal gland which are common sites for lung cancer metastases. The combination of EBUS-TBNA and EUS-FNA (endoscopic ultrasound guided fine needle aspiration through the oesophagus performed with a special gastrointestinal echoendoscope) is advocated for diagnostic workup of lung cancer due to the higher diagnostic yield with their combined use[14]. However, this would require conjoint effort of a pulmonologist and gastroenterologist which may not be practical in real life situations. EUS-B-FNA is the insertion of the EBUS scope through the oesophagus and performing real time ultrasound guided biopsy as EUS-FNA. Both intrathoracic as well as extrathoracic locations such as the left adrenal gland could be approached by EUS-B-FNA in a single procedure.

Experienced bronchoscopists could safely and accurately perform EUS-B-FNA with a high diagnostic sensitivity[15] thanks to the ability to transfer the skill set from EBUS-TBNA to EUS-B-FNA due to overlapping proficiency in endoscopic dexterity, ultrasound imaging interpretation and lymph node sampling[16]. A single scope approach (EBUS-TBNA combined with EUS-B-FNA) could hasten the diagnostic and staging workup of suspected lung cancer, simplify logistics and reduce cost compared with a dual scope approach (EBUS-TBNA and EUS-FNA).

Addition of EUS-B-FNA to EBUS-TBNA could increase the diagnostic yield for lung cancer by 5%[17]. A meta-analysis showed that EUS-B-FNA had high ability to visualise (0.84), to sample (1.00) and to obtain adequate tissue (0.96) of the left adrenal gland in workup for patients with lung cancer[18].

Concerning benign mediastinal lymphadenopathy, the International Sarcoidosis Assessment Trial compared between EBUS-TBNA and EUS-B-FNA for suspected sarcoidosis and revealed no significant difference in granuloma detection rate nor sensitivity (EBUS-TBNA: 70% and 78% vs EUS-B-FNA 68% and 82% respectively)[19]. Recently, use of cryo-biopsy guided by EUS-B for diagnosis of mediastinal lymphadenopathy has also been reported[20].

Other than the improvement in diagnostic yield, EUS-B-FNA has been shown to be better tolerated compared with EBUS-TBNA with less cough, more patient comfort and shorter procedure time[21]. However, EUS-B-FNA is currently not widely adopted by pulmonologists, and this could be explained by the lack of standardised teaching and assessment programmes. These obstacles could be overcome by adopting a systemic and stepwise training, together with apprenticeship and simulation-based practice[22].

CONCLUSION

EBUS plays an important role in the diagnostic and staging algorithms among lung and mediastinal diseases. New biopsy tools could enhance tissue adequacy for comprehensive molecular and immunohistochemical studies to facilitate personalised treatment of lung cancer and could also increase diagnostic yield of non-malignant pathologies. Modalities are emerging to help bronchoscopists target the most suspicious sites for EBUS-TBNA. Application

of EUS-B-FNA further expands the use of EBUS scope beyond the thoracic boundaries and brings higher diagnostic sensitivity with better tolerability.

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Dermatology Quiz

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Specialist in Dermatology and Venereology

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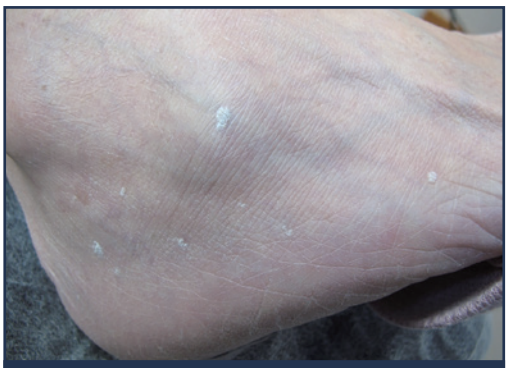

Fig. 1: Multiple small whitish keratotic papules on the right ankle

This 50-year-old lady came to the clinic and complained about multiple whitish hard spots around the ankles. Only mild itching was present with no other symptoms. Physical examination revealed multiple 2-3 mm whitish keratotic papules with rough and dry surface on the lateral aspect of ankles. There was no ulceration or erosion. (Fig. 1)

Questions

1. What are the differential diagnoses of his skin lesion?
2. What causes the lesions?
3. How do you treat this patient?

(See P.33 for answers)

From Airway Medicine to Artisan Baking

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Resident, Department of Medicine, Queen Elizabeth Hospital

Dr Hoi-ting YEUNG

Beyond the hospital and clinic, baking provides a welcome contrast to the structured world of medicine - a space where creativity meets science, and where mistakes simply become lessons for the next recipe.

I didn't set out to become a baker. In fact, my first foray into the kitchen was more accidental than intentional. Back when the COVID-19 pandemic started, I was still a basic physician trainee. It reshaped clinical and daily life in unexpected ways, but amid the challenges. One evening, desperate for a distraction, I stumbled upon a simple recipe for banana bread. It required no fancy equipment, no obscure ingredients - just ripe bananas, flour, sugar, and a bit of courage. I followed the steps with the precision I'd learned in anatomy labs, measuring each ingredient as if it were a dose of medication. The result wasn't perfect, but it was mine. And more importantly, it was the beginning of something unexpected.

Baking quickly became my refuge. Amidst the chaos of clinical duty and exams, the kitchen offered a quiet space where I could breathe. It was a world governed not by diagnoses and deadlines, but by butter, eggs, and flour. There was something deeply comforting about the tactile nature of baking - the feel of dough beneath my fingers, the scent of vanilla wafting through the air, the gentle hum of the oven. It grounded me in a way that textbooks never could.

Unlike medicine, where errors can carry heavy consequences, baking welcomes imperfection. A sunken sponge cake or slightly burnt crust wasn't a failure - it was feedback. Each mishap taught me something new: how to adjust oven temperatures, when to fold instead of stir, and why patience matters when proofing dough. These lessons, though simple, carried profound emotional weight. They reminded me that growth often comes from getting things wrong, and that not every mistake needs to be feared.

As time passed, with the help of the ever-growing database of online instructional content, my skills grew. What started with basic recipes soon turned into a love for making everything from scratch. There's a quiet joy in watching ingredients transform. Flour and water become bread. Sugar and butter become caramel. It's alchemy, really - and witnessing that transformation felt like reclaiming a sense of wonder that medicine sometimes dulled. I found immense satisfaction in baking fresh bread for my family and friends and preparing cakes for special occasions, adding a personal touch to celebrations. Baking became more than just a hobby; it was a way to create moments of joy, a reminder that even amid life's chaos, small pleasures matter.

Other than its personal rewards, baking has also offered me a new way to connect with others. As a trainee, rotating to different hospitals or departments is inevitable and the custom of buying farewell cakes on your last day often becomes a hassle. This is when my home bakery comes in handy, not to mention the great impression it leaves. Sharing homemade creations brings happiness to family, friends, and colleagues. There's an unspoken warmth in offering someone a slice of freshly baked cake, knowing that effort, care, and love went into its making. It's a reminder that nourishment isn't just about food but community, appreciation, and moments of comfort.

Baking also taught me to slow down. In a profession that often demands urgency, the deliberate pace of baking was a revelation. You cannot rush a tart to set or a dough to rise. You have to wait, to trust the process, to be present. That mindfulness seeped into other parts of my life, helping me approach both patients and problems with more patience and compassion.

Over time, I realised that baking wasn't just a hobby, but also a form of self-care. It reminded me that I am more than my profession, more than the sum of my responsibilities. It gave me permission to be playful, to make a mess, to find beauty in the imperfect. It became a way to reconnect with myself, especially during times when I felt lost in the demands of clinical life.

Now, whenever I feel overwhelmed, I return to the kitchen. I reach for my mixing bowl, preheat the oven, and let the rhythm of baking soothe me. Sometimes the cake doesn't rise, or the ganache splits, but the act itself is healing. It's a reminder that creation is a powerful antidote to stress, and that joy can be found in the simplest of rituals.

For many healthcare professionals, balancing work and personal passions can be challenging, but finding something that sparks joy outside of medicine is invaluable. Hobbies like baking remind us of the importance of slowing down, savouring the process, and embracing creativity. Just as medicine requires precision and patience, so too does a well-risen loaf of bread.

In many ways, baking has become a quiet companion on my medical journey. It doesn't compete with my career but complements it. I know that the lessons I

have learned in the kitchen will stay with me: resilience, creativity, and the courage to try again.

Fig. 1: Allowing the dough to ferment (Personal collection)

Fig. 2: Rolling them into shape (Personal collection)

Fig. 3: Brushing egg wash onto the dough before baking (Personal collection)

Fig. 4: Ta-da! Classic cocktail buns (Personal collection)

Fig. 5: Simmering fresh blueberries into a compote (Personal collection)

Fig. 6: Blueberry cheesecake for my good friend's birthday (Personal collection)

FMSHK Shenzhen Field Trip

Dr Alson Wai-ming CHAN

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Dr Alson Wai-ming CHAN

The FMSHK Shenzhen Field Trip was held on 16th Nov, Sunday. Prof Bernard Cheung and Dr Raymond Lo were the conveners of this field trip. Attendees are Dr Alson Chan, Ms Tina Yap, Dr Samuel Fung, Dr Desmond Nguyen, Dr Victor Yeung and Mrs Peggy Cheung.

The team visited the CUHK Shenzhen Research Institute in Nanshan, Shenzhen first. It began with an introduction of the institute and their recent research and projects. The institute director, Prof Yam Yeung and executive director, Dr Huangquan Lin, led the site visit of the whole institute building. They introduced their state-of-the-art and start-up companies in different research sectors inside the building.

The team visited King's School Shenzhen International afterwards. It began with a briefing session of the school, then walking around the school campus. The Field Trip ended with a dinner and returned to Hong Kong in the evening.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
4	★ HKMA CME Portal (Online) HKMA-KWC CME Online Lecture Series on Common Medical Conditions for GP in 2026 Topic: Abnormal ECG and Atrial Fibrillation 5	★ In-person / HKMA CME Portal (Online) HKMA-HKSH CME Programme 2026 Topic: Postnatal Mental Disorder 6	7	★ Certificate Course on Mental Health 2026 – Empowering Professionals to Support Mental Well-being (Video Lectures) 8	9	10
11	12	★ In-person / HKMA CME Portal (Online) HKMA-GHK CME Programme 2025 Topic: Headache in Children 13	★ The Hong Kong Neurosurgical Society Monthly Academic Meeting - To be confirmed ★ HKMA CME Portal (Online) Topic: The Gut-Brain Axis in Pediatric Mental Health: Exploring Microbiome Influences on Mood, Behavior, and Cognitive Development 14	★ Certificate Course on Mental Health 2026 – Empowering Professionals to Support Mental Well-being (Video Lectures) 15	16	17
18	19	★ In-person / HKMA CME Portal (Online) HKMA-GHK CME Programme 2025 Topic: Optimising Patient Outcomes in Cardiovascular - Kidney - Metabolic Management 20	21	★ In-person / HKMA CME Portal (Online) HKMA-HKWC CME Hybrid Lecture Topic: Surveillance and Management of Hepatitis B Carriers in the Primary Care Setting ★ Certificate Course on Mental Health 2026 – Empowering Professionals to Support Mental Well-being (Video Lectures) ★ FMSHK Foundation Meeting ★ FMSHK Executive Committee Meeting 22	23	24
25	26	27	28	★ In-person Topic: Novel Approaches in GAD Management ★ Certificate Course on Mental Health 2026 – Empowering Professionals to Support Mental Well-being (Video Lectures) 29	30	31

Date / Time	Function	Enquiry / Remarks
5 MON 2:00 PM	**HKMA CME Portal (Online)** **HKMA-KWC CME Online Lecture Series on Common Medical Conditions for GP in 2026** **Topic: Abnormal ECG and Atrial Fibrillation** Organiser: The Hong Kong Medical Association Speaker: Dr Nim-pong KWONG	HKMA CME Dept. Tel: 2527 8452 1 CME Point
6 TUE 2:00 PM	**In-person / HKMA CME Portal (Online)** **HKMA-HKSH CME Programme 2026** **Topic: Postnatal Mental Disorder** Organisers: The Hong Kong Medical Association and Hong Kong Sanatorium & Hospital Speaker: Dr Carmen Wei-ming LIAO Venue: The HKMA Wanchai Premises, 5/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong	HKMA CME Dept. Tel: 2527 8452 1 CME Point
8 THU 7:00 PM	**Certificate Course on Mental Health 2026 – Empowering Professionals to Support Mental Well-being (Video Lectures)** Organisers: The Federation of Medical Societies of Hong Kong & The Hong Kong College of Psychiatrists Speaker: Dr Fung-ling TAM	Ms ToTo CHAN Tel: 2821 3512
13 TUE 2:00 PM	**In-person / HKMA CME Portal (Online)** **HKMA-GHK CME Programme 2025** **Topic: Headache in Children** Organisers: The Hong Kong Medical Association and Gleneagles Hong Kong Hospital Speaker: Dr Chung-yin MO Venue: The HKMA Wanchai Premises, 5/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong	HKMA CME Dept. Tel: 2527 8452 1 CME Point
14 WED 7:30 AM	**The Hong Kong Neurosurgical Society Monthly Academic Meeting - To be confirmed** Organiser: Hong Kong Neurosurgical Society Speaker(s): Dr Alexander WOO Chairman: Dr Alberto Chi-ho CHU Venue: Seminar Room, G/F, Block A, Queen Elizabeth Hospital; or via Zoom meeting	CME Accreditation College: 1.5 points College of Surgeons of Hong Kong Dr Jason CHOW Tel: 2595 6456 Fax. No.: 2965 4061
2:00 PM	**HKMA CME Portal (Online)** **Topic: The Gut-Brain Axis in Pediatric Mental Health: Exploring Microbiome Influences on Mood, Behavior, and Cognitive Development** Organiser: The Hong Kong Medical Association Speaker: Dr Eugene Yu-hang YEUNG	HKMA CME Dept. Tel: 2527 8452 1 CME Point
15 THU 7:00 PM	**Certificate Course on Mental Health 2026 – Empowering Professionals to Support Mental Well-being (Video Lectures)** Organisers: The Federation of Medical Societies of Hong Kong & The Hong Kong College of Psychiatrists Speaker: Dr Rommel HUNG	Ms ToTo CHAN Tel: 2821 3512
20 TUE 2:00 PM	**In-person / HKMA CME Portal (Online)** **HKMA-GHK CME Programme 2025** **Topic: Optimising Patient Outcomes in Cardiovascular - Kidney - Metabolic Management** Organisers: The Hong Kong Medical Association and Gleneagles Hong Kong Hospital Speaker: Dr Hiu-lam CHAN Venue: The HKMA Wanchai Premises, 5/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong	HKMA CME Dept. Tel: 2527 8452 1 CME Point
22 THU 1:30 PM	**In-person / HKMA CME Portal (Online)** **HKMA-HKWC CME Hybrid Lecture** **Topic: Surveillance and Management of Hepatitis B Carriers in the Primary Care Setting** Organisers: The Hong Kong Medical Association and Hong Kong West Cluster Speaker: Prof Man-fung YUEN Venue: Central & Western District Health Centre, 7/F & 8/F, 308 Central Des Voeux, No. 308 Des Voeux Road Central, Sheung Wan, Hong Kong	HKMA CME Dept. Tel: 2527 8452 1 CME Point
7:00 PM	**Certificate Course on Mental Health 2026 – Empowering Professionals to Support Mental Well-being (Video Lectures)** Organisers: The Federation of Medical Societies of Hong Kong & The Hong Kong College of Psychiatrists Speaker: Dr Wing-ki TANG	Ms ToTo CHAN Tel: 2821 3512
7:00 PM	**FMSHK Foundation Meeting** Organiser: The Federation of Medical Societies of Hong Kong Venue: Council Chamber, 4/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong	Ms Nancy CHAN Tel: 2527 8898
8:00 PM	**FMSHK Executive Committee Meeting** Organiser: The Federation of Medical Societies of Hong Kong Venue: Council Chamber, 4/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong	Ms Nancy CHAN Tel: 2527 8898
29 THU 2:00 PM	**In-person** **Topic: Novel Approaches in GAD Management** Organiser: The Hong Kong Medical Association Speaker: Dr Christina Yun-ting LAM Venue: The HKMA Central Clubhouse, 2/F, Chinese Club Building, 21-22 Connaught Road Central, Central	HKMA CME Dept. Tel: 2527 8452 1 CME Point
7:00 PM	**Certificate Course on Mental Health 2026 – Empowering Professionals to Support Mental Well-being (Video Lectures)** Organisers: The Federation of Medical Societies of Hong Kong & The Hong Kong College of Psychiatrists Speaker: Dr Christina LAM	Ms ToTo CHAN Tel: 2821 3512

Answers to Dermatology Quiz

Answers:

1. The differential diagnoses include viral warts, seborrhoeic keratosis, actinic keratosis, arsenical keratosis, lichen planus, lichen nitidus, epidermodysplasia verruciformis and stucco keratosis.

   The diagnosis of this lady is stucco keratosis, which is most commonly found in fair-skinned middle-aged people with peak incidence from ages 40-60 years old. The diagnosis is usually made clinically by classical location and typical clinical presentation – multiple whitish 1-4 mm keratotic papules around the ankles and feet.

2. The cause of stucco keratosis is idiopathic. Some people affected may have a history of chronic sun exposure; however, the relationship between stucco keratosis and sun exposure is still uncertain and controversial. Moreover, stucco keratosis is not always at the sun exposure area.

3. The treatment of stucco keratosis can be conservative. There is no treatment to eradicate the lesions permanently and recurrence is common. Topical keratolytic agents such as salicylic acid, lactic acid may be the choice. Cryotherapy can be used to destroy the lesions. Cauterisation and curettage or CO2 Laser may also be considered to eradicate lesions. There is limited evidence showing that topical imiquimod cream and vitamin D3 analogues might be effective for eliminating the stucco keratosis.

Dr Chi-keung KWAN
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Specialist in Dermatology and Venereology

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