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Guest Opinion/Editorial

How to set up a lung cancer screening program: more than a glossy brochure and a CT scanner

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Six years ago the landmark National Lung Screening Trial (NLST) was published demonstrating a mortality benefit to screening asymptomatic individuals at high risk based on age and smoking history with annual low-dose computed tomography (LDCT).[1] The number needed to screen to prevent one death from lung cancer was 320; a number similar to that for mammography in women 60 and older. The NLST also demonstrated a high number of false positive results with LDCT screening with approximately 1 in 4 patients having a screen detected nodule. The vast majority of these nodules (96%) were not malignant in nature and the potential risk of downstream invasive testing for benign disease along with patient anxiety gave many pause to recommend widespread implementation of lung cancer screening.[2]

It wasn't until 2013 that the United States Preventative Services Task Force gave a lung cancer screening (LCS) with LDCT a grade B recommendation for high risk individuals. Following this recommendation, broad uptake of LCS did not occur as many still had concerns about the best way to implement LCS and insurers were largely not providing coverage. In March 2016, close to 5 years after the publication of the NLST, the Centers for Medicare and Medicaid Services (CMS) approved coverage for lung cancer screening for its eligible beneficiaries, however noting the potential risks, a patient shared-decision making visit was mandated prior to LDCT; the first for any cancer screening test.

Implementing lung cancer screening has become much more than advertising and a scanner; professional societies caution that LCS should be conducted in a multidisciplinary and comprehensive program that incorporates expertise in pulmonary nodule management as well as tobacco treatment services. In a joint policy statement, the American College of Chest Physicians and the American Thoracic society recommend nine programmatic components to ensure that LCS is conducted effectively, with quality, and safety.[3] These components include standardized protocols for performing LDCT, reporting results, and pulmonary nodule evaluation. Patient eligibility, frequency and duration for LCS comprise as well as patient and provider education are additional components.

While these essential components provide an ideal framework for implementation, the real-world logistics of starting a LCS program can be complicated. The ACCP and ATS outline strategies for the successful implementation LDCT screening programs into clinical practice in a separate policy statement.[4] These practical approaches are categorized into three phases: planning, implementation, and maintenance of LCS. The planning phase should be guided by a multidisciplinary steering committee that includes engagement and education of primary care providers. Evaluations of early-adopting LCS programs at three unique centers suggests that failure to do so resulted in a lack of PCP commitment to LCS.[5] Planning also requires the support of local leadership and a business model that includes funding for a nurse navigator and database development or software platform to manage and track screened patients, nodules detected, and allows for data reporting to an accredited registry. The implementation phase should emphasize how to ensure that screening is only performed in appropriate individuals, how to perform shared decision making and incorporate tobacco cessation, the process for following up abnormal findings, and adherence to repeat imaging. Lastly, maintaining the program should involve reviewing quality metrics and registry data to ensure it is operating as intended.

In conclusion, implementing LCS has many moving parts with challenges that may vary based on locally available resources and enthusiasm for screening, but it absolutely can be done. To develop and implement a program that is effective and safe involves buy in from many different disciplines and services. A carefully planned approach with a focus on the essential components for LCS will do much to ensure a successful program start and uptake. Finally, continuing review of system and patient level outcomes is important for quality assessment and future adaptations of the program.

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Technology Corner

Endobronchial blockers for Lung Isolation in Massive Hemoptysis

Introduction: Balloon-based endobronchial blockers were developed for lung isolation for thoracic surgical procedures as an alternative to double lumen intubation. They have been used, however, for lung isolation in the setting of massive airway bleeding. There are a variety of endobronchial blockers available on the market, which vary in regards to design and instructions for use. The purpose of this essay is to describe the basic specifications and techniques for using two such devices as they may be applicable to clinicians encountering massive airway bleeding.

Background: Most patients with massive hemoptysis die due to asphyxiation. Approximately 150 to 200 milliliters (ml) of blood could interfere with gas exchange and cause respiratory failure and death. This is because the amount of blood needed to fill the anatomical dead space in most patients is only about 150 ml. Massive hemoptysis has been defined in different series as > 200 to > 600 mL of blood per 24 hours, but due to the rather small quantity of blood needed to fill the anatomic dead space, death will typically occur prior to exsanguination. Bleeding rate of ≥ 1,000 ml within a 24-hour period, aspiration of blood in the contralateral lung, massive bleeding requiring single-lung ventilation and lung cancer as underlying etiologies have all been associated with higher mortality. Morbidity and mortality are reportedly less when tuberculosis, bronchitis or bronchiectasis were responsible for the massive hemoptysis. Some series report higher mortality rates in patients who experienced recurrent bleeding following bronchial artery embolization (BAE) for massive hemoptysis.

The first priority in the management of massive hemoptysis is to maintain a patient airway. While setting up the equipment for endotracheal intubation and lung isolation, the patient should be placed in the lateral safety position (lateral decubitus position) with the bleeding side down so blood does not also fill the unaffected lung. Bronchoscopists should be familiar with the use of endobronchial blocker placement as a means to isolate the bleeding lung, control massive hemoptysis and spare airways for gas exchange. In fact, transporting a patient to interventional radiology or intensive care unit without a secured airway (and isolated bleeding lung) in cases of massive hemoptysis is considered unsafe in the event of airway occlusion from large blood clots in route.

Commonly used endobronchial blockers mainly vary in steering technique, balloon size, locking mechanism and method of placement. The two blockers described herein need visual guidance for proper placement in the desired airway. A locking system is available to secure the blocker in the desired location and reduce the risk for migration. There are no published surveys, however, assessing the operators' comfort level or user-friendly features for the various available systems. The Arndt endobronchial blocker (Cook Medical) require the use of a pediatric bronchoscope when the blocker is placed though a regular 7.0-8.5 endotracheal tubes. An alternative technique can be used, in which the blocker can be inserted in the airway alongside the endotracheal tube, even by using a regular diagnostic adult bronchoscope (Figure1). The VivaSight –EB (Ambu A/S) can be used without the bronchoscope when inserted through a dedicated endotracheal tube with a built-in camera (VivaSight –SL, Ambu A/S) (Figure 2). To date, there are no comparison studies between the blockers designed by different manufacturers. Familiarity, availability, the feasibility of using a bronchoscope in emergent situations and costs impact operators' selection of a particular endobronchial blocker.

Clinical applications: The Arndt endobronchial blocker (Cook Medical) and the VivaSight-EB (Ambu A/S) while approved for clinical use for lung isolation, have not yet been systematically studied for massive hemoptysis. There are several issues that require attention when using these devices for lung isolation in massive hemoptysis:

1. **Massive bleeding from the left lung:** selective intubation of the right main bronchus (RMB) should be performed emergently. However, because of the short length of the RMB (1.5-2 cm), it is very likely that the takeoff of the right upper lobe bronchus would be occluded if the ETT is properly positioned in the RMB. Ventilation to the right lower lobe (RLL) and right middle lobe (RML) may not be tolerated, and thus, alternatives have been proposed; a double lumen endotracheal tube could be considered, but it may not be feasible to place these tubes in emergent situations for hemoptysis. Thus, an endobronchial blocker could be placed in the left main bronchus, while keeping the ETT in the trachea (Figure 3). This way, the entire right lung is being ventilated, while preventing spillage of blood from the left lung.
2. **Massive bleeding from the right lung:** in this scenario, the left lung should be selectively intubated; this is feasible as the left main stem bronchus is typically 5 cm in length and a single lumen ETT can be placed in positioned in the LMB. If the bleeding is from the RML or RLL, however, the ETT can be secured in mid trachea and the blocker positioned in the Bronchus intermedius (Figure 1), allowing ventilation not only of the left lung but also of the RUL.

3. Patient safety during and blocker insertion:

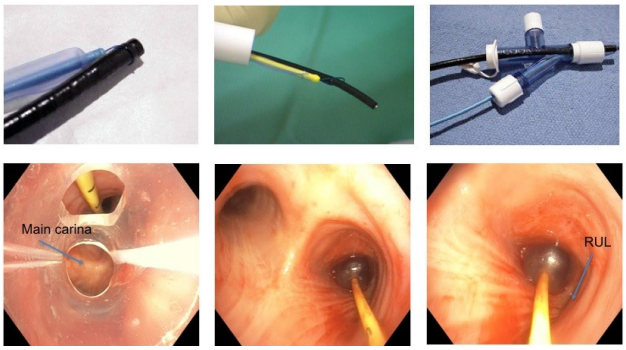
A. The balloon should never be overinflated; in fact, the balloon should be deflated for a few minutes three times a day in order to preserve mucosal viability and to check for bleeding recurrence.

B. If ventilation becomes difficult during endobronchial blockade, the balloon should be deflated and the its position inspected as migration is possible

C. Higher PEEP and low tidal volume may occur during placement due to the presence of scope and blocker in the ETT

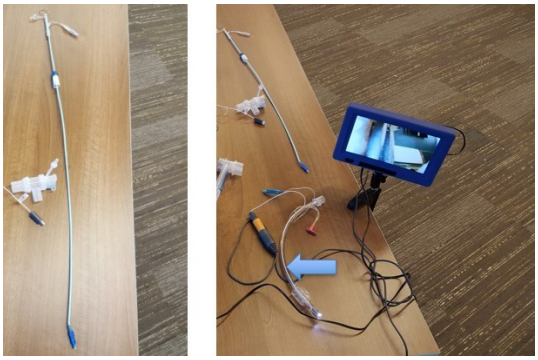
Conclusions: The available endobronchial blockers have different design, insertion technique and maneuverability. The lack of published literature makes a fair comparison between different blockers in the same patient population impossible. We believe that by appropriately using the endobronchial blockers in the setting of massive hemoptysis, practitioners can safely isolate the bleeding lung and potentially stabilize patients until definitive treatment is offered.

Figure 1



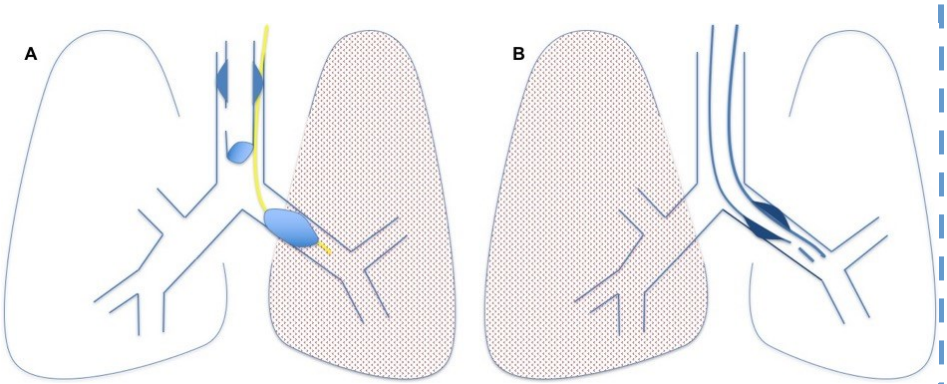
Arndt Endobronchial blocker. *Top left*: The Arndt endobronchial blocker uses a guide loop assembly that fits through the lumen of the blocker and exits from the blocker's distal end to form a small, adjustable loop. *Top center*: The bronchoscope is placed through the diaphragm of the bronchoscopy port of the Arndt Multiport Airway Adapter; the bronchoscope is advanced through the guide loop. *Top right:* Once coupled through the Arndt Multiport Airway Adapter, the bronchoscope and the blocker are placed on the endotracheal tube and the patient ventilated with 100% oxygen. The guide loop should be adjusted to loosely approximate the diameter of the bronchoscope. *Bottom left:* The blocker is inserted in the airway alongside the endotracheal tube. *Bottom Center*: The blocker can be placed in the bronchus intermedius (BI) in cases of bleeding form the RML or RLL. *Bottom right:* When placed in the BI, the RUL bronchus patency is maintained. Photos courtesy of Eric Edell, Mayo Clinic and Septimiu Murgu, University of Chicago.

Figure 2



Left panel: VivaSight-EB is an endobronchial blocker designated for lung isolation. It consists of a sterile, single-use, "steerable" balloon-tipped catheter that is visually guided to a selected airway. The angled distal tip of VivaSight-EB can be adjusted to facilitate placement in the desired bronchi. When used in conjunction with the VivaSight-SL continuous monitoring throughout the procedure ensures that dislocation can be easily detected and corrected. *Right panel:* For visual guidance during positioning the blocker can be used in combination with the bronchoscope or the VivaSight-SL single lumen tube (arrow) with integrated camera.

Figure 3



Managing strategies for massive hemoptysis. A. In case of left lung bleeding, the ETT can be secured in the trachea and the endobronchial blocker placed either through the ETT or along its side and positioned in the left main bronchus. The right upper lobe can be closed off with a right mainstem bronchus intubation. B. In cases of right lung bleeding, the left main bronchus can be intubated over the bronchoscope. This is possible as the LMB is ~5 cm in length.

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EBUS specimen handling for next generation sequencing (NGS)

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Introduction:

The National Comprehensive Cancer Network 2017 Clinical Practice Guidelines for Non-Small Cell Lung Cancer (NSCLC) recommend concomitant diagnosis, staging and acquisition of adequate material for genetic testing (1). Additionally, it is recommended to utilize the least invasive biopsy with the highest yield. The use of endobronchial ultrasound (EBUS) guided transbronchial needle aspiration (TBNA) has become the procedure of choice to diagnose and stage locally metastatic lung cancer. NCCN guidelines also recommend broad molecular profiling of samples to identify possible targetable mutations or for eligibility for clinical trials.

Molecular testing has undergone a tremendous evolution in the past decade: until recently comprehensive molecular profiling required multiple tests for single mutations or translocations (eg: PCR, Sanger sequencing, Fluorescence in situ hybridization, immunohistochemistry) which could incur a high cost in terms of finances, time, and quantity of tissue samples (2). Next Generation Sequencing (NGS) utilizes a single test to identify thousands of mutations from hundreds of genes allowing for the examination of the entire cancer genome and transcriptome. The use of formalin fixation of cytology specimens and possibly the centrifugation required for cell block preparation have been shown to result in significant degradation of macromolecules, whereas air-dried cytology smears result in improved preservation of nucleic acids (3,4). Therefore, the ability to run NGS testing on cytology smears may offer a benefit in molecular testing accuracy. In fact, cytology smears have been recently shown to provide a better DNA quality for NGS than resected specimens and core biopsies (5). Most importantly, slide cellularity and adequacy can be assessed at the time of the procedure (rapid on site examination), whereas cell block and/or core biopsy adequacy cannot be assessed until after processing.

EBUS Procedure:

EBUS procedure is performed as per standard of practice for staging NSCLC: N3, N2, N1 nodes in sequence; minimum of three aspirates per node.

Per routine practice at our institution, after obtaining informed consent, the patient undergoes general anesthesia. Complete EBUS exploration of the mediastinal and hilar lymph node stations is performed in a systematic manner. On examination, if a lymph node greater than 5 mm is identified, EBUS guided transbronchial needle aspirations of the lymph node are performed using a EBUS-TBNA needle (25 or 22 gauge). This process continues through the remaining lymph node stations.

Sample Processing:

In our institution, after the sample is aspirated, the needle is removed from the EBUS scope and the sample is discharged onto a glass slide, first by replacing the needle stylet followed by injection of air using an empty syringe attached to the stylet hub. The drop of material dispelled on the glass slide and the slide is then smeared with a second slide, resulting in two smears. One of the smears is then air-dried for ROSE using Diff-Quik stain. The second slide is sprayed-fixed with alcohol for future Pap staining. The remaining aspirate material is placed into Cytolyt solution or formalin, which will subsequently be processed into a cell-block.

Rapid On-Site Evaluation (ROSE):

Slides are then stained by a cytotechnologist and reviewed by the cytopathologist on-site. Slides are considered adequate if evidence of target sampling was present. For example, when sampling a lymph node, the presence of lymphocytes, anthracosis, granulomas or tumor would be considered adequate (Figure 1). Examples of inadequate samples include the presence of blood or benign bronchial cells (pick-ups) only. If malignant cells are present, the tumor is then subtyped if possible based on cytomorphology alone. If the diagnostic subtype is favored to be non-small cell carcinoma, the smear is then evaluated to determine if adequate tumor is present for molecular studies. In our molecular lab approximately 2000 tumor cells are required for Oncoscreen panel (50 genes) and 20,000 tumor cells for the OncoPlus panel (> 1000 genes). The estimation of cellularity is based on the experience of the cytopathologist, but more objective tools should be applied for clinical trials.

If more than half of the slide has tumor, the cellularity is considered adequate for both panels (Figure 2). If the smear is considered adequate for diagnosis but inadequate for molecular studies, additional passes are performed and evaluated until an adequate smear is obtained. If needed, several smears may be combined to achieve the minimum cellularity requirement.

Molecular Pathology Evaluation:

The selected smears are then submitted to the molecular laboratory for next generation sequencing (NGS). This testing includes the lung fusion panel (ALK/RET/ROS1 fusion gene testing) and the Oncoscreen solid tumor mutation panel, which includes all currently targetable mutations in NSCLC

Conclusion:

In my opinion, using Rapid-Onsite Evaluation in conjunction with EBUS is far superior to a non-ROSE method for assessing adequacy for comprehensive molecular testing and allows the most benefit to the patient by minimizing excessive procedures, obtaining diagnostic and staging information and adequate material for molecular testing. This practice adheres to the current lung cancer guidelines.

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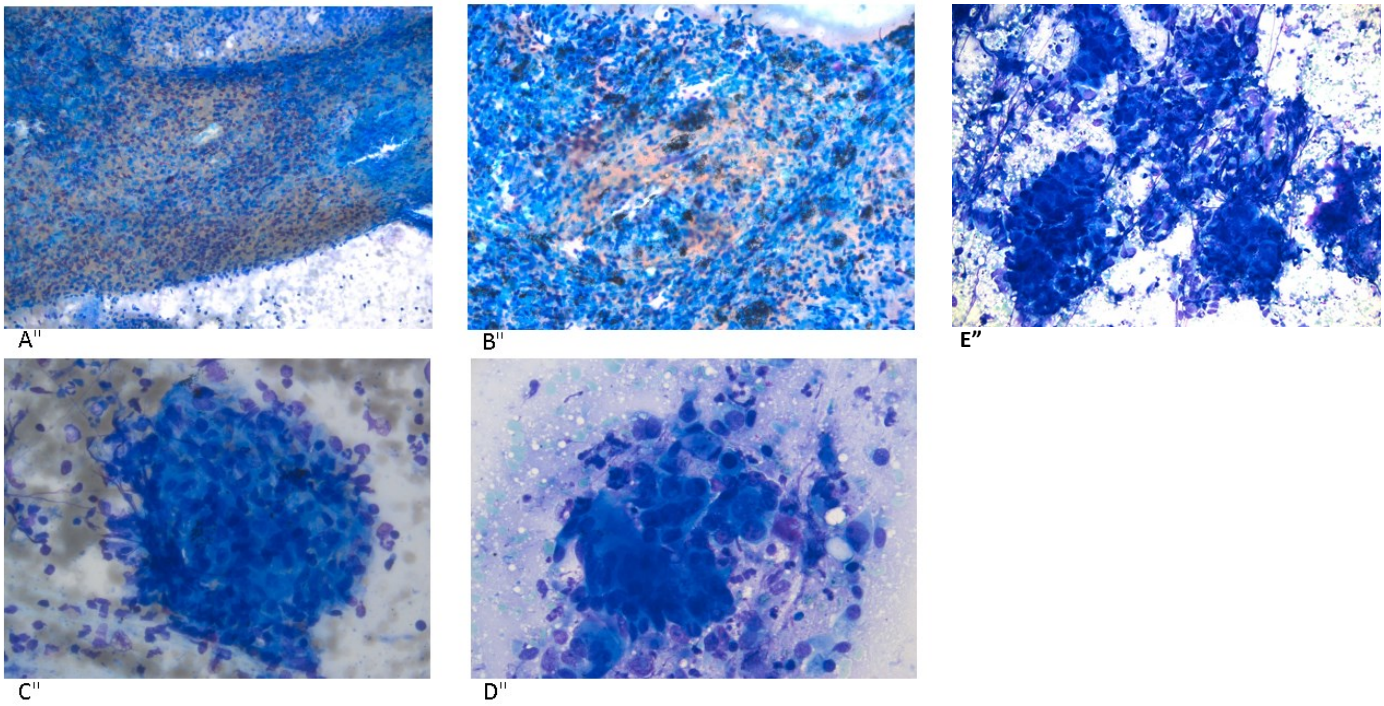

Figure legends

A. Benign lymphoid cells

B. Benign lymphoid cells and anthracosis

C. Granuloma

D. Adenocarcinoma

E. Adequate tumor for molecular studies

Humanitarian News

The World Bronchology Foundation Continues to Help Physicians Save Lives and Expand Their Bronchoscopic Practice in Guayaquil, Ecuador

In 2012, the World Bronchology Foundation (WBF) donated a flexible bronchoscope to the Hospital de Especialidades - Teodoro Maldonado Carbo in Guayaquil, Ecuador. This Hospital serves most of the workers in Guayaquil, as well as many people coming from afar to receive treatment. Despite numerous improvements in infrastructure and programs in previous years, the Hospital did not have a bronchoscope. In addition to donating equipment, members of the WBF provided a week-long bronchoscopy training program (conducted by Dr. Henri Colt & Dr. Silvia Quadrelli) in order to assist increasingly well-trained Respiratory Medicine staff. Through these efforts, the WBF started a new era in Guayaquil, an era during which the Respiratory Medicine Unit was to provide bronchoscopic diagnoses to their many patients. Today more than 30 bronchoscopies are performed by this unit every month.

Four years later and as part of a continuous growth of the public health care sector in Ecuador, the hospital obtained a new videobronchoscope from the government. The WBF had been tracking clinical activities related to the use of originally donated equipment as well as the continuous education in bronchoscopy of many members of the Respiratory Medicine Unit. As part of ongoing follow-up, Dr. Quadrelli (Vice-chair of the WABIP) spent three days in Guayaquil in December, 2016. The purpose of this trip was to help physicians of the Respiratory Medicine Unit become familiar with new equipment and assist in training staff in the performance of transbronchial biopsies, only occasionally performed before. Training consisted of discussing patient scenarios, reviewing patient-care plans, and helping doctors perform 10 procedures under supervision. As a result, Drs. Ulloa, De Janon & Figueroa gained confidence in their abilities to perform transbronchial biopsies, now incorporated into their daily bronchoscopic practice.

The WBF is proud of its ability to follow-up with equipment donation and companion training programs around the world. The excellent use made of the originally donated flexible bronchoscope to the Guayaquil group prompted a change in clinical practice, and expanded the abilities of Ecuadorean doctors to assist hundreds of patients with lung diseases. The Foundation congratulates members of the Respiratory Medicine Unit for the progress they make each year. Thanks to the efforts of charitable donations, educators, and physicians eager to improve patient care, The World Bronchology Foundation continues to be a unique channel through which respiratory care is improved for patients in many countries around the world.

Figure 1: Physicians performing transbronchial lung biopsy using a new videobronchoscope in Guayaquil, Ecuador.

**The views expressed in this article are those of the author and do not necessarily reflect the official positions of the Executive Board or International Board of Regents of the WABIP. Dr. Silvia Quadrelli is Vice-chair of the WABIP.*

Education and Training

WABIP Train the Trainer and Introduction to Flexible Bronchoscopy Program, Maceio, Brazil 2017

Maceió, Brazil, a beautiful city in the state of Alagoas, hosted the 2017 *Train the Trainer* and *Introduction to Flexible Bronchoscopy program* conducted by the WABIP in April. Eleven leading bronchoscopists and university educators from several different regions in Brazil devoted energies to learning new educational methodologies and exploring their sense of motivation and dedication to changing the educational paradigm in the country. As they became familiar with new teaching instruments such as the 4 box practical approach, bronchoscopy assessment tools and checklists, also employing role-playing exercises and applying step-by-step instructional techniques, it became increasingly obvious that change was needed. This was the second time an experience like this occurs in Brazil, allowing a new group of participants to get in touch with Bronchoscopy Education Project philosophy. Prioritizing "learner-centered" approach, models were used for "step-by-step" instructional techniques and to evaluate using competency-oriented validated assessment tools such as the BSTAT (Bronchoscopy Skills and Tasks Assessment Tool). They had also the opportunity of using checklists to assure knowledge of time out, informed consent, and moderate sedation, in conjunction with simulation scenarios and group exercises presented in the Bronchoscopy Education Training Manual.

Throughout this two and a half day seminar, didactic lectures, interactive sessions, group exercises, and key discussion points were facilitated by Henri Colt (Immediate past Chair WABIP and author of The Essential Bronchoscopy Series of books). A one-day *Introduction to Flexible Bronchoscopy* program was held for sixteen Brazilian physicians in-practice or in-training. This program provided opportunities for participants in the *Train the Trainer* program to apply their newly learned skills and ideas. Increasing interaction between students and faculty is the key to acquire cognitive, affective, and experiential knowledge.

This 2017 program was directed and organized by Master Instructor, Dr. Viviana Figueiredo (Sao Paolo), and Dr. Tadeu Lopez (Maceio). The courses were officially endorsed by the Brazilian Society for Thoracic Surgery (SBCT) and the Brazilian Society for Pneumology and Tisiology (SBPT). Guest instructors included Hugo Oliveira (certified instructor, Porto Allegre, Brazil) and Patricia Vujacich (Chair of the WABIP Education Committee, Buenos Aires, Argentina).

Each Train the Trainers Seminar is different. This time, closing remarks on active listening, learner centered approach, case based problem solving, role-playing educational techniques, presentation skills, lecturing and confidential self-assessment made it exceptional in terms of motivation. Initiatives of translating into Portuguese several materials of *Bronchoscopy International* were undertaken. So far, numerous university programs have adopted BSTAT, Step-by-Step, Practical Approach, and the Informed Consent Checklist into their training programs.

As soon as more learning materials become available in Portuguese it is our hope to expand training to other regions in 2018, and to continue to disseminate Bronchoscopy Education Project philosophy and learning tools throughout Brazil.

Figures 1 and 2 above: Learning to apply technical skill training Step-by-Step during the *Train the Trainer* program using BSTAT in an inanimate airway model (Drs. and thoracic surgeons/bronchoscopists Filipe Andrade and Spencer Camargo). Small group workshops provide students in the *Introduction to Flexible Bronchoscopy* course an opportunity to implement a common learning for secretion and mucosal findings using BSTAT.

Education and Training

Figure 3: Opinion leaders from throughout Brazil gathered to participant in the 2017 *Train the Trainers* Program hosted by Dr. Vivian Figueiredo (sitting, middle) and Dr. Tadeu Lopez (standing right, dark blue shirt). Master Instructors Patricia Vujacich (Argentina) and Hugo Oliveira (Brazil) are seated to the right of Vivian. **Figure 4:** Small group case-based practical approach and BSTAT exercise during the *Introduction to Flexible Bronchoscopy* program held in Maceio, Brazil.

XI Biennial Congress of the South American Society for Respiratory Endoscopy (ASER)

This year's congress was held in Lima, Peru hosted by ASER President Hugo Botto (Argentina) and Congress President Pedro Garcia Mantilla (Peru). A record number of participants from throughout Latin America came to Lima for three days of collegiality, friendship, and scientific engagement. The program included a sponsored Symposium on Thoracic Oncology, chaired by Dr. Silvia Quadrelli, Vice-Chair of the WABIP, with participation of known Oncologists (Brian Hunnis from Florida University and Carlos Silva from Argentina), a Peruvian interventional pulmonologist on staff at Henry Ford Hospital (Dr. Javier Diaz-Mendoza) and a Peruvian Radiation Oncologist (Gustavo Sarria).
With more than 100 attendees, congress participants included dozens of foreigners from Argentina, Bolivia, Brazil, Chile, Colombia, Spain, Paraguay, and the United States, as well as 66 Peruvians (58 from Lima and 8 from the Provinces). Faculty numbered 35 speakers and instructors of which 23 came from abroad and 12 were from Peru. Overall, 72 people attended hands-on workshops organized by Dr. Fernando Monge from the Peruvian Association for Bronchology and Dr. Javier Diaz-Mendoza, with generous support from Industry. Conference attendees unanimously say they left Lima with renewed enthusiasm and knowledge of new approaches and techniques that improve their clinical practice.
Workshop sessions included:

- Difficult Airway and Pediatric Bronchoscopy
- PDT, Percutaneous Cricothyrotomy, and Bronchoscopy Intubation
- Interactive Sessions: Informed Consent and Practical Approach exercises for cTBNA
- Mediastinal Anatomy and EBUS TBNA
- Interventional Pleura Procedures and Thoracic Ultrasonography
- Rigid Bronchoscopy Intubation, Stent Placement
- Central Airway Obstruction: Electro and Cryosurgery, including Foreign Body Removal

During the ASER's business meeting, Chile was chosen to host the next ASER XII Congress. Similar to regional bronchology association meetings in Europe and Asia, the ASER meeting will now be held every two years interposed with the Biennial World Congress of the WABIP. Also during the congress, the WABIP held a meeting for all South American regents. News from this meeting will be announced in the WABIP Newsletter, including initiatives proposed by Regents to further the adoption of Bronchoscopy Education Project materials across Latin America, and ways to enhance Regents' participation in both global and regional activities of the WABIP.

Figure 1: Dr. Javier Diaz-Mendoza teaching at the EBUS workstation. **Figure 2:** Participants and faculty at the hands-on workshops of ASER, Peru 2016.

Research

Endobronchial Ultrasound Guided Transbronchial Needle Aspiration: Better than Transbronchial Biopsy for PD-L1 Profiling in Lung Cancer

Several recent studies have raised the question of validity of Endobronchial Ultrasound Guided Transbronchial Needle Aspiration (EBUS –TBNA) in sampling for Programmed Death Ligand 1 (PD-L1). The questions spanned from the amount of cells obtained to the severity of crushed cells rendering specimen uninterpretable. It was suggested that perhaps the surgical specimens were better for its size and minimal crushing of the tissue.

Well, EBUS-TBNA has shown its dominance in tissue sampling yet again. In samples obtained from lymph nodes in the patients with lung masses who also underwent Transbronchial Biopsy (TBBX) and in some cases resection of the lesion, the number of cells obtained were significantly more than the TBBX and the amount of crushed cells were significantly less than TBBX. Hence, offering a much better quality specimen for PD-L1 analysis. The specimens obtained by EBUS-TBNA also showed a high concordance rate with the surgical specimens in both, primary tumors and metastatic diseases (1).

A recent study from Japan (1), prospectively looked at 97 patients with EBUS-TBNA specimens, 20 of whom also had TBBX done. These specimens were evaluated for PD-L1 expression as well as the morphological health of the cells (lack of crush/destruction effect). The study showed that the total number of cells obtained from EBUS-TBNA were statistically significantly ($P<.001$) more than the cells obtained from the TBBX and the crush effect on biopsy samples was also significantly lower ($P<.001$) than TBBX. The PD-L1 expression on EBUS-TBNA specimen showed good concordance rate with the TBBX, primary tumor and the metastatic nodes.

The ability of EBUS-TBNA in providing large number of high quality cells with minimal crush effect and its feasibility for broad spectrum molecular assays including EGFR (Epidermal Growth Factor Receptor), ALK (Anaplastic Lympho-Kinase) (2)(3) and the likes and now PD-L1 confirms it as a robust, minimally invasive, high yield, cheap, and quick test for lung cancer diagnosis, staging, and personalized therapy. With the growing numbers of actionable bio-markers such as above mentioned, the significance of EBUS-TBNA is limitless.

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BRONCHOSCOPY AROUND THE WORLD

Malaysia has an estimated population of 31 million. There are about 60 pulmonologists in the country.

The Malaysian Association for Bronchology and Interventional Pulmonology (MABIP) was founded on 31st December 2013 and has a membership of about 90 local and overseas members.

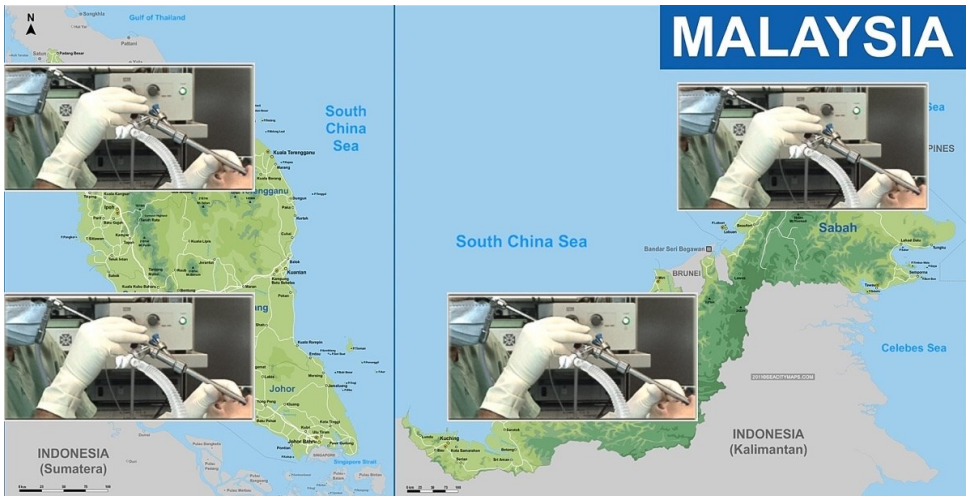
In 2007, a group of local pulmonologists organised the first National interventional bronchoscopy course. Before 2007, interventional bronchoscopy in Malaysia was patchy and there was no concerted effort to promote the expertise. Most pulmonologists then performed basic diagnostic bronchoscopy. Cases that required interventional approach would be referred to thoracic surgeons. Encouraged by the overwhelming response, the interventional course was held annually and always had excellent participation from South East Asia delegates. In 2013, it was felt that a society dedicated to interventional pulmonology was needed to promote the growth and practice in Malaysia. This annual event which started initially as a course in 2007 has now become a fully fledged scientific meeting under the MABIP.

Bronchoscopy is included in the curriculum of the local pulmonary medicine fellowship. Since 2015, the MABIP runs an annual assembly for pulmonologists specifically devoted to interventional pulmonology. It includes didactic lectures, symposia, hands-on workshops, live cases and free papers. This annual assembly is also attended by pulmonologists from all over Asia. Training in rigid bronchoscopy is offered by 4 centres, 2 in West Malaysia and 2 in East Malaysia (photo attached).

Basic bronchoscopy, pleuroscopy (including rigid thoracoscopy) and conventional TBNA are performed in most university and public hospitals in Malaysia. More than 90% of bronchoscopists are pumonologists. Some general physicians are given privileging in basic bronchoscopy. As rigid bronchoscopy is only available in 4 centres, other hospitals usually refer their cases to these 4 centres. Therapeutic bronchoscopy (debulking, airway dilatation, stent placement, electrocautery) is available in these 4 centres. Currently, only 1 centre performs additional advanced diagnostics and therapeutics (cryobiopsy, electromagnetic navigation, bronchial thermoplasty and endobronchial valves). 9 centres have linear EBUS and 1 centre has a radial EBUS and a YAP laser respectively.

The main indications for bronchoscopy in Malaysia are in the investigation of hemoptysis and lung cancer. Tuberculosis is endemic in Malaysia and therefore it is still an important diagnostic indication. Sedation is routinely performed in all institutions, in some centres using TIVA with the cooperation of anaesthesiologists for rigid bronchoscopy.

The strong support from the WABIP has allowed the MABIP to conduct its annual assembly and promote the growth of interventional pulmonology in Malaysia and Asia.



WABIP ACADEMY- WEBCASTS

The WABIP has started a new education project recently: *THE WABIP ACADEMY.* The WABIP Academy will provide free online webcasts with new and hot topics that will interest pulmonologists and interventionalists.

Current webcast topic: **Tissue acquisition for biomarker directed therapy of NSCLC**

You can reach these webcasts by using this link: http://www.wabipacademy.com/webcast/

Links

www.bronchology.com	Home of the Journal of Bronchology
www.bronchoscopy.org	International educational website for bronchoscopy training with u-tube and facebook interfaces, numerous teachiing videos, and step by step testing and assess ment tools
www.aabronchology.org	American Association for Bronchology and I nterventional Pulmonology (AABIP)
www.eabip.org	European Association for Bronchology and Interventional Pulmonology
www.chestnet.org	Interventional Chest/Diagnostic Procedures (IC/DP) NetWork
www.thoracic.org	American Thoracic Society
www.ctsnet.org	The leading online resource of educational and scientific research information for cardiothoracic surgeons.
www.jrs.or.jp	The Japanese Respirology Society
sites.google.com/site/asendoscopiarespiratoria/	Asociación Sudamericana de Endoscopía Respiratoria

UPCOMING EVENTS

Introduction to Flexible Bronchoscopy & Train the Trainers (Australia)

Date 1: May 10-12, 2017
Venue 1: Macquarie University Hospital Sydney, Australia
Date 2: May 17-19, 2017
Venue 2: Royal Brisbane and Womens Hospital, Australia
Program Directors: David Fielding, MD and Jon Williamson, MD
Program Type: Bronchoscopy courses - Introduction to Flexible Brchoscopy & Faculty Development Program ("Train the Trainers")

Introduction to Flexible Bronchoscopy (La Habana, Cuba)

Date: June 9-10, 2017
Venue: Hospital Neumológico de la Habana. Universidad de Medicina Salvador Allende. La Habana, CUBA
Program Directors: Manuel Sarduy, MD and Patricia Vujacich, MD
Program Type: Bronchoscopy course - Introduction to Flexible Bronchoscopy

EBUS and Advanced Diagnostic Bronchoscopy: The Sixth Year (MD, USA)

When: July 20-21, 2017
Where: Hyatt Regency Chesapeake Bay, Cambridge, MD
Program Director: Lonny Yarmus, DO, MD
Program Type: Educational seminar (postgradua,te may include physicians in practice and trainees)
Hands-on workshop, Conference (didactic lecture 3rd Annual MABIP Assembly (Malaysia))

3rd Annual MABIP Assembly (Malaysia)

When: 3-5 OCTOBER 2017
Where: LE MERIDIEN PUTRAJAYA, MALAYSIA
Program Director: ROSMADI ISMAIL, MD
Program Type: Hands-on workshop, Conference (didactic lectures)

Asian-Pacific Congress on Bronchology and Interventional Pulmonology 2017 (Indonesia)

When: November 2-4, 2017
Where: Ayodya Nusa Dua Bali, Indonesia
Program Director: Wahyu Aniwidyaningsih, MD, PhD, MD
Program Type: Educational seminar (postgraduate may include physicians in practice and trainees)
Hands-on workshop Conference (didactic lectures)