

# WABIP Newsletter



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## Guest Opinion/Editorial

### European standardization prospective for training

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Interventional Pulmonology (IP) is experiencing a rapid evolution of new technologies. Several international projects are developing standardized training programs, capable of establishing an Ultra-Specialty discipline (beyond pulmonary and critical care fellowships, to be organized jointly with volume expert centres) with validated metrics for trainee competency assessment.<sup>1</sup> A gradual progression from theory to practice is envisaged, using new teaching techniques, including live sessions, low and high fidelity simulation, non-technical skill training, flipped classroom models and problem-based learning (PBL) exercises – to ensure that trainees' skills are enhanced and updated. Europe has a long tradition in IP, with e.g. Dumon and Cavaliere in rigid bronchoscopy, Jacobaeus and Boutin for thoracoscopy, Becker in EBUS: their schools are still the centers of excellence for training in Europe. While the United States has developed adequate training standards and offers over 30 IP Fellowships,<sup>2</sup> in Europe training program standardization is patchy. The European Respiratory Society (ERS) organizes since 2006 an annual board certification in Pneumology, the "Hermes project", to standardize training within different disciplines of respiratory medicine, but not yet for IP<sup>3</sup>. The ERS does however organize many advanced training courses in IP in France, Greece, Italy, Germany and Denmark and, since 2016, a professional certification of competence in EBUS held mostly in Heidelberg, Amsterdam and

Copenhagen.<sup>4</sup> The ERS working group on IP plans to extend this experience to other skills and procedures, such as thoracoscopy and Advanced Thoracic UltraSound (TUS). Furthermore, individual European countries hold advanced weekly courses or "Boot Camps on IP" and structured Master, e.g. 1 year (500 hours) in Italy, 2 years (130 hrs) in France or in Spain. If a trainee is interested in IP in Germany, s/he receives IP training in the endoscopy unit for 1 year in the best centers (e.g. Heidelberg, Essen, Hemer or Gauting), using a simulator for the first few weeks and close supervised hands-on training. In the UK, trainees keep a logbook for 5 years, to be reviewed and signed off periodically by their supervisors; in the Manchester region, an online based "Pulmonary passport" has been introduced, which includes all procedures (EBUS, Thoracoscopy, etc.). But at present we do not have a single, common curriculum throughout Europe, nor is a certificate of competence in IP mandatory in Europe, while a diploma is often required when applying for a post. In Italy over the years we have felt the need to standardize our training program, for the 1-year Master and also in lifelong training programs, so that trainees can gradually achieve full competence in the majority of IP skills. The teaching faculty on our Masters worked on a draft standardized training program, involving the participating centers: this can guide physicians who want to improve their own and assist those organizing IP training programs. The document includes a general part on Core Curriculum contents, innovative training methods and technical and non-technical simulation, and a Syllabus describing the basic issues and skills for each knowledge base and procedure of IP (flexible bronchoscopy and basic sampling techniques, interventional endosonography (EBUS, EUS, EUS-B), bronchoscopic navigation and EBUS-radial probe, transbronchial cryobiopsy, transthoracic pulmonary biopsy, rigid bronchoscopy and related procedures, sedation in interventional pulmonology, pleural procedures, paediatric bronchoscopy, bronchoscopy in anaesthesiology and ICU, bronchoscopy

in thoracic surgery, emergencies in interventional pulmonology). For each IP procedure we have included: prior experience requirements, knowledge, core basic skills, a check list for procedural steps for practical training, resources for hands-on practical training and tools for quantitative, qualitative and outcomes assessment. The whole document is published in full on the European Association for Bronchology and Interventional Pulmonology (EABIP) website. It should be considered a starting point that will evolve over time. These standards need to be reviewed and approved by national and International Scientific Societies and Healthcare Institutions: the goal is to improve, disseminate and incorporate them in healthcare programs. In conclusion, there is a great need for a road map leading to European standardization in IP, hopefully a task group funded by the ERS/EABIP to come up with a solution applicable across Europe, so as to develop an official certification recognized in the EC (and in post-Brexit UK), as we have for Specialty Fellowships.<sup>5</sup>

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# Technology Corner

## Robotics in Thoracic Surgery: Myths and Realities



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**Introduction:** Robotic Thoracic Surgery (RTS) has emerged as the most advanced platform for minimally invasive access to the chest. RTS offers multiple advantages over traditional Video Assisted Thoracoscopic Surgery (VATS), including three-dimensional visualization, increased degrees of freedom of motion, better ergonomics, and enhanced precision<sup>1</sup>. Over the past decade, the proportion of lung resections that are being performed by RTS has risen steadily and now comprises close to 10% of all operations performed in the United States<sup>2,3</sup>. Although RTS is being rapidly adopted, there remains significant equipoise about its clinical value and associated costs. In this article, we address 3 myths and realities around RTS compared to VATS.

**Background:** The first myth is that RTS lung resection is associated with better clinical outcomes when compared to VATS. The second is that RTS Lobectomy is a better lung cancer operation than VATS Lobectomy because it allows for better lymph node dissection and nodal upstaging. The third is that, considering the high capital and disposable expenses for the robotic platform, RTS is more expensive than VATS.

**Clinical Application:** Multiple studies, including large database analyses and retrospective comparative series, have failed to show any advantages in clinical outcomes such as blood loss, length of hospital stay, or postoperative morbidity and mortality when RTS is compared to VATS<sup>4-7</sup>. A recent systematic review of the literature confirmed those findings and has demonstrated that there are no significant differences in the rates of conversion to thoracotomy, prolonged air leak, blood loss, or postoperative pain between RTS and VATS<sup>3</sup>. There is likely no difference in short term postoperative outcomes between RTS and VATS. The ergonomic advantages of the robotic platform have driven the notion that a better lymph node dissection, and subsequently improved nodal upstaging, can be achieved with RTS lobectomy. This notion has been challenged in the general lung cancer population by the ACOSOG Z0030 trial which demonstrated similar survival between lymph node dissection and lymph node sampling at the time of lobectomy<sup>8</sup>. Specifically concerning RTS lobectomy, it was demonstrated in a recent retrospective cohort study that the rates of nodal upstaging are not better than what is observed in VATS lobectomy<sup>9</sup>. Although this study was not specifically powered for survival, the results suggest that there is no significant survival difference between the two techniques. There is likely no difference in the rates of nodal upstaging between RTS and VATS. The robotic platform is associated with high upfront capital costs (between \$2-3 million) and ongoing maintenance costs (\$150,000 to \$250,000 per year). A recent matched analysis of the PREMIER database comparing RTS to VATS lobectomy showed a higher cost to RTS operations without any added benefit in terms of short term outcomes<sup>5</sup>. However, a repeat analysis of the same database, published recently by different authors, was able to measure a significant decrease in length of stay, complications, and conversions to thoracotomy, thereby justifying the added cost of the robotic platform<sup>10</sup> (this paper was not included in the systematic review discussed above). Another study by a high volume robotic centre has actually reported a cost advantage to using the robotic platform, with a measured accounting profit of \$4,750 per patient<sup>11</sup>. It is important to note that all studies which compare the cost of RTS to VATS do so in a retrospective fashion and calculate only dollar costs. This type of analysis is by definition incomplete and does not account for utility, quality of life, and opportunity cost. To date, there has been no cost-utility analysis (which is the accepted gold standard in determining cost-effectiveness) comparing RTS to VATS in a prospective fashion. A prospective blinded randomized controlled trial comparing RTS to VATS is underway, and scheduled to complete accrual in 2020. The primary outcome of this trial is cost-utility, and it will provide useful information to healthcare payors about the feasibility and sustainability of RTS in the long-term. It is unknown whether RTS is more expensive than VATS, and until prospective cost-utility trials are published, this will remain a point of contention.

**Conclusion:** Robotic Thoracic Surgery is an advanced platform for minimally invasive resections that will undoubtedly usher a new era of innovation in thoracic surgery. Further research is required to determine its role and cost-effectiveness.

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## Airway Complications After Lung Transplantation

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**Introduction**

Lung transplantation presents a unique challenge when compared to other transplanted organs for a variety of reasons. Dual blood supply with a lack of a vascular re-anastomosis, a contaminated site, medication, physical factors, as well as surgical techniques all play a role in development of airway complications (AC). Airway necrosis, dehiscence, stenosis, malacia and infections collectively make up the spectrum of airway complications and have been a significant and persistent source of morbidity and mortality since the original lung transplant. The reported rate of anastomotic complications ranges from 1.6% to 33%, although most agree with an incidence of approximately 15%-18%.<sup>1</sup> Many potential reasons exist for this wide range; the lack of a standardized grading system may contribute significantly. Approximately 35% of patients with a previously treated airway complication will experience a second, and the chance of three or more after the second is approximately 70%.<sup>2</sup> Frequent office visits, the need for procedures, hospitalizations, and additional medications can be a financial and time burden and minimize the perceived benefit of transplant.

The recognition and management of airway complications varies based on the time from transplant, location of the lesion, and severity. Institution specific protocols also account for variance in surveillance, diagnosis, and management. Complications can be classified temporally (early or late), by cause (ischemia, infection, iatrogenic, or idiopathic), anatomically (anastomotic or post-anastomotic), or descriptively (necrosis, dehiscence, fistula, infection, stenosis, granulation tissue or malacia). This article reviews a brief history of transplant airway complications, transplant-specific anatomy and surgical technique, risk factors for AC, classification of AC and management strategies for the various types of complications.

**Risk Factors**

The etiology of AC is undoubtedly multi-factorial. Surgical factors and ischemia of the donor bronchus was initially felt to be primary driver, however more complex interplay between donor and recipient characteristics, surgical technique, post-operative recovery, infections, and medication selection play a role.

Risk factors for the development of AC have been identified; including procurement after extended donor mechanical ventilation (50-70 hours) as well as taller recipients.<sup>3</sup> Taller recipients are likely related to surgical technique, as the airway is telescoped with intussusception leading to entrapment of organisms and an increased ischemia risk.

**Indications and Planning:****Necrosis and Dehiscence**

Post-transplant airway necrosis related to ischemic injury is common. The mucosal slough can extend from the anastomosis to lobar or segmental levels (Figure 1, 2). Necrosis typically resolves by the sixth week post-transplant and dehiscence occurs when normal healing fails (Figure 3). Necrosis and dehiscence represent a continuum from healing to catastrophic airway complications. True dehiscence is uncommon but rates are reported from 1- 24%, the lack of standardization complicates this.<sup>4</sup>

Bronchial dehiscence is often seen at surveillance bronchoscopy but must be considered with a prolonged air leak, spontaneous pneumothorax, failure to wean, or sepsis. Chest radiographs are unreliable. Computed tomography may be helpful showing bronchial wall defects, airway debris, or extra luminal air consistent with dehiscence but bronchoscopy remains the gold standard.

A full review of medications is too detailed for this brief piece but Sirolimus merits discussion. It is a potent immunosuppressive and antiproliferative with less renal impairment, appealing for lung transplantation. Catastrophic airway complications occurred when used in the early postoperative period. Two separate studies of sirolimus in de novo lung transplant patients describe severe wound-healing complications

with dehiscence, one resulting in a fatal event. Present recommendations are to delay using Sirolimus until complete bronchial wound healing, typically 90 days after transplantation.<sup>5,6</sup>

Mucosal slough without necrosis of the bronchial wall may respond to a conservative approach or surveillance and as needed debulking. Often antibiotic or anti-fungal regimens, including inhaled therapies, are initiated. When healing fails and dehiscence occurs, either a surgical or bronchoscopic intervention is required. Both have associated morbidity and mortality. Surgical options include reanastomosis, flap bronchoplasty, and rarely retransplantation. Bronchoscopic techniques include cyanoacrylate glue, growth factors, and autologous platelet-derived growth factors; however the overall success is poor.<sup>7</sup>

A novel technique of placing an uncovered self-expanding metal stent (SEMS) temporarily to facilitate healing exists. This technique utilizes the tendency for SEMS to initiate granulation tissue formation. The SEMS is deployed across the dehiscence and once granulation tissue and epithelialization occurs a stent exchange (if the defect is still present) or removal (if healed) is performed, typically within a few weeks (Figure 4). Mean time to stent removal was 37.5 days.<sup>8</sup> Precise placement and removal make this method challenging with the potential to extend the injury. Close surveillance is recommended given the tendency for stenosis or malacia to occur at or distal to the site of prior dehiscence.

### **Fistula**

Bronchial fistulae are challenging but fortunately rare and can occur as communications between the airway, pleura, mediastinum, or vasculature. Fistula may present as dyspnea, sepsis, pneumothorax, subcutaneous emphysema, or a persistent air leak typically in the setting of dehiscence. Management is similar to that of anastomotic dehiscence. Success depends on the location and size of the defect.

Bronchovascular fistulas are rare and often fatal. Erosion from any infection, particularly aspergillus, is most typical. A herald bleed must be evaluated quickly. Case reports of surgical management with pneumonectomy (if bilateral transplantation), bilobectomy, or fistula resection and reconstruction have been successful.<sup>9</sup>

### **Anastomotic infections**

Infectious complications are common, particularly in the first 3 months, and will be seen in nearly seventy-five percent of transplant recipients with bacterial pneumonia being most common. Immunosuppression, ischemic complications, impaired mucociliary clearance, impaired lymphatic drainage, poor cough reflex due to denervation, and the direct communication of the allograft with the environment all play a role.<sup>10</sup> Pre-transplant colonization is also common.

Infections at the anastomosis are a complication but more importantly are often the precursor to issues covered later. Diagnosis usually occurs at bronchoscopy. Inflammation, ulceration, or pseudomembranes are often seen along the airway and are treated with debridement and antibiotics. Protocols vary by institution and include systemic and inhaled regimens with voriconazole, itraconazole, and inhaled amphotericin commonly used.

### **Bronchial Stenosis**

Bronchial stenosis is the best described complication; with reported rates ranging from just over 1% to as high as one third.<sup>1</sup> They can be anastomotic or distal. (Figure 5). Non-anastomotic stenosis can be technically challenging as they can extend into segments. The bronchus intermedius is the most commonly involved non-anastomotic site, referred to as vanishing bronchus intermedius syndrome (VBIS).<sup>11</sup>

The etiology may involve infection, inflammation, or ischemia and can result in remodeling. Patients present with dyspnea, drop in spirometry, cough, wheeze, or recurrent episodes of pneumonia. Chest radiography can be the first indicator with luminal compromise or atelectasis. CT of the chest can reveal fixed bronchial narrowing. Diagnosis by flexible bronchoscopy remains the gold standard.

The management of bronchial stenosis often requires a stepwise, multimodality approach. Successful techniques include dilation, ablation, and stent placement. Dilation can be by balloon or rigid dilation. Dilation by balloon is often the first therapeutic maneuver performed and provides excellent results with relief of symptoms and improved spirometry. The stenosis often recurs after dilation, but repeated balloon dilations may be the only intervention required in 26% of cases.<sup>12</sup> While no studies have compared methods, balloon dilation has several advantages. It can be performed via flexible bronchoscopy and under conscious sedation. Balloons come in multiple sizes and lengths allowing for specific selection. Lastly, balloon dilation allows for a rapid increase in the size of the balloon rather than repeated upsizing of the rigid bronchoscope. Rigid dilation has several advantages over balloon bronchoplasty such as expense (offset by the need for general anesthesia), direct visualization during dilation and uninterrupted ventilation. Perhaps the largest benefit of the rigid bronchoscope is the ease of stent placement if a silicone stent is to be placed.<sup>13</sup>

In cases where a focal web-like stricture is found, a mucosal sparing technique such as electrocautery or laser should be employed followed by dilation. Techniques reported include those previously reported including: cryotherapy, electrocautery, argon plasma coagulation, laser, brachytherapy, or photodynamic therapy.<sup>13</sup>

Topical applications of mitomycin-c or submucosal applications of steroids have also been used. There are no controlled trials of these interventions, however literature supports that the use of these therapies may potentially delay the time to re-stenosis.<sup>14</sup>

If the stenosis is recurrent, stenting may be required. This is a difficult decision as stent complications can be significant. The technical aspects of a complicated anastomosis has led some to favor placement of self-expanding metal stents (SEMS) However, while SEMS provide immediate relief as well as some protracted success they are fraught with long-term complications and must be carefully considered.<sup>7,8</sup>

The issues with SEMS make silicone stents generally favored for the management of benign stenosis as they have advantages of the ease of repositioning, removal and reduced granulation tissue formation (Figure 6). They are more prone to migration and require rigid bronchoscopy for placement and removal but can be customized to length, diameter or “notched” on site (Figure 7). Data suggests no increase in complications of customized stents for complex airway diseases.<sup>15</sup>

Issues with stent placement and complications have led to the development of new technologies, including 3-D printed or biodegradable stents (BDS). Biodegradable stents are well tolerated and completely dissolve after months. In one prospective study of BDS, eleven stents were placed in ten patients. All had improved spirometry and airway patency was achieved in 9/11 at 1-year follow-up with complete degradation after 141 days.<sup>16</sup> 3-D reconstructed stents may play a role in transplant airway complications as they allow for a personalized fit.

In patients with recalcitrant stenosis alteration of immunosuppression with the addition of sirolimus can be considered (once airway healing has occurred). A retrospective review of 10 patients with recurrent stenosis reported 8 of 10 patients achieved airway patency within 3 months and 7 of 10 had a significant response within the first month of starting rapamycin.<sup>7,8</sup>

A multidisciplinary approach is ideal and if endoscopic therapy fails, a surgical approach should be considered. An invasive approach is risky but sometimes required, with bronchial anastomosis reconstruction, bronchoplasty, sleeve resection, lobectomy, pneumonectomy, and re-transplantation all described.

### Excessive Granulation Tissue

Occluding endoluminal granulation tissue occurs in up to a quarter of lung transplant recipients, most commonly at the anastomosis. Airway infection, particularly with aspergillus, can exaggerate this.<sup>17</sup> Progressive dyspnea, cough, difficulty clearing secretions, post-obstructive pneumonia, or hemoptysis may be the presenting symptoms. Reduced spirometry or a chest CT showing obstructive granulation tissue may be seen but bronchoscopy remains the gold standard.

Forceps can remove granulation tissue easily, but in some cases the beveled edge of the rigid bronchoscope is required to quickly restore patency. Heat or cold modalities as well as the micro-debrider can be used to restore patency. A superior safety profile, the cryosensitivity of granulation tissue, excellent hemostasis and the ability to use around stents without the risk of ignition even in high concentrations of oxygen make cryotherapy an appealing option. APC, electrocautery, and laser ablation have a long history of successful management. High dose rate (HDR) endobronchial brachytherapy, or photodynamic therapy have also been reported but should be used with extreme caution as serious complications including fatal hemoptysis, have been described.<sup>18</sup>

Endobronchial application of antifibrotics (Mitomycin) or injection of anti-inflammatory agents has been described in the management of granulation tissue with limited success. Although randomized trials are lacking, anecdotal success and excellent safety profile encourage continued usage. Bronchial stents have been reported to improve patency in refractory cases but can promote granulation tissue. Stent placement is complicated by granulation in 12 to 36% of patients.<sup>19</sup>

### Tracheobronchomalacia

Malacia of the airway presents in a myriad of ways. A “barking” cough, difficulty clearing secretions, or a drop in spirometry more marked during expiration are typical. Significant malacia is defined as luminal narrowing of 50% or more on expiration (Figure 8).<sup>20</sup>

The management is extrapolated from the non-transplant population. Aggressive pulmonary hygiene, mucolytics, and non-invasive positive pressure ventilation are tried first. Stenting may improve spirometry if medical management fails. Stenting should be carefully considered.<sup>11</sup> If pursued, silicone stenting is typically preferred by experts with close surveillance and often a stent-free trial after 6-12 months.

### Quality Control: Classification of Airway Complications

A potential reason for the wide range of reported AC may be the lack of a standardized, well-accepted grading system. Early grading systems relied on bronchoscopic inspection with some excellent findings including prediction of subsequent anastomotic complications; however they were subjective and captured only early complications. This shortcoming was later addressed. Subsequent additions included bronchial strictures, suture status, and presence of granulation tissue, dehiscence or malacia. The most recently proposed system, by Dutau and colleagues known as the MDS grading, approaches AC in a slightly different manner. Unique to this approach is the ability to include the extent of the abnormalities, from the suture line to more distal lobar and segmental levels. The M designation describes the macroscopic appearance ranging from normal healing to include cartilaginous protrusion, granulation or necrosis. The D classification describes airway diameter and the S designation assesses the suture line for dehiscence and ranges from the absence to a full dehiscence.<sup>21</sup>

A universally accepted classification system is the first step allowing for scientific study and consistent reporting to truly define the incidence, prevalence, morbidity and mortality. A taskforce of the International Society of Heart and Lung Transplant has recently completed such a classification system with results soon to be published.

### Bronchial Artery Revascularization

Routine lung transplantation does not reestablish bronchial artery circulation leaving the anastomotic site dependent on retrograde flow. Anastomosis of bronchial arteries has been successful with promising short and long term results. A pilot study at the Cleveland Clinic looked at a series of 131 lung transplant patients who underwent BAR with an overall success rate of 90% including a 95% success in bilateral transplants. Bronchial artery patency was associated with uniformly normal airway healing. The 5 and 10-year survival for bilateral lung transplant was superior for BAR patients. A higher risk of bleeding was seen, not affecting safety.<sup>22</sup> While encouraging, multi-center studies are needed to establish these benefits.

### Summary

In patients with advanced pulmonary disease, lung transplantation can improve survival and quality of life. However, airway complications remain a major obstacle with associated morbidity and mortality. Patients with AC need additional visits, procedures and adjustments of medications. The increased need for care in an already complicated regimen can lead to a lower perceived improvement in quality of life. This can be discouraging, costly, and time-consuming. Recent improvements in donor and recipient selection, surgical technique, perioperative management, and immunosuppression have decreased the incidence of AC.

The management of lung transplant associated airway complications is complex. Many therapeutic options exist and there is no strong data to suggest one is superior. Management is best delivered in a multidisciplinary approach performed by individuals experienced in the above techniques with an understanding of the intricacies of the post-transplant patient.

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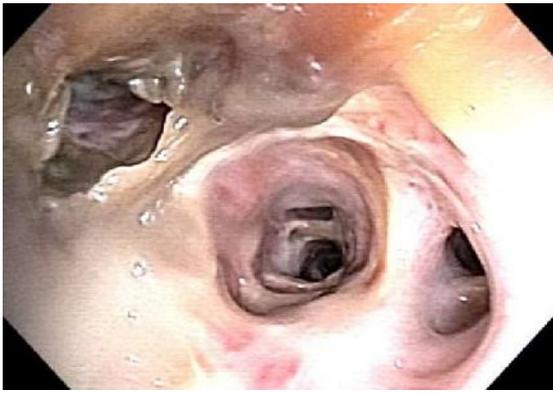


Figure 1: Necrosis and stenosis of the distal RBI and RML

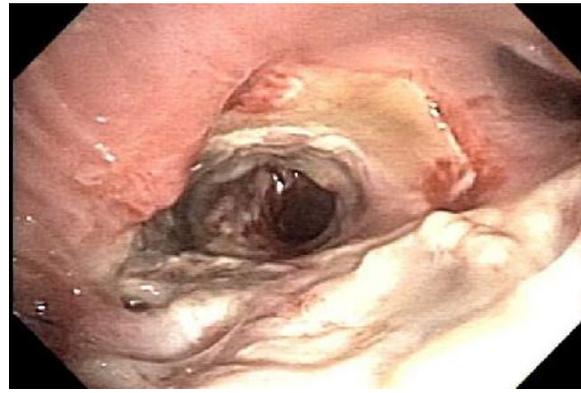


Figure 2 : Mild necrosis of the right mainstem anastomosis



Figure 3 : Dehiscence of the right anastomosis, note the loose sutures and separation of the donor bronchus

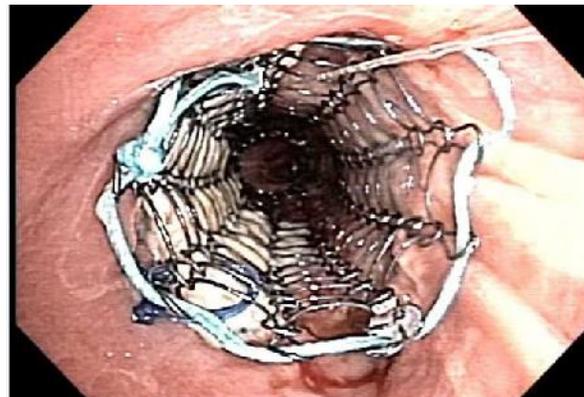


Figure 4 : SEMS placed to initiate granulation tissue for a dehiscence



Figure 5 : Right Bronchus Intermedius stenosis

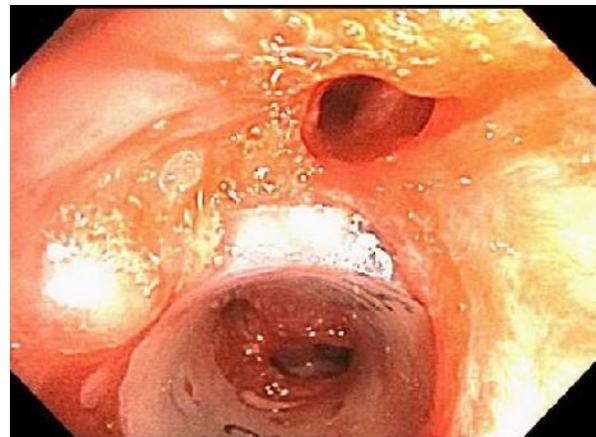


Figure 6 : Right mainstem stenosis after dilation and stent placement



Figure 7: Customized stent placement ; note the notch for the RUL stent

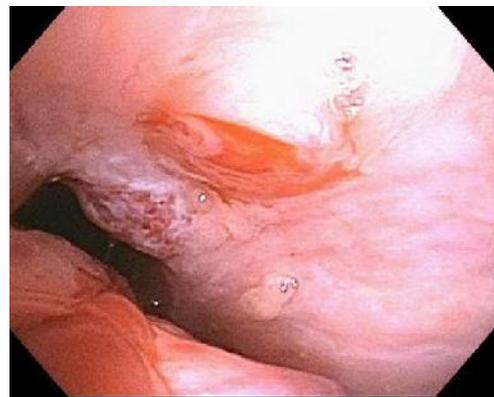


Figure 8 : Malacia of left mainstem

# Humanitarian News

The “Proyecto Horizonte” is an initiative between the World Bronchology Foundation and SEPAR Solidaria, born in 2015. Between the 12th and 26th of November, the “Proyecto Horizonte Honduras 2017” resumed its activity. Dr. Manuel Núñez, Dr. Enrique Cases, and nurse Merce Cuña, travelled to Tegucigalpa (Honduras) to accomplish 5 objectives, which were 1) to support the apprenticeship of future pulmonologists in Honduras, 2) to make a Second Theoretical and Practical Centroamerican Course with the engagement of pulmonologist from countries near Honduras, with the aim of updating the pleural and bronchoscopic techniques, 3) to attend to patients, 4) to donate an ultrasound machine to the “Instituto Nacional CardioPulmonar”, and 5) to control the donated material in Nicaragua one year ago.

Specialists from Honduras, Guatemala, San Salvador and Panamá took part in the Second Theoretical and Practical Course of Interventionist Pulmonology. The experience was rewarding and the level of the course, with the involvement of specialist from Honduras, was very high. The practical part helped for the apprenticeship of the assistants and was highly valued. It is important to highlight the high level of participation in the nursing sessions -a constant in this Centroamerican Course-, which shows that nursing raises concerns and affirms the necessity of training and stimulating it. The work and efforts of Merce Cuña during the course and in the Instituto asistencial was very outstanding and appreciated.



# Humanitarian News

During our stay in the Instituto, we actively participate in the different assistance activities, complex procedures and formatives and clinic sessions that were organized. The contributions made were highly valued. We have to highlight again the activity developed by Merce Cuña, above all in encouraging the nursery, and the work of Manuel Cuña in forming future pulmonologist in Honduras, as well. At the same time, it is important to appreciate the facilities that Dra Suyapa Sosa gave to us, not only by letting us develop our activity, but also by bringing us the opportunity of constantly being with pulmonology's residents.

In the first visit to Honduras, because of the high quantity and complexity of pleural pathology in the medical centre, it was consider that there was a priority need of an ultrasound machine for studying the pleural pathology. Because of this, SIMMEDICA donated an echograph with a high-resolution linear and mini-convex transductcers. We would like to thank the complete willingness of SIMMEDICA to donate material for the Proyectos Horizonte, it has become a key contributor in these projects.

Controlling the donated material its fundamental, not only to know that it remains in good conditions and that is being correctly used, but also to let the responsible people of these material feel that World Bronchology Foundatios and Separ Solidaria the continues supporting them. Because of that, a visit to Chinandega (Nicaragua) was made, and it was checked that the donated bronchoscope in September 2016 was being used correctly and that remained in good conditions. It is important that the interns of SEPAR Solidaria in Nicaragua resort to this hospital, where Dr. Amaya, who is the head of the pulmonology department in the hospital, will receive them cordially.

The use of the allowed material in the Hospital Militar de Managua it is being very useful for the patients. The first results of the transbronchial lung cryobiopsies and central airway obstruction recanalization, have been submitted. Moreover, the pulmonologist in charge of the department, Dr. Christian Sánchez, stayed for three weeks in Spain –Fundación Jimenez Díaz and Hospital Universitario y Politécnico La Fe- with a grant from the WBF and Asociación Española de Endoscopia Respiratoria (AEER), in order to improve its knowledge in interventionist pulmonology procedures. Dr. Christian feels highly inspired, and is conscious that the development of the interventionist pulmonology depends to a large extent on him.

This Proyecto Horizonte its possible thanks to many people. Between them, can be named, Dr. Julio Ancochea, who is sensitive and committed with this project, which began in 2015. Thanks to him, SEPAR Solidaria has facilitated the necessary framework to make the Proyecto Horizonte known in all Centre America. Javier, Luisa, Harold and Gerardo, who are the future pulmonology residents in the Instituto Nacional CardioPulmonar, who are enthusiastic for learning, and who are always sensitive and warm with us. Dra. Suyapa Sosa, who is the core of this group. Without her, the Project would have been impossible and pointless. Drs. Judy Enamorado, Carlos Alvarado, José Castro, Leslie Padilla, Elías and the nurse Walleska and other persons who have help and encourage us. To all of them, thank you very much, we always bring back home more things than what we leave there. Finally, recognizing the generosity, kindness and willingness of SIMMEDICA, without them it would be really difficult to donate material of good quality, with such an efficient cost.

*\*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. Enrique Cases is the chair of the World Bronchology Foundation.*

# Education and Training

## Bronchoscopy Education Project Activity in Belgrade, Serbia

In September 2017, Dr. Henri Colt, with Doctors Maria Simon (Romania) and Mihai Olteanu (Romania), conducted a Train-the-Trainer program with its attached Introduction to Flexible Bronchoscopy Courses for physicians in the Balkans. Organized and hosted by Dr. Spasoje Popevic (Belgrade, Serbia) and the University Hospital of Pulmonology, Clinical Center of Serbia in Belgrade, the program included invited leaders from Serbia, Moldavia, Bulgaria, Macedonia, and Bosnia. These experienced bronchoscopy teachers came together to discuss competency-oriented practices, and to enhance their teaching skill using checklists, assessment tools, and case-based 4 box approach exercises in a multidimensional instructional program. Role-playing exercises were used to practice individualized, learner-centric teaching techniques, and several technical skill stations comprised of airway models were helpful for learning to teach inspection bronchoscopy using our time-tested step-by-step techniques.

During the Introduction to Flexible Bronchoscopy course (IFB), trainers were able to apply their newfound skills and increased understanding of the Bronchoscopy International/WABIP philosophy. They then shared cognitive, technical, experiential, and affective knowledge with more than 20 IFB course participants. Participants in the IFB program were, for the most part, junior specialists from local and regional medical centers, although several surgeons from Serbia were also present, providing helpful insights and clinical experience.

Dr. Spasoje Popevic, now a BI Certified Instructor, provided key leadership during the entire program. In addition to enhancing teaching skills, trainers discussed educational philosophies, and ways to overcome existing obstacles to implementing the widespread use of assessment tools and checklists in the Balkans. An exciting “spirit of collaboration” immediately ensued during the program, and enthusiastic Serbian leaders are already well into the process of translating *The Flexible Essential Bronchoscopist* and several checklists and assessment tools. The Informed Consent summary page (downloadable from [www.bronchoscopy.org](http://www.bronchoscopy.org)) is already translated and being distributed with great success. Meanwhile, leaders from Macedonia, Serbia, Romania, Bulgaria, Moldavia, and Bosnia are moving forward with establishing competency-oriented training guidelines to complement the apprenticeship models currently in place in their respective pulmonary societies.

Once more, a direct result of this training program was increased collaboration and true friendship among colleagues who share a common interest, colleagues who are able to discard personal egos in order to work together for a greater good, and ultimately, greater benefit to their patients who will may no longer suffer from the consequences of procedure-related training. The Bronchoscopy International team and WABIP wish to congratulate all these leaders, who, as proactive agents of change, are consolidating the educational paradigm shift from a traditional apprenticeship model to a competency-oriented model using assessment tools, checklists, simulation, and a multidimensional, learner-centric approach to skill development.



**Figure 1:** Leaders from Serbia, Bosnia, Moldavia, Bulgaria, and Macedonia discussing definitions of patient suffering and roles for competency-oriented training at the Belgrade Train-the-Trainer seminar



**Figure 2:** Doctor Marija Zdravaska from Macedonia using a (instructor) hands-off student (hands-on) approach to teaching bronchoscopy step-by-step while working with participants in the Belgrade Introduction to Flexible Bronchoscopy



**Figure 3:** Drs. Maria Simon (Romania), Henri Colt (USA), Spasoje Popevic (Serbia), and Mihai Olteanu (Romania) were faculty at the Trainthe-Trainer program held in Belgrade, Serbia in September, 2017.



**Figure 4:** Train-the-Trainer and Introduction to Flexible Bronchoscopy Course participants in Belgrade

# WABIP NEWS

**Call for Nominations for Next WABIP Vice-Chair** – Nominations for the next WABIP Vice-chair are still open. The Vice-chair is a voting member of our Executive Board and is entitled to all rights and privileges therein. This member shall carry out leadership responsibilities and tasks in accordance with the principles and objectives of the WABIP to assure the continued growth of our organization. The current Vice-chair will assume the position of Chair immediately after the current Chair's tenure. Send us your nominations at <https://www.wabip.com/news/323-wabip-vice-chair-2018>

**2024 WCBIP Host Applications** – This is a reminder that applications for hosting the 2024 WCBIP congress are now open. This is an excellent opportunity for you and your colleagues to host and organize WABIP's biennial scientific event in your city. Visit the link to read more about the application process <https://www.wabip.com/news/324-call-for-2024-wcbip>

**New Board of Regents Members** – We are pleased to welcome Dr. George Eapen (AABIP) and Dr. Luis Gonzalo Ugarte Fornell (Ecuador IP Society) on the WABIP Board of Regents (“BOR”). With now 57 members, the BOR will meet in Rochester this June to take part in and vote on the next WABIP Vice-chair, the 2024 WCBIP host site and other important WABIP business.



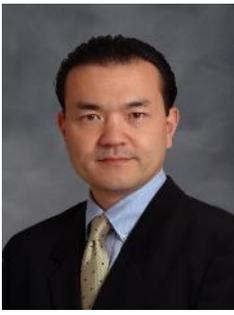
Left: Dr. George Eapen (AABIP); Right: Dr. Luis Gonzalo Ugarte Fornell (Ecuador IP Society)

**Member Society Spotlight** - Since its founding in 1992, the *American Association for Bronchology and Interventional Pulmonology (AABIP)* has been a unifying source for information regarding the fields of Bronchology and Interventional Pulmonology. Over the last few years, the AABIP has achieved significant milestones, including having the Journal of Bronchology and Interventional Pulmonology become indexed on Index Medicus, having IP Fellowship programs become part of the National Residency Match Program, running twice-yearly scientific symposium and developing and implementing the first Board Certification Exam in Interventional Pulmonology. For more information about this association, please visit: <https://aabronchology.org>



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**Associate editor: Dr. Septimiu Murgu**

# **Research**

## **Biodegradable and Drug Eluting Airway Stents**

### **It's like a tailored suit, just for you**

Ideal airway stents have been a topic of every major Interventional Pulmonology discussion, conference, and a book for over a decade. The definition of an ideal airway stents broadly encompasses, easy to deploy, easy to remove, minimal to non-granulation forming, and affordable. Biodegradable material of stent was included in the wish list as the time went on.

In the last few years, the technology has made possible just about all the above-mentioned qualities and much more in the airway stents. Now, we can order a stent designed according to the measurements, contours, and bifurcations of a specific airway of a particular patient. A 3D printer can create such a stent in a short period. We can also choose one of many biodegradable materials for the specific longevity of the stent after which the stent dissolves and disappears. The pre-specified life of the stent precludes unnecessarily prolonged irritation of the airway epithelium which leads to fibrosis and formation of strictures of the airways. Furthermore, the material used to construct the stent can be impregnated with chemotherapeutic or anti-fibrotic agents which are slowly released locally giving a very high concentration of the drug locally and dramatically low levels systemically thus minimizing systemic toxicity and side effects.

In a European pilot study (1) of biodegradable stents manufactured with bio-absorbable Polydioxanone (PDS), the stents were placed in post-lung transplant patients with airway strictures. These stents were found to be easy to deploy and due to their biodegradable material, did not require removal. They served their purpose for a predetermined period with good radial force and tensile strength maintaining patency in the majority of the airways without any short or long-term complications.

In an animal study (2), biodegradable and drug eluting stents were implanted in the trachea to study various properties of the stent. The stents were made of Polycaprolactone and impregnated with Cisplatin as the chemotherapeutic agent. The local concentration of Cisplatin was very high while the systemic levels of the drugs were minimal. The drug slowly released over approximately four weeks and stent disintegrated over time without any airway strictures.

These customized and individualized stents carry a broad potential of maintaining patency of the benign and malignant airways while awaiting definitive treatments and also providing localized therapy for malignant endobronchial or peribronchial diseases with minimal systemic effects. It seems like we are very close to having an "ideal stent" if we are not there already.

#### **References**

1. Lischke et al. *Eur J Cardiothorac Surg.* 2011; 40(3):619-24
2. Chao et al. *Chest* 2013; 144(1):193-9

## 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**

The screenshot shows a webcast page with a blue header labeled 'Webcast'. Below the header, the title 'Small Sample Tissue Acquisition and Processing for Diagnosis and Biomarker driven Therapy of NSCLC' is displayed. A welcome message states: 'Welcome to WABIP's free online learning tool to increase knowledge regarding the appropriate selection, acquisition, and processing of cytology and histology samples from patients with known or suspected lung cancer.' Below this, a prompt says 'Click an icon to begin' followed by four icons: 'Program Description' (document icon), 'Purpose' (target icon), 'General Learning Objectives' (lightbulb icon), and 'Specific Learning Objectives' (lightbulb with star icon). A red 'TABLE OF CONTENTS >' button is centered below the icons. At the bottom, there is a disclaimer: 'Each fictitious clinical case scenario is based on a conglomerate of real patient data. Cases have been modified to avoid any possibility for patient identification and to help meet educational objectives. Any resemblance to real persons, living or deceased, is purely coincidental.' To the right of the disclaimer, it says 'A collaborative project with Pfizer Oncology' and includes a 'Credits >' button and the Pfizer Oncology logo.

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

## Links

<a href="http://www.bronchology.com">www.bronchology.com</a>	Home of the Journal of Bronchology	<a href="http://www.chestnet.org">www.chestnet.org</a>	Interventional Chest/Diagnostic Procedures (IC/DP) NetWork
<a href="http://www.bronchoscopy.org">www.bronchoscopy.org</a>	International educational website for bronchoscopy training with u-tube and facebook interfaces, numerous teaching videos, and step by step testing and assessment tools	<a href="http://www.thoracic.org">www.thoracic.org</a>	American Thoracic Society
<a href="http://www.aabronchology.org">www.aabronchology.org</a>	American Association for Bronchology and Interventional Pulmonology (AABIP)	<a href="http://www.ctsnet.org">www.ctsnet.org</a>	The leading online resource of educational and scientific research information for cardiothoracic surgeons.
<a href="http://www.eabip.org">www.eabip.org</a>	European Association for Bronchology and Interventional Pulmonology	<a href="http://www.jrs.or.jp">www.jrs.or.jp</a>	The Japanese Respiriology Society
		<a href="http://sites.google.com/site/asendoscopiarespiratoria/">sites.google.com/site/asendoscopiarespiratoria/</a>	Asociación Sudamericana de Endoscopia Respiratoria

## Upcoming Events

### IP National Update 2018

- When: February 24-25, 2018
- Where: Hotel Radisson Blu, Nagpur, India
- Program Director: Dr. Sameer Arbat, MD
- Program Type: Educational seminar (postgraduate may include physicians in practice and trainees), Hands-on workshop, Conference (didactic lectures)
- Website: <http://www.ipnationalupdate2018.com>

### Faculty Development Program & Introduction to Flexible Bronchoscopy

- When: March 1-3, 2018
- Where: Auckland, New Zealand
- Program Director: Henri Colt, MD
- Program Type: Educational seminar (postgraduate may include physicians in practice and trainees), Hands-on workshop
- Website: <https://www.wabip.com/events/328-trainthetrainers-nz2>

### Advanced Diagnostic Bronchoscopy Workshop

- When: March 23-24, 2018
- Where: Fort Lauderdale, FL
- Program Director: Atul C. Mehta, MD, FACP, FCCP, MD
- Program Type: Educational seminar (postgraduate may include physicians in practice and trainees), Hands-on workshop
- Website: <http://ccfcme.org/gobronch>

### 3rd Annual Lung Cancer Update: Advances in Screening, Diagnostics and Therapeutics

- When: April 13, 2018
- Where: William and Ida Friday Center, UNC Chapel Hill, Chapel Hill, NC
- Program Director: Lonny Yarmus, DO, FCCP and Jason Akulian, MD, MD
- Program Type: Educational seminar (postgraduate may include physicians in practice and trainees), Hands-on workshop, Conference (didactic lectures)
- Website: <https://hopkinscme.cloud-cme.com/aph.aspx?P=5&EID=7187>

### Ibero-American Symposium on Basic and Advanced Bronchoscopy (SIBBA 2018)

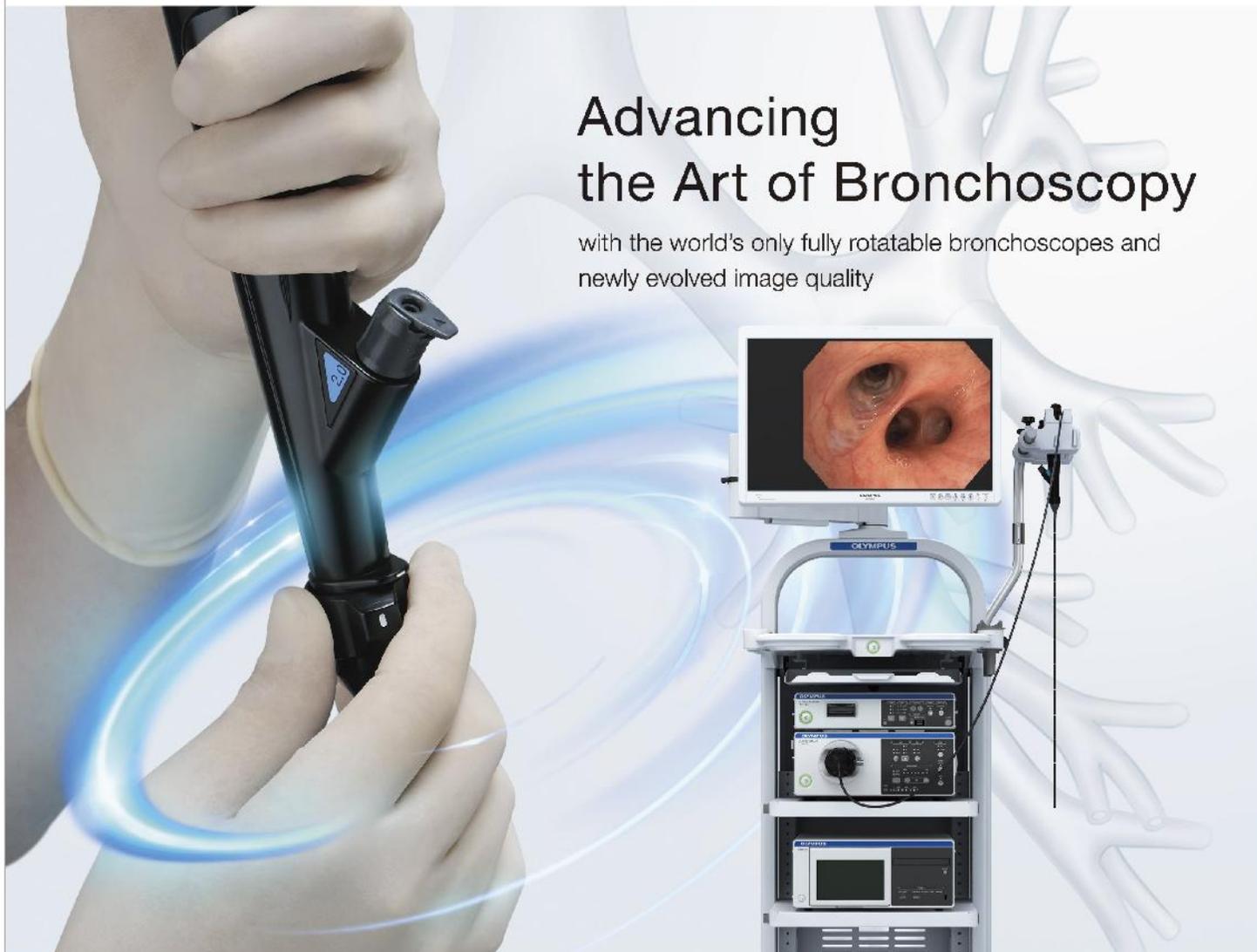
- When: April 13-14, 2018
- Where: Centro de Convenciones Torre AR, Bogota, Colombia
- Program Director: Adnan Majid, MD
- Program Type: Educational seminar, Hands-on workshop, Conference (didactic lectures)
- Website: <http://www.sibbaneumo.com>

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