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9th Edition TNM Classification for Lung Cancer

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Introduction

Since 1996, the International Association for the Study of Lung Cancer (IASLC) has developed infrastructure to refine successive editions of TNM.[1] A clear and consistent nomenclature about the anatomical extent for lung cancer is important to enable reliable communication and assessment of clinical trial applicability to an individual patient.

The 9th edition TNM classification of lung cancer came into effect in January 2025, replacing the previous edition from 2017.[2] As advances in diagnosis, imaging and treatment for lung cancer evolve, there is a need to update lung cancer staging. The cohort of patients from the 8th edition was from 1999 to 2010, whilst the 9th edition utilised a cohort of patients from 2011 to 2019.[1] This new edition contains multiple changes that lung cancer clinicians should be aware of.

Key updates in the 9th edition (figure 1, changes highlighted in red)[2]

T staging

There are no changes in the 9th edition to the T staging category.

N staging

The 9th edition has subdivided N2 into N2a (nodal metastasis to a single N2 station) and N2b (multiple N2 stations). The new staging does not suggest any changes to the IASLC nodal map (figure 2).

The IASLC staging project proposed this change due to recognition that multiple N2 stations confer worse survival compared to a single N2 station. This difference between N2a and N2b was consistent across histologic type, resection status, geographic region and T category.[3]

M staging-

The 9th edition staging has subdivided the M1c category into M1c1 (multiple extrathoracic metastases in a single organ system) and M1c2 (multiple extrathoracic metastases in a multiple organ system).This change was proposed due to the worse survival of the two groups.[4]

Stage Groups

By changing the N2 and M1c subgroups, the new staging had to incorporate them into new staging groups. In addition, T1N1 was down-staged from eighth edition stage IIB to 9th edition stage IIA. These changes are illustrated in figure 3.

The assignment of T1N2a to Stage IIB is the most radical change in the 9th edition, as in the past N2 disease has been classified into Stage III. N2b disease remains in stage III, in line with the worse prognosis of multi-station N2 disease.

All these changes were adequately validated in subset analyses involving both clinical and pathologic stage cohorts.[5]

Clinical implications

The 9th edition TNM staging incorporates differences in the number of involved mediastinal lymph nodes and number of metastatic sites, which convey statistically significant differences in overall survival.

N staging will require greater precision from radiologists, practitioners of invasive staging procedures, surgeons and pathologists to provide sufficient information between single station N2 and multi station N2 metastasis. For example it will mandate that multiple N2 nodes are sampled during invasive staging procedures.

The M staging reflects that there is a significant survival difference between metastasis in a single organ system and multiple organ systems. As advances in metastatic lung

cancer treatments develop, there is an emerging concept of oligometastatic disease as a unique entity. This group of patients could benefit from specific and possibly curative metastasis directed ablative options, such as with surgery and radiotherapy.

Limitations of TNM staging and future directions

The current staging system does have several limitations in how it can incorporate factors that affect cancer survival and treatment responsiveness. For example there are proven nonanatomic tumour related factors that are important for systemic therapies (e.g. presence/absence of driver mutations, PD-L1 expression).[2] There are also additional histologic descriptors that affect cancer prognosis but do not affect T staging (e.g. prescience of spread through airway spaces [STAS], lymphatic invasion, lymphatic carcinomatosis).[2]

The next edition of lung cancer staging should incorporate how newer treatment modalities have effected patient prognosis. As individual and multimodality treatments advance, it creates an increased focus on tumour extent in the more advanced stages. Going forward will be important for databases to include more descriptive data about nodal and metastatic disease, which will guide the next edition of TNM staging.

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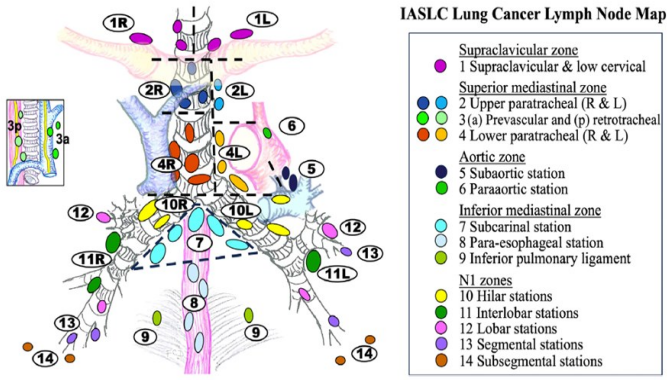
Figure 1: 9th Edition TNM staging

T: Primary tumor	
T0	No evidence of primary tumor
Tis	Carcinoma in situ (squamous cell carcinoma or adenocarcinoma)
T1	Tumor surrounded by lung or visceral pleura, or in a lobar or more peripheral bronchus
T1mi	Minimally invasive adenocarcinoma[a]
T1a	Tumor ≤ 1 cm in greatest dimension[b]
T1b	Tumor > 1 cm but ≤ 2 cm in greatest dimension
T1c	Tumor > 2 cm but ≤ 3 cm in greatest dimension
T2	Tumor with any of the following features:
T2a	- Tumor > 3 cm but < 4 cm in greatest dimension - Invades visceral pleura or invades an adjacent lobe - Involves main bronchus (not carina) or atelectasis/obstructive pneumonitis extending to the hilum[c]
T2b	Tumor > 4 cm but ≤ 5 cm in greatest dimension
T3	Tumor with any of the following features: - Tumor > 5 cm but < 7 cm in greatest dimension - Invades parietal pleura or chest wall, thoracic nerve roots (eg, T1, T2), or stellate ganglion - Invades pericardium, phrenic nerve, or azygous vein - Separate tumor nodule(s) in the same lobe as the primary
T4	Tumor with any of the following features: - Tumor > 7 cm in greatest dimension - Invades vertebra, lamina, spinal canal, subclavian vessels, brachial plexus, or cervical nerve roots - Invades thymus, trachea, carina, recurrent laryngeal nerve, esophagus, or diaphragm - Invades heart or great vessels (aorta, superior/inferior vena cava, intrapericardial vessels) - Separate tumor nodule(s) in a different ipsilateral lobe than that of the primary
N: Regional lymph node involvement	
N0	No regional lymph node metastasis
N1	Metastasis(es) in ipsilateral pulmonary or hilar lymph nodes
N2	Metastasis(es) in ipsilateral mediastinal and/or subcarinal lymph node(s)
N2a	...involving a single ipsilateral mediastinal/subcarinal nodal station
N2b	...involving multiple ipsilateral/subcarinal mediastinal nodal stations
N3	Metastasis in supraclavicular or scalene node(s) or contralateral mediastinal/hilar node(s)
M: Distant metastasis	
M0	No distant metastasis
M1	Distant metastasis
M1a	Malignant pleural or pericardial effusion[d] or pleural/pericardial nodules Separate tumor nodule(s) in a contralateral lobe
M1b	Single extrathoracic metastasis[e]
M1c	Multiple extrathoracic metastases
M1c1	...involving a single organ system[f]
M1c2	...involving multiple organ systems

Figure 2: AISLC Lung Cancer Lymph Node Map



8th Edition TNM Categories

T/M	Label	N0	N1	N2	N3
T1	T1a	IA1	IIB	IIIA	IIIB
	T1b	IA2	IIB	IIIA	IIIB
	T1c	IA3	IIB	IIIA	IIIB
T2	T2a Inv	IB	IIB	IIIA	IIIB
	T2a >3-4	IB	IIB	IIIA	IIIB
	T2b >4-5	IIA	IIB	IIIA	IIIB
T3	T3 >5-7	IIB	IIIA	IIIB	IIIC
	T3 Inv	IIB	IIIA	IIIB	IIIC
	T3 Same Lobe Nod	IIB	IIIA	IIIB	IIIC
T4	T4 >7	IIIA	IIIA	IIIB	IIIC
	T4 Inv	IIIA	IIIA	IIIB	IIIC
	T4 Ipsi Nod	IIIA	IIIA	IIIB	IIIC
M1	M1a Pl Dissem	IVA	IVA	IVA	IVA
	M1a Contr Nod	IVA	IVA	IVA	IVA
	M1b Single Les	IVA	IVA	IVA	IVA
	M1c Mult Les	IVB	IVB	IVB	IVB

9th Edition TNM Categories

T/M	Description	N0	N1	N2		N3
				N2a	N2b	
T1	T1a ≤1 cm	IA1	IIA	IIB	IIIA	IIIB
	T1b >1 to ≤2 cm	IA2	IIA	IIB	IIIA	IIIB
	T1c >2 to ≤3 cm	IA3	IIA	IIB	IIIA	IIIB
T2	T2a Visceral pleura / central invasion	IB	IIB	IIIA	IIIB	IIIB
	T2a >3 to ≤4 cm	IB	IIB	IIIA	IIIB	IIIB
	T2b >4 to ≤5 cm	IIA	IIB	IIIA	IIIB	IIIB
T3	T3 >5 to ≤7 cm	IIB	IIIA	IIIA	IIIB	IIIC
	T3 Invasion	IIB	IIIA	IIIA	IIIB	IIIC
	T3 Same lobe tumor nodule	IIB	IIIA	IIIA	IIIB	IIIC
T4	T4 >7 cm	IIIA	IIIA	IIIB	IIIB	IIIC
	T4 Invasion	IIIA	IIIA	IIIB	IIIB	IIIC
	T4 Ipsilateral tumor nodule	IIIA	IIIA	IIIB	IIIB	IIIC
M1	M1a Pleural/pericardial dissemination	IVA	IVA	IVA	IVA	IVA
	M1a Contralateral tumor nodule	IVA	IVA	IVA	IVA	IVA
	M1b Single extrathoracic lesion	IVA	IVA	IVA	IVA	IVA
	M1c1 Multiple lesions, 1 organ system	IVB	IVB	IVB	IVB	IVB
	M1c2 Multiple lesions, >1 organ system	IVB	IVB	IVB	IVB	IVB

Figure 3: Comparison of 8th and 9th edition TNM categories

Technology Corner

Spray Cryotherapy in Post-Lung Transplant Bronchial Stenosis

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Introduction

Bronchial stenosis is a common and serious complication following lung transplantation, occurring in up to 24% of patients and significantly impacting morbidity, quality of life, and graft function. It typically arises within the first-year post-transplant and can occur at an anastomotic site or extend distally to the segmental airways. The underlying mechanism of post-transplant bronchial stenosis is poorly understood. However, it may be related to maladaptive wound healing in the setting of airway inflammation and ischemic injury of the donor airway with the loss of bronchial arterial blood supply. Management of bronchial stenosis frequently requires a multimodal approach, including dilation, ablation, and stent placement for refractory cases. Additional adjuvant therapies to improve wound healing including steroid injection and mitomycin C application have also been used, with varying results. While these interventions are frequently successful in improving airway patency, a durable response is often difficult to achieve, and there is a significant burden of frequent bronchoscopies and repeated interventions.

Spray cryotherapy (SCT), which has demonstrated safety and efficacy in esophageal disease, is gaining traction in pulmonary medicine as a novel non-contact therapy that may address the underlying fibroinflammatory pathology of airway stenosis. This article highlights recent institutional experience with SCT in lung transplant recipients and explores its role in reducing procedural burden and stent dependence.

Background

SCT delivers liquid nitrogen (LN) through a catheter positioned via flexible or rigid bronchoscopy. LN causes rapid cooling in the context of spray cryotherapy through its extremely low boiling point of -196°C. When LN is sprayed onto the target tissue, it rapidly evaporates and expands (1 mL liquid to 700 mL gas) upon contact with the warmer tissue surface. This phase change from liquid to gas absorbs a significant amount of heat from the tissue, leading to a rapid drop in temperature. The expansion of LN to gas during spraying enhances the cooling effect by increasing the surface area of contact between the cryogen and the tissue. This ensures a more uniform and effective cooling. This process forms ice crystals within the cells and extracellular space, causing cellular destruction through ice crystal formation while preserving the basement membrane of cartilage, collagen, and elastin. Following the rapid freeze is a gradual rewarming. This thaw cycle enhances tissue destruction through cellular damage, immune response activation, and oxidative stress. The controlled injury promotes regenerative rather than fibrotic healing, differentiating SCT from thermal ablative methods, which often cause excessive scarring.

Proper venting of the gaseous nitrogen generated during the procedure is critical to prevent complications such as barotrauma and pneumothorax. Studies have shown that adequate egress of nitrogen gas is necessary for safe use. This venting allows for the safe and effective application of LN spray cryotherapy without undue side effects.

Clinical Application

In a multicenter retrospective study by Fernando et al. (2011), 35 patients with benign airway strictures underwent 63 SCT sessions. Of those available for follow-up, 85% reported symptomatic improvement, and endoscopic evaluation confirmed anatomical improvement in most cases. Only one pneumothorax was reported among all procedures.

Building on this experience, Janke et al. (2016) evaluated SCT in malignant and benign airway disease patients. In the subgroup of 10 patients with benign stenosis—9 of whom had post-lung transplant strictures—80% achieved Grade I (mild) stenosis post-treatment. Though not statistically significant due to the small sample size, the study highlighted the potential of SCT as a beneficial intervention in the transplant population.

A retrospective cohort study at a high-volume transplant center, Cleveland Clinic evaluated SCT in 13 lung transplant recipients with bronchial stenosis. All patients had prior airway interventions, and most had stents at the time of SCT initiation. A total of 47 SCT procedures were performed using the truFreeze system (Steris), with a mean follow-up of 10.8 months.

Key procedural safeguards were employed, including low-flow delivery of LN, confirmation of gas egress, and pauses between treatments to allow gas clearance. There were 3-5 cycles per procedure with each spray lasting 10 seconds and being performed under general anesthesia.

- Bronchoscopy burden: The mean rate of bronchoscopy prior to SCT was 0.64/month. After completion of SCT, this was reduced to 0.28/month in a subset of patients with at least 6 months of follow-up—a statistically significant reduction (p=0.036).

- Stent dependence: Of 8 patients with stents at the start of SCT, 7 underwent successful stent removal. At follow-up, 6 remained stent-free. The stent use rate dropped from 62% to 15% (p=0.016).

Safety profile: SCT was well tolerated. The most common intra-procedural complication was transient hypotension related to general anesthesia induction (36%), which resolved without sequelae prior to SCT being initiated. One pneumothorax (2% of procedures) occurred, requiring chest tube placement.

Conclusions:

This early clinical experience supports the feasibility and safety of SCT in a lung transplant population with complex airway disease and significant prior intervention history. The observed reduction in bronchoscopy frequency and stent dependence suggests that SCT may play a disease-modifying role rather than being merely palliative.

While initial data are promising, important limitations exist, including the small sample size, retrospective data, single-center design, and relatively short follow-up. All patients in this study were treated at the bronchus intermedius. While the results may be generalizable, safety and efficacy in other anatomic locations—especially more distal airways—need further investigation.

While SCT is not currently a first-line therapy for bronchial stenosis, it is emerging as a useful adjunct or alternative in refractory cases. Its tissue-sparing mechanism and favorable safety profile make it a compelling option for select patients. The early evidence suggests that SCT may contribute to:

- Prolonged airway patency
- Reduced frequency of interventions
- Increased success of stent-free management

Future prospective, multicenter studies are needed to confirm these findings and to define standardized treatment protocols, optimal patient selection criteria, and long-term outcomes.

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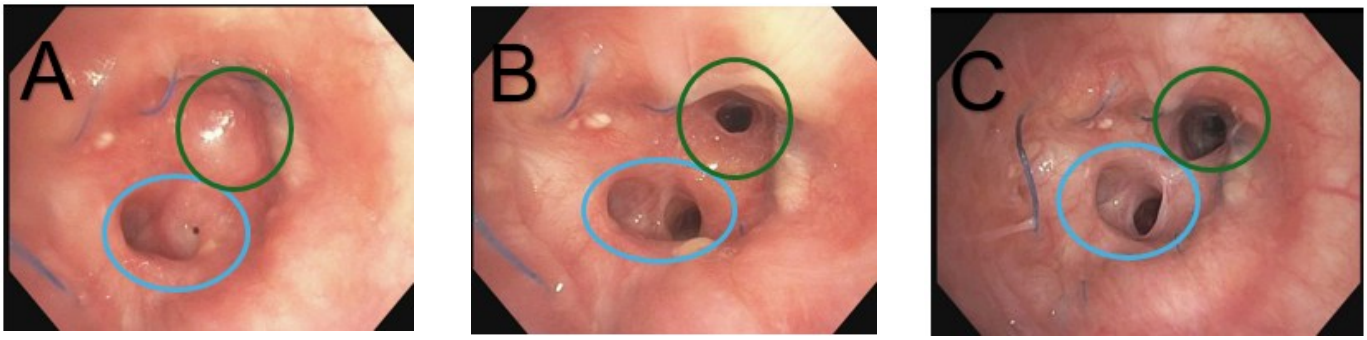

Figure 1.

A: Left mainstem anastomosis with anastomotic, perianastomotic and lobar stenosis prior to first SCT treatment (green circle indicating left upper lobe division, blue circle indicating left lower lobe),

B: Two months following initiation of SCT with two treatments consisting of 5 sprays. (green circle indicating left upper lobe division, blue circle indicating left lower lobe),

C: Most recent bronchoscopy nearly three years after initiating SCT therapy. (green circle indicating left upper lobe division, blue circle indicating left lower lobe),

Chest Tube Management in the First 72-Hours Following Post-Bronchoscopic Lung Volume Reduction (BLVR) Pneumothoraces

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Bronchoscopic lung volume reduction (BLVR) is a minimally invasive procedure using small endobronchial valves (EBV) to treat emphysema marked by hyperinflation. While BLVR improves pulmonary function and dyspnea, one of the complications is pneumothorax. The incidence of pneumothorax following BLVR is between 14-26% .[1,2] Development of a pneumothorax following BLVR can result in morbidity and extended length of stay (LOS) for patients. Furthermore, post-BLVR pneumothoraces can pose significant challenges for treating physicians.

Algorithms have been developed for the management of pneumothoraces following BLVR.[3] While pathways provide steps to help manage pneumothoraces, they do not delineate at what point in the post-BLVR period these interventions should be performed. Many physicians have difficulty knowing when to implement steps along the pathway and when to determine if an EBV should be removed.

Responses to interventions performed within the first 72-hours following a BLVR-related pneumothorax are critical. The presence or absence of improvement can determine whether EBVs should remain in the patient or be removed. Decisions in this period can provide realistic expectations for recovery along with a finite time regarding the short-term outcomes of the procedure.

Placement of a chest tube for a post-BLVR pneumothorax typically provides clinical stability. Immediately following chest tube placement, the catheter should be placed to wall suction of -20 mmHg. The presence of a PAL after chest tube placement is common. If a patient develops ventilatory failure, severe hypoxia, or significant subcutaneous emphysema while on wall suction one or all EBVs should be removed. In these situations, the patient is unable to tolerate the complicating pneumothorax even with chest tube placement.

In patients with a stable pneumothorax on wall suction, the management goal in the first 72-hour post-BLVR is to successfully transition the patient to water seal. Water seal is a method of chest tube drainage using water as a barrier to prevent air from entering the chest during inhalation but allows air to escape during exhalation. When water seal is tolerated, the amount of air escaping into the pleural space from the defect causing the pneumothorax is like the air removed by the chest tube. If stability on water seal can be achieved, there should be confidence that the PAL will resolve, with the average time to chest tube removal being 16.9 days.[4] A patient is considered stable on water seal when there is no increasing oxygen requirement, worsening shortness of breath or chest pain, and absence of new subcutaneous emphysema. If any of these occur, the patient is inappropriate for water seal and should be attached back to wall suction.

On post-operative day 1 after chest tube placement, patients should undergo a water seal trial. If the patient tolerates the water seal trial, then they should remain off suction. If unable to tolerate water seal, air evacuation from the pleural space is likely inadequate due to the chest tube diameter. In this setting, the patient should have the chest tube upsized to at least an 18 French catheter or have an additional chest tube placed. The increased diameter or number of the chest tubes may help adequately evacuate pleural air.

Once the diameter or number of chest tubes has been optimized, a daily water seal trial should be performed on post-operative days 2 and 3. If stable on water seal, discussions should be had with the patient about remaining in the hospital until the PAL resolves or discharge home with a mini-atrium. In the latter case, weekly outpatient visits could occur to determine when the chest tube can be removed. If water seal trials fail on post-operative day 2 and day 3, then removal of one EBV should be performed to facilitate healing of the PAL. While physicians and patients can continue to attempt daily off suction, the likelihood of transitioning to water seal is unlikely or will take a prolonged period. This may result in increased risk of pleural infection and potentially significant deconditioning. Instead, at least one valve should be removed with plans for reinsertion approximately 8-12 weeks following resolution of the PAL.

Pneumothoraces following BLVR can be challenging for both patients and physicians. Uncertainty about chest tube management and the timing of interventions can be frustrating. The first 72 hours after a post-BLVR pneumothorax can be telling of the short-term outcome of the complication and the likelihood for PAL resolution. Understanding the response to chest tube management in the first 72 hours after a BLVR pneumothorax can help facilitate care and recovery.

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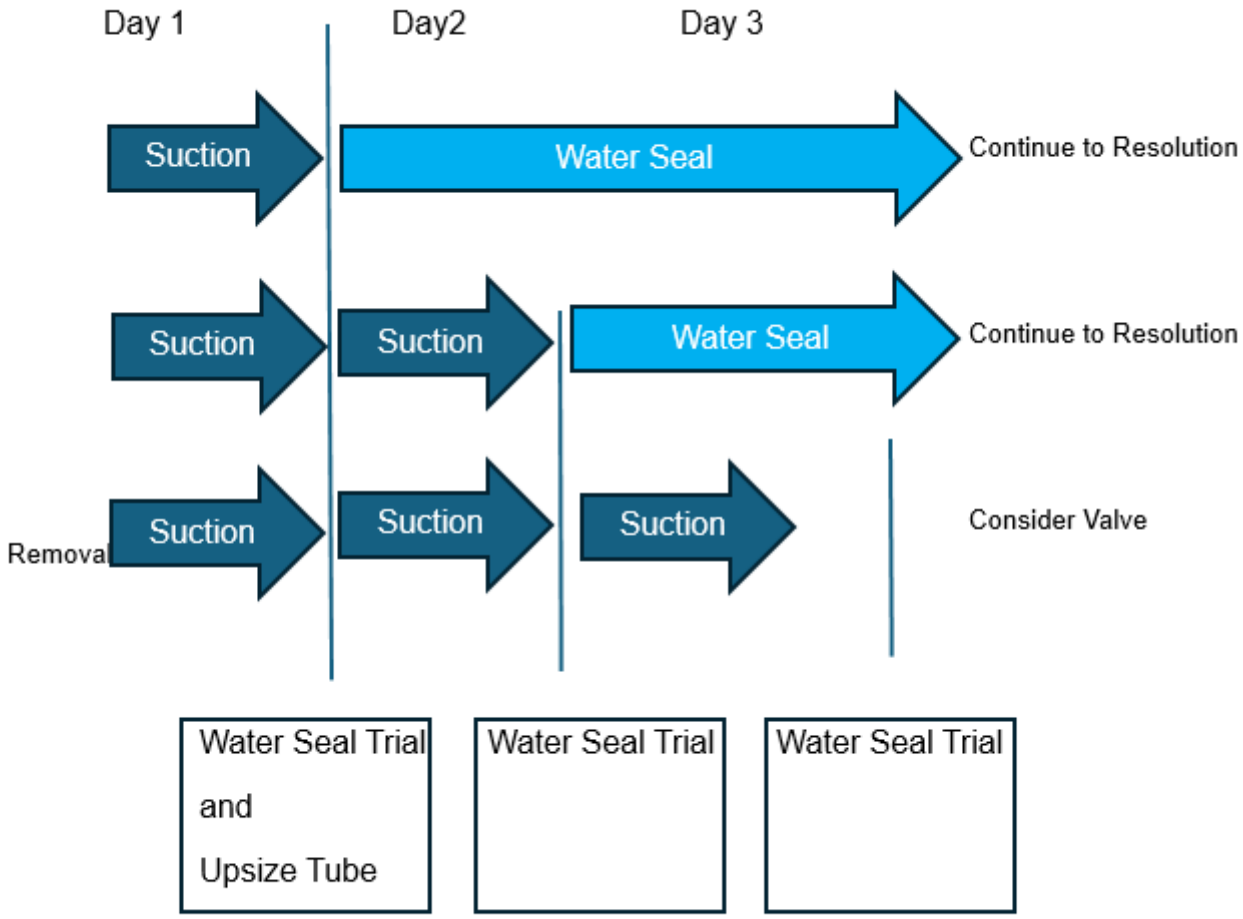

Figure 1: Chest Tube Management First 72-Hours Following Post-BLVR Pneumothorax

Challenges of International Humanitarian Action in a Geopolitical Order Threatened by Democratic Erosion

International humanitarian efforts achieve their greatest efficacy in environments where democratic processes operate firmly and effectively. The essential values of humanitarian work—neutrality, impartiality, independence, and humanity—necessitate an environment characterised by civil liberties, the rule of law, and the separation of powers. Only consolidated democracies guarantee the civic space essential for humanitarian organisations to function without arbitrary interference, approach vulnerable communities devoid of political constraints, and preserve their operational autonomy against governmental pressure. Democratic erosion signifies not merely a political crisis but also a fundamental threat to the international humanitarian system, whose protective and assistive mechanisms fundamentally rely on democratic norms that prioritise human needs above political power, geopolitical interests, or electoral considerations.

The realm of international humanitarian activity has experienced significant adjustments in recent decades, increasingly influenced by structural alterations in the global geopolitical framework and, notably, by the ongoing decline of democratic systems. The systems that have historically facilitated humanitarian aid are presently encountering unparalleled challenges amid a climate of increasing fragility in liberal democracies and a profound reconfiguration of political power dynamics due to digital technology.

Steven Levitsky and Daniel Ziblatt 's *How Democracies Die* (2018) and Giuliano da Empoli's *Engineers of Chaos* (2019) provide complementary analytical frameworks for understanding the nature and scope of this crisis. While these works do not explicitly address humanitarian issues, their examinations of democratic decline, social polarisation, digital manipulation, and political instrumentalisation are crucial for contextualising the current challenges confronting humanitarian relief. Examining these works is essential for understanding how the evolution of democratic spaces and the rise of new authoritarianism are altering the context for international humanitarian efforts.

The book "*How Democracies Die*?" by Steven Levitsky and Daniel Ziblatt (Harvard University) is a reference work for understanding the processes of democratic deterioration in the contemporary political context. Published in 2018, this work has incited much scholarly and public discourse regarding the risks confronting contemporary democratic systems. The book's fundamental premise holds that contemporary democracies do not usually collapse through military coups or violent events, but through a gradual, legal, and imperceptible process of erosion. Levitsky and Ziblatt argue that the greatest danger to 21st -century democracies comes from democratically elected leaders who, once in power, systematically undermine democratic institutions from within (Levitsky & Ziblatt , 2018). This phenomena, occasionally termed "stealth authoritarianism," is defined by behaviours that, when considered individually, may appear lawful or inconsequential, but which together constitute a pattern of democratic deterioration. Therefore, it can be said that "*by the time people realize, it's already too late*" (Levitsky & Ziblatt , 2018). The incremental nature of this process makes it difficult to identify threats early and complicates the activation of democratic defense mechanisms.

The authors identify four indicators of authoritarian behavior that indicate when a leader or political movement may pose a threat to democracy:

1. **Rejection of democratic rules** : Questioning election results, suggesting constitutional manipulation, or refusing to accept electoral defeats.
2. **Denial of legitimacy of opponents** : Viewing political rivals as existential threats to the nation, treating them as "enemies of the people" rather than legitimate competitors.
3. **Tolerance or encouragement of violence** : Explicit support or lack of condemnation of political violence carried out by followers or other related groups.

4. **Predisposition to restrict civil liberties** : Intention to limit the freedom of the press, expression or assembly of opponents, including attacks on the credibility of the media.

Levitsky and Ziblatt rigorously examine their idea through both modern and historical situations that they believe illustrate these processes. During Hugo Chávez's tenure, Venezuela underwent a process in which his unmistakable charisma and substantial popular backing facilitated the consolidation of power within the executive branch, progressively undermining the separation of powers and instituting measures to suppress dissenting voices. This process is mirrored in Turkey, where Recep Tayyip Erdoğan has solidified his power by systematically undermining institutions that ought to function independently of the executive branch. Hungary exemplifies a quintessential instance of modern democratic decline. Under Viktor Orbán, a constitutionally elected leader, the nation has undergone a systematic erosion of democratic institutions that has profoundly altered the Hungarian political scene. Donald Trump's presidency in the United States has ignited vigorous scholarly discourse over how his unique speech as well as certain acts may pose possible dangers to the norms and institutions that support the American democratic system. Recently In Argentina, a nation with robust democratic principles that actively upholds human rights post the 1976 military dictatorship, the far-right administration of democratically elected President Javier Milei has altered the political landscape by employing pseudo-legal tactics to undermine parliamentary actions and dismiss judicial resolutions.

History also offers valuable lessons about these processes. The Weimar Republic in Germany illustrates how the rise of political extremism, combined with structural weaknesses in institutional design, created the conditions for the eventual rise of Nazism. Similarly, Fascist Italy under Benito Mussolini demonstrates how a leader with authoritarian tendencies can use legitimate electoral processes to build popularity before beginning a systematic process of erosion of democratic institutions. According to the authors, the era preceding the American Civil War, despite its temporal remoteness, serves as a historical illustration of how severe social and political polarisation, along with the disintegration of mutual tolerance between conflicting political groups, can precipitate a society's descent into democratic failure.

The primary point of Levitsky and Ziblatt's work is that, irrespective of the perfection of formal institutional designs, they are ineffective without the presence of democratic behaviours that uphold and invigorate these standards. In this context, drawing from the North American experience, the authors delineate two categories of unwritten norms that are essential for the democratic system: a) mutual tolerance and b) institutional self-restraint. Mutual tolerance entails acknowledging the adversary as merely an opponent rather than an enemy; it involves recognising that, despite differing perspectives and visions, as long as they adhere to constitutional principles, they possess an equal right to exist, vie for power, and govern. Self-restraint denotes "patient self-control, temperance, and tolerance" or "the act of abstaining from exercising a legal right." It denotes "eschewing actions that, although compliant with the letter of the law, contravene its spirit." The authors caution that democracies are not eternal, and their endurance relies on the public resolve to safeguard them from challenges that may, ironically, emerge from the democratic process itself. In a historical context marked by the ascendance of authoritarian tendencies globally, Levitsky and Ziblatt's appeal for the preservation of democratic values and institutions is especially pertinent and essential.

On the other hand, the work "The Engineers of Chaos" by the Italian-Swiss essayist and novelist Giuliano Da Empoli (2019) emerges as an incisive analysis of the role that digital strategists and information technologies have played in the recent rise of populism and the extreme right worldwide. Da Empoli (Institut d'études politiques de Paris) conceptualises the emerging dynamics of political manipulation in the digital era and their ramifications for modern democratic institutions. The principal argument of "*The Engineers of Chaos*" asserts that digital platforms have evolved from impartial tools that democratise information access to environments that generate "organised chaos," mostly benefiting authoritarian and populist factions.. Da Empoli remarked in an interview with La Repubblica (2019) that "*what we are witnessing is not merely a technological evolution, but a political revolution that is redefining the parameters of the democratic framework*." Digital platforms have enabled chaos to be utilised as a weapon of power.

The exploitation of chaos is seen in the strategic application of algorithms, big data analytics, and psychographic segmentation methods to influence public opinion. In contrast to conventional political propaganda, these novel approaches provide unparalleled accuracy in pinpointing susceptible audiences and tailoring communications intended to manipulate their anxieties, resentments, and biases. Da Empoli presents the notion of "political technology" to highlight the sophistication involved in utilising digital tools to shape public opinion. The study reveals that social media algorithms intentionally promote

divisive content due to its ability to elicit increased engagement, resulting in "algorithmic polarisation." This creates a detrimental cycle in which extreme content gains heightened visibility, thereby exacerbating user radicalisation and the fragmentation of public discourse.

Da Empoli focuses on the figures operating behind the scenes, those digital strategists who, working away from public scrutiny, have managed to decisively influence the outcome of important political contests. He highlights figures such as Steve Bannon, Donald Trump's former strategist, and Dominic Cummings, architect of the Brexit campaign. These strategists are distinguished by their capacity to gather and analyse extensive data sets, enabling them to deliver highly targeted messages to various voter demographics, exploiting their weaknesses and intensifying existing societal divisions. The rise of these specialists in digital manipulation signifies the professionalisation of online political influence, wherein the capacity to manipulate data and algorithms is an essential tool for attaining power. Da Empoli designates what he refers to as "indignation marketing" as a crucial approach of contemporary populism. This strategy involves methodically inciting and leveraging animosity towards conventional institutions, mainstream media, and political elites. In this scenario, post-truth politics arises, as objective facts diminish in significance against contrived narratives that resonate with the emotions and biases of particular audiences. A troubling outcome of the current political landscape is that, in the post-truth era, the architects of chaos disregard objective truth; rather, they manipulate contradictions and ambiguity in information to foster distrust in conventional media and democratic institutions. Truth transforms into a battleground, where facts hold little significance in comparison to the emotional resonance of statements. The manipulation of emotions via social media engenders parallel realities, wherein disparate groups of the population possess fundamentally divergent perspectives on the same occurrence. This phenomena erodes the foundation of democracy, which relies on a requisite level of unanimity regarding truth and facts.

Digital platforms have created "information bubbles" wherein consumers predominantly engage with content that corroborates their preexisting prejudices, obstructing discourse and consensus over politics. In a 2019 interview with El País, Da Empoli asserts: "*When individuals exist within insular information bubbles, they forfeit the capacity to empathise with those who hold divergent perspectives*." This engenders a fractured society in which political discourse devolves into a cultural conflict. This remark underscores how digital polarisation exacerbates wider social and political conflicts, leading to a crisis of confidence in democratic institutions.

The book serves as a crucial warning about how digital platforms, far from fulfilling their promise of democratising access to information and fostering more inclusive public debate, have been co-opted by actors seeking to exploit chaos for political ends. By exposing the strategies and tactics employed by the "engineers of chaos," Da Empoli contributes to a greater awareness of the vulnerabilities of our democratic systems in the digital environment.

In short, both books concur that contemporary democracies are susceptible to the deterioration of essential values and that numerous democracies are progressively declining in non-violent however radical manners, although they highlight distinct reasons for this decline. Levitsky and Ziblatt contend that democracies rely on informal norms like mutual tolerance and reciprocity among political actors; when these norms deteriorate, authoritarian leaders can subvert democratic institutions internally. Conversely, Da Empoli emphasises that digital technologies have fostered an environment where traditional democratic norms, such as trust in the media and electoral systems, are being undermined by disinformation and mass manipulation. Instead of facing direct assault, these norms are subverted by the widespread dissemination of erroneous and divisive narratives.

Democratic erosion as a threat to humanitarian space

What is the effect of these notions on the humanitarian sector in a setting characterised by an increase in both the frequency and severity of armed conflicts, particularly affecting civilian populations? Levitsky and Ziblatt assert that the "democratic demise by myriad diminutions" has obvious ramifications for international humanitarian efforts.

In environments where essential democratic principles—like mutual tolerance and institutional restraint—are being undermined, humanitarian organisations encounter heightened limitations on their operational capabilities. Leaders exhibiting authoritarian inclinations often manipulate humanitarian aid, restricting access to at-risk groups based on political criteria or employing resource allocation as a tool for social control and power consolidation.

This situation is especially pronounced in what Levitsky and Ziblatt refer to as "illiberal democracies," when electoral procedures remain intact while oversight mechanisms and fundamental rights are deliberately undermined. According these au-

thors, countries such as Hungary, governed by Viktor Orbán, and Turkey, led by Recep Tayyip Erdoğan, illustrate how democratically elected administrations can gradually constrict civic space, imposing arbitrary regulations on non-governmental organisations, criminalising aid to migrants or refugees, and fostering nationalist discourses that undermine the legitimacy of international humanitarian intervention.

The erosion of the separation of powers and judicial independence progressively eliminates the institutional mechanisms that have traditionally protected humanitarian space. When courts, parliaments, and independent regulatory bodies lose autonomy from the executive branch, humanitarian organizations are exposed to arbitrary decisions without effective legal recourse. The persecution of humanitarian workers, the freezing of NGO assets , or the imposition of insurmountable administrative restrictions thus become tools of political control disguised as legality.

Da Empoli's analysis in *The Engineers of Chaos* complements this perspective by examining how digital technologies are being used to erode the democratic consensus that has historically underpinned international humanitarian action. Da Empoli argues that "*what we are witnessing is not a simple technological evolution, but a political revolution that is redefining the rules of the democratic game*" (2019). This transformation profoundly impacts the ability of humanitarian organizations to operate effectively in increasingly polarised contexts.

The fragmentation of information produced by algorithms that prioritize divisive and extreme content has progressively undermined the social consensus on the importance of humanitarian aid. As Da Empoli points out, these political microtargeting techniques , exemplified by the Cambridge Analytica case, facilitate the "*exploitation of vulnerabilities and exacerbation of existing social divisions*", transforming humanitarian concerns into ideological conflicts. The resultant polarisation undermines the social and political backing essential for maintaining effective humanitarian initiatives, while validating nativist and isolationist discourses that depict foreign aid as opposed to national interests.

This "outrage marketing" has proved notably effective in undermining essential humanitarian norms. Disinformation operations aimed at humanitarian organizations—alleging their cooperation with people traffickers, advancing ideological objectives, or misappropriating funds—have eroded public faith in recognised humanitarian entities. The implicit social permission that has always validated international humanitarian intervention is increasingly fractured and contested.

The rivalry amongst great powers has heightened the geopolitical manipulation of humanitarian aid. Levitsky, Ziblatt, and Da Empoli all emphasise that the contest for spheres of influence has transformed foreign aid into an instrument for exerting soft power. China has established an alternate paradigm of international cooperation that clearly dismisses requirements pertaining to democratic governance or human rights. Russia has employed the provision and obstruction of humanitarian aid as a tool of geopolitical leverage, especially in situations like Syria and Ukraine. The instance of Israel restricting United Nations access to Gaza exemplifies how humanitarian aid is manipulated as a tool in political negotiations, intentionally hindering international organisations' ability to deliver essential assistance in conflict areas and employing humanitarian exigencies as leverage within a larger geopolitical framework.

The decline of multilateral organisations like the United Nations—a trend identified by Levitsky and Ziblatt as associated with the emergence of nationalist movements in Western democracies—has undermined the global coordination systems essential for tackling transnational humanitarian issues such as mass displacement, pandemics, and

An additional challenge is the securitisation of humanitarian aid. When political actors perceive their opponents as "existential enemies" rather than legitimate competitors, fundamental humanitarian issues—such as refugee protection or assistance to vulnerable populations—become weapons in a broader cultural war.

This polarisation has enabled the increasing securitisation of humanitarian aid, wherein humanitarian concerns are recontextualised as risks to national security. The portrayal of migrants and refugees as possible terrorists or criminals typifies this phenomena. Da Empoli emphasises that digital strategists have methodically leveraged cultural and economic worries to advance narratives that vilify humanitarian help, framing it as a threat to societal stability. Securitisation has substantial implications for humanitarian organisations. When governments prioritise security measures over humanitarian concerns, they enact restrictive policies that significantly hinder access to vulnerable communities. Simultaneously, humanitarian workers encounter escalating legal dangers due to the criminalisation of acts historically safeguarded by international humanitarian law, such aiding illegal migrants or delivering medical care in areas governed by non-state actors.

Humanitarian News

The erosion of public trust caused by deception is a highly pertinent topic. The proliferation of fake news and conspiracy theories has created an information environment where the truth becomes indiscernible and where any humanitarian intervention can be portrayed as motivated by hidden agendas.This phenomenon, which Da Empoli calls "algorithmic post-truth," has severely impacted humanitarian organizations' ability to effectively communicate both the needs they address and the results they achieve. Coordinated disinformation campaigns have spread narratives portraying NGOs as agents of foreign interests, promoters of ideological agendas, or even secret traffickers. The ability of malicious actors to exploit vulnerabilities in the digital information ecosystem has made defending institutional credibility a permanent challenge for the humanitarian sector.

All these circumstances affect access to financial support. In the polarised environment, humanitarian funding has become simultaneously scarcer and more politically conditioned. Nationalist rhetoric (" America First ", " Britain First ") that characterises contemporary populist movements has legitimized significant reductions in international cooperation budgets, arguing that national resources should be prioritised over foreign needs. At the same time, available funds are increasingly subject to explicit or implicit political conditions. Traditional donors impose operational restrictions aligned with geopolitical or national security objectives, compromising fundamental humanitarian principles such as neutrality and independence.

Technology manipulation rises new ethical dilemmas in the modern humanitarian efforts. The growing digitalisation of humanitarian operations—ranging from biometric identification of beneficiaries to algorithmic assistance distribution—presents substantial problems in environments where personal data may be exploited for social control, surveillance, or political persecution. As the Cambridge Analytica case demonstrates, the mass collection of personal data carries significant risks when it occurs in environments with weak institutional or legal protections. Data collected for legitimate humanitarian purposes could potentially be seized or manipulated by authorities with authoritarian tendencies. Humanitarian organizations thus face the dilemma of adopting technological innovations that could significantly improve their operational efficiency, while navigating unprecedented ethical and practical risks.

In summary, the works of Levitsky , Ziblatt , and Da Empoli provide an understanding of the depth and complexity of the challenges facing international humanitarian action in the context of global democratic decline.

Confronted with this situation, reimagining humanitarian efforts necessitates both practical modifications and strategic reevaluation. Humanitarian organisations must cultivate strong capabilities to function effectively in adversarial institutional contexts, integrating advanced political analysis into their strategic planning and employing adaptable methodologies that enable rapid adjustment to evolving constraints. Simultaneously, they must enhance their resilience against disinformation operations by investing in strategic communication and fostering trust within local communities. A systemic reevaluation of the methods to reinforce the normative consensus typically supporting humanitarian action is necessary. This involves acknowledging that the safeguarding of humanitarian space is fundamentally connected to the defence of essential democratic principles: pluralism, autonomous institutions, confidence in deliberative processes, and dedication to factual accuracy. In a context where fundamental principles face systematic challenges, humanitarian intervention cannot be seen independently from the larger efforts to maintain democratic spaces.

Eventualy, safeguarding the impartiality, independence, and efficacy of humanitarian efforts amid democratic decline necessitates a fresh dedication to maintaining civic spaces, fostering effective global frameworks, and constructing extensive coalitions that surpass political divisions. The worldwide humanitarian society can only achieve its critical mandate through this coordinated strategy.

We must also recognise that we are confronting the disintegration of the world in which the majority of adults have lived, together with numerous principles that characterised it. Democracies, as currently understood, are deteriorating, and numerous ones are undergoing disintegration. As a result, the humanitarian sector, with its principles of safeguarding at-risk communities and fostering a more compassionate and equitable world, faces the threat of extinction. Global citizens must recognise that national and international policies affect their most intimate daily lives and articulate the world they wish to bequeath to their children, as well as the actions they may undertake to create that desired reality. Indifference to reality seems dangerous and unacceptable.

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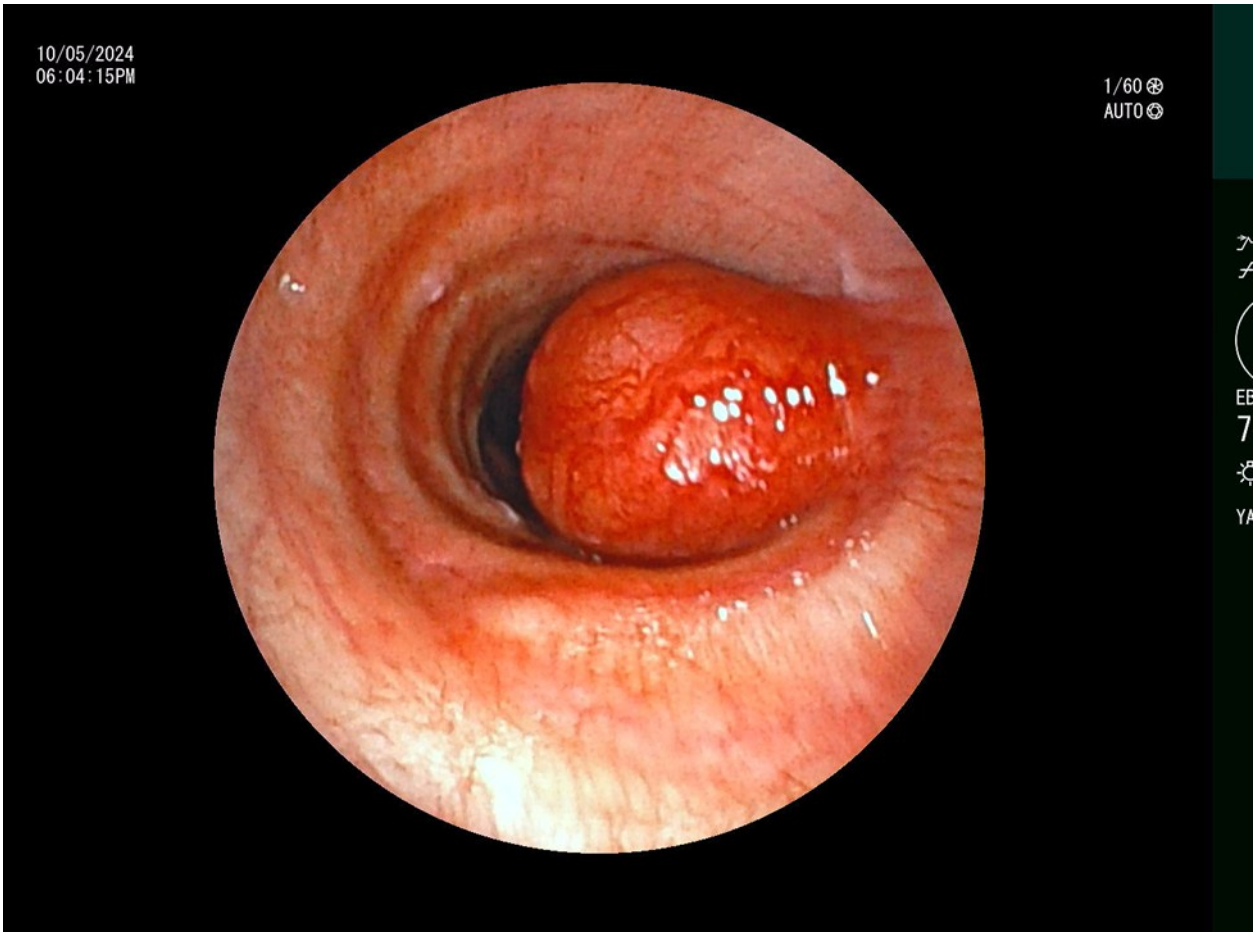
**The views expressed in this article are those of the author (Silvia Quadrelli) and do not necessarily reflect the official positions of the Executive Board or International Board of Regents of the WABIP.*

Best Image Contest

Best Image Contest 2025 (2 of 3)



Central Airway Diseases

Adenoid Cystic Carcinoma- tracheal tumor

Credits / Image courtesy of

Dr. Kona Lakshmi Chermisha Naidu

This image is 2 of 3 selected among 100+ submissions to our Best Image Contest held in late 2023. Our next Image Contest will open later this year. We look forward to receiving your image submissions.

WABIP News

IP Fellowships 2026 Applications Now Open!

We cordially invite you to apply for an intensive Interventional Pulmonology fellowship program conducted by the WABIP and Liv Hospital. This is open to pulmonologists and thoracic surgeons worldwide, with new opportunities every three months. The duration of the program for each fellow is three months, aligned with the following calendar year quarters:

Quarter 1: January 1 – March 31

Quarter 2: April 1 – June 30

Quarter 3: July 1 – September 30

Quarter 4: October 1 – December 31

Applications are currently open for all quarters in 2026.

APPLY at https://www.wabip.com/institute#apply

Applications are due by June 15, 2025

Inviting Applications for Prof. Levent Dalar Scholarship for IPI Fellows

We are pleased to invite applications for the Prof Levent Dalar IPI Scholarship, offering USD 5,000 each to two selected fellows to support their participation in the Interventional Pulmonology International (IPI) program. Eligibility Criteria:

- Must be a resident of a country listed under the United Nations Least Developed Countries (LDCs).
- Currently employed at a public or academic/training institution.
- Proficient in basic diagnostic bronchoscopy.
- Committed to initiating an Interventional Pulmonology (IP) program and training peers in their home country.
- Women applicants are strongly encouraged and will be given preference.

Academic Collaboration between AABIP and WABIP – IPI

The Interventional Pulmonology Institute (IPI) of the World Association for Bronchology and Interventional Pulmonology (WABIP) is proud to announce an academic collaboration with the American Association for Bronchology and Interventional Pulmonology (AABIP).

This collaboration marks a significant step forward in advancing global education and training in interventional pulmonology. The AABIP has graciously supported the IPI's educational mission and certification processes by providing academic and certification materials developed by their world-renowned faculty.

WABIP – IPI extends its sincere gratitude to the AABIP for their generous support and shared commitment to excellence in education, professional development, and international cooperation in the field of interventional pulmonology.

Together, we look forward to shaping the future of our specialty and enhancing standards of care worldwide.

Research

Standardizing the Standards

Ali Musani MD
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Division Chief, Pulmonary Medicine
Director, Western Region Interventional Pulmonology, Northwell Health
Lenox Hill Hospital

Abhinav Agrawal, MD, FCCP, DAABIP
System Director, Interventional Pulmonology, Northwell Lung Institute
Director of Interventional Pulmonology & Bronchoscopy (North Shore/LIJMC)
Associate Professor of Medicine
Associate Professor of Cardiovascular & Thoracic Surgery
Division of Pulmonary, Critical Care & Sleep Medicine
Donald and Barbara Zucker School of Medicine at Hofstra/Northwell

In the evolving landscape of pulmonary diagnostics, the rise of advanced bronchoscopic techniques, such as robotic-assisted and navigation bronchoscopy, has ushered in a new era of promise in detecting and diagnosing lung nodules. However, despite the technological sophistication, one critical issue continues to cloud the actual value of these innovations: the inconsistent definition of diagnostic yield.

At the heart of this confusion lies the lack of consensus on what constitutes a "yield" in a biopsy procedure. While most experts agree that diagnostic yield—the proportion of procedures resulting in a definitive diagnosis—should be the primary outcome measure in diagnostic studies, the practical definitions remain highly variable. Some definitions consider non-specific inflammatory or benign findings diagnostic, while others adopt a more conservative stance, requiring tissue results to inform patient management directly. This inconsistency, as highlighted in a recent study by Vachani et al. (1), can create a staggering 20% difference in reported yield across a cohort of 1,000 patients, depending on whether a strict, intermediate, or liberal definition is applied.

This variability is not merely academic. It has significant implications for patient care, technology adoption, and healthcare spending. The allure of high-yield percentages can mislead clinicians and institutions into overestimating the effectiveness of specific technologies. Moreover, studies funded by corporate partners are particularly vulnerable to adopting yield definitions that inflate apparent efficacy, compounding bias, and undermining objective evaluation.

Recognizing the urgency of this issue, a recent joint statement by the American Thoracic Society and the American College of Chest Physicians assembled a multidisciplinary panel to propose a standardized, strict definition of diagnostic yield for advanced bronchoscopy (2). Their framework emphasizes actionable outcomes that inform subsequent clinical management and categorizes non-specific or indeterminate results as non-diagnostic. This structured approach aligns with the STARD (Standards for Reporting Diagnostic Accuracy Studies) guidelines and introduces a proposed STARD-inspired flow chart tailored for advanced diagnostic bronchoscopy (2).

Such standardization is long overdue. We can facilitate fair comparisons across technologies, centers, and study designs by ensuring transparency and uniformity in reporting outcomes. The proposed definition sets a high bar for evidence, guarding against inflated claims while promoting rigorous, patient-centered research.

Nevertheless, it is essential to acknowledge that several confounding factors—such as disease prevalence, operator experience, and variability in pathology interpretation—can influence outcomes even with a strict definition. A standardized definition is not a cure-all but a critical step toward meaningful progress in evaluating diagnostic technologies.

As lung cancer screening becomes more widespread and advanced biopsy techniques expand, establishing a universal, unbiased definition of diagnostic yield is essential. Only then can we ensure accurate assessments, guide responsible technology adoption, and ultimately improve patient outcomes.

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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
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