

History of Interventional Pulmonology



20^{ème} Rencontre de l'Association Franco Méditerranéenne de
Pneumologie-Cardiologie (AFMP)
du 24 au 27 avril 2024

Jeudi 24 avril 2025

S. Gasparini
San Raffaele Hospital, Milano

Past-Chair WABIP
(World Association for Bronchology
and Interventional Pulmonology)

CONFLICT OF INTEREST

**I have no real or perceived
conflicts of interest that relate
to this presentation.**

Interventional Pulmonology:
A story of pioneers, of intuitions, of ideas, of courage,
of technological development, of passion



A story that went hand in hand with the technological development of the last century....



1900



1910



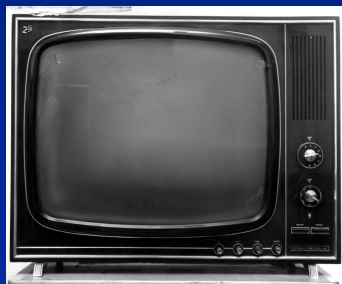
1920



1930



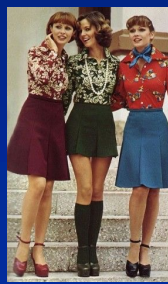
1940



1950



1960



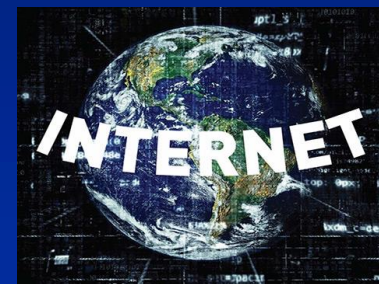
1970



1980

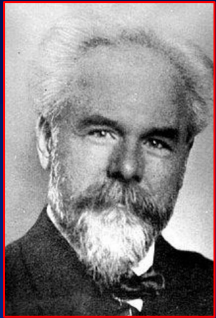


1990



2000

A story where some giants emerge



G. Killian



S. Ikeda



K.P. Wang



J.F. Dumon



H. Becker

Si je voyais plus loin, je pourrais le faire en me tenant sur les épaules de géants
Isaac Newton (1642-1727)

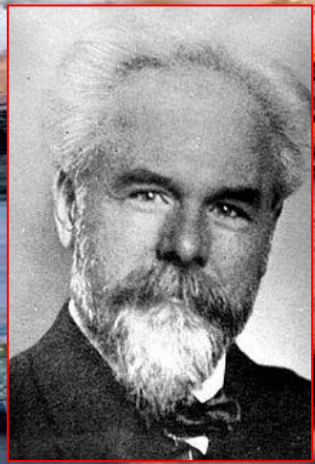
The origins: 1897

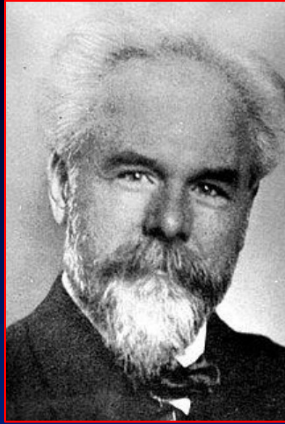


The sport club Juventus
Is founded

1897

The exploration begins....
Gustav Killian, ENT, Freiburg, Germany:
“directe bronckoscopie”





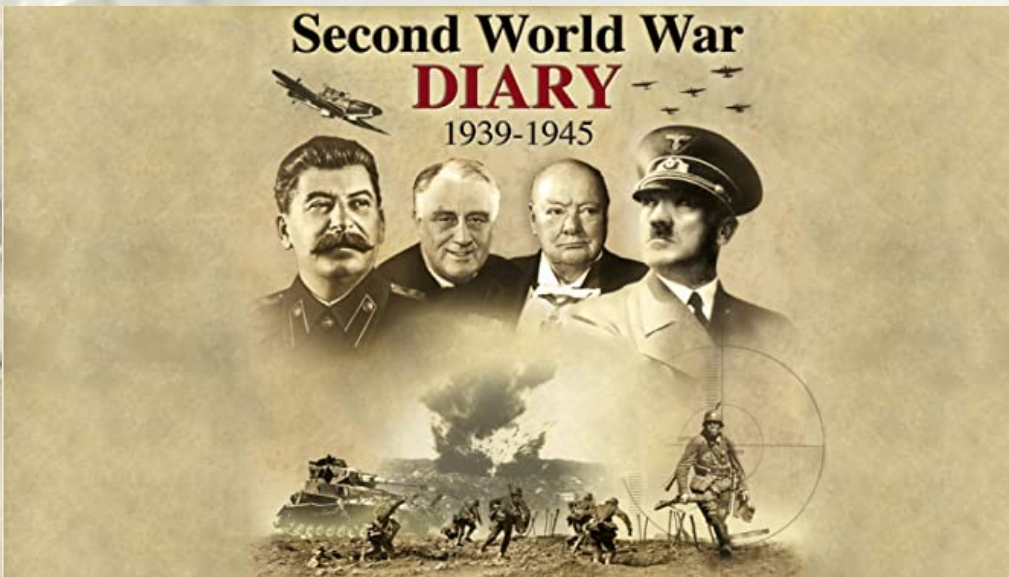
1897

Gustav Killian removed a bone from RMB using an esophagoscope

“Dès qu'on apporte une lumière dans l'obscurité, les choses s'illuminent, ils deviennent visibles et peuvent être distingués les uns des autres”

Christoph Martin Wieland (1733-1813)

1914-1945



1897: rigid bronchoscopy; foreign bodies removal

1965: transbronchial pulmonary biopsy (TBLB)

In medicine many discoveries have happened by chance...



TRANSBRONCHOSCOPIC LUNG BIOPSY IN DIFFUSE PULMONARY DISEASE

Andersen HA, Fontana RS, Harrison EG Jr
Dis Chest 1965; 48: 187-192

60's



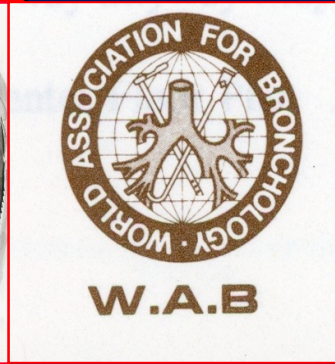
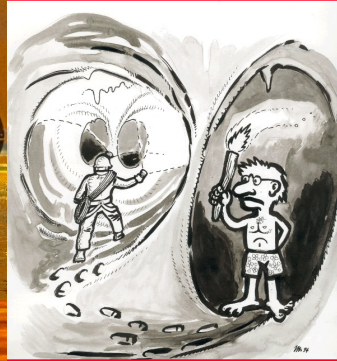
1966: Shigeto Ikeda and the first flexible bronchoscope

1897: rigid bronchoscopy; foreign bodies removal

1910: Jacobeus: thoracoscopy

1965: transbronchial pulmonary biopsy (TBLB)

1966: flexible bronchoscopy



1978

**1° World Congress
Bronchology, Tokyo**



«NEVER GIVE UP»

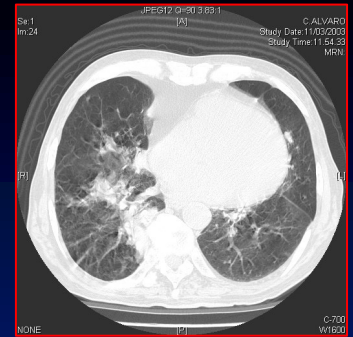
(ne jamais abandonner)

(Shigeto Ikeda - Autobiography)



Shigeto Ikeda tombeau

'70's



**Analysis of proteins and respiratory cells
from human lungs by bronchial lavage**
Reynolds HJ et al. J Lab Clin Med, 1974

BAL

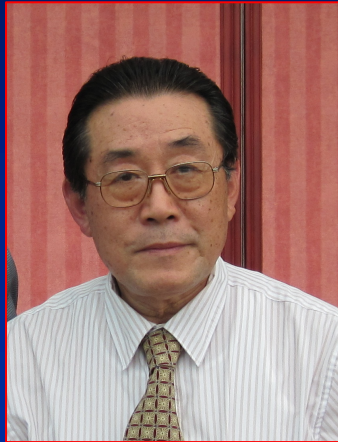


BAL may be diagnostic in:
Infections (PC, CMV, TB,...)
Alveolar Proteinosis
Alveolar Hemorrhage
Tumors
Asbestosis
Eosinophilic pneumonia
Histiocytosis X
DAD

BAL may help in:
Sarcoidosis
Hypersensitivity pneumonia
COP
Drug induced lung diseases

Les déceptions de l'âge mûr succèdent aux illusions de la jeunesse
(Benjamin Disraeli)

80's



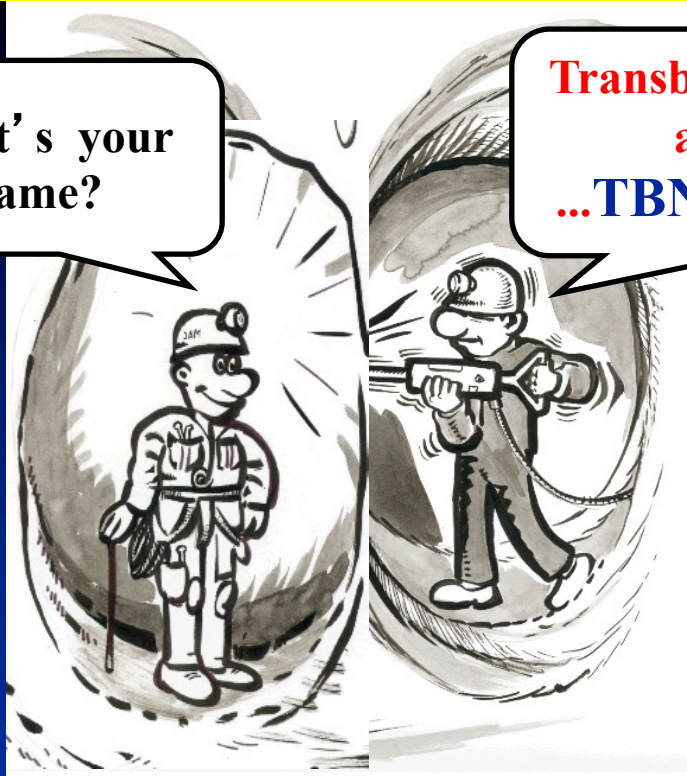
Transbronchial needle aspiration in the diagnosis and staging of bronchogenic carcinoma.
Wang KP et al, Am Rev Respir Dis 1983; 127: 344-347

Flexible transbronchial needle aspiration for staging of bronchogenic carcinoma.
Wang KP et al, Chest 1983; 84: 571-576

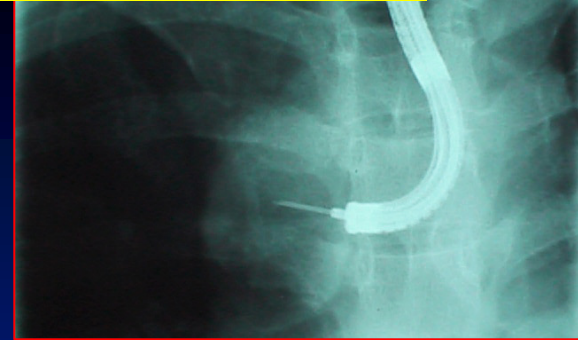
Ko Pen Wang (Baltimore, USA)

DIAGNOSTIC AND STAGING BRONCHOSCOPY

What's your name?



Transbronchial needle aspiration...
...**TBNA** for friends...



«Ce travail produira certainement, au fil du temps, une révolution dans les âmes... Nous aurons rendu service à l'humanité». (Denis Diderot, 1753)

1897: rigid bronchoscopy; foreign bodies removal

1910: Jacobeus: thoracoscopy

1965: transbronchial pulmonary biopsy (TBLB)

1966: flexible bronchoscopy

1974: BAL

1983: TBNA

Therapeutical bronchoscopy

1984: LASER

1990: STENTS



Jean Francoise Dumon (1939-2020)

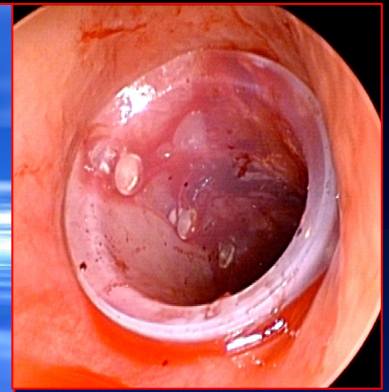




Principles for safety in application of NdYAG laser in bronchoscopy
Dumon JF, Shapshay S et al. Chest 1984



A dedicated tracheobronchial stent
Dumon JF. Chest 1990



Pablo Diaz Jimenez - Barcellona

**Thank you
JEAN FRANCOISE,
PABLO,
SERGIO!!!**



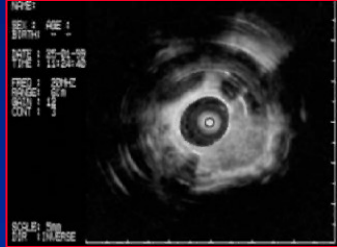
Sergio Cavaliere - Brescia



Heinrich Becker, Heidelberg

90's

Endobronchialer Ultraschall.
Eine neue Perspektive in der Bronchologie
Becker HD. Ultraschall Med 1996



Le but de nos travaux doit être d'étendre les limites des lieux éclairés et de multiplier les centres de lumière au sol. (Denis Diderot, 1753)

1897: rigid bronchoscopy; foreign bodies removal

1965: transbronchial pulmonary biopsy (TBLB)

1966: flexible bronchoscopy

1974: BAL

1983: TBNA

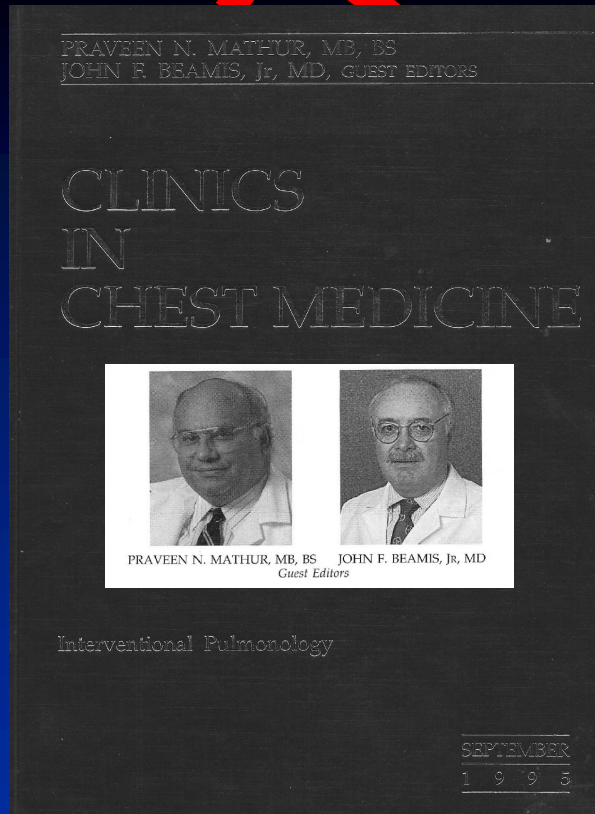
1984: Therapeutical bronchoscopy

1996: EBUS

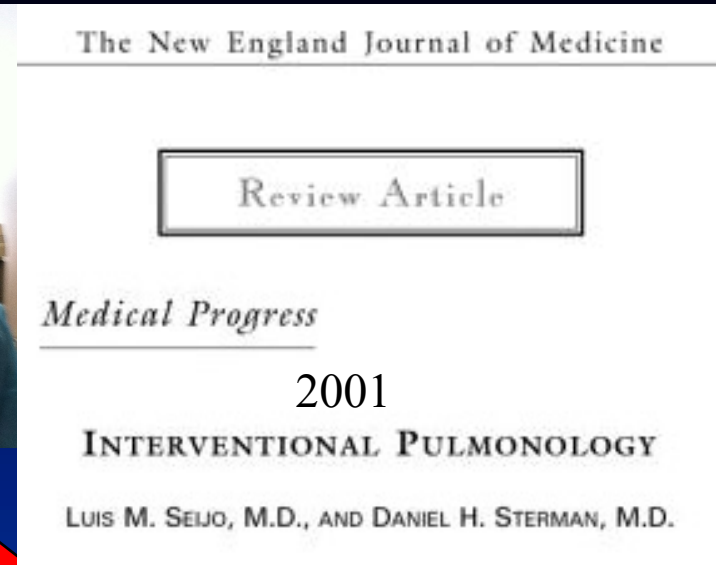


2000...

2001: INTERVENTIONAL PULMONOLOGY



Luis Seijo, Madrid



«INTERVENTIONAL PULMONOLOGY»

emphasizes the pneumological competence of the procedures

ERS Annual Meeting, Berlin 2001

~~Study Group “Endoscopy and biopsy techniques”~~

Study Group “Interventional Pulmonology”



~~2002: European Association for Bronchology~~

European Association for Bronchology and IP (EABIP)



~~2002: World Association for Bronchology (WAB)~~

World Association for Bronchology and IP (WABIP)

~~2002: AIPO Gruppo di Studio «Endoscopia Toracica»~~

Gruppo di studio «Pneumologia Interventistica»



ERS/ATS: Statement on Interventional Pulmonology

ERJ 2002; 19: 356-373

Interventional Pulmonology Procedures:

Guidelines from the ACCP. Chest 2003; 123: 1693



2000.... new explosions of technology and ideas



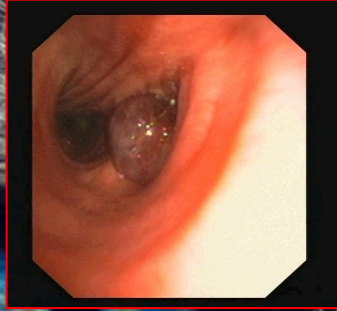
- Improving the image more and more
- Seeing ever smaller structures
- Going ever deeper
- Beyond the walls of the tracheobronchial tree and the thorax
- New guidance systems to navigate the bronchi
- New sampling tools
- Always keeping the airways open
- New therapeutic perspectives

Improving the image

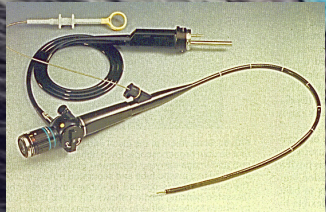
ULTRA HD BRONCHOSCOPY



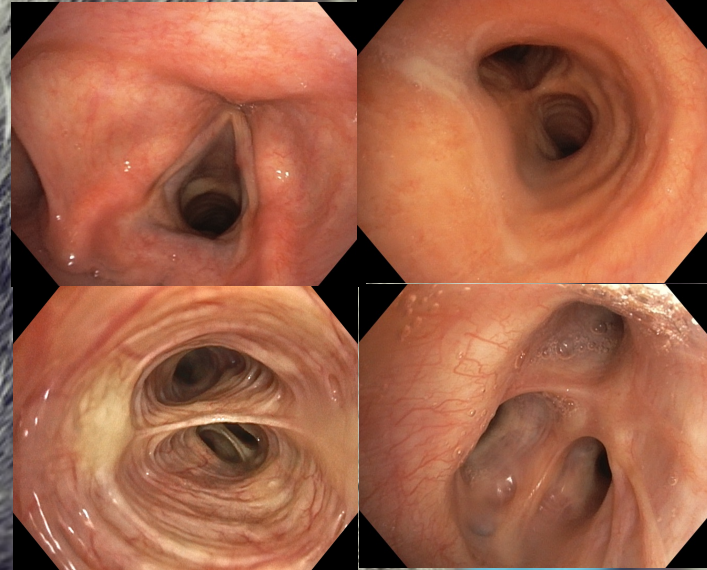
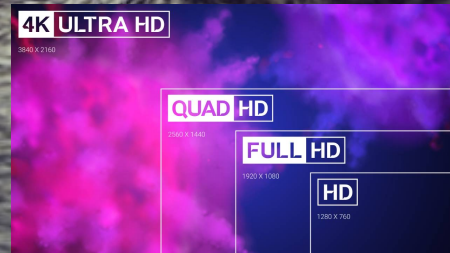
OLD
FIBERSCOPE



VIDEOSCOPE



4K resolution
Ultra HD

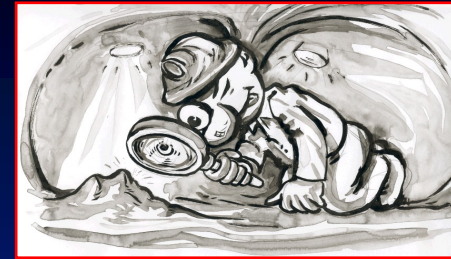
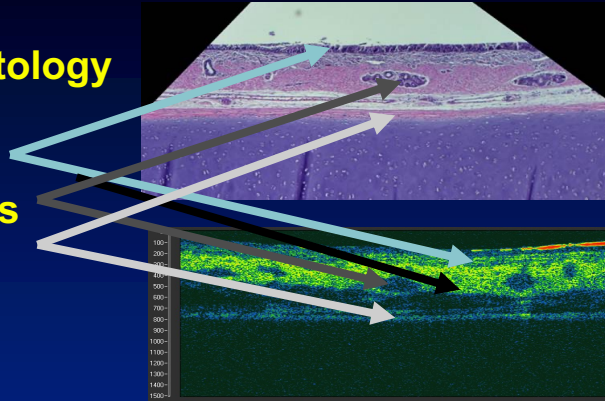


Seeing ever smaller structures

OCT (Optical Coherence Tomography)



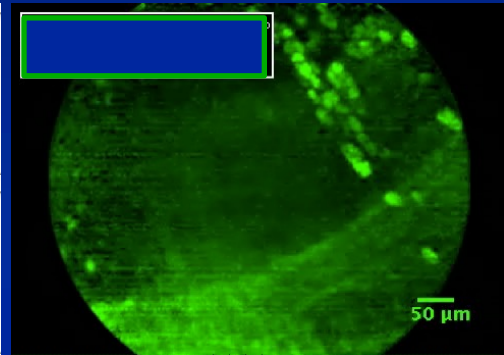
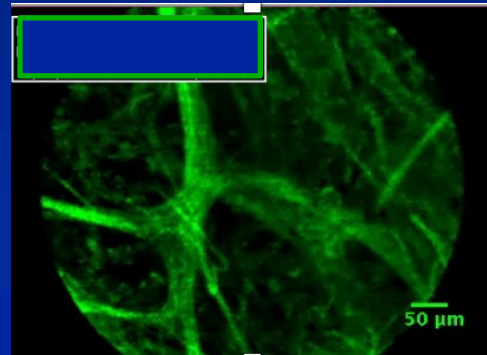
**Correlation of Histology
and OCT images:
epithelial layer
submucosa glands
smooth muscle**



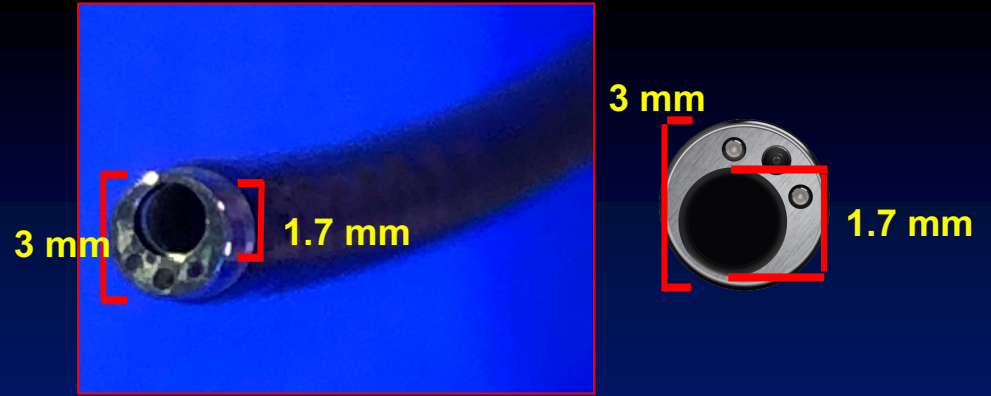
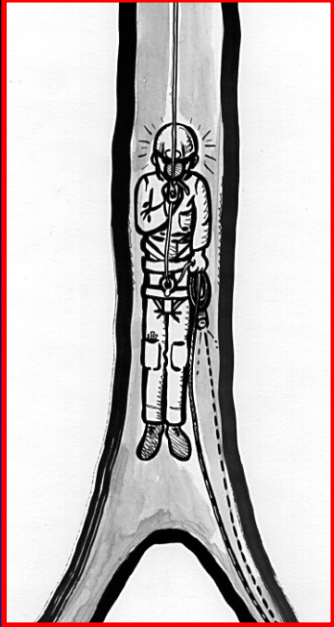
Confocal Microscopy of the Airways and the Alveoli

Clinical studies on going:

- Preneoplastic lesions
- Peripheral pulmonary lesions
- Airways remodelling
- Infiltrative diffuse lung diseases



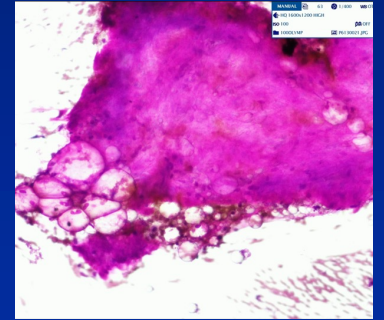
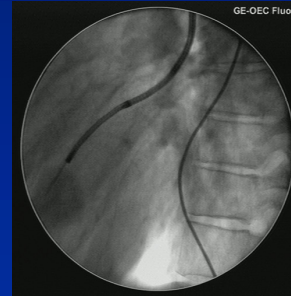
Going ever deeper



Lingula



Ultrathin bronchoscopes

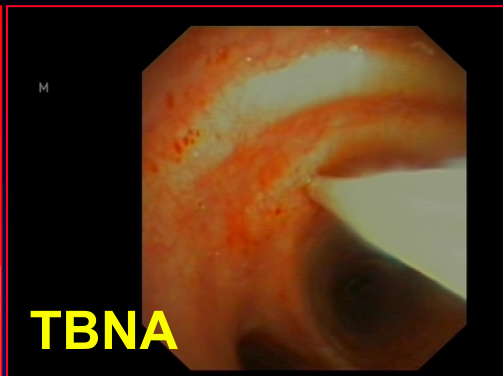


HAMARTOMA

*The 1900s had prepared the ground...
In the early 2000s a revolution broke out in Interventional Pulmonology
that was destined to change the way we do bronchoscopy*

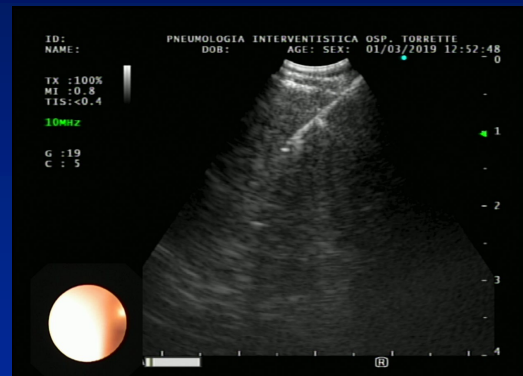
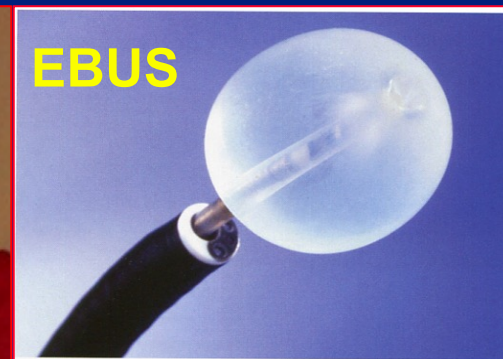
two giants meet.....

*Dans une figure, cherche la grande lumière et la grande
ombre, le reste viendra tout seul (Edouard Manet)*



+

=



2004: EBUS-TBNA



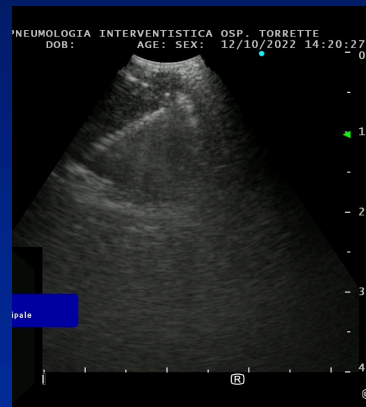
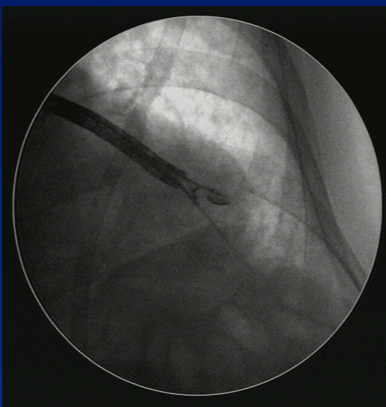
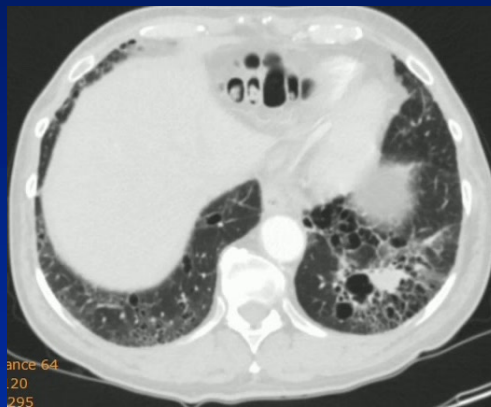
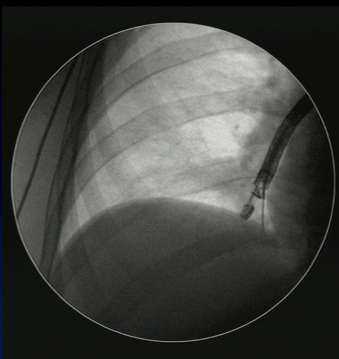
***EBUS TBNA in diagnosing
hilar and mediastinal lesions
Krasnik M et al. Chest 2005***



***Endobronchial ultrasound
guided transbronchial
aspiration for staging
of lung cancer
Yasufuku K et al. Lung Cancer 2005***

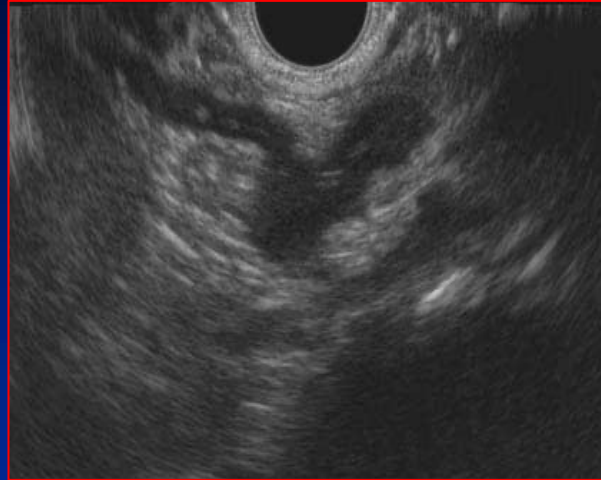


***Real-time, endobronchial ultrasound
guided, transbronchial
needle aspiration:
a new method for sampling
mediastinal lymph nodes
Herth FJ et al. Thorax 2006***



*Seuls ceux qui risquent d'aller trop loin auront la chance de savoir jusqu'où vous pouvez aller
(T.S. Eliot)*

Bronchoscopy: beyond the thorax



**TRANSOESOPHAGEAL NEEDLE ASPIRATION USING A
CONVEX PROBE ULTRASONIC BRONCHOSCOPE**
Hwangbo B et al. Respiriology, 2009

**LEFT ADRENAL GLAND
METASTASIS (EUS-B-FNA)**

2010s



Advances in oncology and the need to obtain adequate tissue for molecular typing of tumors

The need to obtain more tissue for the histological definition of diffuse infiltrative pneumopathies



Clin Cancer Res. 2010 Oct 15;16(20):4909-11. doi: 10.1158/1078-0432.CCR-10-2005. Epub 2010 Oct 5.

The tissue is the issue: personalized medicine for non-small cell lung cancer.

Hirsch FR¹, Wynes MW, Gandara DR, Bunn PA Jr.

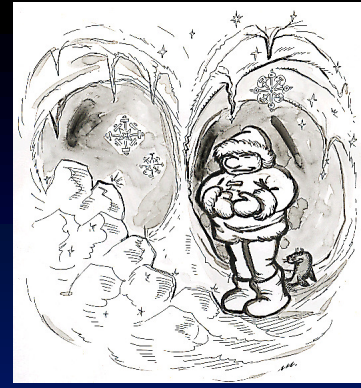
ANNU 2010



Jurgen Hetzel

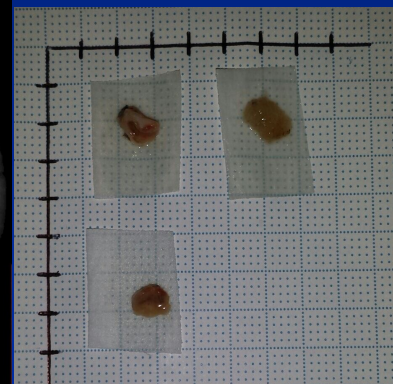
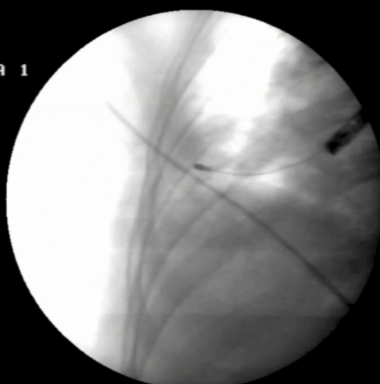
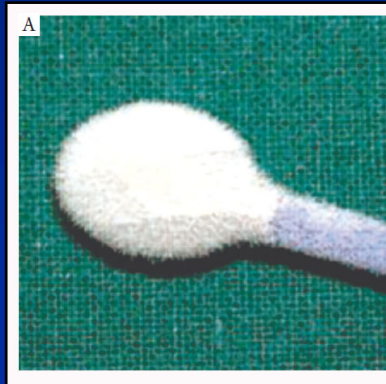


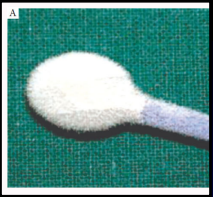
Venerino Poletti



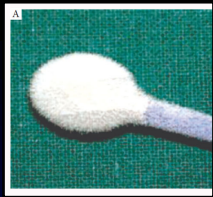
**Transbronchial Cryobiopsy: A New Tool
for Lung Biopsies**

Respiration. 2009;78(2):203-8





CRYOBIOPSY



Transbronchial Cryobiopsy for the Diagnosis of Interstitial Lung Diseases CHEST Guideline and Expert Panel Report

Maldonado F et al. Chest 2020

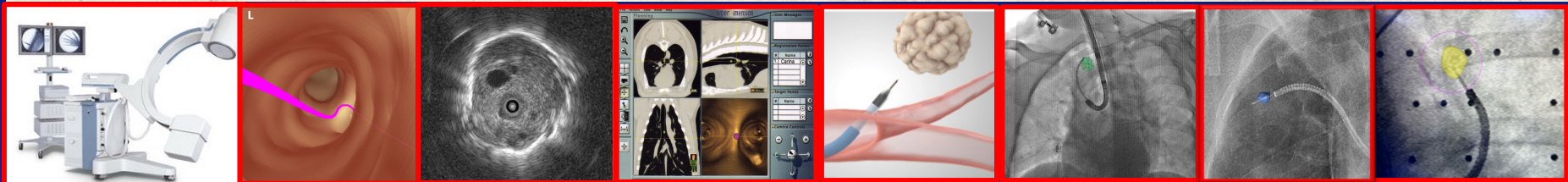
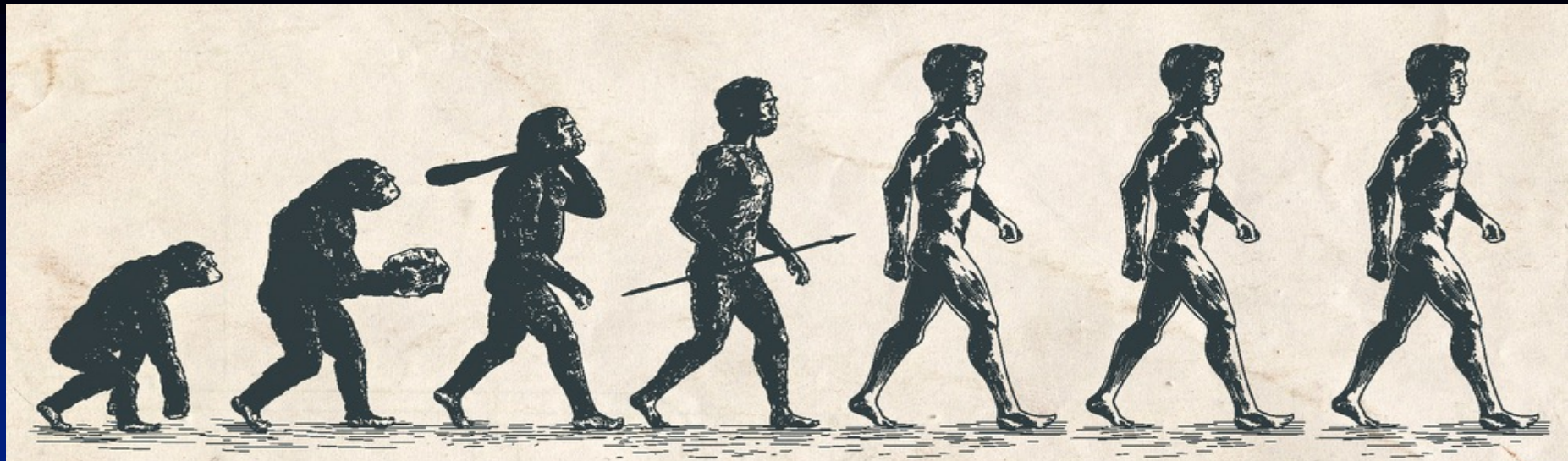
Transbronchial lung cryobiopsy for peripheral pulmonary lesions

Tang et al, Pulmonology 2024

Transbronchial mediastinal cryobiopsy in the diagnosis of mediastinal lesions: a randomised trial

Zhang J et al, ERJ 2021

The peripheral pulmonary nodule: the answers of Interventional Pulmonology



Fluoroscopy
1967

**Virtual
Bronchoscopy**
2002

**Radial EBUS
miniprobe**
2002

**Electromagnetic
Navigation**
2005

**Transparenchymal
access**
2015

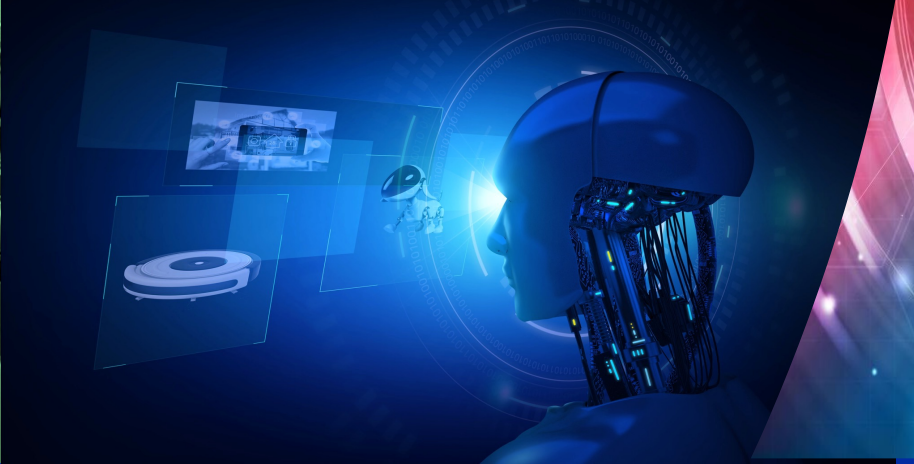
Cone Beam CT
2018

**Robotic
bronchoscopy**
2019

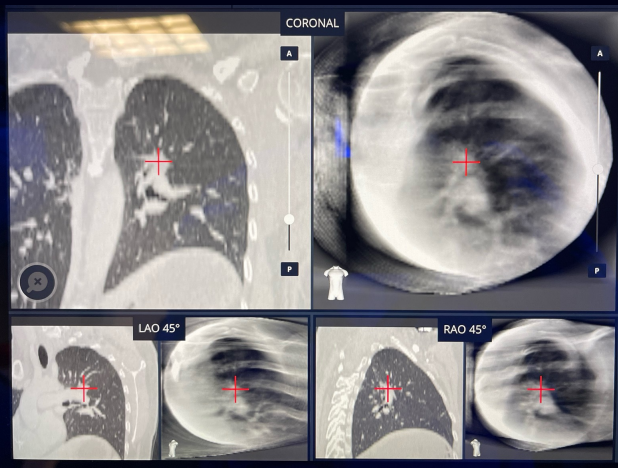
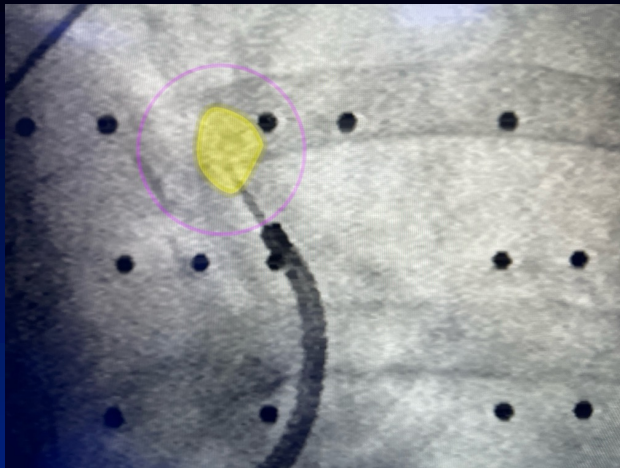
Lung Vision
2021

Il ne s'agit pas de préserver le passé, mais de réaliser ses espoirs (Max Horkheimer)

Will artificial intelligence help us find our way?



LUNG VISION



Will the robot help us reach the stars?



LAST BUT NOT LEAST....ROBOTIC BRONCHOSCOPY

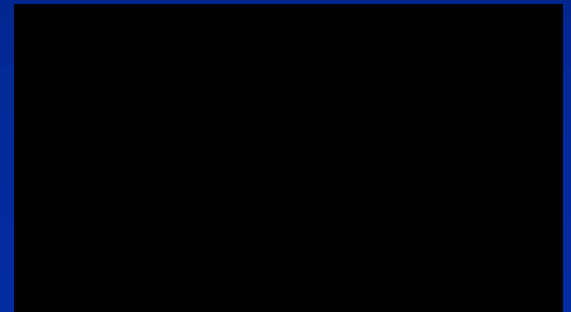
MONARCH Platform



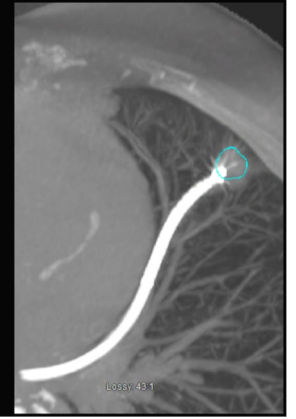
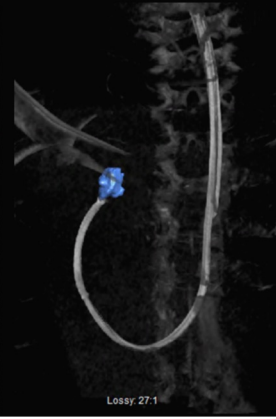
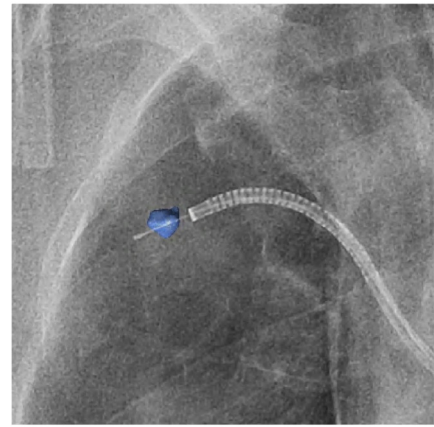
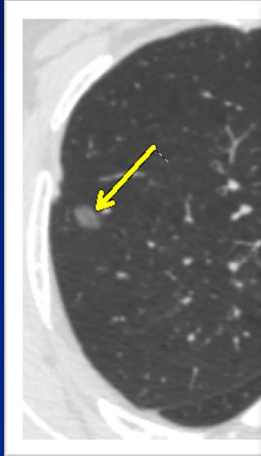
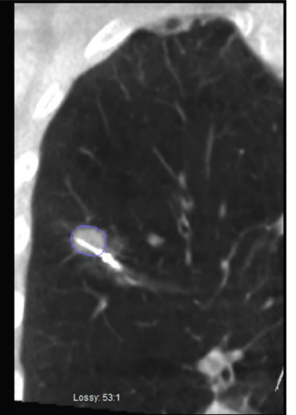
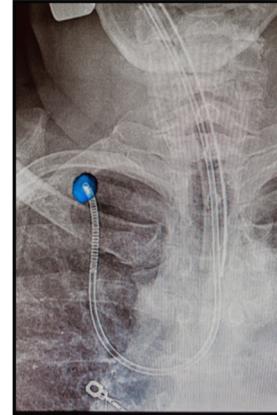
INTUITIVE ION Platform



NOAH MEDICAL GALAXY Platform



ROBOTIC BRONCHOSCOPY





Le pays des chimères est, au monde, le seul digne d'être habité
J.J. Rousseau (1712-1778)

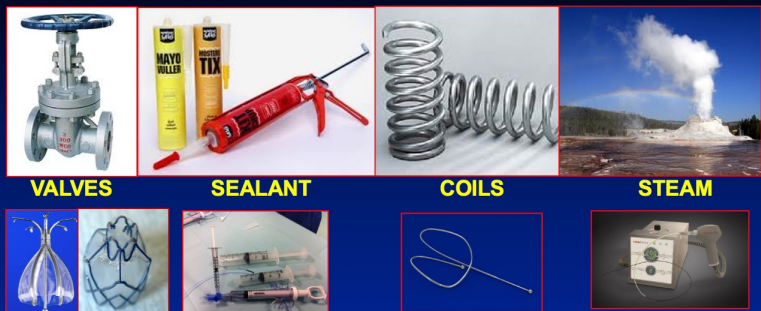
A woman's face is centered within a field of intense, swirling flames. Two concentric, semi-transparent circles are overlaid on the image, with the inner circle focusing on the woman's face. The overall color palette is dominated by the oranges, yellows, and reds of the fire, set against a dark background.

New therapeutic perspectives



20 years ago...
Severe COPD and asthma:

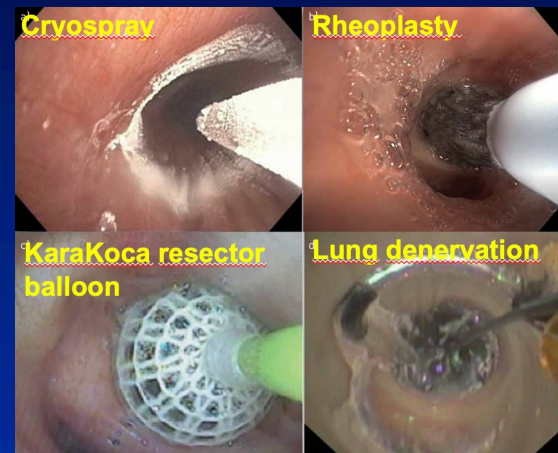
Contraindications for bronchoscopy!!



Bronchoscopic volume reduction



Thermoplasty

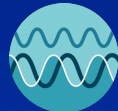


Hypersecretive COPD
treatment

Lorsqu'il s'agit de l'avenir, notre travail n'est pas de le prédire, mais plutôt de lui permettre de se produire (Antoine de Saint-Exupery, 1900-1944)

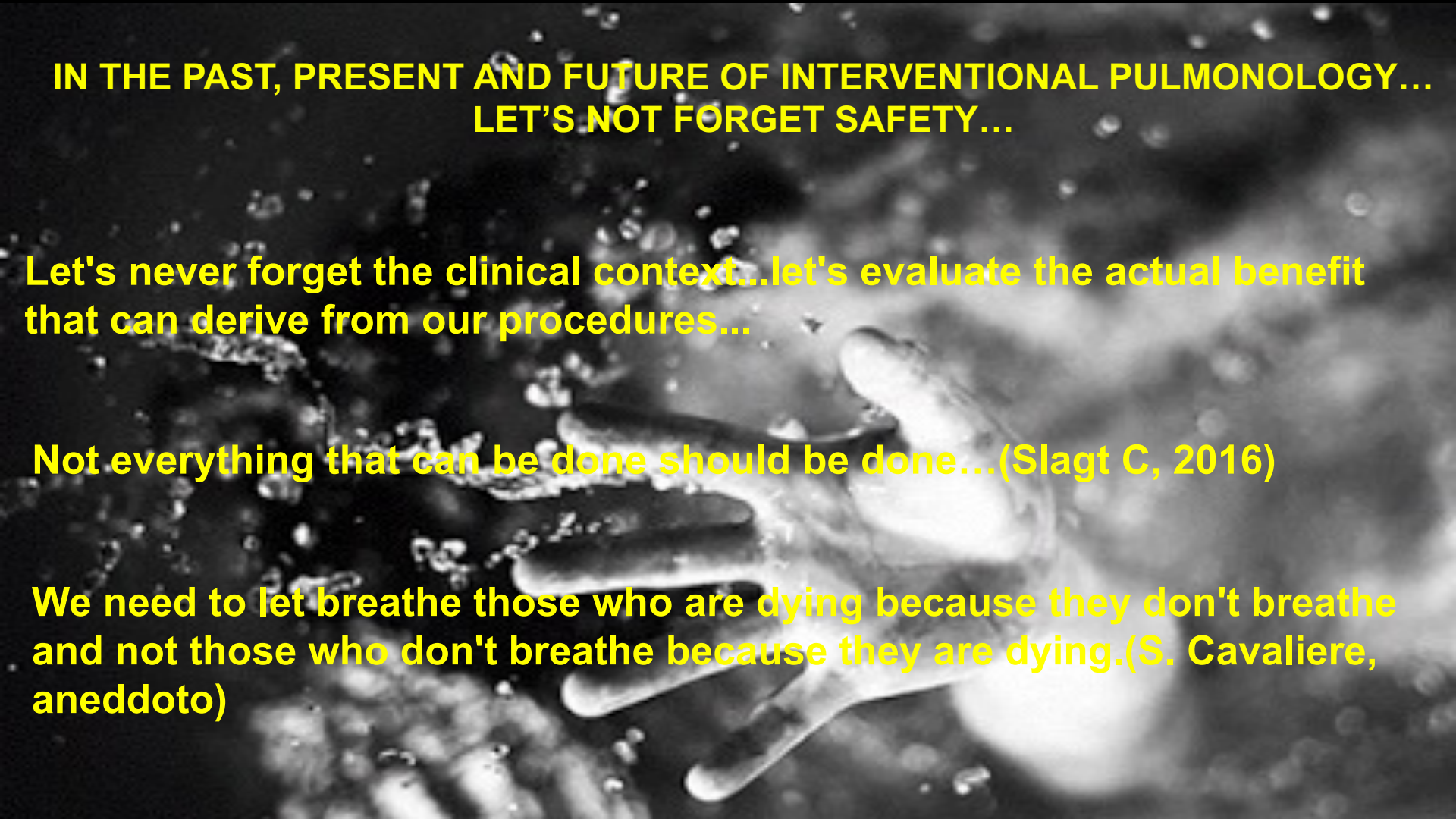
BRONCHOSCOPIC TREATMENTS OF LUNG CANCER

- BRACHYTHERAPY
- LASER
- PHOTODYNAMIC THERAPY
- RADIOFREQUENCY ABLATION
- MICROWAVE ABLATION
- THERMAL VAPOR ABLATION





Le passé est derrière vous, apprenez-en.
L'avenir est devant vous, préparez-vous.
Le présent est là, vivez-le.
(Thomas S. Monson)(Thomas S. Monson)

A black and white photograph of a hand reaching out from a body of water, with many bubbles and ripples around it. The hand is positioned in the center-right of the frame, with fingers slightly spread. The background is dark and filled with light-colored bubbles and water droplets, creating a sense of movement and depth.

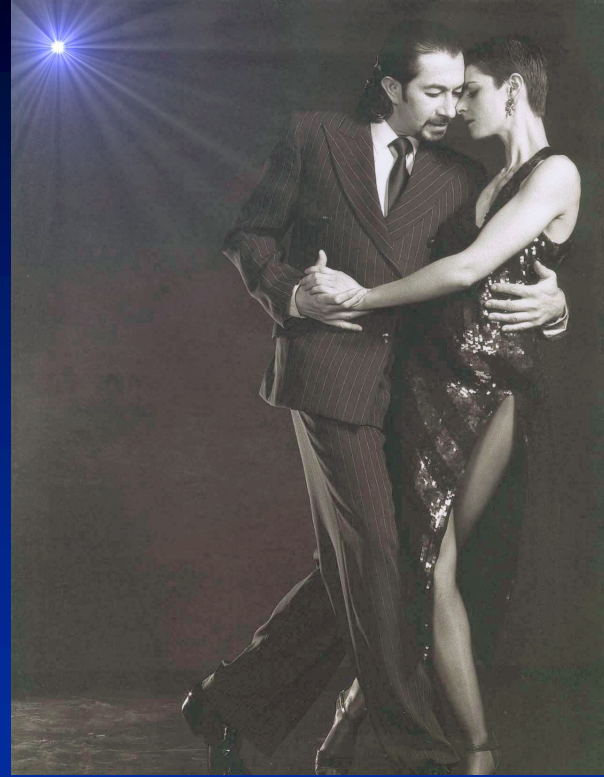
**IN THE PAST, PRESENT AND FUTURE OF INTERVENTIONAL PULMONOLOGY...
LET'S NOT FORGET SAFETY...**

Let's never forget the clinical context...let's evaluate the actual benefit that can derive from our procedures...

Not everything that can be done should be done...(Slagt C, 2016)

We need to let breathe those who are dying because they don't breathe and not those who don't breathe because they are dying.(S. Cavaliere, aneddoto)

**IN THE PAST, PRESENT AND FUTURE OF INTERVENTIONAL PULMONOLOGY...
THERE IS ALWAYS PASSION...**



Let's build a better world for everyone





MERCI