

Life is visible through technology

## Infivision

Sincerely invite you to explore EIT together,  
to jointly open up a new field of medical.



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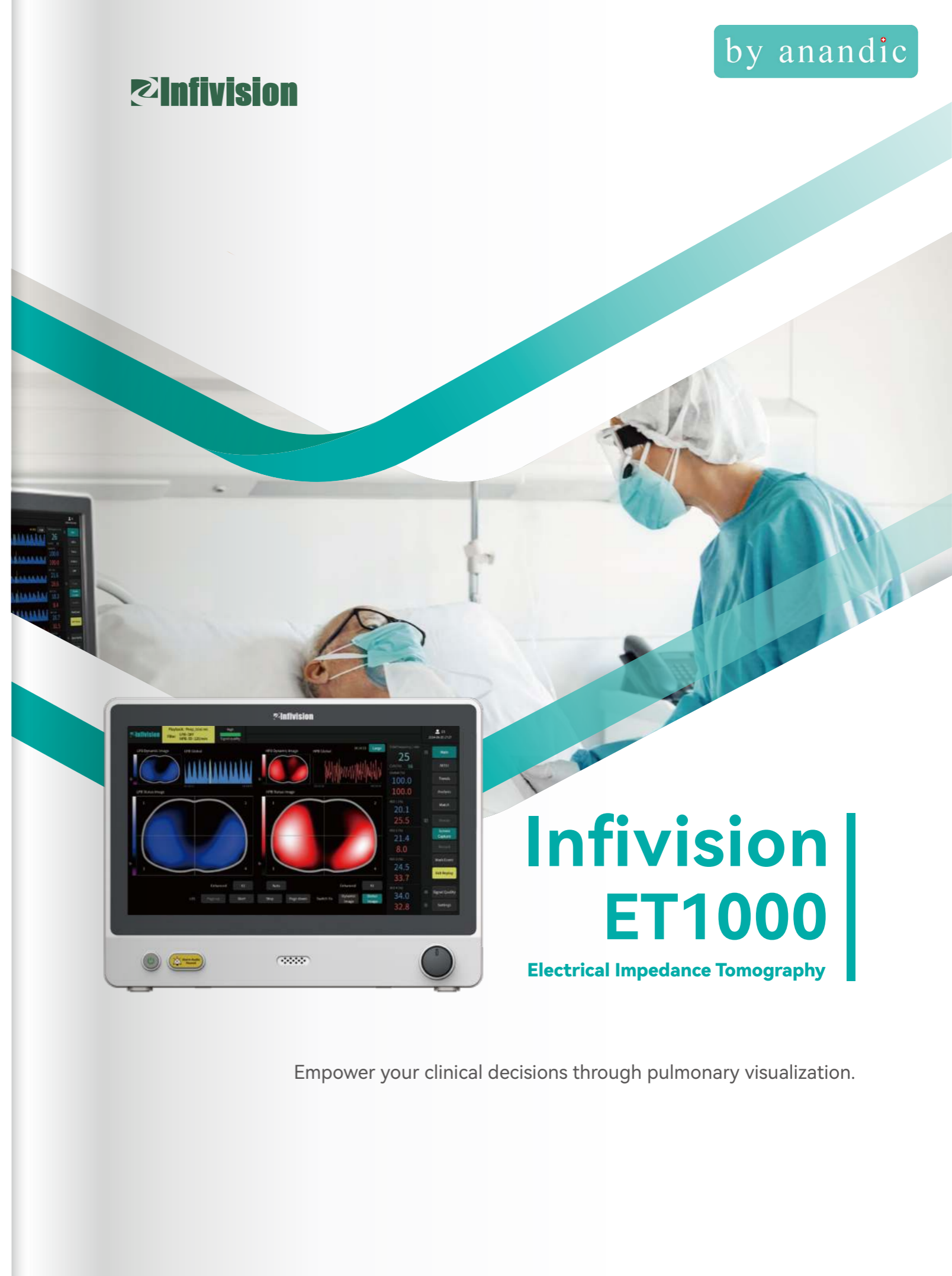
Infivision Medical Imaging Technology Co., Ltd.

www.infivision.com.cn

Version Number: Infivision ET1000\_Brochure\_V1.0.0\_EN



by anandic



# Infivision | ET1000

Electrical Impedance Tomography

Empower your clinical decisions through pulmonary visualization.

# EIT Technology

## “ Electrical Impedance Tomography (EIT)

EIT is a medical imaging technology that obtains impedance changes through corresponding imaging algorithm by giving low intensity current and measuring surface voltages through attaching electrodes around chest.

### Work flow



Since thoracic EIT is capable of detecting physiological and pathological changes of electrical properties of lung tissue at very high scan rates, it allows the assessment of regional distribution of lung ventilation and perfusion as well as of changes in regional lung aeration and fluid content.\*

\* Adler, A., & Holder, D. (Eds.). (2021). Electrical impedance tomography: Methods, history, and applications (2nd ed.). Springer.

# Infivision ET1000

## ● A quick assessment of diagnosis and treatment

Infivision ET1000 provides quick assessment and bedside pulmonary ventilation and perfusion, with intuitive imaging to assist doctors in making diagnosis and treatment plans, offering timely guidance.

## ● Continuously monitoring

Monitoring changes in the condition and treatment effects throughout the process ensures continuous safety assurance.

## ● Individualized respiratory management

Individualized and precise treatment can provide more direct and timely guidance for accelerating the recovery of patients.

## ● Easy to use

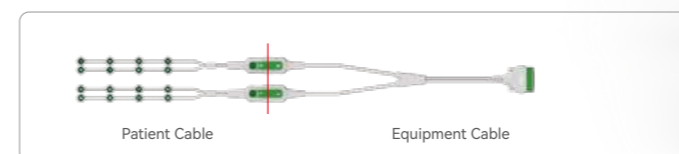
The belt is easy to position and operates with simplicity. Image acquisition is rapid and intuitive, facilitating clear and immediate interpretation by healthcare workers.

### Accessories

Electrode Belts	

Electrode Belts Size	
Chest Circumference	Suggest Model
35.5~44.5cm	4XS
41.5~52.5cm	3XS
49~60 cm	2XS
57.5~72.5 cm	XS
70~85cm	SS
80~96 cm	S
92~110cm	M
106~127cm	L
124~150cm	XL

### Cables



# Infivision ET1000 Features

WE ARE EIT

## Exclusive Technology

The world's pioneer in pulse wave perfusion imaging, which is contrast agent free and completely non-invasive.

## Real Time

To see the pulmonary functional changes without any delay.

## Non-Invasive

Ensuring safety, minimizing risks and enhancing patient comfort.

## Radiation Free

Eliminates the risks associated with radiation, ensuring patient well-being with repeated use.

## Functional Imaging

Functional imaging assists health workers in observing changes in medical conditions by visualizing pulmonary ventilation and perfusion alterations.

## Bedside

Safeguard stands next to the patients, saving both cost & time.

## Portable Design

Ultra-portable, easy to carry, ideal for on-the-spot ICU use.

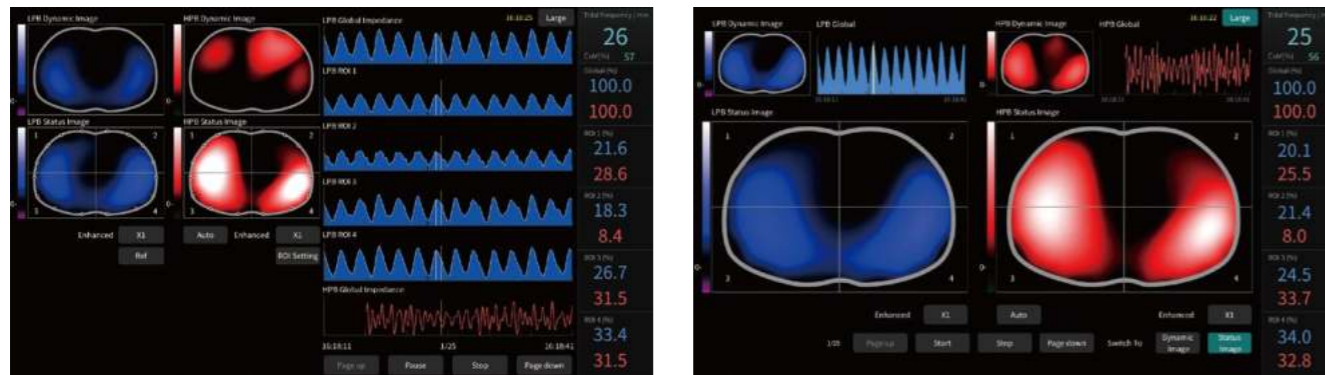
## Facilitating Research

Supports data export and empowers in-depth scientific research by providing specialized data analysis software (ETSA), enabling comprehensive study and innovation in medical science.



# Diverse Analysis tools

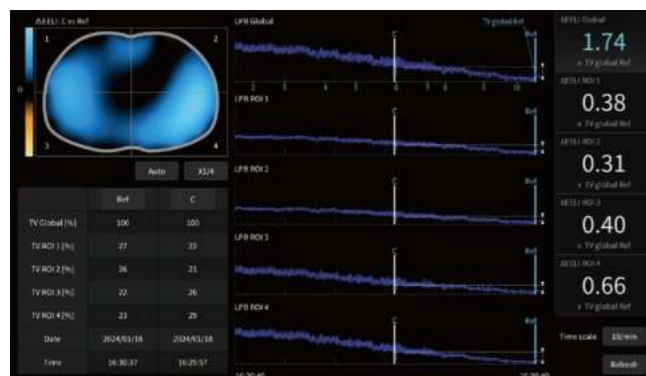
## Main View ( Main View & Large Mode )



Provides several sections to help quickly assess key pulmonary function information which include:

- Continuous, dynamic images of ventilation and perfusion.
- Status images of overall and region-of-interest distribution of ventilation and perfusion.
- Display the numerical values or percentages for regional respiratory and perfusion impedance changes & display the ratio of the center of ventilation COV%.

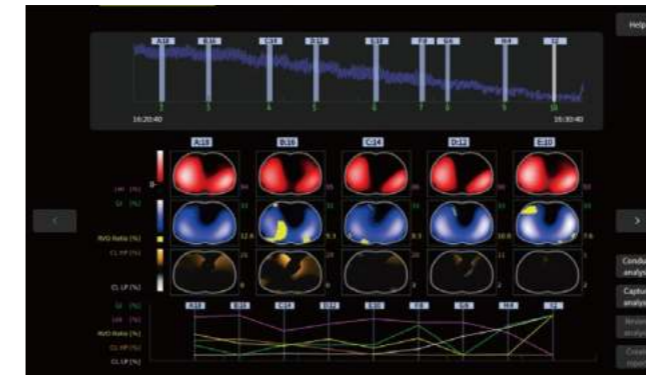
## ΔEELI View



This view is used to assess the changes of End Expiratory Lung Impedance ( $\Delta$ EELI) to

- Evaluate changes in  $\Delta$ End-expiratory lung volume ( $\Delta$ EELV) which reflect alterations in Functional Residual Capacity (FRC) (Ex-After modifying the Positive End-Expiratory Pressure (PEEP), applying recruitment maneuvers, or proning the patient).
- Aiding in the detection of possible recruitment of individual lung areas.
- Aiding in the detection of possible derecruitment of individual lung areas.

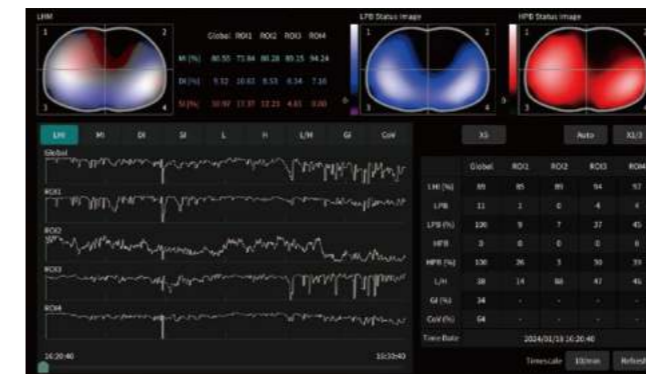
## Analysis View



Allows the analysis of regional compliance changes and delays in regional ventilation in addition to the evaluation of ventilation & perfusion distribution.

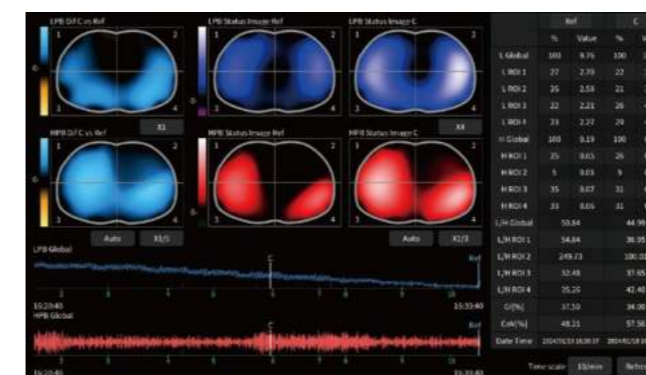
- Automatically evaluate progressive and regressive PEEP adjustments to identify the optimal PEEP that effectively balances between over-expansion and collapse.
- Evaluate the potential for lung recruitment.
- Shows the correlation degree between ventilation and perfusion, based on impedance variation status images.

## Match View



Facilitating research by giving more information such as MI (match index), DI (deadspace index), SI (shunt index) and related waveforms to observe and explore more.

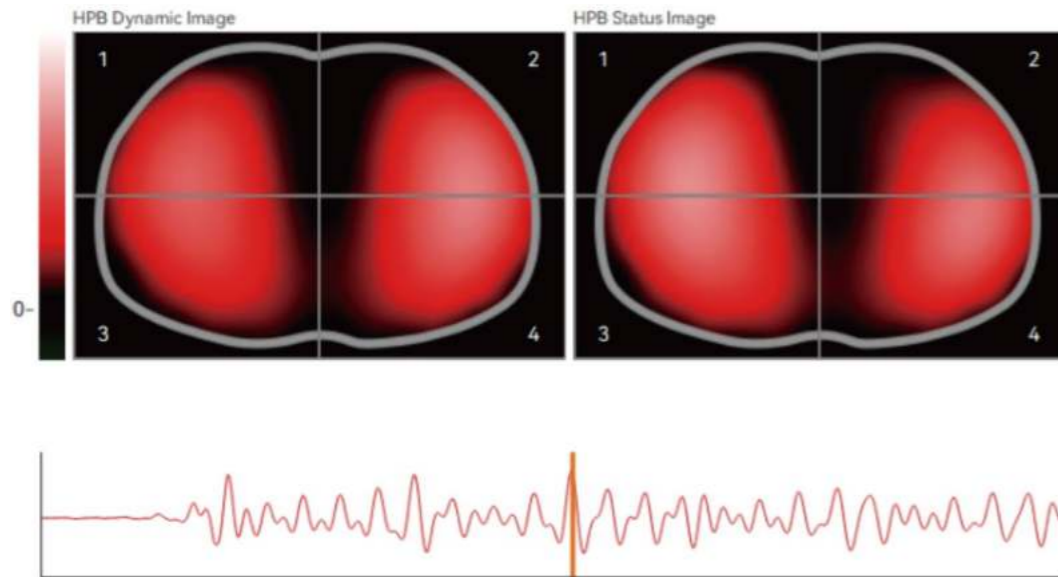
## Trend View



Compares the respiratory and perfusion images corresponding to any two given time points to

- Help to identify possible overdistension.
- To detect the onset of derecruitment during PEEP titration.
- Identify ARDS patients' response to a recruitment maneuver.

# Perfusion Imaging in Infivision ET1000



## What is the principle to measure perfusion?

A: Impedance signal filtered to evaluate the propagation of pressure waves through the pulmonary vascular bed has been historically termed as “pulsatility”<sup>[1]</sup>. The signal could be influenced by the change of lung volume during respiration or the simple propagation (pulsation) of waves into the vessel wall without flow inside<sup>[2]</sup>.

## How are the signals for lung perfusion imaging obtained?

A: The signals are obtained from the changes in electric potentials on the chest surface, which occur due to both respiratory and cardiac activities. These activities affect both lung resistivity. Cardiac related signals, producing alteration of resistivity due to the movement of blood in the heart and lungs are separated from those related to variation of lung volume during respiration.

## What is the principle behind lung perfusion imaging used in the Infivision ET1000 equipment?

A: Lung perfusion imaging with Infivision ET1000 involves a non-invasive technique that giving small alternating currents into the chest through the electrodes in a scanning manner to produce different electric potentials ultimately converting into a frame with electric potential differences, which are then used for the image reconstruction.

## How is the perfusion signal extracted from the measured signals?

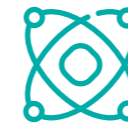
A: The perfusion signals are extracted using frequency-domain filtering techniques. By analyzing the spectrum of the measured signal, the cardiac signal, which occurs at higher frequencies than the respiratory signal, can be isolated using a digital band-pass filter.

[1] Gao, Y., Zhang, K., Li, M. et al. Feasibility of 3D-EIT in identifying lung perfusion defect and V/Q mismatch in a patient with VA-ECMO. Crit Care 28, 90 (2024).

[2] Stowe S, Boyle A, Sage M, Nadeau M, Praud J-P, Fortin-Pellerin É, Adler A. A Comparison of EIT Lung Perfusion Measures. Proceedings of the 19th International Conference on Biomedical Applications of Electrical Impedance Tomography (EIT 2018), Edinburgh, UK. 2018.

# Clinical Applications

## Multiple Departments



- Intensive Care Unit/Operating Room/Emergency Department
- Department of Respiratory
- Department of Rehabilitation
- Department of Cardiothoracic Surgery
- Other departments requiring ventilation/perfusion monitoring

## Multiple Diseases



- Pneumonia
- ARDS
- COPD
- Pleural effusion
- -Hemothorax
- Pneumothorax
- Pulmonary embolism/Thrombolysis
- Pulmonary arterial hypertension
- Individualized PEEP titration
- Ventilation heterogeneity
- Assessment of lung recruitment maneuver
- Prone positioning
- Weaning
- Pendelluft
- Assessment of HFNC
- Perioperative respiratory management

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## Clinical case 1

### Patient Information:

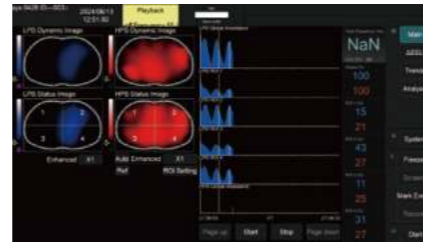
Gender: Male

Diagnosis: Septic shock and kidney dysfunction and ARDS



#### Pre-Therapy Assessment:

Patient with ARDS, severe respiratory failure ( $P_{aO_2}/F_{iO_2}=60\text{mmHg}$ ), not candidate to ECMO and prone position due to hemodynamic instability. Inhomogeneous involvement and near complete atelectasis of right lung, not recruited by protective ventilation in the presence of equal perfusion (Infivision ET1000).



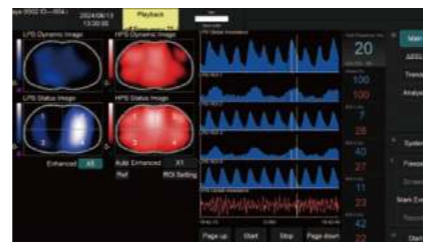
#### Therapeutic Intervention:

Independent lung ventilation with double lumen intubation guided by Infivision ET1000 applying 20cmH<sub>2</sub>O of PEEP on right lung and protective ventilation on left determined slow recruitment of closed lung ameliorating oxygenation, and conventional imaging.

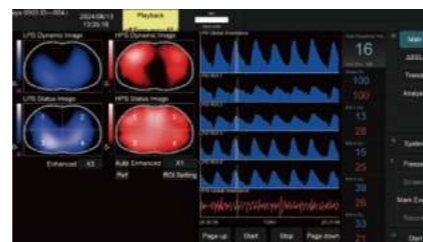


#### Post-Therapy Assessment:

X-ray and Infivision ET1000 demonstrated improvement in the right lung through independent ventilation.



Resolution of ARDS with normal recruitment of both lungs and normal perfusion (Pulsatility).



## Clinical case 2

### Patient Information:

Gender: Male

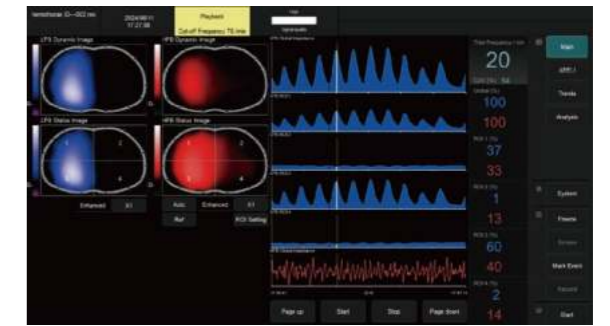
Diagnosis: Complete collapse of the left lung determined by massive hemothorax



#### Pre-Therapy Assessment:

Infivision ET1000 Images & ultrasound:

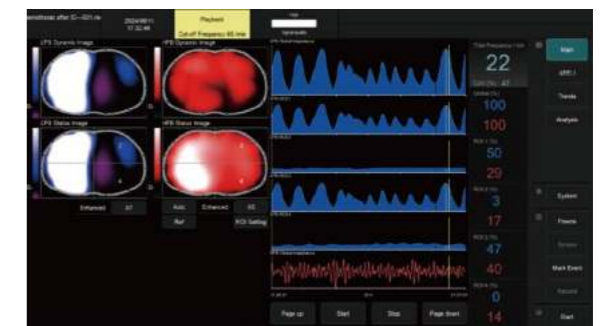
Revealed a complete absence of ventilation and perfusion in the collapsed left lung due to the hemothorax.



#### Therapeutic Intervention:

Surgical Procedure:

Hemothorax assessment followed by surgical toilette.



#### Post-Therapy Assessment:

Physiological shunt secondary to hypoxic vasoconstriction and reduction of perfusion on left side determined by persistence left lung collapse despite surgery, confirmed with lung ultrasound.

Only small aeration of ventral part of the left lung was detectable in Infivision ET1000.

\* Courtesy of Dr. Baldassare Ferro, MD., Ospedali Riuniti di Livorno, Italia