A new view of ventilation

5 things to know about Electrical Impedance Tomography



EIT makes regional ventilation visible

Conventional ventilator monitoring provides essential information, including tidal volume, airway pressures, compliance, resistance, and oxygenation trends. However, these values reflect the respiratory system as a whole.

EIT adds regional information by continuously visualizing how ventilation is distributed within the lungs. This can help clinicians move beyond the question, "How much ventilation is being delivered?" and begin asking, "Where is that ventilation going?" [1,3]



EIT brings radiation-free imaging to the bedside

EIT does not use ionizing radiation. Instead, it uses low-amplitude electrical currents applied through electrodes placed around the chest to measure changes in thoracic impedance.

Because EIT is radiation-free and available at the bedside, it can support repeated assessments when clinicians need updated information during changing clinical conditions.[1,3]



EIT can help clinicians evaluate response to interventions

Ventilation is dynamic. Regional ventilation patterns may change after a recruitment maneuver, PEEP adjustment, patient repositioning, or other clinical intervention.

By visualizing regional ventilation continuously, EIT can provide additional context as clinicians assess the impact of these changes at the bedside.[1,3]



EIT adds trend-based insight

EIT measures changes in regional lung impedance as air moves in and out of the lungs. One EIT-derived trend, end-expiratory lung impedance, or EELZ, reflects impedance at the end of exhalation.

During PEEP adjustments or recruitment maneuvers, changes in EELZ may help clinicians assess patterns consistent with recruitment or derecruitment. EIT supports advanced functional lung imaging through trends like EELZ, adding regional context to PEEP and recruitment assessments.[1–4]



EIT supports individualized ventilation assessment

Mechanical ventilation is not one-size-fits-all. Lung condition, recruitability, positioning, disease progression, and response to interventions can vary significantly from patient to patient.

By providing continuous regional ventilation information, EIT can support a more individualized approach to ventilation assessment. It does not replace conventional monitoring, imaging, or clinical judgment. Instead, it complements existing information by adding a regional view of ventilation at the bedside.[2,3]

Key takeaway

EIT helps bring regional ventilation into the clinical conversation. By complementing traditional ventilator monitoring with regional information, EIT can help clinicians explore questions such as:

- ✓ Where is ventilation going?
- ✓ How did ventilation distribution change after an intervention?
- ✓ Are different lung regions behaving differently?

References

1 **https://pubmed.ncbi.nlm.nih.gov/27596161/**
Frerichs I, Amato MBP, van Kaam AH, et al. Chest electrical impedance tomography examination, data analysis, terminology, clinical use and recommendations: consensus statement of the Translational EIT Development Study Group. Thorax. 2017.

2 **https://pubmed.ncbi.nlm.nih.gov/34352563/**
Sella N, Pettenuzzo T, Zarantonello F, Andreatta G, De Cassai A, Schiavolin C, Simoni C, Pasin L, Boscolo A, Navalesi P. Electrical impedance tomography: A compass for the safe route to optimal PEEP. Respir Med. 2021 Oct;187:106555.

3 **https://pubmed.ncbi.nlm.nih.gov/38127779/**
Franchineau G, Jonkman AH, Piquilloud L, Yoshida T, Costa E, Rozé H, Camporota L, Piraino T, Spinelli E, Combes A, Alcala GC, Amato M, Mauri T, Frerichs I, Brochard LJ, Schmidt M. Electrical Impedance Tomography to Monitor Hypoxemic Respiratory Failure. Am J Respir Crit Care Med. 2024 Mar 15;209(6):670-682.

4 **https://pubmed.ncbi.nlm.nih.gov/22092203/**
Grivans C, Lundin S, Stenqvist O, Lindgren S. Positive end-expiratory pressure-induced changes in end-expiratory lung volume measured by spirometry and electric impedance tomography. Acta Anaesthesiol Scand. 2011 Oct;55(9):1068-77.

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