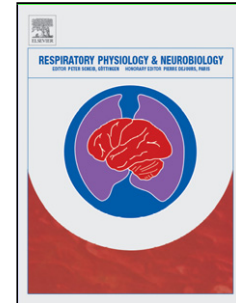


Accepted Manuscript

Title: Lung Pathologies analyzed with Multi-Frequency Electrical Impedance Tomography: Pilot Animal Study

Author: Susana Aguiar Santos Michael Czaplik Jakob Orschulik Nadine Hochhausen Steffen Leonhardt



PII: S1569-9048(18)30028-4
DOI: <https://doi.org/doi:10.1016/j.resp.2018.03.016>
Reference: RESPNB 2951

To appear in: *Respiratory Physiology & Neurobiology*

Received date: 30-1-2018
Revised date: 13-3-2018
Accepted date: 30-3-2018

Please cite this article as: Susana Aguiar Santos, Michael Czaplik, Jakob Orschulik, Nadine Hochhausen, Steffen Leonhardt, Lung Pathologies analyzed with Multi-Frequency Electrical Impedance Tomography: Pilot Animal Study, *Respiratory Physiology & Neurobiology* (2018), <https://doi.org/10.1016/j.resp.2018.03.016>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Lung Pathologies analyzed with Multi-Frequency Electrical Impedance Tomography: Pilot Animal Study

Susana Aguiar Santos^{a,*}, Michael Czaplik^b, Jakob Orschulik^a, Nadine Hochhausen^b, Steffen Leonhardt^a

^a*Philips Chair for Medical Information Technology, RWTH Aachen University, Germany*

^b*Department of Anesthesiology, RWTH Aachen University Hospital, Germany*

Abstract

In critically ill patients, correct diagnosis of lung disease is essential for successful therapy. Therefore, this study investigated whether new multi-frequency electrical impedance tomography (mfEIT) can detect, monitor and differentiate between pathologies associated with the acute respiratory distress syndrome (ARDS).

For this pilot study, 12 pigs were randomized into an ARDS (bronchoalveolar lavage) group (n=7) and a healthy control group (n=5). Animals were monitored by means of mfEIT. In addition to functional images, a new impaired-ventilation (rImpVent) index was developed and frequency-difference images were computed and analyzed.

Amplitude functional images revealed only small differences between the groups. However, phase functional images were of greater importance in distinguishing between lung pathologies. Correlation images showed substantial differences between the two groups. The new rImpVent index achieved high sensitivity (91%) and specificity (92%) in detecting $\text{PaO}_2/\text{FiO}_2 \leq 200$ mmHg. mfEIT was able to detect lung edema, differentiate this from atelectasis, and also monitor their progress over time in terms of global and regional differences.

Keywords: EIT, lung monitoring, ARDS, atelectasis, lung edema

*Corresponding author

Email address: santos@hia.rwth-aachen.de (Susana Aguiar Santos)

Download English Version:

<https://daneshyari.com/en/article/8650773>

Download Persian Version:

<https://daneshyari.com/article/8650773>

[Daneshyari.com](https://daneshyari.com)