

Document details


[< Back to results](#) | 1 of 1
[↗ Export](#)
[↓ Download](#)
[🖨 Print](#)
[✉ E-mail](#)
[Save to PDF](#)
[☆ Add to List](#)
[More... >](#)
[Full Text](#)
[View at Publisher](#)

IFMBE Proceedings

Volume 67, 2018, Pages 27-33

2nd International Conference for Innovation in Biomedical Engineering and Life Sciences, ICIBEL 2017, held in conjunction with the 10th Asia Pacific Conference on Medical and Biological Engineering, APCMBE 2017; Penang; Malaysia; 10 December 2017 through 13 December 2017; Code 208329

Model iterative airway pressure reconstruction during mechanical ventilation asynchrony: Shapes and sizes of reconstruction (Conference Paper)

Tan, C.P.^a, Chiew, Y.S.^a ✉, Geoffrey Chase, J.^b, Chiew, Y.W.^c, Pretty, C.^b, Desai, T.^d, Ralib, A.M.^e, Mat, M.B.^e 

^aSchool of Engineering and Advanced Engineering Platform Health Cluster, Monash University Malaysia, Selangor, Malaysia

^bUniversity of Canterbury, Christchurch, New Zealand

^cLam Wah Ee Hospital, George Town, Pulau Pinang, Malaysia

[View additional affiliations](#) ∨

Abstract

[∨ View references \(25\)](#)

Model-based methods estimating patient-specific respiratory mechanics may help intensive care clinicians in setting optimal ventilation parameters. However, these methods rely heavily on the quality of measured airway pressure and flow profiles for reliable respiratory mechanics estimation. Thus, asynchronous and/or spontaneous breathing cycles that do not follow a typical passive airway profile affect the performance and reliability of model-based methods. In this study, a model iterative airway pressure reconstruction method is presented. It aims to reconstruct a measured airway pressure affected by asynchronous breathing iteratively, trying to match the profile of passive breaths with no asynchrony or spontaneous breathing effort. Thus, reducing the variability of identified respiratory mechanics over short time periods where changes would be due only to asynchrony or spontaneous artefacts. A total of 2000 breathing cycles from mechanically ventilated patients with known asynchronous breathing were analyzed. It was found that this method is capable of reconstructing an airway pressure free from asynchronous or spontaneous breathing effort. This work focuses on several cases, detailing how iterative pressure reconstruction method performs under different cases, as well as its limitation. © 2018, Springer Science+Business Media Singapore.

Author keywords

Airway pressure reconstruction Asynchrony Mechanical ventilation Spontaneous breathing

Indexed keywords

Engineering controlled terms: Biomedical engineering Mechanics Pressure Respiratory mechanics Ventilation

Compendex keywords: Airway pressures Asynchrony Mechanical ventilation Model-based method Patient specific Performance and reliabilities Reconstruction method Spontaneous breathing

Engineering main heading: Iterative methods

Funding details

Funding number	Funding sponsor	Acronym
	Ministry of Higher Education, Malaysia	MOHE

Metrics

0 Citations in Scopus

0 Field-Weighted Citation Impact



PlumX Metrics

Usage, Captures, Mentions, Social Media and Citations beyond Scopus.

Cited by 0 documents

Inform me when this document is cited in Scopus:

[Set citation alert >](#)

[Set citation feed >](#)

Related documents

Assessing mechanical ventilation asynchrony through iterative airway pressure reconstruction

Chiew, Y.S. , Tan, C.P. , Chase, J.G.
(2018) *Computer Methods and Programs in Biomedicine*

Respiratory mechanics assessment for reverse-triggered breathing cycles using pressure reconstruction

Major, V. , Corbett, S. , Redmond, D.
(2016) *Biomedical Signal Processing and Control*

Assessing respiratory mechanics of reverse-triggered breathing cycles-case study of two mechanically ventilated patients

Major, V. , Corbett, S. , Redmond, D.
(2015) *IFAC-PapersOnLine*

[View all related documents based on references](#)

[Find more related documents in Scopus based on:](#)

Funding number	Funding sponsor	Acronym	Authors >	Keywords >
FRGS/1/2016/TK03/MUSM/03/2	Ministry of Higher Education, Malaysia	MOHE		
	Health Research Council of New Zealand	HRC		
13/213	Health Research Council of New Zealand	HRC		

Funding text

Acknowledgements The authors would like to thank the Health Research Council of New Zealand (HRC) (Grant Number: 13/213), the Ministry of Higher Education Malaysia (MOHE) Fundamental research grant scheme (FRGS) (Ref: FRGS/1/2016/TK03/MUSM/03/2), and the Advanced Engineering Platform Health Cluster of Monash University Malaysia for funding this research.

ISSN: 16800737
ISBN: 978-981107553-7
Source Type: Conference Proceeding
Original language: English

DOI: 10.1007/978-981-10-7554-4_5
Document Type: Conference Paper
Volume Editors: Usman J., Ibrahim F., Ahmad M.Y., Teh S.J., Hamzah N.
Sponsors:
Publisher: Springer Verlag

References (25)

[View in search results format >](#)

All Export Print E-mail Save to PDF Create bibliography

- 1 Kretschmer, J., Wahl, A., Möller, K.
Dynamically generated models for medical decision support systems
(2011) *Computers in Biology and Medicine*, 41 (10), pp. 899-907. Cited 23 times.
doi: 10.1016/j.compbiomed.2011.08.001
[View at Publisher](#)
-
- 2 Penning, S., Le Compte, A.J., Moorhead, K.T., Desai, T., Massion, P., Preiser, J.-C., Shaw, G.M., (...), Chase, J.G.
First pilot trial of the STAR-Liege protocol for tight glycemic control in critically ill patients
(2012) *Computer Methods and Programs in Biomedicine*, 108 (2), pp. 844-859. Cited 8 times.
doi: 10.1016/j.cmpb.2011.07.003
[View at Publisher](#)
-
- 3 Tawhai, M.H., Hoffman, E.A., Lin, C.-L.
The lung physiome: Merging imaging-based measures with predictive computational models
(2009) *Wiley Interdisciplinary Reviews: Systems Biology and Medicine*, 1 (1), pp. 61-72. Cited 22 times.
http://onlinelibrary.wiley.com/store/10.1002/wsbm.17/asset/17_ftp.pdf?v=1&t=gnqztdpa&s=ccf8b8b1d0fc4a2d9794223caae073c665ca6f78
doi: 10.1002/wsbm.17
[View at Publisher](#)
-
- 4 Chiew, Y.
Feasibility of titrating PEEP to minimum elastance for mechanically ventilated patients
(2015) *Pilot Feasib. Stud*, 1 (1), p. 9. Cited 3 times.
-
- 5 Rees, S.E., Allerød, C., Murley, D., Zhao, Y., Smith, B.W., Kjærgaard, S., Thorgaard, P., (...), Andreassen, S.
Using physiological models and decision theory for selecting appropriate ventilator settings
(2006) *Journal of Clinical Monitoring and Computing*, 20 (6), pp. 421-429. Cited 58 times.
doi: 10.1007/s10877-006-9049-5
[View at Publisher](#)