

The following manuscript was accepted for publication in Pharmaceutical Sciences. It is assigned to an issue after technical editing, formatting for publication and author proofing Citation: Khoubnasabjafari M, Pourfathi H, Mahmoodpoor A, Jouyban A. Waste of mechanical ventilators as a biological sample for follow up of biomarkers and drugs, Pharm. Sci. 2020, doi: 10.34172/PS.2020.20

Editorial

Waste of mechanical ventilators as a biological sample for follow up of biomarkers and drugs

Maryam Khoubnasabjafari¹, Hojjat Pourfathi², Ata Mahmoodpoor³, Abolghasem Jouyban^{4,5,*}

¹Tuberculosis and Lung Diseases Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

²Department of Anesthesiology, Faculty of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran

³Anesthesiology Research Team, Tabriz University of Medical Sciences, Tabriz, Iran

⁴Pharmaceutical Analysis Research Center and Faculty of Pharmacy, Tabriz University of Medical Sciences, Tabriz, Iran

⁵Digestive Diseases Research Institute, Tehran University of Medical Sciences, Tehran, Iran

Email address: ajouyban@hotmail.com (A. Jouyban).

Determination of biomarkers or drugs in blood or urine is used in biomedical sciences for early diagnosis or better management of diseases for many decades. These samples have their advantages and disadvantages and search for new biological samples is ongoing. Exhaled breath condensate (EBC) is one of the attractive alternatives in this area,¹⁻³ especially for follow up in lung diseases⁴ and devices were marketed to collect EBC samples.¹ The mechanism of the presence of non-volatile compounds in EBC is well-established⁵ and the EBC of sample donors with normal breath (cautious patients or healthy sample donors) is collected using the cool traps.¹ The small droplets of lung lining fluid are condensed in the outlet of mechanical ventilators and these collected liquids are treated as waste in daily practice of critical care units.

This editorial aims to hypothesize that, the collected liquid in the expiratory circuit of the mechanical ventilators (mechanically ventilated EBC, MVEBC) or the filter placed in the expiratory circuit could be treated as a new biological sample to follow up biomarkers and/or drugs concentrations and is capable of providing a new laboratory marker for better management of patients under mechanical ventilation. The concentration of phenytoin in two collected MVEBC samples were checked and detected in the samples and the results were in accordance with the administered dosage of the drug to the patients.

Monitoring biomarker/drug concentrations are required in clinical practice and MVEBC could be used as a safe and non-invasive tool for this purpose. Our very small pilot plan shows such a possibility and further investigations using large number of samples is ongoing. It is expected that the concentrations of analytes in MVEBC should be more than that of EBC samples collected at sub-zero temperatures which resulted in more water vapor condensation and more sample dilution.

References

1. Kuban P, Foret F. Exhaled breath condensate: Determination of nonvolatile compounds and their potential for clinical diagnosis and monitoring: A review. *Anal Chem Acta* 2013;805:1–18.

2. Rahimpour E, Khoubnasabjafari M, Jouyban-Gharamaleki V, Jouyban A. Non-volatile compounds in exhaled breath condensate: Review of methodological aspects and potential clinical applications. *Anal Bioanal Chem* 2018;410(25):6411-6440.
3. Khoubnasabjafari M, Rahimpour E, Jouyban A. Exhaled breath condensate as an alternative sample for drug monitoring. *Bioanalysis* 2018;10(2):61-64.

Accepted Manuscript