

Comparison and Reproducibility of the eNO-Measurement in Exhalate with different Devices

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Introduction:

The eNO (exhaled Nitric Oxide) is more and more interested in differential diagnosis and long term observation of allergic Asthma, Cough and corticoid sensitive COPD. Affordable devices are available in the meantime. By this reason more respect should be given to measuring techniques and accordance of measuring procedures with guidelines.

Material/Methods:

For this investigation were available NO-devices from Aerocrine, ECoPhysics, Medisoft and CardinalHealth. Measuring principles were chemiluminescence as well as specific electrochemical sensors.

Chemiluminescence based devices give an NO curve in correlation to spirogram whereas sensor based devices give a summary value within 15 to 30 sec.

For expiratory NO measurement is recommended an exhalation with 50 cc/sec against an airway pressure of 10 to 20 cmWater. And expiratory plateau of at least 4sec (children) or 6 sec in adults is needed. The devices should have an optical and /or acoustic feedback for the volunteer.

Results:

The measurements with different devices were comparable due to reported NO levels. The optical feedback was better than acoustic in patients handling.

In sensor-based devices was the partially long waiting time between two measurements sub optimal for repeated measurements. Some devices do not enable cost-neutral double measurements.

Influences between test and re test were not detectable. Reproducibility in the devices was high ($R^2 > 0,9$)

Comparison between the devices showed a sufficient correlation ($R^2 > 0,75$) in higher NO concentrations, not in NO levels below 15 ppb. Correlation in high eNO levels were more similar.

Discussion:

The tested system did at all not enable a calibration by the customer, only NIOX, Ecophysics and CardinalHealth. The usage and patients interface was most simple and easy to use in CardinalHealth system. A connection with praxis software and data bases should be one more aspect for the future. The CardinalHealth system generates a report with declaration of compliance with guidelines and a trend graphic.