Measurements of nasal NO concentration are helpful to screen for primary ciliary dyskinesia in children and infants with a suggestive clinical presentation. The best standardized method to sample nasal NO in isolation from the lower respiratory tract is performed with aspiration at a fixed flow through the nose while the subject exhales against resistance to close the velum. The time to NO plateau can be in excess of 30 seconds and the need to breathe against fixed resistance for this time makes this impractical in very young children.

We evaluated a new nasal NO sampling method (Fig.1) that does not require exhalation against resistance.

Nasal NO was measured in 15 healthy children (2–6 yrs old) using an electrochemical probe (Medisoft, Sorinnes, Belgium). Each child performed 4 measurements per nostril.

The new method consists of creating a parallel sampling circuit with air compensation. Nasal air is aspirated from one nostril and NO-free air is replenished to the other nostril thus creating a constant flow through both nasal cavities in series.

This maintains the intranasal pressure constant. The sampling flow rate is kept constant at 250 ml/min and CO2 is monitored in real-time to ensure that there is no entrainment of gas from the pharynx that might contaminate the sample with lower respiratory NO.

The main outcome parameters include: fractional concentration of nasal NO (eNO), nasal NO output (VNO), length of the nasal NO plateau and reproducibility (coefficient of variation from 4 measurements) for each nostril.

Results

All subjects were able to perform the 4 tests for each side, with a low CoV (Median = 6.13%). VNO measured ranged from 48.6 to 254.8 nL/min. However, there was a significant difference between values obtained from the 2 nostrils (Wilcoxon test, p<0.01) for unclear reasons.

In most cases, the plateau lasted longer than 10 seconds. In general CO2 levels were very low indicating veil closure (Median = 0.62% and 95%CI = 0.569 %– 0.672%). No relationship was found between age and nasal NO plateau length.

Another example in Fig. 2B shows that the change in transnasal pressure might lead to alveolar air admixture and by consequence, fluctuation of the nasal NO signal.

Conclusion

The new method offers considerable advantages over the conventional technique. The control lower respiratory tract air contamination (CO2 monitoring) is assured, the measurement requires only tidal breathing with no effort, thus making the measurement easier to perform even with the small children under 5 years old.

The authors have no conflict of interest.