USZ Universitäts Spital Zürich

NASAL HIGH FREQUENCY OSCILLATORY HIGH-FLOW THERAPY IN PRETERM INFANTS: A RANDOMIZED CROSSOVER TRIAL

OSCI-FLOW

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Background – nCPAP and High-flow

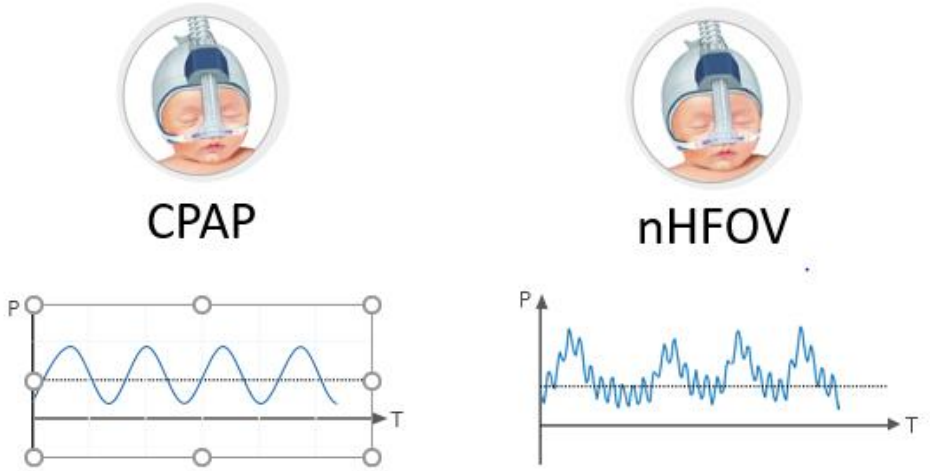
nCPAP

High-flow

Manley 2013, 2016, 2019. Roberts 2014. Klingenberg 2014.

Background – Non-invasive high frequency oscillatory ventilation

nHFOV

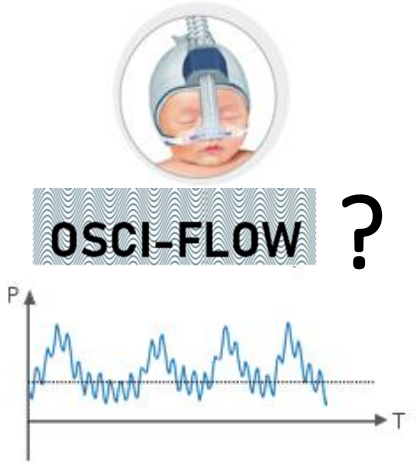


nHFOV vs. nCPAP

- Less need for mechanical ventilation
- Lower CO_2
- Less desaturations and bradycardia

Shehadeh 2019, Rüegger 2018.

Background – High-flow with high frequency oscillations



- No clinical data
- Silicon model (High-flow with oscillations vs. standard High-flow
  - Lower CO_2
  - Lower MAP

Sivieri 2019, Rub 2019.

Methods – Prospective, randomized crossover study

P	Preterm infants <35 weeks gestational age More than 3 days old nCPAP, PEEP 5 mbar, FiO_2 <0.3 Treatment with caffeine citrate for apnea of prematurity
I	Osci-flow for 3 hours
C	High-flow for 3 hours
O	Difference in the combined number of episodes of desaturations and bradycardia

Methods – Electrical Impedance Tomography (EIT)

Methods – Osci-flow

SLE6000 infant ventilator (Anandic, UK)

High-flow nasal cannula (Fisher and Paykel)

‘Osci-flow’

nHFOV mode

- Frequency 6 Hz
- Amplitude 20 mbar
- I:E ratio 1:1
- MAP titrated to create a flow of 4l/min

High-flow

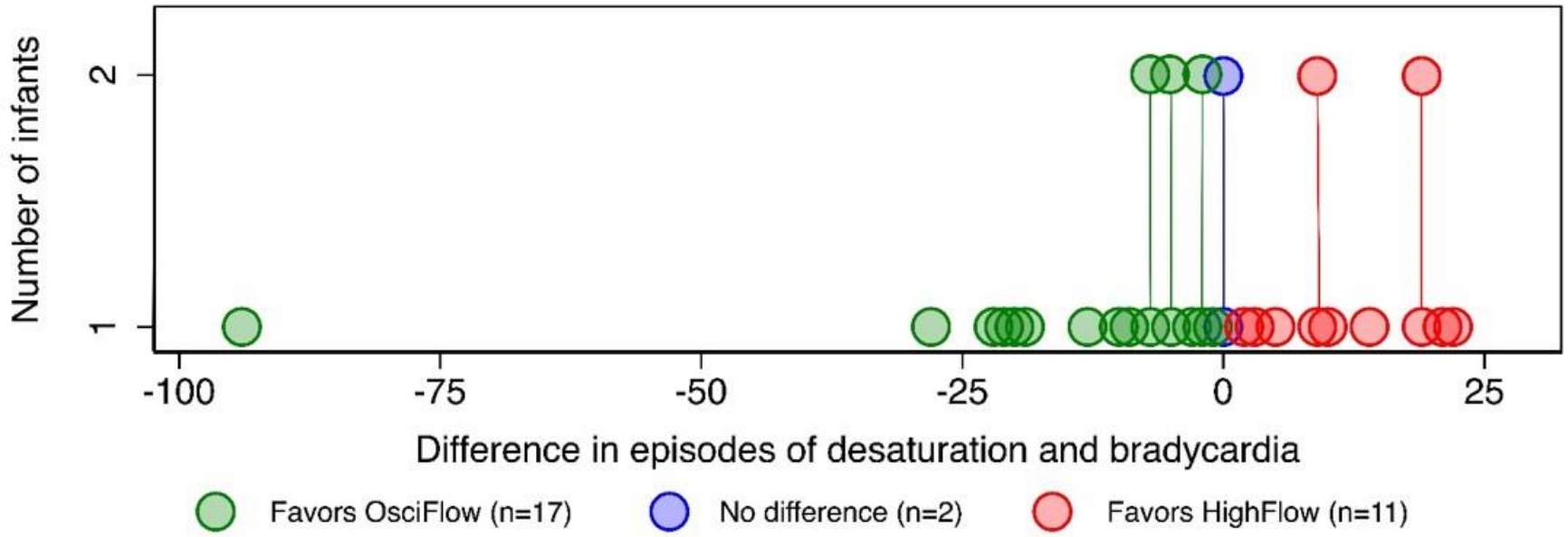
- 4 l/min

Results – Demographics

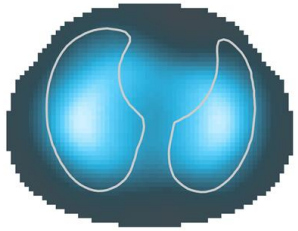
Patient characteristics	N=30
Gestational age, weeks	26.9 (25.3 to 28.0)
Birth weight, g	770 (660 to 1150)
Postnatal age, days	47 (31 to 54)
Postmenstural age, weeks	33.1 (32.1 to 34.0)
Weight at study, g	1760 (1590 to 1870)

Results – Primary Outcome

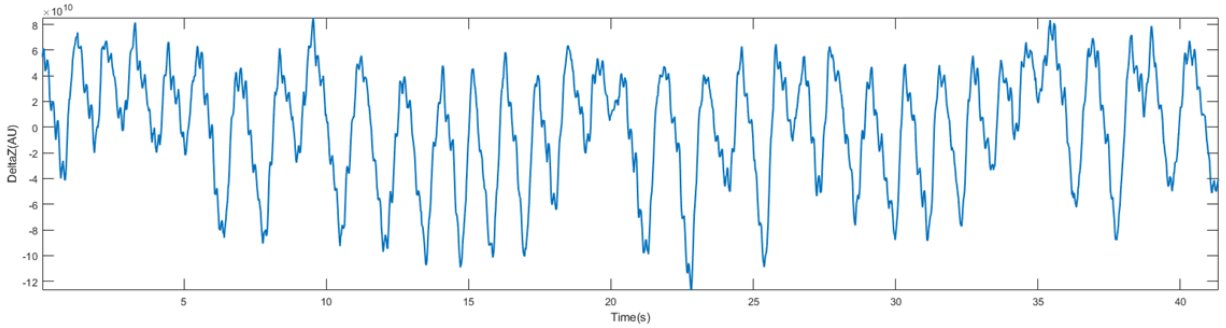
	Osci-flow	High-flow	Paired difference	p-value
Number of desaturations and bradycardia	20 (6 to 49)	26 (6 to 44)	-2 (-10 to 9)	0.37

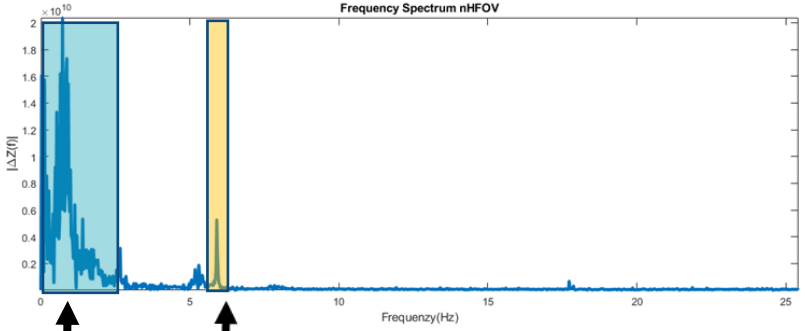


Results – EIT data



Osci-flow

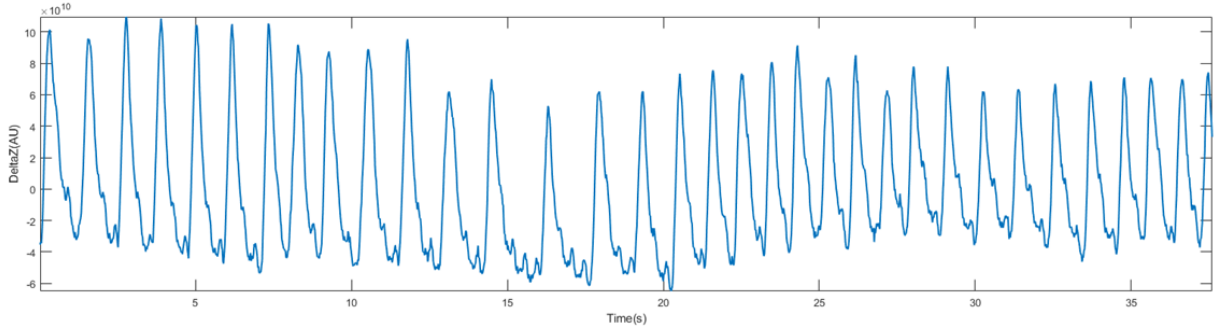


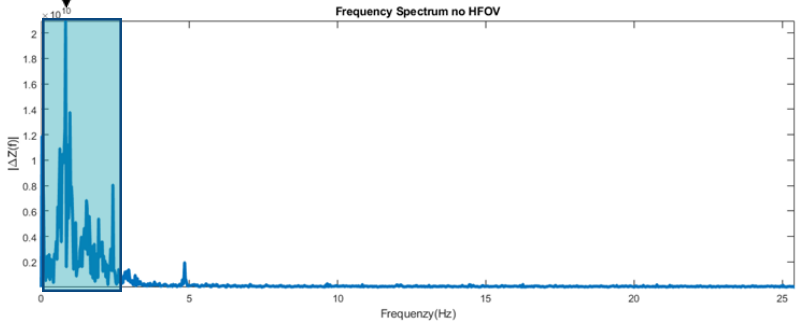


Tidal volume

Oscillation signal

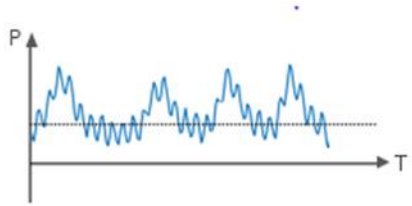
High-flow





Discussion and conclusions

OSCI-FLOW



- No difference in the number of desaturation and bradycardia between Osci-Flow and High-Flow
- No difference in gas exchange and cardiorespiratory parameters
- Safe and well tolerated
- Transmission of oscillations to the lungs demonstrated by EIT

Thank you for your attention

Many thanks to the study team

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Prof. Dr. Dirk Bassler

Dr. Vincent Gaertner

Dr. Leonie Plastina

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