A555 - Microvascular effects of hyperoxia and mild hypoxia in anesthetized rats.

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Introduction:
The aim of this study was to evaluate the effects of hyperoxia and mild hypoxia on microcirculatory perfusion in a rat model.

Methods:
Spontaneously breathing anesthetized (isoflurane) male Wistar rats (n=12) were equipped with arterial (left carotid) and venous (right jugular) cannulae and tracheotomy. Rats were randomized in 3 groups: normoxia – inspired oxygen fraction (FiO₂) of 0.21; hyperoxia – FiO₂ 1; mild hypoxia – FiO₂ 0.15. The following measurements were taken hourly for 4 hours: blood gases, mean arterial pressure (MAP), stroke volume index (SVI) and heart rate (echocardiography), skeletal muscle microvascular density (sidestream dark field videomicroscopy).

Results:
At 1 hour, arterial O₂ tension was 103±19 mmHg in normoxia, 296±60 mmHg in hyperoxia, 62±8 mmHg in mild hypoxia (p<0.001). Hyperoxia induced an increase in MAP (from 109±13 to 129±8 mmHg at 1h, p<0.05) and a decrease in SVI (from 0.67±0.1 to 0.59±0.1 ml/kg at 1h, p<0.05), while in mild hypoxia MAP tended to decrease and SVI tended to increase (p>0.05). Microvascular density decreased in hyperoxia and increased in mild hypoxia (Figure 1).

Conclusion:
In anesthetized rats, microvascular density decreased with hyperoxia and increased with mild hypoxia.
**Vessel Surface (delta%)**

Two-way ANOVA
p<0.001

*p<0.05, **p<0.01, ***p<0.001
Vs. Normoxia

**Total Vessel Density (delta%)**

Two-way ANOVA
p<0.05

*p<0.05 Vs. Normoxia

- ○ Normoxia (FiO2 21%)
- ■ Hyperoxia (FiO2 100%)
- ▲ Mild hypoxia (FiO2 15%)
Changes in microvascular density