

## Poster Presentations — B17

### A New Pig Model of Induced Bronchospasm

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**Introduction:** Asthma crisis is a severe medical emergency that requires immediate treatment. For these reasons, the precise evaluation of new therapeutic modalities such as helium inhalation are difficult to perform. Animal models are therefore mandatory. Unfortunately, the models available in the literature are not really close to human physiology.<sup>1</sup> This work presents a new adult animal model of induced, reproducible, durable and reversible bronchospasm.

**Method:** Animals were cared for in accordance with the standards for care and use of laboratory animals set forth by the University of Louvain. Evaluations were performed on 9 pigs on different days. The animals were 3-4 months old and weighed approximately 50-60 kg each. On the study day, all animals are anesthetized with IM zolazepam 7.5 mg/kg and IM xylazine 2 mg/kg. An IV catheter is placed in an auricular vein and supplemental IV anesthesia is administered (propofol 1 mg/kg) before intubation with a 7.5 mm inner diameter cuffed endotracheal tube. Anesthesia is maintained with IV propofol 2 mg/kg/h. Vascular catheters are surgically placed (Swan-Ganz introducer 8.5 Fr in the left internal jugular vein for drug administration and inert gas infusion, Swan-Ganz CCO-SvO<sub>2</sub> in the right internal jugular vein and catheter for invasive blood pressure measurement in a carotid). The animals are ventilated in a volume control mode with an FiO<sub>2</sub> of 30% using a Servo 900C ventilator with a synchronized aerosol. Ventilation is adjusted according to the results of blood gas analysis. Baseline parameters are measured (i.e., BP, HR, PAP, SvO<sub>2</sub>, CO, T<sup>o</sup>, SpO<sub>2</sub>, EtCO<sub>2</sub>, patient and ventilator work of breath, peak inspiratory pressure). The bronchospasm is induced with an aerosol of methacholine. The initial concentration is 8 mg/ml and is then adjusted to obtain a stable state with a peak inspiratory pressure of approximately 40 mmHg. At this moment new inert gas measurements are recorded. Statistical methodology was based on ANOVA and ANOVA for repeated measures. P<0.05 was considered significant.(\*).

**Results:** Pulmonary function results before and during induced bronchospasm in pigs are presented on table. During all the manipulations including bronchospasm, hemodynamic parameters remained stable. The work of breath significantly increased. The inert gas measurements clearly demonstrated a ventilation-perfusion mismatch.

	Work of Breath of pig (J/l)	Compliance (1/cmH <sub>2</sub> O)	Resistance (cmH <sub>2</sub> O.l <sup>-1</sup> .s)	Peak pressure (cmH <sub>2</sub> O)	DA-aO <sub>2</sub> (mmHg)	Elastance (cmH <sub>2</sub> O/l)
Control	0.46 ∓ 0.12	0.045 ∓ 0.01	6.03 ∓ 1.43	17.1 ∓ 0.7	22.6 ∓ 3.2	28.40 ∓ 0.185
Bronchospasm	1.25 ∓ 0.056*	0.016 ∓ 0.001*	15.5 ∓ 3.2*	44.7 ∓ 3.2*	152.6 ∓ 8.2*	60.81 ∓ 0.31*

**Conclusion:** Our results confirm that this new animal model of acute, methacholine-induced bronchospasm in pigs adequately mimics adult human asthma crisis. Moreover, this model is easily reproducible.

**Reference:**

<sup>1</sup> The Lung, second edition 1997, chapter 95.

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