Supplementary Material

Comparison between variable and conventional volume-controlled ventilation on cardiorespiratory parameters in experimental emphysema

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ADDITIONAL METHODS



Figure S1. Experimental design for model characterization. SAL, intratracheal instillation of saline; ELA, intratracheal instillation of porcine pancreatic elastase.



Figure S2. Experimental timeline. V_T, tidal volume; RR, respiratory rate; pHa: arterial pH; I:E, inspiratory-to-expiratory ratio; PEEP, positive endexpiratory pressure; ZEEP, zero end-expiratory pressure; FIO₂, fraction of inspired oxygen; RL, Ringer's lactate; MAP, mean arterial pressure; VCV, conventional volume-controlled ventilation; VV, variable ventilation; Time 1: 1 hour mechanical ventilation; END: 2 hour mechanical ventilation; EELV: end-expiratory lung volume.

Gene	Primer	Primer sequences (5'-3')		
IL-6	Forward	CTC CGC AAG AGA CTT CCA G		
	Reverse	CTC CTC TCC GGA CTT GTG A		
CINC-1	Forward	TGC ACC CAA ACC GAA GTC AT		
	Reverse	TTG TCA GAA GCC AGC GTT CAC		
SP-D	Forward	AAATCTTCAGGGCGGCAAA		
	Reverse	GGCCTGCCTGCACATCTC		
Amphiregulin	Forward	TTTCGCTGGCGCTCTCA		
	Reverse	TTCCAACCCAGCTGCATAATG		
Ang-2	Forward	CAGCCAACCAGGTGATT		
	Reverse	AAGTTGGAAGGACCACATGC		
VEGF	Forward	CAG AAA GCC CAT GAA GTG GT		
	Reverse	ACA CAG GAC GGC TTG AAG AT		
36B4	Forward	AAT CCT GAG CGA TGT GCA G		
	Reverse	GCT GCC ATT GTC AAA CAC		

Table S1. Forward and reverse oligonucleotide sequences of target gene primers

Primers used in experiments. IL-6, interleukin-6; CINC-1, cytokine-induced neutrophil chemoattractant 1; SP-D, surfactant protein D; Ang-2, angiopoietin-2; VEGF, vascular endothelial growth factor; 36B4, acidic ribosomal phosphoprotein P0.



Figure S3. A. SAL animal. B. ELA animal. R, right lung; L, left lung. Analysis of Hounsfield units (HU) in the SAL animal: right lung, -543 HU (minimum) to -496 HU (maximum); left lung, -608 HU (minimum) to -525 HU (maximum). Analysis of HU in the ELA animal: right lung, -914 HU (minimum) to -466 HU (maximum); left lung, -929 HU (minimum) to -842 HU (maximum).



Figure S4. Mean arterial pressure (MAP) over time. Measurements were obtained at Baseline-PEEP, Time 1 (1 hour mechanical ventilation), and End (2 hours mechanical ventilation). Symbols represent the mean \pm standard deviation (SD) of 8 animals per group. SAL: animals that received saline and were analyzed 5 weeks after the last saline endotracheal instillation; ELA: animals that received elastase and were analyzed 5 weeks after the last elastase endotracheal instillation; VCV, conventional volume-controlled ventilation; VV, variable ventilation. Comparisons among groups (group effect), over time (time effects), and their interaction (time \times group effect) were performed by means of two-way repeated-measures ANOVA followed by Bonferroni's post-hoc test (p<0.05).

	SA	SAL		LA
	VCV	VV	VCV	VV
V _T (mL/kg)	6.0 ± 0.1	6.0 ± 0.1	5.9 ± 0.1	6.0 ± 0.3
CV of $V_T(\%)$	1.6 ± 0.4	1.7 ± 1.1	1.3 ± 0.7	2.1 ± 1.4
V' _E (mL.min ⁻¹)	150.1 ± 1.8	148.0 ± 2.6	147.4 ± 2.0	147.4 ± 2.0
E,RS (cmH ₂ O/mL)	3.9 ± 0.6	3.7 ± 0.3	4.0 ± 0.8	3.9 ± 0.3
E1, _{RS} (cmH ₂ O/mL)	3.7 ± 1.2	3.7 ± 0.9	3.9 ± 1.3	3.5 ± 0.8
E2, _{RS} (cmH ₂ O/mL)	0.13 ± 0.33	0.20 ± 0.26	0.55 ± 0.52	0.18 ± 0.46
R (cmH ₂ O/mL/s)	3.7 ± 0.6	3.7 ± 0.9	2.9 ± 1.3	3.5 ± 0.8
PEEPi (cmH ₂ O)	0.4 ± 0.0	0.4 ± 0.1	0.4 ± 0.1	0.4 ± 0.1
рНа	7.43 ± 0.06	7.41 ± 0.02	7.37 ± 0.10	7.40 ± 0.06
PaCO ₂ (mmHg)	34 ± 5	36 ± 4	41 ± 7	41 ± 4
PaO ₂ (mmHg)	97 ± 19	89 ± 30	82 ± 22	108 ± 27
HCO_3^- (mEq/L)	24 ± 2	23 ± 2	23 ± 4	25 ± 3

Table S2. Respiratory variables and blood gas analysis at Baseline ZEEP

SAL: animals that received saline and were analyzed 5 weeks after the last saline endotracheal instillation; ELA: animals that received elastase and were analyzed 5 weeks after the last elastase endotracheal instillation; VCV, volume-controlled ventilation; VV, variable ventilation; V_T, tidal volume; CV of V_T, coefficient of variation of tidal volume; V'_E, minute ventilation; E_{,RS}, dynamic lung elastance; E1_{,RS}, volume-independent elastance; R, airway resistance; PEEPi, intrinsic positive end-expiratory pressure; pHa, arterial pH; PaCO₂, arterial carbon dioxide partial pressure; PaO₂, arterial oxygen partial pressure; HCO₃⁻ bicarbonate. Values are given as mean \pm standard deviation of 8 animals/group.