

## Supplementary Material

### Effect of cardiogenic oscillations on trigger delay during pressure support ventilation

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## METHODS

### Effect of changes in the compliance of the respiratory system on cardiogenic oscillations

We programmed a standard inspiratory effort using the Active Servo Lung 5000 (ASL 5000, IngMar Medical™, Pennsylvania, USA), a breathing simulator which digitally controls a piston to simulate patient effort and respiratory system mechanics. For this study, ASL was set with a pulmonary compliance of 20 mL/cmH<sub>2</sub>O; airway resistance of 10 cmH<sub>2</sub>O·L<sup>-1</sup>·s, peak inspiratory effort of -10cmH<sub>2</sub>O; respiratory rate of 12 bpm; residual capacity of 500 mL.

Additionally, we also acquired data with different settings of pulmonary compliances (20, 40, 60 and 80 mL/cmH<sub>2</sub>O) using the Servo-I ventilator in order to assess the effect of changes in the compliance of the respiratory system on 1) cardiogenic oscillations displayed on airway pressure and flow curves (Figure S2), and 2) trigger performance (Table S6). We observed no significant change in time delay,  $\Delta P_{aw}$ , or WOB<sub>trig</sub> using different settings of compliance of the respiratory system. Likewise, airway pressure and flow waveforms did not change significantly with the different compliance levels.

### R Code for generating simulated cardiogenic oscillations

The code for generating the cardiogenic oscillations on top of the muscle pressure curve was written in R version 3.4.1:

```
# -Global parameters####
freq_aq = 512 # frequency of acquisition (ASL)
numero_de_ciclos = 20 # number of cycles

# -Pmus_parameters####
t_subida = 1 # upslope time
t_descida = 0.25 # downslope time
t_relaxado = 3.75 # 'relaxed' time
amplitude = 10 # amplitude

# -Heart beat parameters####
FC = 1.4 # Heart rate in Hz
amplitude_oscilacao = 0.25 # amplitude of the cardiogenic oscillation
relacao_contracao_relaxamento = 1/3 # ratio between systole and diastole

# -Creating the Pmus####
```

```

t_ins_1 = seq(from = 0, to = t_subida, by = 1/freq_aq)
t_ins_2 = seq(from = 0, to = t_descida, by = 1/freq_aq)
pmus_1 = amplitude*sin(t_ins_1*0.5*pi/t_subida)
pmus_2 = amplitude*sin(pi/2 + t_ins_2*0.5*pi/t_descida)
exp = rep(0, freq_aq * t_relaxado)
pmus = c(pmus_1, pmus_2, exp)

# -Isolated cardiogenic oscillation####
t_card = seq(from = 0, to = relacao_contracao_relaxamento/FC, by =
1/freq_aq)
oscilacao_cardiogenica = amplitude_oscilacao *
sin(t_card*pi*FC/relacao_contracao_relaxamento)
diast = rep(0, 1024/(FC / relacao_contracao_relaxamento))
oscilacao_isolada = c(oscilacao_cardiogenica, diast)
t_ciclo_cardicao = seq(from = 0, along.with = oscilacao_isolada)/512
num_ciclos = round(length(pmus)/length(oscilacao_isolada)) + 1
oscilacao = rep(oscilacao_isolada, num_ciclos)[1:length(pmus)]

# -Cardiogenic oscillation on top of Pmus####
Pmus_com_oscilacao = rep(-pmus - oscilacao, numero_de_ciclos)
t = seq(from = 0, along.with = Pmus_com_oscilacao)/512
plot(Pmus_com_oscilacao ~ t, type = 'l', bty = 'n', lwd = 2, ylab =
expression(bold('Pmus (cmH2*O)')), xlab = 'Tempo (s)', font.lab = 2)

# -Saves files for ASL5000####
num_files = length(Pmus_com_oscilacao)/(20*512) # 20-sec window
for (i in 1:num_files){
  write.table(x = Pmus_com_oscilacao[(20*512*(i-1)+1):(20*512*i)], file =
paste('Pmus_com_oscilacao_', i, '.txt'), row.names = F, col.names = F)
}

```

**Table S1.** Specification of mechanical ventilators tested

<b>Ventilator</b>	<b>Flow Trigger Sensitivity</b>	<b>Inspiratory Rise Time</b>	<b>Inspiratory Flow</b>	<b>Bias Flow</b>
Evita XL	0.3 – 15 L/min or when inspiratory volume > 25mL (for adults)	0 – 2 s	6 – 120 L/min	None
Servo-i	0 – 100% (fraction of the fixed bias flow)	0 – 0.2 s	0 – 200 L/min	Fixed; 2 L/min
PB840	0.1 – 10 L/min	1 – 100 %	0 – 200 L/min	Variable; Flow trigger +1.5 L/min
Fleximag	0 – 30 L/min	0 – 2 s	1 – 180 L/min	5 L/min
iX5	2 – 15 L/min	25 – 100 %	0 – 180 L/min	2 L/min

**Table S2.** Trigger performance during a standard inspiratory effort without cardiogenic oscillation

Ventilator / Trigger Sensitivity	TD (ms)	$\Delta P_{aw}$ (cmH <sub>2</sub> O)	WOBi (J/L)	WOBtrig (mJ)	PIF (L/min)	Cycles with auto-trigger (%)
<b>Evita XL</b>						
0.3 L/min	67 ± 6.2	-0.69 ± 0.11	0.466 ± 0.006	0.04 ± 0.01	70 ± 0.43	0
0.5 L/min	68 ± 5.4	-0.72 ± 0.10	0.476 ± 0.006	0.05 ± 0.01	69 ± 0.34	0
1 L/min	68 ± 6.5	-0.71 ± 0.12	0.474 ± 0.006	0.05 ± 0.01	69 ± 0.31	0
2 L/min	75 ± 8.7	-0.75 ± 0.09	0.489 ± 0.008	0.07 ± 0.03	70 ± 0.41	0
3 L/min	73 ± 4.7	-0.76 ± 0.08	0.509 ± 0.037	0.05 ± 0.01	70 ± 0.58	0
5 L/min	80 ± 12.6	-0.79 ± 0.11	0.511 ± 0.005	0.10 ± 0.09	71 ± 0.53	0
<b>PB840</b>						
-1 cmH <sub>2</sub> O	129 ± 16.8	-1.14 ± 0.25	0.507 ± 0.018	0.50 ± 0.17	80 ± 0.31	0
1 L/min	68 ± 0.0	-0.38 ± 0.01	0.443 ± 0.003	0.08 ± 0.00	76 ± 1.11	0
2 L/min	89 ± 3.5	-0.42 ± 0.02	0.465 ± 0.004	0.21 ± 0.03	77 ± 1.04	0
3 L/min	105 ± 8.6	-0.45 ± 0.03	0.486 ± 0.002	0.37 ± 0.07	78 ± 1.18	0
<b>Servo-I</b>						
-1 cmH <sub>2</sub> O	164 ± 3.5	-1.64 ± 0.04	0.581 ± 0.004	0.75 ± 0.05	71 ± 0.19	0
Flow 1	129 ± 4.6	-1.18 ± 0.05	0.546 ± 0.017	0.38 ± 0.04	73 ± 0.15	0
Flow 2	115 ± 3.9	-1.04 ± 0.03	0.540 ± 0.004	0.28 ± 0.03	69 ± 0.17	0
Flow 4	94 ± 1.9	-0.84 ± 0.02	0.521 ± 0.002	0.15 ± 0.01	68 ± 0.13	0
Flow 6	79 ± 4.1	-0.68 ± 0.04	0.504 ± 0.004	0.09 ± 0.01	67 ± 0.18	0
Flow 8	65 ± 3.6	-0.53 ± 0.05	0.490 ± 0.004	0.05 ± 0.01	67 ± 0.17	0
Flow 10	45 ± 7.4	-0.28 ± 0.10	0.468 ± 0.007	0.01 ± 0.01	66 ± 0.25	0
<b>FlexiMag</b>						
-1 cmH <sub>2</sub> O	107 ± 7.3	-0.99 ± 0.10	0.576 ± 0.006	0.24 ± 0.04	61 ± 0.27	0
1 L/min	75 ± 12.8	-0.68 ± 0.16	0.553 ± 0.010	0.08 ± 0.04	60 ± 0.27	0
2 L/min	90 ± 23.9	-0.81 ± 0.18	0.571 ± 0.015	0.15 ± 0.13	61 ± 0.46	0
3 L/min	98 ± 25.4	-0.58 ± 0.15	0.574 ± 0.013	0.31 ± 0.19	61 ± 0.51	0
<b>iX5</b>						
-1 cmH <sub>2</sub> O	209 ± 5.3	-2.18 ± 0.04	0.650 ± 0.007	1.25 ± 0.07	70 ± 2.69	0
2 L/min	222 ± 2.3	-2.24 ± 0.02	0.703 ± 0.005	1.47 ± 0.04	70 ± 1.72	0
3 L/min	228 ± 11.7	-2.27 ± 0.02	0.719 ± 0.008	1.64 ± 0.52	71 ± 2.03	0

*Definition of abbreviations:* TD = time delay to trigger;  $\Delta P_{aw}$  = variation from PEEP to lowest inspiratory airway pressure; WOBi = patient inspiratory work of breathing; WOBtrig = work of breathing while triggering; PIF = peak inspiratory flow.

**Table S3.** Trigger performance during a standard inspiratory effort during 0.25 cmH<sub>2</sub>O of cardiogenic oscillation.

Ventilator / Trigger Sensitivity	TD (ms)	$\Delta P_{aw}$ (cmH <sub>2</sub> O)	WOBi (J/L)	WOBtrig (mJ)	PIF (L/min)	Cycles with auto-trigger (%)
<b>Evita XL</b>						
1 L/min	77 ± 2.9	-0.95 ± 0.06	0.446 ± 0.006	0.05 ± 0.01	71 ± 0.64	50
2 L/min	93 ± 7.9	-1.09 ± 0.08	0.471 ± 0.005	0.04 ± 0.04	71 ± 0.61	47
3 L/min	72 ± 13.7	-0.71 ± 0.19	0.457 ± 0.015	0.08 ± 0.07	71 ± 0.63	23
4 L/min	75 ± 13.5	-0.69 ± 0.11	0.451 ± 0.007	0.12 ± 0.10	72 ± 0.33	0
5 L/min	75 ± 13.5	-0.69 ± 0.11	0.451 ± 0.007	0.12 ± 0.10	72 ± 0.33	0
<b>PB840</b>						
-1 cmH <sub>2</sub> O	116 ± 12.8	-1.16 ± 0.18	0.486 ± 0.014	0.28 ± 0.07	81 ± 0.36	0
1 L/min	64 ± 2.6	-0.37 ± 0.02	0.436 ± 0.002	0.06 ± 0.01	78 ± 0.97	39
2 L/min	81 ± 3.1	-0.43 ± 0.02	0.454 ± 0.004	0.12 ± 0.02	79 ± 0.97	0
3 L/min	101 ± 3.3	-0.53 ± 0.04	0.471 ± 0.003	0.17 ± 0.03	80 ± 1.11	0
4 L/min	119 ± 3.8	-0.60 ± 0.05	0.490 ± 0.003	0.27 ± 0.04	81 ± 1.20	0
<b>Servo-I</b>						
-1 cmH <sub>2</sub> O	152 ± 5.1	-1.73 ± 0.07	0.568 ± 0.005	0.77 ± 0.04	70 ± 0.30	0
Flow 10	63 ± 7.4	-0.51 ± 0.08	0.501 ± 0.008	0.04 ± 0.01	66 ± 0.36	61
Flow 9	62 ± 2.8	-0.52 ± 0.03	0.497 ± 0.002	0.06 ± 0.01	66 ± 0.31	13
Flow 8	67 ± 3.5	-0.56 ± 0.04	0.503 ± 0.004	0.08 ± 0.02	67 ± 0.21	20
Flow 7	74 ± 2.3	-0.68 ± 0.03	0.510 ± 0.022	0.11 ± 0.01	67 ± 0.00	0
Flow 6	77 ± 9.3	-0.68 ± 0.07	0.513 ± 0.010	0.11 ± 0.02	67 ± 0.30	13
Flow 5	83 ± 2.2	-0.77 ± 0.03	0.507 ± 0.002	0.15 ± 0.01	67 ± 0.00	0
Flow 4	91 ± 4.6	-0.84 ± 0.06	0.514 ± 0.005	0.21 ± 0.03	67 ± 0.27	13
Flow 3	97 ± 6.0	-0.91 ± 0.07	0.520 ± 0.006	0.25 ± 0.05	68 ± 0.30	0
Flow 2	109 ± 6.4	-1.07 ± 0.10	0.531 ± 0.007	0.34 ± 0.05	68 ± 0.36	0
Flow 1	113 ± 11.1	-1.11 ± 0.14	0.535 ± 0.011	0.39 ± 0.09	68 ± 0.34	0
<b>FlexiMag</b>						
-1 cmH <sub>2</sub> O	81 ± 13.1	-0.97 ± 0.10	0.543 ± 0.011	0.12 ± 0.09	65 ± 0.93	0
1 L/min	85 ± 15.2	-0.96 ± 0.20	0.551 ± 0.012	0.12 ± 0.04	65 ± 0.28	5
2 L/min	81 ± 19.2	-0.89 ± 0.29	0.553 ± 0.018	0.13 ± 0.07	66 ± 0.42	0
3 L/min	78 ± 15.0	-0.77 ± 0.19	0.556 ± 0.013	0.13 ± 0.10	66 ± 0.42	0
4 L/min	137 ± 14.5	-1.08 ± 0.20	0.591 ± 0.012	0.75 ± 0.15	68 ± 0.52	0
<b>iX5</b>						
-1 cmH <sub>2</sub> O	183 ± 9.3	-2.02 ± 0.04	0.631 ± 0.010	1.14 ± 0.29	70 ± 2.76	0
2 L/min	190 ± 2.3	-2.07 ± 0.02	0.683 ± 0.008	1.18 ± 0.04	70 ± 2.01	0
3 L/min	191 ± 2.5	-2.07 ± 0.01	0.691 ± 0.005	1.20 ± 0.04	70 ± 2.37	0

*Definition of abbreviations:* TD = time delay to trigger;  $\Delta P_{aw}$  = variation from PEEP to lowest inspiratory airway pressure; WOBi = patient inspiratory work of breathing; WOBtrig = work of breathing while triggering; PIF = peak inspiratory flow.

**Table S4.** Trigger performance during a standard inspiratory effort during 0.5 cmH<sub>2</sub>O of cardiogenic oscillation.

Ventilator / Trigger Sensitivity	TD (ms)	$\Delta P_{aw}$ (cmH <sub>2</sub> O)	WOBi (J/L)	WOBtrig (mJ)	PIF (L/min)	Cycles with auto-trigger (%)
<b>Evita XL</b>						
1 L/min	69 ± 5.11	-0.91 ± 0.13	0.443 ± 0.005	0.06 ± 0.01	71 ± 0.59	49
2 L/min	79 ± 5.9	-1.08 ± 0.11	0.452 ± 0.006	0.09 ± 0.04	71 ± 0.48	49
3 L/min	84 ± 9.9	-1.14 ± 0.14	0.468 ± 0.011	0.10 ± 0.11	71 ± 0.74	47
4 L/min	71 ± 10.5	-0.84 ± 0.11	0.459 ± 0.008	0.15 ± 0.15	72 ± 0.32	17
5 L/min	79 ± 14.9	-0.85 ± 0.07	0.467 ± 0.007	0.19 ± 0.17	72 ± 0.53	0
<b>PB840</b>						
-1 cmH <sub>2</sub> O	112 ± 12.3	-1.25 ± 0.21	0.481 ± 0.014	0.59 ± 0.16	81 ± 0.85	0
1 L/min	82 ± 4.2	-0.48 ± 0.03	0.458 ± 0.006	0.25 ± 0.04	80 ± 1.26	67
2 L/min	71 ± 2.6	-0.32 ± 0.05	0.455 ± 0.014	0.23 ± 0.03	81 ± 0.95	0
3 L/min	94 ± 3.3	-0.52 ± 0.05	0.466 ± 0.003	0.46 ± 0.05	81 ± 1.09	0
4 L/min	111 ± 2.8	-0.62 ± 0.06	0.483 ± 0.003	0.80 ± 0.05	81 ± 1.12	0
<b>Servo-I</b>						
-1 cmH <sub>2</sub> O	144 ± 1.7	-1.86 ± 0.03	0.572 ± 0.002	0.78 ± 0.03	69 ± 0.29	0
Flow 10	64 ± 4.6	-0.6 ± 0.06	0.503 ± 0.004	0.05 ± 0.01	66 ± 0.29	67
Flow 9	71 ± 4.1	-0.7 ± 0.07	0.509 ± 0.004	0.06 ± 0.01	67 ± 0.15	67
Flow 8	74 ± 8.6	-1.01 ± 0.35	0.720 ± 0.083	0.09 ± 0.08	66 ± 0.21	65
Flow 7	70 ± 6.2	-0.69 ± 0.10	0.507 ± 0.007	0.10 ± 0.01	67 ± 0.00	52
Flow 6	70 ± 2.3	-0.69 ± 0.04	0.506 ± 0.002	0.12 ± 0.01	67 ± 0.00	23
Flow 5	75 ± 2.7	-0.75 ± 0.04	0.511 ± 0.003	0.15 ± 0.02	67 ± 0.29	13
Flow 4	83 ± 5.4	-0.86 ± 0.08	0.519 ± 0.005	0.20 ± 0.03	67 ± 0.15	20
Flow 3	92 ± 5.4	-0.98 ± 0.07	0.527 ± 0.005	0.28 ± 0.05	67 ± 0.30	9
Flow 2	95 ± 8.4	-1.0 ± 0.17	0.529 ± 0.008	0.31 ± 0.07	68 ± 0.34	5
Flow 1	96 ± 10.3	-1.2 ± 0.19	0.535 ± 0.010	0.35 ± 0.1	68 ± 0.15	0
<b>FlexiMag</b>						
-1 cmH <sub>2</sub> O	72 ± 7.4	-1.01 ± 0.14	0.546 ± 0.007	0.06 ± 0.02	66 ± 0.42	0
1 L/min	65 ± 12.9	-0.75 ± 0.41	0.575 ± 0.074	0.15 ± 0.07	66.7 ± 0.43	57
2 L/min	94 ± 15.5	-1.17 ± 0.21	0.568 ± 0.012	0.27 ± 0.21	67.8 ± 0.21	0
3 L/min	114 ± 26.1	-1.09 ± 0.27	0.580 ± 0.015	0.56 ± 0.28	68 ± 0.47	0
4 L/min	131 ± 8.7	-1.09 ± 0.20	0.590 ± 0.009	0.91 ± 0.15	68 ± 0.45	0
<b>iX5</b>						
-1 cmH <sub>2</sub> O	174 ± 5.1	-2.15 ± 0.02	0.622 ± 0.006	1.15 ± 0.06	69 ± 2.87	0
2 L/min	180 ± 1.6	-2.17 ± 0.01	0.687 ± 0.006	1.23 ± 0.03	69 ± 2.19	0
3 L/min	182 ± 2.2	-2.18 ± 0.02	0.696 ± 0.005	1.25 ± 0.03	70 ± 1.35	0

*Definition of abbreviations:* TD = time delay to trigger;  $\Delta P_{aw}$  = variation from PEEP to lowest inspiratory airway pressure; WOBi = patient inspiratory work of breathing; WOBtrig = work of breathing while triggering; PIF = peak inspiratory flow.

**Table S5.** Trigger performance during a standard inspiratory effort during 1 cmH<sub>2</sub>O of cardiogenic oscillation.

Ventilator / Trigger Sensitivity	TD (ms)	$\Delta P_{aw}$ (cmH <sub>2</sub> O)	WOB <sub>i</sub> (J/L)	WOB <sub>trig</sub> (mJ)	PIF (L/min)	Cycles with auto-trigger (%)
<b>Evita XL</b>						
1 L/min	81.17 ± 3.41	-1.36 ± 0.10	0.459 ± 0.004	0.090 ± 0.018	71.52 ± 0.57	0.66
2 L/min	81.49 ± 3.73	-1.35 ± 0.09	0.465 ± 0.004	0.104 ± 0.04	71.67 ± 0.42	0.65
3 L/min	81.49 ± 4.19	-1.32 ± 0.12	0.468 ± 0.007	0.075 ± 0.022	71.75 ± 0.51	0.65
4 L/min	80.07 ± 8.67	-1.31 ± 0.15	0.472 ± 0.007	0.158 ± 0.098	71.92 ± 0.56	0.58
5 L/min	85.78 ± 13.49	-1.27 ± 0.12	0.472 ± 0.004	0.272 ± 0.203	72.28 ± 0.44	0.46
6 L/min	84.40 ± 10.75	-1.22 ± 0.08	0.479 ± 0.008	0.258 ± 0.137	72.37 ± 0.52	0.09
7 L/min	85.54 ± 8.74	-1.25 ± 0.09	0.484 ± 0.003	0.277 ± 0.139	72.51 ± 0.45	0
<b>PB840</b>						
-1 cmH <sub>2</sub> O	96.46 ± 2.13	-1.17 ± 0.04	0.470 ± 0.003	0.585 ± 0.031	82.04 ± 0.13	0
1 L/min	65.32 ± 0.43	-0.56 ± 0.02	0.449 ± 0.002	0.182 ± 0.025	81.44 ± 0.16	0.67
2 L/min	76.17 ± 6.14	-0.59 ± 0.26	0.458 ± 0.011	0.289 ± 0.069	81.79 ± 2.17	0.67
3 L/min	80.59 ± 9.84	-0.71 ± 0.53	0.458 ± 0.016	0.478 ± 0.043	82.65 ± 4.04	0.38
4 L/min	96.85 ± 3.08	-0.69 ± 0.03	0.472 ± 0.002	0.796 ± 0.081	81.90 ± 1.01	0
<b>Servo-I</b>						
-1 cmH <sub>2</sub> O	124.14 ± 3.77	-1.96 ± 0.10	0.550 ± 0.003	0.862 ± 0.052	68.76 ± 0.14	0
Flow 10	60.54 ± 4.36	-0.67 ± 0.09	0.502 ± 0.004	0.091 ± 0.022	66.96 ± 0.11	0.67
Flow 9	64.56 ± 2.12	-0.76 ± 0.04	0.505 ± 0.002	0.105 ± 0.014	67.02 ± 0.07	0.67
Flow 8	66.06 ± 4.84	-0.78 ± 0.09	0.507 ± 0.004	0.124 ± 0.028	67.00 ± 0.11	0.67
Flow 7	71.11 ± 4.14	-0.88 ± 0.08	0.511 ± 0.004	0.145 ± 0.029	67.10 ± 0.08	0.67
Flow 6	75.25 ± 2.85	-0.94 ± 0.06	0.516 ± 0.002	0.172 ± 0.026	67.15 ± 0.10	0.67
Flow 5	76.28 ± 5.18	-0.95 ± 0.11	0.517 ± 0.004	0.175 ± 0.039	67.13 ± 0.15	0.67
Flow 4	85.82 ± 4.80	-1.13 ± 0.10	0.525 ± 0.004	0.244 ± 0.046	67.28 ± 0.12	0.67
Flow 3	84.63 ± 2.39	-1.10 ± 0.03	0.523 ± 0.003	0.271 ± 0.060	67.31 ± 0.15	0.56
Flow 2	85.69 ± 4.61	-1.12 ± 0.08	0.523 ± 0.003	0.350 ± 0.053	67.49 ± 0.10	0.17
Flow 1	95.24 ± 4.71	-1.30 ± 0.10	0.529 ± 0.002	0.472 ± 0.061	67.75 ± 0.20	0.09
<b>FlexiMag</b>						
-1 cmH <sub>2</sub> O	61.46 ± 10.24	-1.03 ± 0.47	0.550 ± 0.020	0.103 ± 0.045	67.71 ± 3.93	0.23
1 L/min	60.54 ± 7.85	-0.44 ± 0.31	0.554 ± 0.006	0.039 ± 0.062	67.66 ± 0.49	0.65
2 L/min	83.18 ± 4.93	-1.20 ± 0.10	0.575 ± 0.003	0.247 ± 0.057	66.80 ± 0.22	0.50
3 L/min	85.47 ± 7.02	-1.18 ± 0.13	0.580 ± 0.003	0.334 ± 0.104	67.15 ± 0.35	0
4 L/min	114.65 ± 10.09	-1.30 ± 0.09	0.596 ± 0.002	0.884 ± 0.235	67.32 ± 0.23	0
<b>iX5</b>						
-1 cmH <sub>2</sub> O	154.54 ± 2.82	-2.40 ± 0.01	0.617 ± 0.009	1.294 ± 0.040	69.87 ± 1.78	0
2 L/min	159.81 ± 1.42	-2.42 ± 0.01	0.678 ± 0.005	1.301 ± 0.023	68.82 ± 1.80	0
3 L/min	161.53 ± 4.82	-2.41 ± 0.07	0.691 ± 0.010	1.373 ± 0.244	68.36 ± 2.16	0

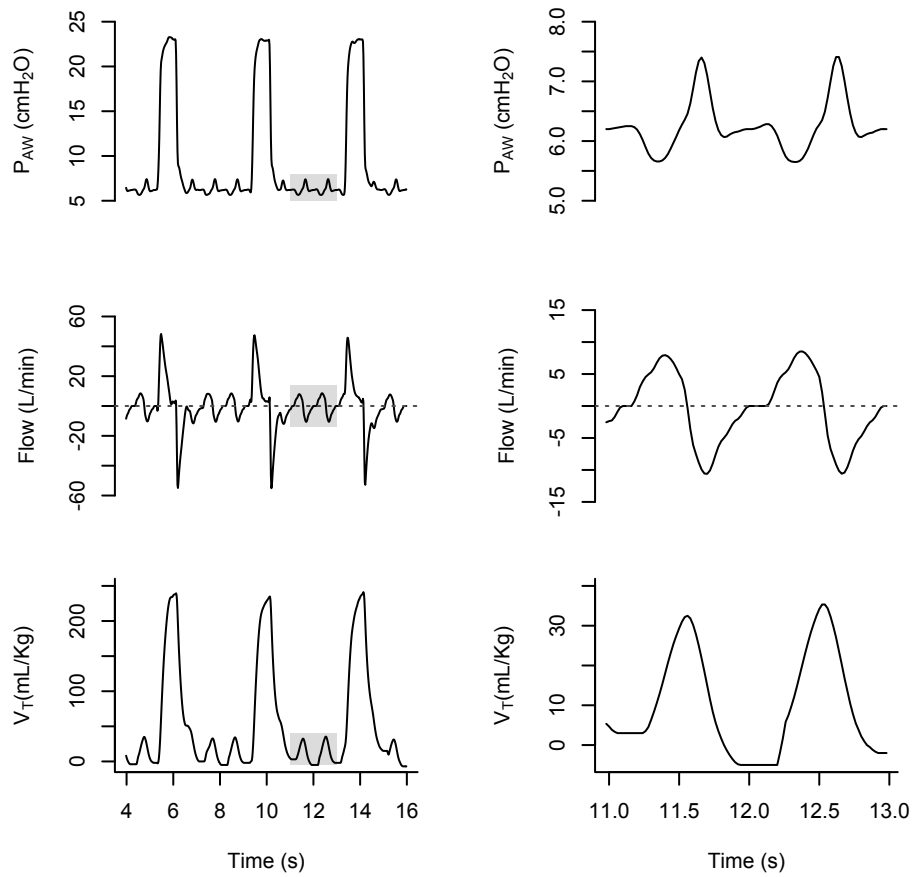
*Definition of abbreviations:* TD = time delay to trigger;  $\Delta P_{aw}$  = variation from PEEP to lowest inspiratory airway pressure; WOB<sub>i</sub> = patient inspiratory work of breathing; WOB<sub>trig</sub> = work of breathing while triggering; PIF = peak inspiratory flow.



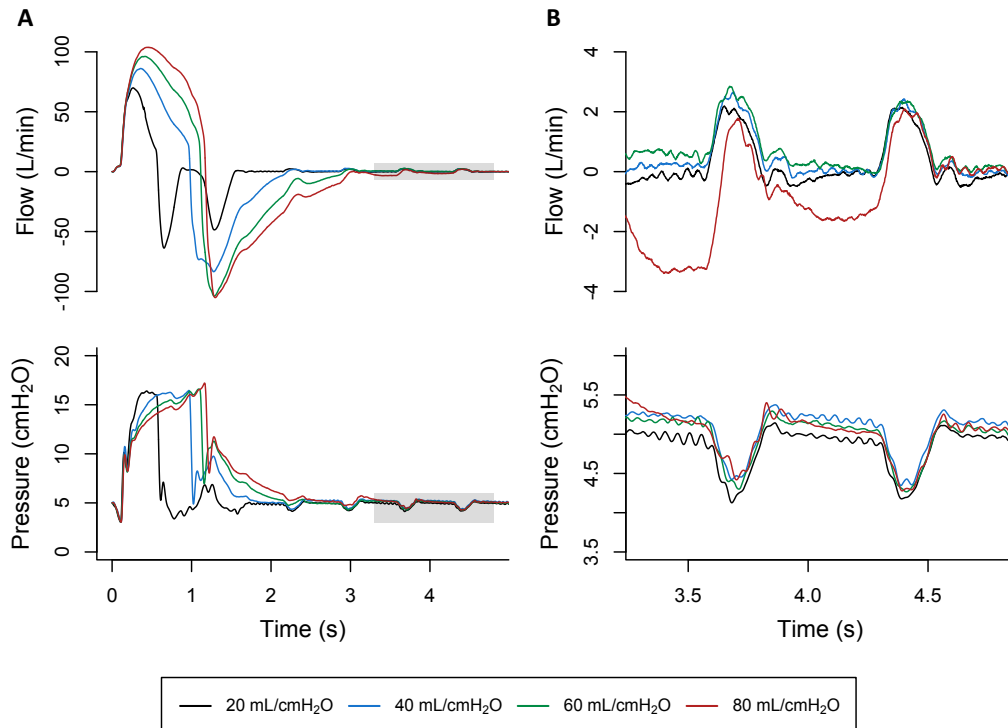
**Table S6** – Trigger performance during a standard inspiratory effort during 1 cmH<sub>2</sub>O of cardiogenic oscillation.

<b>Lung Compliance (mL/cmH<sub>2</sub>O)</b>	<b>TD (ms)</b>	<b>ΔPaw (cmH<sub>2</sub>O)</b>	<b>WOBtrig (mJ)</b>
20	100.6 ± 2.5	-1.87 ± 0.06	0.705 ± 0.04
40	103.0 ± 5.6	-1.92 ± 0.20	0.701 ± 0.08
60	103.9 ± 2.8	-1.94 ± 0.05	0.690 ± 0.06
80	106.3 ± 1.9	-1.99 ± 0.04	0.715 ± 0.05

Definition of abbreviations: TD = time delay to trigger; ΔPaw = variation from PEEP to lowest inspiratory airway pressure; WOBtrig = work of breathing while triggering.



**Figure S1** – Effect of cardiogenic oscillation on airway pressure ( $P_{aw}$ ), flow and tidal volume ( $V_T$ ) of a subject with acute respiratory distress syndrome under mechanical ventilation. This subject, with a compliance of 19  $\text{mL/cmH}_2\text{O}$ , was enrolled in a clinical trial designed to assess the effect on survival of lung recruitment maneuvers and high PEEP (ClinicalTrials.gov: NCT01374022). The magnitude of cardiogenic oscillations was of approximately 5  $\text{L/min}$  in airway flow.



**Figure S2** – Effect of different simulated compliance settings [20 (black), 40 (blue), 60 (green), and 80 (red) mL/cmH<sub>2</sub>O] on changes in airway pressure and flow (A) caused by simulated cardiogenic oscillations of 1 cmH<sub>2</sub>O in the Servo-I ventilator (Maquet). A zoom into the shaded area (B) shows no significant change on airway pressure and flow at the end-expiration.