Heart rate (HR), mean arterial pressure (MAP), mean pulmonary arterial (MPAP) and pulmonary capillary wedge (PCWP) pressures, cardiac output (CO) (Swan-Ganz catheter) as well as arterial oxygen tension (PaO[sub]2[/sub]) were recorded before and after lung injury: at 0 (baseline), −4, −8, −12, −16 cmH[sub]2[/sub]O.
Results: Significant improvement in PaO[sub]2[/sub] was observed during the eNP when compared with baseline. There were no significant changes in hemodynamic parameters when the negative pressures of −4, −8 and −12 cmH[sub]2[/sub]O were applied (fig. 22).
Conclusions: This study demonstrates effectiveness of extrathoracic negative pressure during recruitment of injured lung tissue in terms of arterial oxygenation and hemodynamic stability.

References

1. Lovas A. et al.: Biomed Res Int 2015; 2015: 478970.

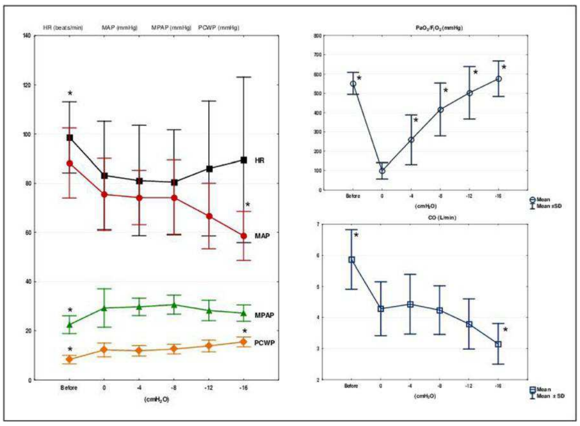

Fig. 22 (abstract P48). Legend 1: *P < 0.05 vs baseline

P49

Influence of extrathoracic negative pressure on mechanics of atelectatic lung during IPPV

A. Fijalkowska-Nestorowicz[1], J. Glapinski[2], J. Wosko[3]
[1]Medical University, Lublin, Poland; [2]Wroc[3]aw University of Technology, Wroclaw, Poland; [3]SPSK No4, Lublin, Poland
Critical Care 2017, **21(Suppl 1):**P49

Introduction: Respiratory mechanics are regularly impaired when atelectasis occurs. There are many different procedures that can be used in order to reopen collapsed lung tissue. The aim of our study was to determine the effects of extrathoracic negative pressure (eNP) on respiratory mechanics of atelectatic lungs.
Methods: Ten Large White pigs weighting 52 ± 5 kg were included in the study. Under general anaesthesia all animals were tracheotomized (tube size 8.5–9 mm) and ventilated in a volume-controlled mode (P-B 840) at RR–18/min, with VT– 8–10 ml/kg, I:E ratio −1:2 and F[sub]I[/sub]O[sub]2[/sub]–1.0. Lungs injury was induced by repetitive lavages with 1.5–1.8 l warm 0.9% NaCl until PaO[sub]2[/sub]/F[sub]I[/sub]O[sub]2[/sub] remain stable below 100. After lungs injury was produced, the eNP, using a whole body size-box, was commenced in combination with IPPV. Peak airway pressure (P[sub]a[/sub][sub]w[/sub]peak), airway resistance (R) and dynamic compliance (Cdyn) were recorded, using ventilator software, before lungs injury and after – at 0 (baseline), −4, −8, −12 and −16 cmH[sub]2[/sub]O negative pressures.
Results: There were significant differences in P[sub]a[/sub][sub]w[/sub]peak and R but no in Cdyn at negative pressure −8, −12, and −16 cmH[sub]2[/sub]O compared to baseline (tab).
Conclusions: Extrathoracic negative pressure constitutes a positive profile of respiratory mechanics of atelectatic lungs and improves blood oxygenation.

Table 10 (abstract P49). See text for description

	Before	0 (cmH_2O)	−4 (cmH_2O)	−8 (cmH_2O)	−12 (cmH_2O)	−16 (cmH_2O)
P_{aw}peak (cmH_2O)	19.9 ± 2.9*	29.4 ± 3.8	30.5 ± 6	26.2 ± 5.9	24.6 ± 5.9*	25.5 ± 4.6*
Cdyn (ml/cmH_2O)	30.9 ± 4.5*	21.4 ± 8.9	20 ± 5.7	21.6 ± 5.8	23.1 ± 5.8	21.7 ± 3.9
R (cmH_2O/l/s)	10.3 ± 2.6	13.3 ± 4.9	10.5 ± 3.8	7.8 ± 1.9*	6.7 ± 1.4*	6.4 ± 1.2*
PaO_2/F_IO_2 (mmHg)	552 ± 56*	98.8 ± 42.5	259 ± 129*	416 ± 137*	503 ± 136*	576 ± 93*

Legend Table 10 *P < 0.05 vs baseline

P50

Inspiratory negative pressure in simulated spontaneous breathing with a bag valve mask: a bench study

F. Duprez[1], T. Bonus[1], G. Cuvelier[2], S. Mashayekhi[1], S. Ollieuz[1], G. Reychler[3]
[1]Epicura, Hornu, Belgium; [2]Condorcet, Tournai, Belgium; [3]UCL, Bruxelles, Belgium
Critical Care 2017, **21(Suppl 1):**P50

Introduction: In emergency care, oxygen therapy can be administered directly with bag valve mask (BVM). In some cases, this method is applied to patient with a spontaneous breathing. The purpose of this study was to evaluate inspiratory negative pressure (INP) during spontaneous breathing through three different bag valve masks.
Methods: Three BVM (Ambu®Oval, MR100®, Ambu® Mark IV; without oxygen reservoir bag) were analyzed. Spontaneous breathing was simulated on a bench study. A two-compartment model of adult test lung (Dual Test Lung® DTL, Michigan Instrument) was connected to a Servo i® ventilator. One compartment of DTL was moved by Servo i®, the other as the driving compartment which simulated breathe. Servo i® was set in volume-controlled mode. Three-minute ventilation (MV) (Respiratory frequency (Rf): 10,20,30 cpm with tidal volume (Vt) of .45 L were analyzed. The peep was equal to 0 cm H2O and the Ti/Ttot was equal to 0.33. The compliance of DTL was set to .06 L/cm H2O and the initial resistance set to 5 cm H2O/L/sec. The change in inspiratory pressure was measured by an analog IWorx station/digital IWx/214 LabScribe II ® software. Three consecutive measurements were performed for each MV. Parameters were compared over time using ANOVA for each MV (p < .001).
Results: For all MV, no significant statistical differences were raised between Ambu®Oval and Ambu® Mark IV (ANOVA: p < .001).
Conclusions: For a same BVM, when MV increases, INP increases. For all MV, MR100® is the BVM is one who offers the lower resistance. This is most likely due to the type of patient valve of the BVMs, because patient valve of AMBUs® is a mushroom valve conception, while patient valve of MR100® is a duckbill valve conception. This last type of valve seems to offer less resistance than mushroom valve.

MV (Rf x Vt) (cpm x ml)	Mean inspiratory negative pressure (cm H2O) with SD during simulated spontaneous breathing with three bag valve masks		
	Ambu® Oval	MR100®	Ambu® Mark IV
10 x 450	-1.7 (+/-.23)	-1.1 (+/- .28)	-1.8 (+/- .08)
20 x 450	-3.3 (+/-.10)	-2.2 (+/- .10)	-3.4 (+/- .18)
30 x 450	-5.5 (+/- .15)	-4.3 (+/- .15)	-5.6 (+/- .13)

Fig. 23 (abstract P50). Legend 1: Mean inspiratory negative pressure with SD (cm H2O) during simulated spontaneous breathing with three bag valve masks