Introduction:
Bedside assessment of lung recruitability is essential to screen ARDS patients to improve lung function and to guide the treatment. A high recruitability index, for instance, would favor the balance towards a recruitment maneuver, followed by individualized PEEP. The purpose of this study was to measure the gain of respiratory system compliance after a brief and "light" maneuver of PEEP challenge. The goal of the maneuver was to predict a meaningful reduction in DP.

Methods:
The "light" recruitability maneuver was performed through a tool developed by Nihon Koden Mechanical Ventilator (NKV550, California, EUA). The applicable program (Reclutability-Assessment-APP) available at the mechanical ventilator performs the recruitability maneuver automatically. The APP provides gain of compliance percentage and shows the difference between pulmonary compliance at the same PEEPs. This study was realized using PEEP at 5 cmH\textsubscript{2}O and ideal PEEP according to PEEP titration maneuver performed by electrical impedance tomography (EIT) and CT.

Results:
5 animals (38,7±2,8kg) with severe lung injury (PaO\textsubscript{2}/FiO\textsubscript{2}<100mmHg) were studied. By applying different lung-histories and PEEPs, we performed multiple maneuvers in the same animal, some of them applied to a lung full of collapse (with high-recruitability, confirmed by CT) versus some of them with an already-recruited-lung (animals with minimum recruitability, confirmed by CT). In the recruitable animals, the reduction in DP was (8,2±4,8cmH\textsubscript{2}O) versus (0,1±0,1cmH\textsubscript{2}O) in the non-recruitable ones. Respectively, the gain in compliance was (109,4%±40,6) in the recruitable ones vs. (5,6%±4,8) in the non-recruitable ones (P=0,01). There was a significant correlation between the gain in compliance and the reduction in DP. (P=0,0002, R\textsuperscript{2}=0,83) (Figure 1).

Conclusion:
Using a simple and automatized maneuver available at the bedside, it is possible to predict lung recruitability, as well as the consequent reduction in DP (> or < than 4cmH\textsubscript{2}O, used as meaningful clinical threshold).

Image:
Figure 1. Regression linear model (gain of compliance between the initial and final PEEP level – versus the DP (driving pressure) reduction observed after applying the final PEEP.

$R^2 = 0.83$

$P = 0.0002$