Pleural and esophageal pressure under thoracic surgery

Dott. IACOPO PASTICCI (1), Dott. MATTIA BUSANA (1), Dott. MICHELE UMBRELLO (2), Dott. PAOLO FORMENTI (2), Dott.ssa MIRIAM GOTTI (2), Dott. LUCA BOLGIAGHI (2), Dott. FRANCESCO VASSALLI (1), Dott. MATTEO BONIFAZI (1), Dott. LORENZO GIOSA (1), Dott. MATTEO MARIA MACRÌ (1), Dott.ssa ROSANNA D' ALBO (1), Dott.ssa FEDERICA ROMITTI (1), Prof. DAVIDE CHIUMELLO (2)

(1) UMG, University of Göttingen, Robert-Koch-Straße, 40, Göttingen, Germania.
(2) Ospedale San Paolo, Via Antonio di Rudinì, 8, Milano, Italia.

Argomento: Insufficienza respiratoria acuta e ventilazione meccanica

BACKGROUND: The relationship between pleural (Ppl) and oesophageal (Pes) pressure is still under debate. We measured the values of both during the respiratory cycle of patients under thoracic surgery. Our aim was to investigate how the change in intrathoracic pressure and the change in Ppl and Pes are related when the normal physiology and anatomy are altered. **METHODS:** Pes and Ppl were measured via an oesophageal balloon and a pressure transducer connected to the thoracic drainage. The measurements were done during one lung ventilation and lateral decubitus (OLV), during double lung ventilation and lateral decubitus (DLV) and during double lung ventilation and supine position (SUPINE). To record them properly we performed an inspiratory and an expiratory hold. **RESULTS:** Absolute values of Pes an Ppl differ during the whole surgery and during both inspiratory and expiratory holds. However, the tidalic variations in Ppl (ΔPpl) and Pes (ΔPes) are linearly related ($p<0.001$) as reported in figure 1. It follows that the transpulmonary pressure and the elastance of the chest wall derived either from Ppl or Pes are not statistically different. **DISCUSSION:** The airways pressure, other than inflating the lung is transmitted through the thorax, determining an increase of the measured Ppl. This increase seems to be equal to the increase of Pes despite the pneumothorax, the lateral or the supine position and the surgical manipulation. **CONCLUSIONS:** In thoracic surgery the changes in oesophageal pressure reflect the changes in pleural pressure, leading the oesophageal pressure to be a good tool for the monitoring of the respiratory mechanics.

ΔPPL AND ΔPES

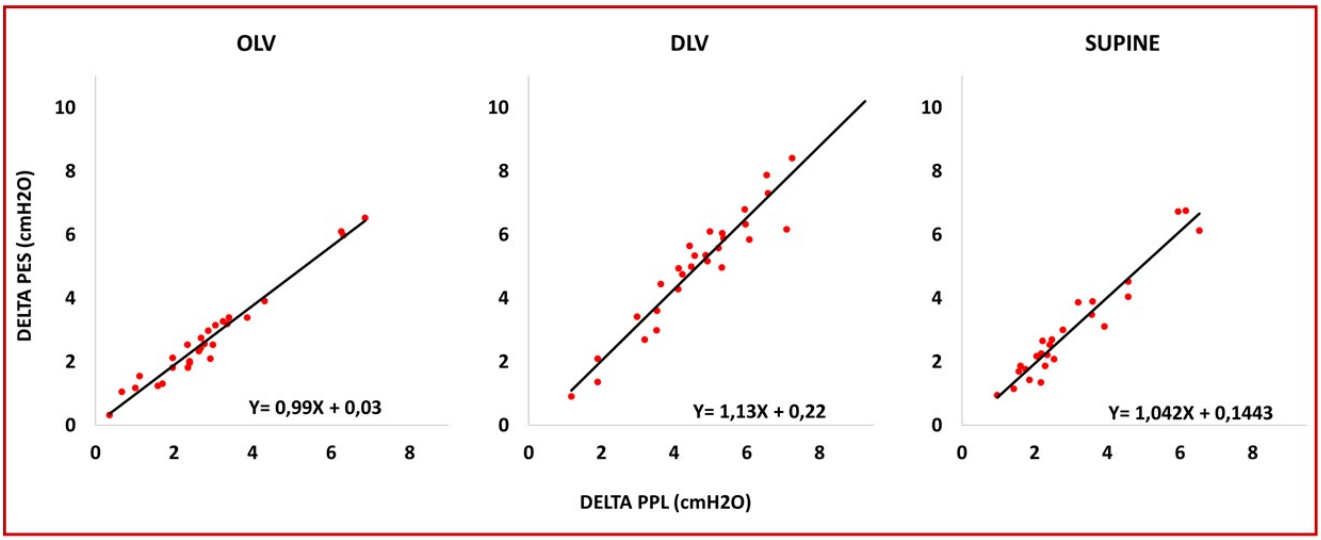

Fig. 1 : Correlation between delta Ppl and delta Pes during the three phases of the surgery: OLV (one lung ventilation, lateral decubitus), DLV (double lung ventilation , lateral decubitus), SUPINE (double lung ventilation, supine position)