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Title: Contributions of rib cage (RC) and abdomen (AB) to tidal volume are useful indicators for the assessment of difficult-to-wean patients

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Body: Respiratory muscles impairment is an important determinant of the need for mechanical ventilation (MV) in difficult-to-wean patients. We investigated whether the relative contribution of rib cage (RC) and abdomen (AB) to tidal volume was a useful indicator of successful weaning from MV. The contribution of RC and AB volume changes to tidal volume (Vt) were measured by opto-electronic plethysmography in 7 difficult-to-wean patients, during 20' of MV and 20' of spontaneous breathing (SB) after disconnection from MV. Recordings were repeated at 3 weaning stages: A) tracheostomy and invasive ventilation; B) tracheostomy and non-invasive ventilation (NIV); C) decannulation and NIV. The compartment with the highest % contribution to Vt at the start of weaning (stage A) was defined as predominant compartment (PC), the other as secondary compartment (SC). PC was the rib cage in 5 patients and AB in 2. During SB, the contributions of PC and SC became progressively similar from stage A to C, with no significant differences at stage C (see figure). Our results show that in difficult-to-wean patients the contribution to tidal volume of RC and AB becomes progressively more homogeneous as MV dependency decreases during weaning. Accurate monitoring of RC and AB contributions to Vt provides therefore useful indications for weaning assessment.