Expiratory Chest Compression for Atelectasis: No Harm, No Foul—Oops!

The only thing better than a well designed follow-up study that effectively addresses questions raised in earlier research is a study whose results are contrary to the authors' hypothesis. So imagine my elation with the report by Unoki et al[1] in this issue of RESPIRATORY CARE.

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In their earlier study[2] Unoki et al used anesthetized, ventilated rabbits to determine the effect of manual chest compression, which is a common chest physical therapy technique used with both infants and adults and which is believed to help improve expiratory flow, mobilize secretions, expand the lungs, and improve oxygenation. That exquisitely performed study demonstrated that chest compression did not provide the expected benefits of improved lung volume and oxygenation (which are 2 key indices of atelectasis in newborns) but chest compression appeared to have no adverse effects—"no harm, no foul."

However, few clinicians would suggest the use of chest compression in isolation, without other bronchial hygiene techniques. Subsequently, Unoki et al speculated that chest compression might be more effective as an adjunct to aggressive bronchial hygiene techniques such as endotracheal suctioning and that such aggressive secretion removal would be synergistic with chest compressions, improving secretion clearance and ventilation. They tested that hypothesis in the study reported in this issue. Contrary to expectations, the animals in both of the study arms that included chest compressions suffered greater deterioration in ventilation, oxygenation, and compliance than did those that received suctioning alone or those in the control arm.

Though we must be cautious in applying animal-study data to humans, the new findings by Unoki et al have substantial implications for chest physiotherapy for neonates. Ventilation with 100% oxygen for 2.5 h did not negatively impact oxygenation or compliance in the control or suction arms.[2] The 2 Unoki et al studies provide an excellent example of how an experimental model can be established and expanded on to provide greater insight with subsequent research.

Rib cage compression is just one example of chest physiotherapy techniques that have been widely adapted and modified based on a well-meaning intuitive extrapolation of clinicians' rationalizations of physical interactions.[3–5] These techniques are ordered and applied without high-level evidence that they benefit patients and are therefore worth the time and resources invested.[6] Unfortunately, relevant evidence can be difficult and expensive to gather, especially with infants.

The development of bench and animal models can often provide valuable insights and help alert the clinician to key issues for future consideration. Although animal studies are considered low-level evidence (compared to randomized, multicenter, placebo-controlled trials with humans), they can "send up a flare" that commonly used therapy techniques may not only fail to benefit the patient, they may increase risk or even cause harm.

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