CHEST PHYSIOTHERAPY TECHNIQUES IN ICU PATIENTS: AN APPRAISAL OF THE EVIDENCE

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Background: Chest physiotherapy techniques (CPT) are routinely used in ICU settings to improve secretions clearance and pulmonary status. Critically ill patients may have increased secretion production due to prolonged immobilization, endotracheal intubation and mechanical ventilation, recurrent microaspiration, and poor immunologic and nutritional status, among others. Despite its widespread use, little is known about its effectiveness. This review analyzes the available evidence supporting its routine use and the impact that CPT may have on major outcomes in critically ill patients, both adult and pediatric.

Methods: Several databases (Medline, Cochrane, and bibliographies of published papers) were searched for any available randomized clinical trials (RCT) and systematic reviews comparing any CPT with controls in adult and pediatric critically ill patients. Only articles published in English from January 1975 to March 2002, that specifically addressed outcomes such as mortality, effect on weaning from mechanical ventilation, length of ICU and hospital stay, and costs were included.

Results: Our search strategy yielded only 5 RCTs and 4 systematic reviews.

- *Effect of CPT On intubated patients*. One RCT, comparing either standard nursing care vs. standard nursing care plus CPT in adult trauma patients, found no differences on outcomes. Another RCT, involving postcardiac surgery children, found a decreased incidence of atelectasis but an increased LOS in the study group.

- *Effect of positioning/postural drainage*. In a RCT comparing standard rotation vs. rotational beds, the incidence of pneumonia was significantly lower in the study group, especially in septic patients. However, there was no differences in LOS, duration of mechanical ventilation or mortality.

- *Effect of CPT on postextubation*. We found one systematic review that included 3 RTCs on the effect of CPT in neonates. The review found no significant reduction in postextubation lobar collapse. The review did find a slight decrease incidence of reintubation with CPT. There were no studies in adults.

- *Effect of CPT post-surgical critically ill patients.* We found one systematic review that included 8 RTCs on the effects of incentive spirometry (IS) on postoperative pulmonary complications (PPCs). All studies but one reported no positive effect of IS. Only one study found that IS, deep breathing and IPPB were more effective than control (no treatment) in shortening LOS.

A meta-analysis of 14 RCT of adult patients undergoing upper abdominal surgery and any combination of IS, IPPB, deep breathing and control looking at outcomes of PPCs, found a slight decrease in PPCs when comparing IS with Control and when comparing deep breathing exercises with no CPT.

In another RCT of patients following cardiac valve surgery comparing the effect of CPT vs. standard treatment found no differences in patient outcomes. However, they noted the addition of significant costs. Similarly, we found only one study in children looking at the effects of CPT on cardiothoracic surgery. Routine CPT had a negative effect. Despite the routine use of CPT in lung transplanted patients, we found no study addresing its effectiveness.

Conclusions: Few studies addressing the use of CPT techniques for ICU patients were found. Most studies were small and few of them were randomized. The majority of studies did not have controls and were short-term outcomes studies. The available evidence does not support the routine use of CPT nor does it demonstrate its effectiveness in an ICU setting. We did not find any studies in which CPT had a positive effect on weaning, LOS or morbidity and/or mortality. In fact, several studies found potential detrimental effects of routine CPT. The studies found suggest that hemodynamics should be monitored during CPT/suctioning and sufficient sedation should be administered to avoid adverse hemodynamic and metabolic responses. Further research in this area of care of critically ill patients is clearly needed.