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Title: Effect of lung expansion techniques in the incidence of pulmonary complications after upper abdominal surgery

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Body: Respiratory physiotherapy is widely recommended to prevent postoperative pulmonary complications (PPC); however, the evidence of which lung expansion technique is more effective for preventing PPC remains unknown. **OBJECTIVE:** To compare the effect of different lung expansion techniques in the incidence of PPC after upper abdominal surgery (UAS). **METHODS:** This randomized clinical trial enrolled 91 consecutive patients undergoing UAS. Patients were randomized with concealed allocation in 4 treatment groups: flow-oriented incentive spirometry (FIS, n=23; 60±14yrs, 25.3±5.1Kg/m²), volume-oriented incentive spirometry (VIS, n=23; 55±11yrs, 23.6±3.8Kg/m²), deep breathing (DB, n=26; 60±12yrs, 25.1±6.1Kg/m²) and continuous positive airway pressure with pressure of 10 cm H₂O (CPAP, n=19; 48±15yrs, 24.7±4.6Kg/m²). Interventions were performed 10 x 5 repetitions, 3 times daily in the post-operative period until 5th postoperative day. PPC included: pneumonia, tracheobronchitis, atelectasis with clinical repercussions and hypoxemia (SpO₂<85%) that were assessed daily by a blinded researcher. Fisher test was used and significance level was set at 5%. **RESULTS:** Time of surgery was similar among groups and PPC occurred, in average, 8.7% of the patients and there was no difference among groups (FIS=9%; VIS=4%; DB=19%; CPAP=0%; p>0.05). No difference was also observed among groups for hospital length of staying (p>0.05); however, CPAP group presented higher number of patients under 60 years, smoking history and laparoscopic surgeries. **CONCLUSIONS:** Our preliminary results showed that all lung expansion techniques were similar in the prevention of PPC after upper abdominal surgery.