Inspiratory muscle training for reducing postoperative pulmonary complications: A simple method that we hope is effective

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In their article in this issue of the *Journal*, “Inspiratory Muscle Training Is Associated With Decreased Postoperative Pulmonary Complications: Evidence From Randomized Trials,” Ge and colleagues¹ attempt to determine whether preoperative inspiratory muscle training (IMT) is associated with a significant difference in the rate of postoperative pulmonary adverse outcomes in patients undergoing cardiothoracic or upper abdominal surgery. They use the statistical method of “trial sequential analysis” to complete the meta-analysis and conclude that preoperative IMT is associated with improved maximum inspiratory pressure and decreased postoperative pulmonary complications (PPCs).

There are multiple risk factors predicting the development of PPCs, and some are modifiable.² In many clinical trials, the use of preoperative IMT has seemed to decrease the incidence of PPCs. Most trials, however, have not been double-blind. Previous meta-analyses³⁻⁵ have also indicated the effectiveness of IMT, but the quality of evidence is low or moderate. In the study of Ge and colleagues,¹ the IMT effect is little different from that seen in previous meta-analyses. Only 1 additional recent clinical trial has been added to the current literature. The current study of Ge and colleagues¹ thus faces the same problem as other meta-analyses: the evidence level is questionable.

Another limitation of the study is the incomplete documentation of some pretreatment variables (such as preoperative pulmonary test results) and of the ratio of laparoscopic or thoracoscopic surgery to open surgery. This lack of complete data is a difficulty inherent in meta-analyses. Getting information from original clinical trials is a hallmark of meta-analysis, but sometimes it is not so easy. Minimally invasive surgery may wash out the effect of IMT. Although the current meta-analysis of Ge and colleagues¹ and the previous meta-analyses favor IMT, the evidence strength is not great enough before excluding pretreatment and operation variables.

A simple method we can rely on?

Central Message

Inspiratory muscle training reduces the incidence of postoperative pulmonary complications, but more evidence is needed before applying these techniques to more patients.

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According to previous clinical studies, most trials include IMT sessions that last more than 15 minutes a day for training periods longer than 2 weeks. This intervention is time-consuming and usually requires a physiotherapist. It is difficult to justify the application of preoperative IMT to every patient undergoing cardiothoracic or upper abdomen surgery if the evidence level is not high. IMT is therefore preferred for patients with a high risk of PPCs. Other interventions, such as preoperative smoking cessation, correcting preoperative severe anemia, avoidance of general anesthesia in favor of regional anesthesia, and protective ventilation, also have an effect on PPC prevention.⁶ Compared with these strategies, which are not time-consuming, IMT should have more supportive clinical evidence before being applied to more patients.

In conclusion, the current study of Ge and colleagues¹ strengthens the case for IMT's effect in preventing PPCs demonstrated in previous trials. More double-blind studies are needed, however, to meet a higher evidence level justifying application of this technique to more patients undergoing cardiothoracic or upper abdomen surgery.

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