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Editorial

Is prophylactic mechanical ventilation really necessary after esophageal surgery?

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It is generally accepted that the characteristic postoperative mechanical respiratory abnormality following abdominal or thoracic surgery is a restrictive pattern with severely reduced inspiratory capacity and vital capacity, plus smaller, but more important, reductions in FRC. Thus, patients breathe rapidly with a small tidal volume and are unwilling or unable to inspire deeply. The reduced inspiratory capacity limits the patient's ability to cough effectively and causes atelectasis and hypoxemia. In view of these postoperative abnormalities, ventilatory support with mechanical ventilation after major surgery seems to be a reasonable procedure to minimize the number of respiratory complications.

Radical surgery for esophageal cancer requires a combined thoracoabdominal procedure and is still associated with a high rate of postoperative pulmonary complications [1]. Although patients undergoing combined thoracoabdominal surgery seem to be particularly liable to changes in lung function and the development of atelectasis, strangely enough, the characteristic changes in lung function after radical esophageal surgery have not been fully investigated. In this volume of the *Journal*, Murata and Kubota report the results of their study concerning the changes in respiratory mechanics and respiratory energy expenditure after radical esophagectomy [2]. They studied a total of 21 patients.

Postoperatively, all the patients received artificial ventilation to prevent respiratory failure or respiratory complications for several days. Weaning from mechanical ventilation was successful in 14 patients and failed in the other 7 patients. The results demonstrated that total compliance, lung compliance, and chest wall compliance were all significantly lower in the unsuccessful weaning group than in the successful weaning group. They also showed that the work of breathing and the oxygen cost of breathing were significantly higher in the unsuccessful weaning group. These findings suggest that an increase in respiratory energy expenditure due to the impairment of respiratory mechanics is the main cause of postoperative respiratory failure in patients undergoing radical operation for esophageal cancer.

No doubt, there are beneficial effects of prophylactic mechanical ventilation after major surgery. For example, mechanical ventilation can reduce the metabolic demands on an often fragile circulatory system and allow for more aggressive pain control in patients recovering from major surgical insults. However, prolonged mechanical ventilation may not only alter the quality of life for a patient but also have several adverse effects, such as circulatory depression, barotraumas, and ventilator-induced lung injury. There is also a question whether prophylactic mechanical ventilation is really necessary after esophageal surgery.

There is a substantial literature to suggest that postoperative mechanical ventilation as prophylaxis against adverse respiratory or cardiac outcomes is unnecessary in the absence of clear pulmonary pathology [3,4]. The decision to keep patients intubated and mechanically ventilated following major procedures is often made out of concern that the stress or pain of assuming the work of breathing might lead to adverse outcomes. The tradition of overnight ventilatory support in patients recovering from radical esophagectomy, for example, has clearly been shown not to be universally necessary [5,6].

In several institutions in Japan, it is rather a routine procedure for a patient to be extubated immediately after radical esophagectomy and managed under spontaneous breathing. In the study of Murata and Kubota [2], the rate of unsuccessful weaning seems to be considerably high. However, to my knowledge, no prospective randomized study has been conducted to compare the rate of postoperative complications in patients breathing spontaneously and patients receiving mechanical ventilation after radical esophageal surgery. At this point, it is not clear whether prophylactic mechanical

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ventilation is truly beneficial to patients undergoing radical esophageal surgery.

References

1. Nishi M, Hiramatsu Y, Hioki K, et al. (1988) Pulmonary complications after subtotal oesophagectomy. Br J Surg 75:527–530
2. Murata K, Kubota T (2001) Impairment of chest wall mechanics and increased chest wall work of breathing causes postoperative respiratory failure in patients who have undergone radical esophagectomy. J Anesthesia 15:125–131
3. Shackford SR, Virgilio RW, Peters RM (1981) Early extubation versus prophylactic ventilation in the high risk patient: a comparison of postoperative management in the prevention of respiratory complications. Anesth Analg 60:76–80
4. Quasha AL, Loeber N, Feeley TW, et al. (1980) Postoperative respiratory care: a controlled trial of early and late extubation following coronary artery bypass grafting. Anesthesiology 52:135–141
5. Caldwell MTP, Murphy PG, Page R, et al. (1993) Timing of extubation after oesophagectomy. Br J Surg 80:1537–1539
6. Blass J, Staender S, Moerlen J, et al. (1991) Complication-free early extubation following abdomino-thoracic esophagectomy. Anaesthesist 40:315–323