# No chest tube protocol in video-assisted thoracic surgery procedures

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The urge for less pain, earlier mobility, low financial cost, and better cosmetic outcome has driven the everlasting pursuit of thoracic surgeons for smaller incisions, low port number, and shorter hospital stay. Management of chest tubes is pivotal in the postoperative care of patients submitted to thoracic surgeries. However, thoracic surgeons have traditionally managed chest tubes based more on their experience and personal preference rather than guided by an evidenced-based approach. Chest tubes increase the rate of postoperative pain and hospital stay, and the removal of a chest tube improves ventilator function and reduces chest pain after pulmonary resection. Removing a chest tube sooner not only has financial benefits but also has beneficial functional effects for the patient. Upon witnessing the benefits of early removal of chest tubes after video-assisted thoracic surgery procedures, some surgeons are starting to adopt a no chest tube protocol especially in thoracic procedures, in which the lung is left untouched. Upon reviewing the papers published on avoiding chest tubes in video-assisted thoracic surgery procedures, it showed that such a technique can be safely used without affecting the quality of the procedures. Moreover, it can lead to a more favorable postoperative course.

**Keywords:**
no chest tube, thoracic surgery, video-assisted thoracic surgery

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## Introduction

Since reporting of the first video-assisted thoracic surgery (VATS) lobectomy in the early 1990s, thoracic surgery has seen many changes over all levels from indications of surgery, first lines of management, and number of ports in VATS among the thoracic surgery society. Continuous enhancement of instrumentation, camera, and magnification of vision has encouraged massive leaps in the domain.

From open thoracotomy to multiportal VATS, uniportal VATS, subxiphoid and subcostal approaches there has been a continuous search for smaller incisions, low number of ports, reduced pain, better cosmetics, and speedier recovery without aff ecting the safety of the patient or the outcome of the operation.

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## Review of literature

In the *Interactive Cardiovascular and Thoracic Surgery Journal* best evidence practice for chest tube management [2], they stated that a drain inserted for a pneumothorax can be removed when the air leak has ceased for at least 24 h and the lung is fully reinflated on radiography. Occasionally, if there is doubt about the presence of an intermittent air leak, the drain may be clamped and a chest radiography repeated 4–6 h after clamping. A significant air leak would produce a pneumothorax. If the drain has been inserted for the drainage of fluid, it can be removed when the daily drainage falls below 200 ml and the lung is fully expanded on the chest radiography.

Chest tubes increase the rate of postoperative pain and hospital stay, and the removal of a chest tube improves ventilatory function and reduces chest pain after pulmonary resection. Removing a chest tube sooner not only has financial benefits but also has beneficial functional effects for the patient [3].

With advances of the instruments and wide application of VATS in almost all of the thoracic surgeries together with the improvement of stapling devices, the amount of air leak has significantly decreased, thus decreasing the time needed for chest tube drainage. Several studies discussed the possibility of early removal of chest tube after VATS; Göttgens *et al.* [4] discussed the benefits of early removal of chest tube after VATS and open thoracotomy lobectomies comparing the differences in the numerical pain score and orced expiratory volume in 1 s before and after chest tube removal.

Upon witnessing the benefits of early removal of chest tubes after VATS procedures, some surgeons are starting to adopt a no chest tube protocol, especially in thoracic procedures, in which the lung is left untouched.

In 2004, Watanabe *et al*. [5] carried out a study including 76 patients who underwent VATS wedge resection between 1998 and 2004. Patients were selected based on the absence of air leaks, bullous lung, severe pleural adhesions, and prolonged chest tube drainage preoperatively. Patients were divided into two groups and were compared regarding their hospital stay, pain score, postoperative chest radiographies, and need for reinsertion of the chest tube [5].

The results of Watanabe *et al*. [5] showed no significant difference in the hospital stay or the pain score, yet they did describe the patients with intraoperative chest tube removal to be more comfortable and much easier to move. Both groups showed equal percentage of postoperative pneumothorax, concluding that intraoperative removal of chest tube did not jeopardize the safety or quality of the operation [5].

In 2008, Todd and colleagues published a paper in which they questioned the need for chest tube after thoracoscopy in children, in a series of 333 patients who underwent VATS for a heterogeneous group of presentations during the period from 1993 to 2007, including 176 patients who underwent VATS lung biopsy. In their series only one patient showed postoperative pneumothorax, requiring a reintervention. It was concluded that chest tube can be avoided in VATS procedures in children, providing a more favorable experience [6].

Ueda *et al*. [7] from Japan published a study that questioned the possibility of avoiding chest tubes in major lung resection after using absorbable mesh (Neoveil, Gunze, Osaka, Japan) and fibrin glue to ensure good pneumostasis. A suction-induced air-leakage test was used to identify the need for chest tube. It was concluded that the use of such a technique would help in avoiding chest tube in major lung resections, resulting in less postoperative pain [7].

## Conclusion

Upon reviewing the papers published on avoiding chest tubes in VATS procedures, it showed that such a technique can be safely used without affecting the quality of the procedures. Moreover, it can lead to a more favorable postoperative course.

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### Conflicts of interest

There are no conflicts of interest.

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