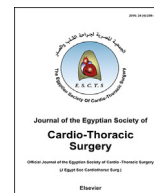


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Intra-operative removal of chest tube in video-assisted thoracoscopic procedures[☆]

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ABSTRACT

Objective: Thoracic Surgery has witnessed a massive revolution in the last 25 years with the standardization of video-assisted thoracoscopic surgery as the best approach of the thoracic operations. Earlier, when thoracic surgery was done through the huge thoracotomy incisions and rib spreading retractors with their excruciating pain, the chest tube pain was masked, but using VATS, has caused surgeons seeking early removal of chest tubes. With advances of the instruments and stapling devices, the amount of air-leak was significantly reduced, diminishing the time needed for chest tube drainage.

Methods: A prospective study, from May 2014 to December 2016, included 29 patients admitted to the service in Faculty of Medicine, Assiut University. Patients had different clinical presentations. Undergoing VATS procedures (uni-portal VATS in all except one), they were then divided into two groups: study group, those with intra-operative removal of chest tube, (16 patients) and control group (13 patients). Patients would undergo an air-leak test.

Results: The two groups had a significant difference in the post-operative mean pain score (study group 4.9 & control group 7.8), and hospital stay (study group 1.4 & control group 4). Both groups were similar in occurrence of post-operative pneumothorax (study group 25% & control group 23.1%), with only 2 patients (12.5%) in the study group requiring re-insertion of chest tube.

Conclusions: Intra-operative removal of chest tube during VATS procedures was a safe technique in well selected patients with an intra-operative successful air-leak test with radiological and clinical follow-up. This technique provided lesser post-operative pain with shorter hospital stay.

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1. Introduction

Thoracic Surgery has witnessed a massive revolution in the last 25 years. 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 (Figs. 1–3).

Earlier in the days where thoracic surgery was done through the huge thoracotomy incisions and rib spreading retractors with their simultaneous postoperative excruciating pain, the pain caused by the chest tube had less importance since it was usually masked by that of the thoracotomy. The standardization of VATS as the best approach of most of the thoracic operations with its benefits of decreased pain and earlier mobility, has caused thoracic surgeons to seek early removal of chest tubes to avoid their subsequent complications of intercostal nerve compression, paresthesia and liability to infections.

Chest Tube management is one of the pillars of thoracic surgery. A drain inserted for pneumothorax can be removed when there is no air leak for at least 24 h and the lung is fully expanded on X-ray. Occasionally, if there is fear of the presence of a sporadic air leak, the drain may be closed and a chest X-ray is 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 roentgenograms [1]. Yet 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 have significantly decreased. Thus decreasing the time needed for chest tube drainage.

This is a **Pilot study** to explore the possibility of intraoperative chest tube removal in patients undergoing VATS procedures, identifying the safety of such techniques, criteria for selecting patients and analyzing the sequels of the application of such technique as regarding:

- 1- Postoperative pain.
- 2- Hospital stay.
- 3- Recurrence of pneumothorax and need for reinsertion of chest tube.

2. Materials and methods

This work was conducted in Cardiothoracic Surgery Department, Assiut University Hospital after approval of the protocol by the ethical committee of Assiut university, Faculty of Medicine. It represents a prospective comparative study of patients admitted to the service from May 2014 to December 2016 who had underwent a therapeutic VATS procedures. 29 patients were admitted to the study divided into two groups: study group, patients whom undergone intraoperative removal of chest tube, (16 patients) and control group in which the chest tube was left postoperatively (13 patients).

Inclusion Criteria:

- ✓ Patients undergoing video-assisted thoracic surgery at Assiut University Hospital
- ✓ No evidence of air leak at the end of the surgical procedure.
- ✓ No active bleeding at the end of the surgical procedure.



Fig. 1. Post-operative patient from study group (intra-operative removal of chest tube).

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