

Chest Tube Management After Lung Resection: A “Real-Life” Scenario

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To the Editor

Over the past decade, the growth of minimally-invasive Thoracic Surgery has elicited a reduction of complication rates, length of stay and hospital costs. Furthermore, standardization of surgical techniques, the development of highly sophisticated devices and the implementation of Enhanced Recovery after Surgery (ERAS) protocols optimized intraoperative performance and postoperative results [1]. To date, no clear consensus has been reached concerning optimal drainage timing and removal criteria, due to conflicting study and scarce data evidence [2]. ERAS protocols by the European Society of Thoracic Surgery (ESTS) on post-operative chest tube management recommend placement of a single tube after a routine anatomical lung resection, use of digital drainage systems, avoidance of external suction and removal of the chest tube if daily serous effusion volume is less than 450 mL [3].

In this issue of the journal, the study by Minervini *et al.* [4] investigated the adherence of Thoracic Surgeons to ERAS guidelines. By means of an online anonymous survey emailed to the members of the Canadian Association of Thoracic Surgeons (CATS) the authors assessed the current status of chest tube management in Canada. Most surgeons placed a single drain both in open (75%) and video assisted thoracic surgery (VATS) lobectomies (93%). External suction on chest tube was applied by 73% of respondents and discontinued at least 12–24 h before tube removal. Digital drainage systems were used by half of the surgeons surveyed due to unavailability at the institution (43%) and high cost (30%). Moreover, the adoption of electronic drainage systems has been reported to actually reduce the expenses in the long-term, due to a more precise monitoring of air leaks and an overall better timing of removal [5]. Furthermore, other contributions from the Literature underscore a greater patient satisfaction related to better portability and convenience, specifically in the domestic environment [6]. On the other hand, the review by Embalabala *et al.* [1] demonstrates a clear-cut clinical advantage of the digital devices

over traditional methods, due to heterogeneity of case populations and differences in methodologic criteria.

According to Minervini *et al.*'s [4] survey, 25% of the respondents removed the chest tube regardless of drainage output. Such practice was independent of the surgeons' experience ($p = 0.127$), number of lobectomies performed annually ($p = 0.877$), proportion of VATS lobectomies on the total of resections ($p = 0.259$), type of drainage system used ($p = 0.141$) and awareness regarding ERAS guidelines ($p = 0.374$). Among those who remove chest tubes based on fluid output, thresholds varied widely; 86% considered a cutoff volume lower than 450 mL/24 h. Most respondents (77%) were interested in a clinical trial studying chest tube removal independent of drainage volume. The general attitude regarding chest tube management does not refer to established guidelines, but is based on the single Center's experience and the Surgeon's personal habits. The cut-off value of 450 mL daily production, although supported by randomized studies and meta-analyses, has not gained general acceptance yet [7–10].

As closing remarks, we congratulate with the Authors for publishing such a well-designed survey. Finally, it would be interesting to investigate the position of the Italian Thoracic Surgeons regarding such important clinical aspect.

Availability of Data and Materials

Not applicable.

Author Contributions

Conceptualization: VT and MR. Methodology: RC. Writing—original draft preparation: VT. Writing—review and editing: MR and RC. All authors have been involved in revising the manuscript critically for important intellectual content. All authors gave final approval of the version to be published. All authors have participated sufficiently in the work to take public responsibility for appropriate portions of the content and agreed to be accountable for all aspects of the work in ensuring that questions related to its accuracy or integrity.

Ethics Approval and Consent to Participate

Not applicable.

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Conflict of Interest

Roberto Cirocchi is serving as one of the Editorial Board and Guest Editor members of this journal. We declare that Roberto Cirocchi had no involvement in the review of this article and has no access to information regarding its review. Other authors declare no conflict of interest.

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