

Everyone Hates Chest Tubes



Christopher W. Seder, MD

Everyone hates chest tubes—this is pretty much universal. However, the timing of when to remove a patient's chest tube has not gained nearly as much consensus. In the absence of an air leak, hemorrhage, infection, or a chyle leak, various daily pleural drainage thresholds have been used to prompt tube removal, ranging from 200 to 500 mL/d.¹ Some authors have even advocated for a “no drain” policy after thoracoscopic lobectomy in patients who have no air leak after extubation, citing no adverse events and preserved physical function relative to patients with a tube.^{2,3} The decision of when to pull a chest tube is made hundreds, if not thousands, of times daily across the world; and it is primarily based on individual surgeon preferences. In response, The Society for Translational Medicine recently published guidelines for the postoperative management of chest tubes in patients undergoing lobectomy.⁴ However, only grade 2B recommendations (weak recommendation, moderate quality evidence) were able to be provided: chest tubes with up to 450 mL/d can be safely removed and the use of pleural fluid-to-blood protein ratio <0.5 might be informative when deciding if a tube should be removed.

In this month's *Seminars in Thoracic and Cardiovascular Surgery*, Azzi et al⁵ have proposed the concept that surgeons may be able to remove chest tubes earlier than usual by using 6-, 8-, and 12-hour chest tube fluid outputs to predict 24-hour outputs following lung resection. In this single-institution cohort ($n = 150$), most patients underwent minimally invasive lobectomy for nonsquamous cell lung carcinoma, with right upper lobe being the most common site of operation. The authors examined if the chest tube output in postoperative hours 24–30 (6 hours), 24–32 (8 hours), and 24–36 (12 hours) were predictive of total output between hours 24 and 48 (24 hours). Using a variety of typical drainage thresholds (250 mL/d, 400 mL/d, and 20% whole-body lymphatic flow), specificity (85–94%), false-positive rates (6–15%), and positive predictive values (75–92%) were calculated to assess the predictive performance of the shortened chest tube observation durations.

Azzi et al report provocative findings that provide the foundation for a prospective randomized trial in which chest tubes are removed at the 6-, 8-, or 12-hour mark and rates of postoperative



Christopher W. Seder, MD.

Central Message

The recently opened General Thoracic Surgery Club Clinical Trials Network provides the ideal platform to publicize clinical trials and expand enrollment to multiple institutions.

complications are compared to traditional care. One could argue that such a study should be restricted anatomic lung resections, as wedge resection may confound the data since they typically require less hilar dissection. In addition, a well-defined postoperative protocol, mandating mobilization prior to the 6-, 8-, or 12-hour mark and the use of suction, would need to be devised. Furthermore, I would propose that pleural output in postoperative hours 0–6, 0–8, and 0–12 be examined against output in the first 24 hours, instead of leaving the chest tube for a mandatory 24 hours prior to the assessment. In such a trial, patients could be stratified by lobe resected, age, approach, and presence of chronic obstructive pulmonary disease. The prospective nature of the study would make the use of digital drainage systems unnecessary, removing that as a potential barrier to enrollment.

We, as thoracic surgeons, must initiate more prospective clinical trials providing high-level data to answer simple surgical questions, such as this. The recently opened General Thoracic Surgery Club Clinical Trials Network (www.gtsc.org) provides the ideal platform to publicize such trials and expand enrollment to multiple institutions for more rapid accrual. The authors should be congratulated on their efforts to use a data-driven approach to aid thoracic surgeons in making a decision that has traditionally been based on personal preference. Now, let's take it to the next level and prospectively study the value of this predictive model.

Department of Cardiovascular and Thoracic Surgery, Rush University Medical Center, Chicago, Illinois

Address reprint requests to Christopher W. Seder, MD, Department of Cardiovascular and Thoracic Surgery, Rush University Medical Center, 1725 W. Harrison St, Suite 774, Chicago, IL 60612. E-mail: christopher_w_seder@rush.edu

DOI of original article: <http://dx.doi.org/10.1053/j.semtcvs.2019.02.023>.

REFERENCES

1. Novoa N, Jiménez M, Varela G: When to remove a chest tube. *Thorac Surg Clin* 27:41–46, 2017
2. Murakami J, Ueda K, Tanaka T, et al: The validation of a no-drain policy after thoroscopic major lung resection. *Ann Thorac Surg* 104:1005–1011, 2017
3. Ueda K, Haruki T, Murakami J, et al: No drain after thoroscopic major lung resection for cancer helps preserve the physical function. *Ann Thorac Surg* 2019. <https://doi.org/10.1016/j.athoracsur.2019.03.018>
4. Gao S, Zhang Z, Aragón J, et al: The Society for Translational Medicine: Clinical practice guidelines for the postoperative management of chest tube for patients undergoing lobectomy. *J Thorac Dis* 9:3255–3264, 2017
5. Azzi J, Gottlieb B, Maziak D, et al: Early identification of patients who will meet 24-hour fluid output threshold for chest tube removal after lung resection. *Semin Thorac Cardiovasc Surg* 31:861–867, 2019