

Pleural Manometry Does Not Reduce Procedural Discomfort during Large Volume Therapeutic Thoracentesis: a Multicenter Randomized Trial

Robert J. Lentz, MD^{1,2,3}; Andrew D. Lerner, MD⁴, Jasleen Pannu, MD¹; Christopher Merrick, MD¹; Lance Roller, MS¹; Charla Walston, AGACNP-BC¹, Sarah Valenti, ACNP-BC⁵; Tracey Goddard, ACNP-BC⁵; John T. Huggins, MD⁶; Otis B. Rickman, DO^{1,2}; Lonny Yarmus, MD⁴; Ioannis Psallidas, MD, PhD⁷; Najib M. Rahman, DPhil, MSc⁷; Fabien Maldonado, MD^{1,2}

¹Division of Allergy, Pulmonary, and Critical Care Medicine, Department of Medicine, Vanderbilt University School of Medicine, Nashville, TN; ²Department of Thoracic Surgery, Vanderbilt University School of Medicine, Nashville, TN; ³Department of Veterans Affairs Medical Center, Nashville, TN; ⁴Section of Interventional Pulmonology, Division of Pulmonary and Critical Care Medicine, Johns Hopkins University School of Medicine, Baltimore, MD; ⁵Department of Radiology, Vanderbilt University School of Medicine, Nashville, TN; ⁶Division of Pulmonary, Critical Care, and Sleep Medicine, Department of Medicine, Medical University of South Carolina, Charleston, SC; ⁷Oxford Centre for Respiratory Medicine, Oxford Respiratory Trials Unit, University of Oxford, Cambridge, UK.

RATIONALE: Therapeutic thoracentesis is commonly performed in inpatient and ambulatory medicine. In patients with non-reexpandable lung, pleural fluid removal can cause excessively negative pleural pressure resulting in chest discomfort, pneumothorax, and re-expansion pulmonary edema. Some evidence suggests using pleural manometry to avoid excessively negative pleural pressure reduces procedural discomfort and protects against complications, though this has never been evaluated in a randomized fashion.

METHODS: In this randomized trial, 127 consecutive consenting adults referred for therapeutic thoracentesis at two institutions with free-flowing effusions meeting pre-specified criteria suggesting volume of at least 500 milliliters were randomized to manometry- versus symptom-guided thoracentesis. Complete effusion drainage was sought in all procedures. Subjects rated chest discomfort on a visual analog scale ranging 0-100 before drainage ("open"), at regular intervals of volume drained, and at the end of the drainage procedure ("close"). Pleural pressure was measured at the same volume intervals in the manometry group. Drainage was discontinued in both arms for persistent chest discomfort or incessant cough; rapidly falling pleural pressure or pleural pressure at end-expiration lower than -20 cm H₂O were additional discontinuation criteria in the manometry arm.

RESULTS: The final analysis included 62 subjects in each arm; three were removed after randomization with no outcome data recorded due to manometer malfunction (n=2) or dry tap due to pleural tumor burden (n=1). Subjects were well-matched between arms on demographic characteristics, comorbidities, analgesic medication use, and baseline chest discomfort. Twenty-one percent of manometry procedures were discontinued after meeting a pleural pressure stop criterion. There was no difference in the primary outcome of overall procedural chest discomfort rated at five minutes post-procedure between manometry and symptom-guided groups (mean 25.4 vs. 23.0, P = 0.78). There was also no significant difference between chest discomfort at open (18.2 vs. 18.1, P = 0.76), close (26.4 vs. 30.1, P = 0.44), 15 minutes post-procedure (22.3 vs. 22.6, P = 0.72), difference between opening and closing discomfort (-2.3 vs. 3.9, p = 0.43), or intraprocedure trend in discomfort scores (Figure 1, P = 0.25). There were six complications, all asymptomatic pneumothoraces ex-vacuo in subjects allocated to symptom-guided thoracentesis (P = 0.01); as 13% of subjects did not have a post-procedure chest radiograph available, the significance of this finding is uncertain.

CONCLUSIONS: Measurement of pleural pressure during large-volume therapeutic thoracentesis did not protect against development of chest discomfort; these data do not support the routine use of manometers during this procedure.

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