

Suggested Readings Regarding Chest Tube Stripping

Charnock Y, Evans D: Nursing management of chest drains: a systematic review. *Aust Crit Care* 2001;14(4):156-160.

Systematic review of the literature relating to chest drain care, specifically: dressings, tube manipulation and positioning, and tube removal.

Dango S, W SieneI, B Passlick, C Stremmel: Impact of chest tube clearance on postoperative morbidity after thoracotomy: results of a prospective, randomised trial. *Eur J Cardiothorac Surg* 2010;37(1):51-55.

Randomized trial compared milking (1 min Q 2 hr x 48 hr) with observation and all patients had -20 cmH₂O. Milking significantly increased drainage, but thought to be resulting from stimulation of pleura, not because tube was more patent; no clots were observed in tubes of any patients; advise against routine tube manipulation

Day TG, RR Perring, K Gofton: Is manipulation of mediastinal chest drains useful or harmful after cardiac surgery? *Interact Cardiovasc Thorac Surg* 2008;7(5):888-890.

"Best evidence review" examined the literature and only considered Issacson, Lim-Levy and Pierce to meet inclusion criteria; insufficient evidence to support tube manipulation; given risks illustrated by Duncan, tube manipulation is not recommended

Duncan C, R Erickson: Pressures associated with chest tube stripping. *Heart & Lung* 1982;11:166-171.

The classic reference that first identified very high negative pressures with chest tube stripping demonstrated pressures between -145 cmH₂O and -370 cmH₂O depending on length of tube compressed and -145 cmH₂O to -408 cmH₂O when roller was compared to manual technique; pleural pressures were higher than mediastinal pressures. Study measurements were done on 20 men who had postoperative pleural or mediastinal chest tubes; measurements were taken at the juncture of the chest tube and the drainage tubing; suction to the drain was -20 cmH₂O

Gordon PA, Norton JM, Merrell R: Refining chest tube management: analysis of the state of practice. *Dimens Crit Care Nurs* 1995;14(1):6-12.

Compares traditional practices with evidence-based practices relating to suction levels, manipulating chest drain tubing, positioning tubing.

Gross SB: Current challenges, concepts, and controversies in chest tube management. *AACN Clin Issues Crit Care Nurs* 1993;4(2):260-275.

This comprehensive, extensively referenced review examines the state of the art of nursing care in 1993, including indications; tube placement; drainage systems; principles relating to chest drainage; controversies including mediastinal bleeding, tube clearance, clamping, tube site care, antibiotics; chest tube removal; complications; and autotransfusion.

Halm MA: To strip or not to strip? Physiological effects of chest tube manipulation. *Am J Crit Care* 2007;16(6):609-612.

This clinical evidence review examines the literature relating to drainage tube manipulation and finds no research supporting the practice.

Isaacson JJ, Brewer MJ: The effect of chest tube manipulation on mediastinal drainage. *Heart & Lung* 1986;15:601-605.

Milking compared with stripping showed no difference in drainage in cardiac surgery patients; statistical analysis also showed no difference in drainage between suction pressures of -5 cmH₂O and -20 cm H₂O

Kirkwood P: Are chest tubes routinely milked, stripped, or suctioned to maintain patency? *Crit Care Nurse* 2002;22(4):70-72.

“Ask the Expert” recommends against routine tube manipulation

Lim-Levy F, Babler SA, De Groot-Kosolcharoen J, Kosolcharoen P, Kroncke GM: Is milking and stripping chest tubes really necessary? *Ann Thorac Surg* 1986;42:77-80.

This classic study is one of the first to compare milking, stripping and no manipulation to CABG patients and determined there was no benefit to tube manipulation and recommended avoiding any dependent loops in the drainage tubing.

Oakes, LL, Hinds P, Rao B, Bozeman P, Taylor B, Stokes D, Fairclough D: Chest tube stripping in pediatric oncology patients: an experimental study. *American Journal of Critical Care* 1993;2(4):293-301.

This study used a fixed randomization within groups of (1) thoracotomy and/or radiation and (2) no such treatment, with 8 patients in each group; half of patients received chest tube stripping Q2 hr for the first 48 hours after thoracotomy, the control group had no tube manipulation. Tube manipulation had no effect on pain, fever or pulmonary complications between the two groups (pain was assessed after tube stripping, not during). Routine stripping is questioned.

Pierce JD, Piazza D, Naftel DC: Effects of two chest tube clearance protocols on drainage in patients after myocardial revascularization surgery. *Heart & Lung* 1991;20(2):125-130.

Randomized trial compared milking (any compression with twisting or squeezing) with stripping (continuous compression with a roller) when a clot was visible in the drainage tubing. 78/200 patients had no clots; tube manipulation did not improve outcomes and is not recommended.

Shalli S, Saeed D, Fukamachi K, et al.: Chest tube selection in cardiac and thoracic surgery: a survey of chest tube-related complications and their management. *J Card Surg* 2009;24(5):503-509

Survey of 108 cardiothoracic surgeons and 108 cardiac surgery nurses; *to surgeons*: "Which statement best suits your attitude toward chest tube 'stripping'?" 74% allow it, 23% discourage it, 4% absolutely forbid it; "Do you believe that the currently available techniques for nurses to deal with active chest tube clogging (tapping, folding, squeezing, and milking the tube) in the setting of bleeding are: usually unsatisfactory 49%, usually satisfactory 49%. *To nurses*: "Does your institution allow nurses to strip chest tubes and chest drainage tubing to remove clots?" yes 28% no 72%; "Do you find the currently available techniques to manage chest tube clogging (see above) in the setting of bleeding are": usually unsatisfactory 49% usually satisfactory 47% completely satisfactory 3%.

Teplitz L: Update: are milking and stripping chest tubes necessary? *Focus on Critical Care* 1991;18(6):506-511.

This literature review found no research in support of stripping or milking chest tube draining tubing to maintain patency.

Wallen M, A Morrison, D Gillies, E O'Riordan, C Bridge, F Stoddart: Mediastinal chest drain clearance for cardiac surgery. *Cochrane Database Syst Rev* 2004;CD003042 [pii] 10.1002/14651858.CD003042 [doi](2):CD003042.

Cochrane Review found 3 studies that met criteria but could not be combined in meta-analysis; no data to support tube manipulation (milking or stripping) to prevent cardiac tamponade; no evidence to support or reject tube manipulation.