Suction or Gravity? Revisited

Examining the Research

Nine studies directly compared suction and gravity.1,3,8-10,12-15 While they had a variety of study designs, they did look at common outcomes, including the duration of chest tube, duration of air leak, hospital length of stay, and whether or not there was a “prolonged air leak” (number of days defined by the author). Of the nine, four placed all patients on suction before randomizing.1,9,14,15

Only one study found statistically significant outcomes in favor of suction;1 these surgeons use an alternating suction protocol in which patients “on suction” are disconnected during the day and only receiving suction overnight, so the “suction” patients were actually on gravity drainage more than half the time. Three studies found no statistically significant differences between the groups,8,12,14 and one was limited to the number of patients with prolonged air leaks, and then only found a difference (in favor of gravity) when patients who had lobectomy or segmentectomy (n=396) were pulled out of the whole group (n=500; p=0.05).9

While not all studies measured each outcome, in the remaining four studies3,10,13,15 shorter duration of chest tube, shorter duration of air leak, shorter length of stay, and fewer patients with prolonged air leak (PAL) all favored the gravity drainage group with (statistical significance).

Literature Reviews

Three of the six literature reviews extracted data and performed meta-analysis.16-18 All three reviewed five common studies,2,3,8,11,14 and each included one other study.12,15,19 There was no difference detected between suction and gravity for duration of air leak, incidence of prolonged air leak, duration of chest tube(s), and hospital length of stay. A review of the literature on treating pneumothorax concluded clinical objectives can be accomplished with either needle aspiration or tube drainage via gravity.20

Finally are two “state of the art” reviews.7,21 One examined the effect of suction on prolonged air leak and concluded that no studies were in favor of suction, two found no difference, and four were in favor of gravity drainage.21 In the other, the author states, “[gravity drainage] was not only safe for air leaks but also seemed superior to suction at stopping leaks in patients who maintained … pleural apposition.” “Patients who had their tubes placed on water seal … instead of wall suction … were more likely to have their leak stop.” In summary, “randomized studies have shown that placing chest tubes to water seal … is superior to suction and better at stopping air leaks when a pneumothorax does not occur when patients are placed to water seal [however]; a pneumothorax itself is not an indication for suction because many patients have a fixed pleural space deficit.”7

Suction not Required?

None of these researchers recommends suction for all patients following lung surgery. Typical recommendations include: “We believe minimizing duration of suction has resulted in decreased duration of air leak and number of patients with PAL,”10 and “routine application of … suction … is not necessary after lobectomy…
In the Literature

Implementation Science for EBP

The current issue of Orthopaedic Nursing provides a useful summary explaining how nurses can use the principles of implementation science (IS) to facilitate the change process necessary to provide up-to-date, evidence-based care at the bedside. The authors relate their experience changing practice related to identifying and managing delirium. The IS model allowed them to identify barriers and shortcomings and how to correct them.


But We Didn’t Know!

A group of Georgia nurses conducted a national survey to identify factors that influenced nurses’ adoption of AACN’s evidence-based guidelines on tube feeding placement verification. Only 55% of the 370 respondents were aware of the guidelines, and only 25% followed the four practices supported. Nurses with BSN or higher were twice as likely to comply, and the guideline characteristics of observability (the innovation is visible to others) and trialability (nurses could try out the innovation) enhanced adoption. This research will help nurses design more effective EBP implementation plans.

Source: Bourgault AM: Factors influencing critical care nurses’ adoption of the AACN practice alert on verification of feeding tube placement. American Journal of Critical Care 2014;23(2):134-143. PubMed Citation

EBP Unintended Consequences?

Colorado nurses highlight a potentially serious “translation” problem in the current Journal of Emergency Nursing. To enhance safety for medication dosing, the hospitals focused on ensuring that all weights were in kilograms. Part of the process was removing scales that measured pounds and ounces. While all children were weighed, low-risk adults were asked their weight, which was always in pounds. The electronic medical record only accepted kilogram weights. The next challenge was that parents couldn’t understand how much their child weighed. The nurse would convert the weight to pounds for the family, which introduced the potential error that the nurse would remember and record the weight in pounds rather than kg. To solve the problem, conversion cards were created and placed with the scales. The nurses circle the weight in kg and give it to the parent who can see the conversion factor. This report is a terrific reminder that “simple” changes can still be filled with potential hidden dangers.


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It is of no help in persistent air leaks when the lung is expanded … [and] we advocate no use of routine suction in patients undergoing lobectomy.”79 Other authors state, “the water seal method … [is] a safe and effective method for treating postoperative air leaks.”75 “Although the majority of physicians favored … suction when a patient has an air leak after lung resection … water seal is superior,”76 and “We have adopted a policy … of not adding suction … unless it is specifically judged to be indicated.”71 Two researchers point out that reducing routine suction also eases nursing workload.71

Marshall and colleagues sum it up best, “The data presented here, combined with previously reported data … provide compelling evidence that placing chest tubes on suction routinely after pulmonary resection is counterproductive.”3

Sources

We’re pleased to announce that Managing Chest Drainage, our 2.0 credit online continuing education activity is back! The monograph is fully updated with a version optimized for mobile or tablet use, and if you don’t finish the activity in one sitting, you can log back in and complete when you like, on any device. Once you register, you can log in to your profile for a record of your activity, and if you need another certificate, you can print it at any time. We’re working on building a library of CE activities for you this year. Simply click on the link at www.AtriumU.com.