A MODEL FOR TEACHING THE MECHANICS OF A CHEST DRAINAGE SYSTEM

Doug Pursley, M.Ed., RRT

Ozarks Technical Community College, Springfield, Missouri

Background

The traditional method of teaching the mechanics of chest drainage systems is to present a lecture via PowerPoint. In the experience of the author, this method by itself does not produce 100% mastery and leaves some students still having difficulty grasping the concept of a three-chambered chest drainage system. For this reason, we sought to produce a working model of a chest drainage system that would both add a laboratory component to the instruction and provide another venue by which students could enhance their comprehension of the topic.

Method

The model was constructed out of common respiratory supplies and equipment. The lung and chest wall was made by inserting a 0.5 L manual ventilation bag (Ventlab, Mocksville, NC) into an empty 1000 ml plastic sterile water container (Cardinal Health, McGaw Park, IL). A 2 inch circular hole was cut in the bottom of the container and a latex glove was secured around the bottom to simulate the diaphragm. The chest drainage system was formed by using three 1000 ml plastic sterile water containers connected together with 3/16" suction tubing and filled to appropriate fluid levels. A 5 mm ETT serves as the underwater seal and a common straw serves as the suction control mechanism. The top part (~ 2 inches) of a 7 mm ETT is used to connect suction tubing to the suction control chamber. Two additional holes were cut into the side of the lung and thorax container – one to facilitate placement of the chest tube (which was 3/16" suction tubing) and another to place an external pressure manometer. To determine if the model was able to enhance student learning, 18 second-year respiratory therapy students received the customary PowerPoint presentation followed by a twenty minute review of key principles using the model. They were then asked to respond to the following statement using a Likert scale format: "The model enhanced my comprehension of chest tubes and helped me discover aspects of the three-bottle system that I did not fully understand in the PowerPoint."

Results

All eighteen students either strongly agreed or agreed (SA=13, A=5) that the model enhanced their understanding of chest drainage systems.

Conclusion/Summary

Research has shown that students retain greater amounts of information when they are actively involved in the learning process. Our model allows students to observe tidaling in the underwater seal, see pressure changes occur in the pleural space when the suction control straw is moved up or down, and watch the lung inflate when they apply suction to the pleural space, among other interactions. The model accurately, realistically, and inexpensively simulates a patient-chest drainage system and may improve students' comprehension of this topic.