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PEEP Valve for an Anesthesia Machine

WEN-HSIEN WU, M.D., M.S.,* AND HERMAN TURNDORF, M.D.†

Controlled hypotensive anesthesia is often used during special surgical procedures when massive bleeding is anticipated or when difficult surgical dissection is expected.[1–7] Many drug combinations and postural alterations have been suggested to overcome resistance to blood pressure decrease. Increased airway pressure is an effective and useful adjunct to anesthetics, ganglionic blockade, or vasodilators.[2,3,6] Extensive use of positive end-expiratory pressure (PEEP) has been limited by the technical difficulties in producing it safely with available anesthesia machines. We describe below a functional PEEP valve that can be attached easily to any anesthesia machine.

A 10-mm hole was drilled through the center of a circle system expiratory valve dome. Through this opening one end of a 25-cm length of scaled acrylic tubing fitted with a latex finger cot secured by a neoprene O ring was passed. This tube was set vertically 3 mm from the valve leaflet, and cemented in place.

Filling the vertical tubing with water to the PEEP level desired produces a constant expiratory resistance by compression of the finger cot against the expiratory valve disc. Expiratory airway pressure greater than the prefilled water pressure opens the expiratory valve and decompresses the circuit. Since no mechanical device is used, system failure is always in the direction of decreased, not increased, airway pressure.

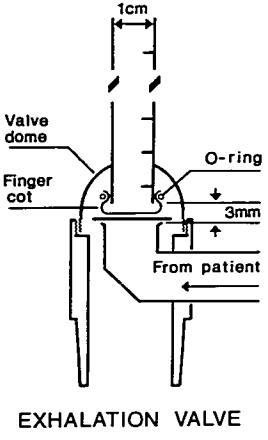

FIG. 1. Construction of the PEEP valve for an anesthesia machine.

If the O ring or the finger cot ruptures, the few milliliters of water in the vertical tube leak harmlessly into the soda lime directly below. The leak in the breathing circuit thus created can be corrected easily by manual occlusion of the acrylic tubing until a new dome can be attached.

The device has been found effective and does not interfere with the functioning of the ventilator.

* Associate Professor.
† Professor and Chairman.
Received from the Department of Anesthesiology, New York University Medical Center, 560 First Avenue, New York, New York 10016.
Address reprint requests to Dr. Turndorf.

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Central Venous Pressure Monitoring—A Simple Device to Determine Zero Level

JOHN C. SNOW, M.D.,* AND DUSAN B. DOBNIK, M.D.†

Central venous pressure (CVP) is an important and useful variable in clinical monitoring. Following is a description of a simple device to determine CVP zero level.

Various devices such as rulers or bars are used to adjust zero level of monitoring equipment to the position of right atrium. We found the following method simple, accurate, and very satisfactory. We use transparent plastic tubing, found in any operating room, fill it with water, and then use as a U tube. That is, when the water level in one arm of U tube is at the level of right atrium, the water level in the other arm indicates zero level of the monitoring device (fig. 1). There are two practical reference points to estimate the level of the right atrium: 1) mid-axillary line; 2) the midpoint of the anterior–posterior diameter of the thorax at the level of the fourth intercostal space.

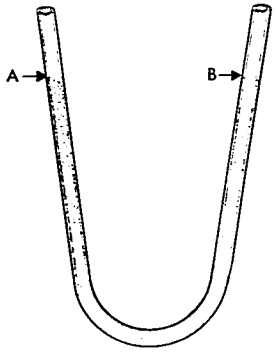

FIG. 1. To adjust zero level of CVP monitoring device: A, the water level of one arm of a disposable plastic transparent connecting tube is positioned at the level of the right atrium (supine position); B, the water level in the other arm of the U tube indicates the zero level of the CVP monitoring device.

* Professor of Anesthesiology.
† Assistant Professor of Anesthesiology.
Received from the Department of Anesthesiology, Boston University School of Medicine and University Hospital, Boston, Massachusetts 02118.
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Address reprint requests to Dr. Snow.