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REFERENCES


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Dangers of Using an Improvised Underwater Seal for CPAP Oxygenation during One-lung Ventilation

To the Editor.—Arterial oxygenation during one-lung ventilation can be improved by insufflating oxygen to the non-ventilated lung at a constant positive airway pressure (CPAP). Baraka et al. have described a simple and inexpensive system for providing CPAP using an oxygen source, a flow meter, a manometer, and an underwater seal (fig. 1). They have shown that the use of this device increased the PaO2 of patients during one-lung ventilation. On occasion, we have used a similar device on patients who had poor oxygenation during one-lung ventilation. Our device differs in that the underwater seal (which serves as the pressure regulator) is placed in series with the airway, rather than in parallel (fig. 2). This is an important difference with respect to the safety of the device. In our system, occlusion of any of the tubing results in a gradual fall in the airway pressure as oxygen is absorbed. If the limb of their system going to the water seal is occluded (such as by stepping on it), the non-ventilated lung would be exposed to the full pressure of the oxygen source which could cause major barotrauma.

There is a second potential hazard with CPAP systems. If the surgeons should attempt to clear an open bronchus of blood or secretions and manage to fit a suction device snugly into the bronchus, the wall suction flow would greatly exceed the oxygen source flow, and negative pres-
sure would be generated in either type of CPAP device. If a narrow-bore tubing were used, the water would be rapidly drawn from the chamber and into the airway, causing a partial drowning of the patient. We use a large-bore tubing (25–30 mm diameter) between the water seal and the patient and a low-volume chamber. Our large-volume tubing can contain the entire contents of the water chamber. Thus, air would be bubbled through the water column in the large tubing and the patient would not be drowned.

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CPAP Oxygenation during One-lung Ventilation Using a Bain Circuit

To the Editor:—Hypoxemia is a commonly encountered problem during one-lung ventilation. Non-dependent lung continuous positive airway pressure (CPAP) has been shown to significantly improve oxygenation in those patients in which this problem occurs.1 Multiple devices have been described to deliver CPAP to the non-dependent lung.2–5 We suggest the use of a Bain circuit to deliver CPAP to the non-ventilated, i.e., non-dependent, lung.

The fresh gas inlet of the Bain circuit (coaxial modification of a Mapleson D circuit) is connected to any oxygen source with a flowmeter (we use an E cylinder oxygen tank) and the oxygen flow is set at 1–2 LPM. The circuit is connected to the non-ventilated lumen of the double-lumen endotracheal tube, and the overflow valve on the Bain circuit is set at the appropriate closure to yield the desired amount of CPAP, which is read from the manometer on the Bain apparatus (fig. 1). Functionally, this behaves exactly as the system described by Thiagarajah et al.4 However, the items, a Bain circuit and an E cylinder oxygen tank, are perhaps more readily available and preclude an extensive search of the spare parts box for components necessary to produce CPAP in the non-dependent lung.

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