concern for malignant hyperthermia, a diagnosis of relative hypovolaemia and hypoperfusion was made in the context of a hypermetabolic post-CPB state. A fluid bolus ($15\ \mathrm{ml} \cdot \mathrm{kg}^{-1}$) was administered and a dobutamine infusion ($5\ \mu\mathrm{g} \cdot \mathrm{kg}^{-1} \cdot \mathrm{min}^{-1}$) was initiated. The patient was sedated with morphine and additional muscle relaxant administered. The acidosis cleared rapidly, central venous pressure increased to 11 mmHg, heart rate decreased, and urine output increased. The patient recovered uneventfully. Attempts to persuade the family to undergo definitive MH diagnosis were unsuccessful.

The unphysiological state caused by CPB may produce conditions similar to a malignant hyperthermia episode in the postoperative period with rapid increases in temperature and carbon dioxide production.[1,2] Allen and Cattran[3] reported a hyperthermic episode in a MH susceptible patient after CPB treated with dantrolene. The patient developed a pneumonia attributed to pulmonary aspiration from the subsequent muscle weakness. Subsequent review by the authors determined that the episode was secondary to a hypermetabolic state after CPB. Awareness and close observation of postoperative metabolic changes after CPB combined with appropriate fluid management, sedation and ventilatory adjustments may prevent the unnecessary administration of dantrolene.

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(The opinions or assertions contained herein are the private views of the authors and are not to be construed as reflecting the view of the Department of the Army or the Department of Defense)

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Dual end-tidal CO_2 monitoring and double-lumen tubes

To the Editor:

We would like to report a technique that we have found to be useful in monitoring end-tidal CO_2 ($\mathrm{ETCO_2}$) in the presence of a double-lumen tube.

Monitoring $\mathrm{ETCO_2}$ of each lung is a valuable adjunct to ensure proper double-lumen tube placement and also to detect its displacement during anaesthesia. Shafieha *et al.*[1] used two end-tidal CO_2 monitors to analyze CO_2 wave forms from tracheal and bronchial lumens of the double-lumen tube, but using two monitors is not always practical or convenient. The following device uses a single capnometer.

Three 18-gauge needles cut at 2 cm are attached to the ports of a three-way stopcock. One short sampling tube is connected to one needle and two longer sampling tubes with tracheal adapters are connected to the other two ports of the stopcock. The short sampling tube is connected to the end-tidal port of the capnometer. The two tracheal adapters are connected to each lumen of the double-lumen tube via 8 mm portex endotracheal connectors as shown in the Figure. Using the three-way control of the stopcock, one can direct the sampling gas from tracheal, bronchial or both lumens. This enables the recording of CO_2 wave forms from either of the lungs or from both lungs. Correct placement of the double-lumen tubes can be checked by analyzing the CO_2 wave form from each lung and also during clamping and unclamping procedures of each lumen. Further, the CO_2 wave forms can be examined periodically from each lung. A change in end-tidal concentration or CO_2 wave form could give early warning of a misplaced double-lumen tube or inadequate ventilation and CO_2 elimination from the lungs. We recommend that this method of CO_2 analysis be used in addition to other conventional methods to increase the safety of double-lumen tubes.

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