compression that occurred at the time of the change in maternal position. Electronic FHR monitoring allowed immediate detection of the fetal bradycardia, which prompted expeditious delivery before the development of fetal hypoxia and metabolic acidosis. This case illustrates the utility of FHR monitoring during induction of regional anesthesia for cesarean section, especially when oligohydramnios is present.

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A Dangerous Defect in a Heat and Moisture Exchanger

To the Editor:—A heat and moisture exchanger (HME) can be a valuable addition to the anesthetic circuit by preventing heat loss and protecting the large airway mucosa from drying. The following is a report of a case in which a defective HME nearly caused serious complications.

A previously healthy 31-yr-old female came to the emergency room at 2:00 A.M. with pelvic pain and an adnexal mass. Vital signs were stable with an hematocrit of 34 after 2 liters of iv fluid. Blood pressure was 115/65, pulse 90. Following preoperative medication with midazolam 1.25 mg iv and metaclopramide 10 mg iv, she was brought to the operating room where a rapid sequence induction using thiopental and succinylcholine was used. Anesthesia was maintained with isoflurane and O_2, and atracurium was given for muscle relaxation. Pulse and blood pressure remained stable. An HME (ICOR, AB, Sweden) was inserted between the elbow of the anesthesia circuit and the endotracheal tube.

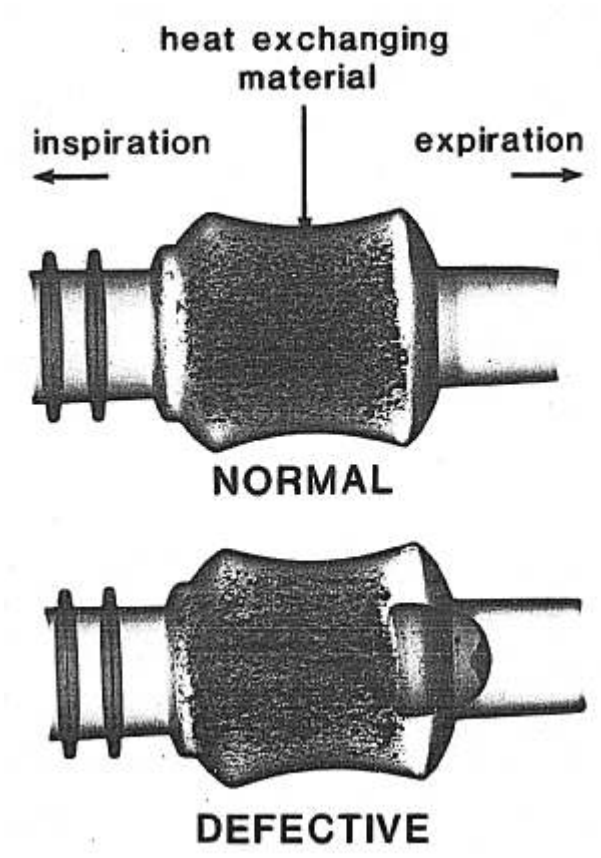

FIG. 1. X-ray photograph showing the plastic plug obstructing the expiratory limb of the HME.

Within a few minutes blood pressure decreased to 67/45. By this time the pelvic cavity had been entered and a ruptured ectopic pregnancy had been discovered, but there was no active bleeding. It was assumed that the patient was hypovolemic. Intravenous fluids were increased and the isoflurane (1.5%) was discontinued. The ventilator was turned off and the lungs were ventilated by hand. It was immediately apparent that increased effort was required. The pressure gauge showed a rapid rise to 40 cm H_2O followed by a rapid decline in pressure. Breath sounds were decreased but present bilaterally with a markedly prolonged expiratory phase. No wheezing was heard.

The inspiratory and expiratory valves were functioning. The pulse oximeter showed 100% saturation. The CO_2 waveform on the mass spectrometer was narrowed and decreased in amplitude. Air trapping due to a plugged endotracheal tube was assumed, and it was decided to reintubate the trachea. When the circuit was disconnected between the HME and the endotracheal tube, a large amount of air rushed out of the endotracheal tube as if under pressure. The HME was removed and the circuit reconnected to the endotracheal tube. The lungs were easily ventilated and the blood pressure immediately returned to 120/60. The case proceeded uneventfully without any evidence of pulmonary trauma.

The HME was found to have a circular plug of plastic inside the chamber between the heat exchanging material and the expiratory limb (fig. 1). This had been acting as a one-way ball valve causing partial air trapping in the lungs. The resulting high intrathoracic pressure caused hypotension due to decreased cardiac filling.

This case points out the value of discontinuing mechanical ventilation immediately upon the onset of sudden hypotension. This maneuver may improve cardiac filling in cases of hypovolemia, and in this case, it allowed the anesthesiologist to more rapidly diagnose a problem in the breathing circuit.

HMEs should be inspected before insertion for the same reason we inspect the anesthesia machine and circuit.

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