Measurement of Spontaneous Ventilation with the Engstrom Respirator

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Drs. Saklad and Yamada remark that if the patient is being ventilated by an Engstrom apparatus and inasmuch as this apparatus has a spirometer incorporated into it, the patient's ability to breathe spontaneously may be determined in the following fashion:

(1) Stop the ventilator.

(2) Remove the inspiratory tube at a point close to the chimney.

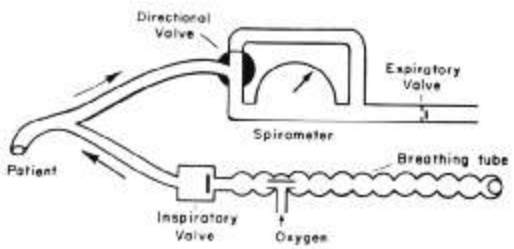
(3) Insert a unidirectional valve, as the Collins "J" valve, on the inspiratory side of the chimney.

The patient will then inhale room air and exhale down the expiratory tube. With the spirometer valve in the ON position, the exhaled gases are directed through the spirometer and the patient's tidal exchange and minute volume can be thus determined.

There are two disadvantages to the above plan: (1) a resistance of approximately 0.5 to 0.7 mm. of mercury is reached when exhaling 500 ml. rather rapidly; (2) the patient is exposed to room air.

The resistance is an undesirable feature. This might make it unwise to employ this means to measure the respiratory ability of certain types of patients.

Should it be desirable to meter the respiratory ability of a patient who is being ventilated with oxygen-enriched air, increased oxygen tension can be maintained during the spirometer study by attaching a breathing tube to the inspiratory valve, and allowing oxygen to run into it as in the accompanying figure.



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CASE REPORTS

Respiratory Obstruction with Oxygenation Apnea

This report, presented by Dr. Thomas F. Horbein to the Committee on Clinical Anesthesia Study Commissions, describes a case of respiratory obstruction with postoxygenation apnea. It is of interest in regard to the problem of diagnosis of the cause of apnea and as a documented example of a clinically occurring extreme degree of respiratory acidosis. It illustrates several physiologically interesting aspects of response to hypoxia and hypercapnia.

Case Report

This two and one-half year old Caucasian male was admitted with progressive respiratory distress, beginning with a cough the day prior to admission and accompanied by a low grade fever. He had had surgery at twenty months of age for a Meckel's diverticulum, and five months prior to the present illness, repair of a large interatrial septal defect and pulmonic valvular stenosis was performed. He had experienced several episodes of bronchiolitis during the first year of life and was treated subsequently for pneumonia and frequent attacks of asthma. Between such episodes he was reported to be normally active but always possessed blueness of his nail beds and required two pillows in order to sleep at night.

Physical examination on admission revealed a well-developed and nourished child, slightly