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Bronchial Lavage in Status Asthmaticus

Status asthmaticus, refractory to standard forms of medical treatment, will require mechanical ventilation with circulatory support.

The clinical picture of such a case may present with the following features: (1) Generalized bronchospasm, with high-pitched rhonchi on both inspiration and expiration – the expiratory sound may disappear and produce a silent phase, suggesting further bronchiolar obstruction with air trapping; the chest X-ray is hypertranslucent. (2) Progressive hypoxæmia, hypoxia, hypercapnœa, semi-coma or confusion which may be aggravated by injudicious use of sedation or uncontrolled oxygen therapy. (3) Acute ventricular strain with tachycardia, hypotension, gallop rhythm and pulsus paradoxus, with ECG changes due to pulmonary hypertension and myocardial hypoxia. In such cases, measures to relieve the respiratory work and myocardial strain are logical, and intermittent positive pressure ventilation (IPPV) can be extremely valuable.

Thompson and his colleagues have documented remarkable improvement in ventilatory activity following lavage and removal of bronchial plugs in asthma (Thompson *et al.* 1966). In status asthmaticus, bronchial lavage, if it can be done safely and effectively, would appear to be a useful adjunct to other intensive therapy and theoretically it should have the following advantages: (1) By removing bronchial plugs, it should facilitate and shorten the period of IPPV required. (2) The resulting fall of airway resistance should reduce the risk of complications due to high peak airway pressures, such as pneumothorax.

In the method used at our intensive care unit (Williams & Crooke 1968), the patient is rehydrated with intravenous fluids and steroids are administered. Serial estimations of the blood pressure are made throughout the procedure and the ECG may be monitored. After pre-oxygenations, anæsthesia is induced with a sleep dose (20–60 mg) of methohexitone followed by suxamethonium 75–100 mg. Cricoid pressure is applied; the larynx and trachea are sprayed with a solution containing 100 mg hydrocortisone and 80 mg lignocaine, and a cuffed endotracheal Portex tube is inserted orally. An oxygen/ether mixture is now introduced by manual inflation until the third plane of surgical anæsthesia (i.e. mid-dilatation of the pupils) is reached. The compliance usually improves rapidly during this period due to the bronchodilator effects of the ether.

Lavage is now begun, using a 1% sodium bicarbonate solution, which has the properties of being nonirritant, nontoxic, within the range of physiological pH (pH of solution 7·4–7·7) and near isotonic with body fluids. To a standard infusion set 500 ml of the solution is connected and, with the patient supine, the solution is poured down the endotracheal tube until it overflows; three or four breaths of oxygen are given by manual inflation to aid in distribution and endobronchial suction is carried out. The procedure is repeated three times with the patient supine and three times in each of the following positions: right lateral, left lateral and Trendelenburg. In the later stages of lavage the anæsthesia lightens, coughing occurs and this, with manual compression of the chest, aids in the removal of the lavage fluid with plugs. In all, 12 to 14 lavages are thus done, using quantities of 30–50 ml; the procedure takes 30–40 minutes. Coughing and spillage make it difficult to estimate how much lavage fluid is retained but initially 150–300 ml fluid is returned.

A muscle relaxant, di-allyl nor-toxiferine, is then administered; the endotracheal tube is fixed in position and the patient established on the Cape ventilator. A slow rate (12–14) is chosen with initially a pre-set tidal volume of 400–500 ml; this is gradually increased to 700–800 ml as the blood pressure allows. Peak ventilation pressure at this stage is usually about 50 cmH_2O but may fall over the next few hours when further lavage fluid is removed.

During 1967, 18 moribund asthmatics have been treated thus, with no morbidity attributable to the method. Of the 2 patients who died, one had had a cardiac arrest prior to admission and never regained consciousness; the other had a cerebral hæmorrhage in the recovery stage of the asthma five days after lavage. In all cases the lavage results have been good, with numerous mucous plugs obtained. Microscopically, these show eosinophils with occasional histiocytes and desquamated epithelia in a mucin debris.

This simple technique allows ventilation to be controlled during lavage; trauma to the respiratory tract is minimized. These satisfactory results support the use of bronchial lavage as a routine aid to the resuscitation of the asthmatic.

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