

## PATTERNS OF AIRFLOW IN UPPER AIRWAYS OBSTRUCTION

D. EMPEY The forced expiratory volume in one second (FEV<sub>1</sub>) and peak expiratory flow rate (PEFR) were measured in normal subjects both with and without resistances in the form of orifices of decreasing diameter.

The ratio  $\frac{\text{FEV}_1 \text{ as } \% \text{ of predicted normal}}{\text{PEFR as } \% \text{ of predicted normal}}$  was calculated and found to be approximately 1.10 without added resistance. The addition of increasing resistances led to a rise in this ratio, e.g., 1.60 with an orifice 8 mm in diameter and 3.10 with an orifice 4 mm in diameter. Groups of patients were then studied. These included 24 patients with obstruction of the upper airways (tracheal stenosis, bilateral vocal cord paresis, etc.); 42 patients with lower airways obstruction (asthma and bronchitis); and 19 with fibrosing alveolitis.

It was found that the ratio  $\frac{\text{FEV}_1 \text{ predicted } \%}{\text{PEFR predicted } \%}$  exceeded 1.60 only in those cases with obstruction of the upper airways (above the carina). Those patients with the highest ratios had the most severe degrees of obstruction. Some patients were also investigated by more complex techniques such as flow-volume curves and derived flow rates. Consideration of these, and further studies, provide an explanation for the alteration in  $\frac{\text{FEV}_1 \text{ predicted } \%}{\text{PEFR predicted } \%}$  ratio and a theoretical justification for its use. The measurement of this ratio by means of simple standard equipment appears to be useful in the diagnosis and assessment of upper airways obstruction.

## LUNG FIBROSIS IN ANKYLOSING SPONDYLITIS

D. DAVIES In recent years it has become recognized that some patients with ankylosing spondylitis develop progressive upper lobe fibrosis, often with cavitation. The condition can easily be mistaken for tuberculosis. It usually develops several years after the onset of joint symptoms and begins as unilateral or bilateral apical consolidation and fibrosis. The rate of progression is variable and it may extend to involve the upper half of both lungs. The cavities frequently become colonized by *Aspergillus fumigatus* with the formation of fungus balls. This occurs more commonly than in most tuberculosis cavities.

The condition is illustrated by a selection from 11 cases recognized in recent years.

There is no evidence that bacterial infection or radiotherapy are causal factors. There are good reasons for accepting this as another extra-articular manifestation of ankylosing spondylitis.

## INCLINED FRONTAL PLANE TOMOGRAPHY

M. MEREDITH BROWN In several hundred patients frontal plane tomograms have been made with a Massiot-Philips radiotome with which both the patient and the film are rotated so that the plane of the tomograms is parallel to that of the trachea and main bronchi.

In the normal patient, the trachea, main bronchi, and principal branches are shown on a single cut, including the angle of the carina and the thickness of the right wall of the trachea. Narrowing or distortion of these air passages can be demonstrated more accurately than by other radiographic methods, except perhaps bronchography. Lesions of the smaller bronchi, such as the middle lobe bronchus or the segmental branches cannot be demonstrated as they do not lie in the plane of the tomograms. Vascular abnormalities can sometimes be recognized, and the technique is particularly valuable in demonstrating enlarged lymph nodes.

In clinical practice these tomograms have been found useful in demonstrating lesions of the trachea and main bronchi; in confirming suspected lymph node enlargement of hilar and paratracheal groups; and in helping to elucidate the hilar structures in patients with bronchial neoplasms. In this way the technique is an aid to diagnosis and to the planning of treatment. The accuracy is such that negative findings can be confidently accepted.

## BRONCHODILATATION

## Pharmacology of the Bronchi

G. STERLING Recent research into the pharmacology of the contraction of bronchial smooth muscle has emphasized both neural and humoral factors.

Of the former there is now no doubt that the cholinergic parasympathetic system causes bronchoconstriction and that atropine may be of diagnostic and therapeutic value in bronchial asthma. Current research is concentrated more on the role of the adrenergic system: partly on the question of whether alpha-adrenergic receptors, which appear to cause bronchoconstriction when stimulated, are likely to be important clinically; partly on the effects of beta-adrenoceptive blockade in asthma and the possibility of catecholamine metabolites causing beta-blockade.

With regard to humoral factors, interest has been concentrated on the mode of action of disodium cromoglycate in alleviating allergen and exercise induced asthma and in reducing the hyperreactivity to histamine shown by asthmatic subjects. Recent evidence suggests that disodium cromoglycate *in vivo* may have an antihistaminic action as well as preventing the breakdown of mast cells, though this observation needs to be confirmed. Of the potential humoral mediators of bronchoconstriction and bronchodilatation the prostaglandins have been investigated most intensively recently, following the discovery that they occur naturally in the human lung and have potent constrictor and dilator effects on the bronchus.

## Side Effects of Beta-adrenergic Receptor Stimulant Bronchodilator Drugs

J. W. PATERSON The side effects of this group of drug may be divided into three classes:

1. *Expected*: These are side effects which may be predicted from a knowledge of the pharmacology of the drug. Thus stimulation of beta-receptors in sites