Ind. J. Physiol. Pharmac., Volume 33, Number 4, 1989

SHORT COMMUNICATION

EFFECTS OF UPPER RESPIRATORY INFECTIONS ON THE FORCED EXPIRATORY VOLUMES AND FLOW RATES

S. WALTER

Department of Physiology,
Christian Medical College, Vellore - 632 002

(Received on October 18, 1989)

Abstract : The effects of an upper respiratory infection on some commonly measured spirometric indices have been determined in this study. The forcod vital capacity, forced expiratory volume in one second, forced expiratory flow in the middle half of the vital capacity and the peak expiratory flow were significantly lower during the infection. This stresses the need in cross sectional and longitudinal pulmonary function evaluation, to avoid testing a subject while he has an upper respiratory infection.

INTRODUCTION

Spirometric pulmonary function testing is routinely done in epidemiological, clinical and research work, both in cross sectional and in longitudinal studies. However, stringent criteria are not always maintained during the testing. Several factors can affect the pulmonary function status of a subject at any particular time and unless these are recognized and taken into consideration, small but important differences between populations or changes in a patient over time, may be overlooked. One common respiratory condition which may temporarily affect pulmonary function is an upper respiratory tract infection (1, 2). This study was done to determine the effects of such infections on some commonly measured spirometric indices.

METHODS

Thirty four otherwise healthy medical students (22 men and 12 women) participated in this study. Each subject was tested twice, once during an acute upper respiratory tract infection and once atleast four weeks after relief from symptoms. Forced vital capacity (FVC), forced expiratory volume in one second (FEV_1), FEV_1 expressed as a percentage of FVC (FEV_1 %) and forced expiratory flow in the middle half of the FVC (FEF 25–75%) were recorded using a 9 litre Collins respirometer. Peak expiratory flow (PEF) was obtained with a Wright peak flow meter. Paired t tests were used for comparing the two sets of values.

RESULTS AND DISCUSSION

The symptoms reported during the infection were nasal discharge and obstruction; feverishness and malaise; sorethroat and cough (Table I). None of the subjects was ill enough to be absent from work on the test day. Table II shows the pulmonary function differences between the two tests. There is a significant deerease in the PEF, FVC, FEV_1 and FEF 25–75% during the upper respiratory infection.

TABLE I : Prevalence of symptoms.

Symptoms	*% suffering from*
Nasal discharge	59
Nasal obstruction	59
Malaise and feverishness	47
Sorethroat	65
Cough	53

TABLE II : Changes in Pulmonary Function.

Lung function parameter	*Change*		
	During URI — After recovery		
	Mean difference	*SEM*	*P*
FVC, Litres	— .07	.034	<.05
FEV_1 Litres	— .11	.036	<.01
FEV_1%	— 1.50	.827	N.S.
FEF 25-75% L/Sec	— .21	.067	<.01
PEF L/min	—23.4	4.834	<.001

This shows that significant pulmonary function impairment can be caused by mild uncomplicated upper respiratory infections. The changes observed, suggest involvement of both large and small airways (3) which may be due to reflexly induced smooth muscle contraction. Such reflex alterations in bronchial calibre have been shown to be induced by thermal and chemical stimuli of the nasal mucosa (4).

These results stress the need in cross sectonal and longitudinal pulmonary function evaluation, to avoid testing a subject while he has an upper respiratory tract infection.

ACKNOWLEDGEMENTS

The author wishes to thank the medical students who participated in this study.

REFERENCES

1. Picken JJ, Niewoehner DE, Chester EH. Prolonged effects of viral infections of the upper respiratory tract upon small airways. *Am J Med* 1972; 52 : 738-46.
2. O'Connor SA, Jones DP, Collins JV, Heath RB, Campbell MJ, Leighton MJ. Changes in pulmonary function after naturally acquired respiratory infection in normal persons. *Am Rev Resp Dis* 1979; 120 : 1087-93.
3. Mead J, Tourner JM, Macklem PT, Little JB. Significance of the relationship between lung recoil and maximum expiratory flow. *J Appl Physiol* 1967; 22 : 95-108.
4. Ritter FN. Physiology of the nose, paranasal sinuses and middle ear. In : Middleton E (Jr), Reed CE and Ellis EF, eds Allergy. Principle and practice Vol I, St Louis : CV Mosby and Company. 1978.