Clinical Tests of Respiratory Function

CLINICAL TESTS OF RESPIRATORY FUNCTION

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Preface

Tests of respiratory function have been available for clinical use for about 30 years but they are still not fully integrated in the mainstream of clinical medicine. I think they are often ill understood and therefore frequently misused, or, more importantly, not used when they should be. The main aim of this book is to narrow the divide between respiratory physiology and the lung function laboratory on the one hand, and the bedside or outpatient clinic on the other. To a large extent, the failure to apply the tests appropriately stems from the misguided feeling that complicated laboratory-based measurements are needed, when, in fact, simple tests used in the ward or clinic are often of much greater value. To many the jargon and hieroglyphics of respiratory physiology are undoubtedly inhibiting and, it must be admitted, respiratory physiologists have themselves been to blame for perpetuating the mystique of their subject and often for failing to promote a pragmatic approach which can be routinely applied to clinical situations. The more tests used and the more indices recorded, the more superficially impressive (and perhaps the more lucrative) is the report on an individual patient; the disadvantages of this approach are that it dilutes the clinical relevance of the information and may assault the comprehension of its recipient.

I hope this book will be of value to respiratory physicians in practice and in training, and particularly to those involved in the interpretation of the commonly performed tests of respiratory function. The tests described are conventional measurements of function of the 'whole organ'; tests of respiratory function in the broadest sense might also include biochemical and subcellular techniques applied to bronchial secretions, lung tissue or fluid lavaged from the lung, as well as studies of pulmonary metabolism and of the way drugs are handled by the lung. All these are expanding fields but so far none has generated a widely applicable clinical test.

This book is not primarily a laboratory manual with a detailed technical account of the tests, nor does it give comprehensive normal or reference values as these are fully covered elsewhere, notably by Cotes. The choice of tests included is a personal one – I did not set out to cover every conceivable test, but I have concentrated on those that I find to be of value in assessing the severity of a functional disturbance, in elucidating its mechanism, in differential diagnosis and in following responses to treatment. I have included a few tests that are of doubtful clinical applicability (e.g. the D_m and V_c components of the CO Diffusing Capacity), or are too demanding of technology for widespread use (e.g. the multiple inert gas technique of Wagner and West), where these aid the understanding or interpretation of simpler tests. I must also admit that occasionally the criterion for inclusion of an unusual feature or piece of information has been simply that I find it interesting. In many situations the exact pathogenesis of abnormali-

ties of respiratory function tests is ill understood, but where specific mechanisms are established or likely, I have tried to explain these, with the philosophy that sensible application of the tests is more likely to result from understanding or from a questioning attitude than from ignorance or unwarranted assumptions.

After a brief description of apparatus, the book falls into three main sections. Chapters 2 to 6 aim to describe the theoretical and practical aspects of the commonly applied tests of mechanical and gas exchange function, of respiratory control and exercise, together with the causes of their variations in normal subjects. Chapters 7 to 10 deal with diseases that would normally be within the purview of the respiratory physician. In chapters 11 to 17, diseases primarily of other bodily systems are discussed (sometimes with rather arbitrary groupings); I hope that this less conventional section will give a timely review of the considerable recent literature on respiratory function in non-respiratory disease, which has emphasised the high frequency with which unexpected abnormalities come to light. Finally, in Chapter 18 I attempt to give some guidelines on the everyday application of the tests. I have not given specific examples of results of conventional tests in the commoner clinical conditions: I hope these patterns of abnormality will be self-evident and in any case they will be familiar to most readers. I have, however, included some examples of less commonly applied tests, such as maximum flow-volume curves and radioisotope scans. The density of referencing is variable: where long-established findings or generally accepted views are quoted I have generally only listed one or two important works; the referencing is more comprehensive when the results or opinions are recent, speculative, controversial or unexpected. The vexed problem of units also deserves a mention: my own view is that the introduction of SI units for blood gas measurements has made a mildly difficult subject more complicated, and since the system has (predictably) been only half-heartedly adopted by only half the individuals in the field, anyone sufficiently interested to consult the literature needs to be conversant with both SI and traditional units. For this reason many figures show a dual scale, but in the text my prejudice in favour of mmHg or cmH₂O surfaces from time to time.

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