

Arterial Hypertension

Pathogenesis, Diagnosis, and Therapy

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To my mother and the memory of my father

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Foreword

It has been a little more than half a century since serious, organized research on hypertension began. Public and even physician interest in the subject remained minimal until the early forties, and even then there were not more than a dozen "fulltime" investigators worldwide. The first organization devoted to communicating regularly the results of hypertension research was created in Cleveland in 1945; it became the Council for High Blood Pressure Research of the American Heart Association in 1949.

The early history of hypertension is not a story of progressive achievement. Richard Bright is given great credit, followed by Mahomed, Allbutt, Riva-Rocci, Bergman and Janeway, but it was not until Volhard, Fahr and Allen that some semblance of order emerged. They were followed by a younger, much more vigorous group of investigators who in fact initiated modern research in hypertension. Two more generations have followed.

In the course of some fifty years, we have seen emerge a magnificent body of evidence that has prescribed good treatment and contributed a considerable understanding of the many complex mechanisms involved in the hypertensions. Treatment is now actively promoted by public health agencies, including the World Health Organization. This is another case of treatment preceding full understanding of the nature of the disease.

The secondary hypertensions have received by far the greatest attention. It has become cliché to state that "the cause and mechanisms of essential hypertension are unknown." The early investigations all sought single causes and mechanisms, and all ended up with one or another aspect of secondary hypertension, such as aldosteronism or renal hypertension. But it has at last become apparent, I believe, that essential hypertension, like arteriosclerosis, has no single cause or mechanism. It has been called a "disease of regulation," because so many of the body's systems are involved in the regulation of blood pressure in order to regulate tissue perfusion. This principle has been pictured as a mosaic, which depicts the interrelatedness of the regulatory functions. This was the analogy used by Willard Gibbs to describe the Phase Rule in physical chemistry.

While people found it difficult to accept the principle of dysfunction of regulatory mechanisms, it has received almost unconscious sanction in current attempts to quantitate each of the varied facets of hypertension to show the "modulating effect" of each mechanism on the other. This has allowed for the current range of thinking on the subject.

A second generality in which I now believe, after 45 years, is that the core mechanism of hypertension involves angiotensin, either of renal, neural or angiogenic origin. Determination of the structure of inhibitors to angiotensin and the ability to synthesize them have disclosed an extraordinary picture: angiotensin and salt-water metabolism, both of which involve the nervous and endocrine systems, act to modulate one another. So we now have a body of knowledge that lends itself admirably to experiment, and we are on the threshold of taking the next large step: deepening our research to the molecular level, a step taken by the chemists and geneticists only a few years ago with the development of molecular biology.

Dr. Rosenthal and his colleagues have worked diligently, and I believe successfully, in compiling this volume. It is a particular pleasure for me to introduce this valuable work, which I feel sure will contribute significantly to further understanding of this very important subject.

Irvine H. Page, M.D.

Preface

In the past few years, the explosion of information contributing to our understanding of hypertension has made it all but impossible for any one physician to keep thoroughly up-to-date. The practicing physician must apply principles of diagnosis and therapy that are evolving from the research and clinical experience of many specialists. It was my purpose, therefore, in asking my colleagues to contribute chapters in their various areas of expertise, to distill a practical and critical review of the mechanisms, diagnosis, and therapy of hypertension as we presently understand them. Experimental data have been included only where they are necessary to the understanding of fundamental principles directly relevant to clinical practice. Data that have yet to be confirmed have been included only marginally. Our goal was to present information that has been proven to be clinically useful and practical. As each contributor is treating the subject from his particular angle, an overlapping of information is, by necessity, entailed in some instances.

In order to shed light on certain factors responsible for the development and maintenance of high blood pressure, individual chapters are devoted to psychosomatic, metabolic, endocrine, neurogenic, and cardiovascular functions in hypertension. Besides contributions on the renal and urologic aspects of hypertension, we have explored the apparent connection of hypertension to atherosclerosis, obesity, and diabetes mellitus. We also felt it important to include a chapter on the increasingly visible problem of adolescent hypertension. Each of the steps involved in the diagnosis of hypertension, including techniques for measuring blood pressure, the basic work-up of a patient, and radiologic and nuclear medicine evaluation, are covered in separate chapters. Finally, problems that arise in treating hypertensive patients, including those with mild and resistant forms and those with the geriatric form, are discussed thoroughly, along with some relevant aspects of clinical pharmacology.

My most sincere thanks are due to all the contributors for their excellent work and for their patience. They both supported and challenged me as this volume developed, and for their suggestions and criticisms I am indebted to them. My particular thanks are due to the staff of Springer-Verlag New York, and above all to my wife Regine, who unfalteringly supported me with patience, wisdom, and active cooperation.

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