
The Kidney in Liver Disease

Second Edition

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**The Kidney
in Liver Disease**
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To Nina
and David,
and Susanna

Preface

I have long felt that there is a need for a comprehensive, up-to-date text focusing on the renal functional abnormalities that complicate advanced liver disease. In 1976, I undertook to edit the first edition of *THE KIDNEY IN LIVER DISEASE*. The book was intended to meet this need by bringing into sharp focus the present knowledge about this highly important area and to provide nephrologists, gastroenterologists, endocrinologists, physiologists and internists, and surgeons in general with ready reference information which might otherwise be difficult to retrieve. In so doing, I strove to avoid merely cataloging this diverse information. Instead, each author was asked to inject a personal flavor either by providing original research data, or by elaborating on his personal and published clinical observations. The favorable comments that greeted the appearance of the book indicated that I was correct in my perception. There is now a need for a second edition.

In the five years since the publication of the first edition of the book, the explosive growth of literature pertaining to the physiology and diseases of the kidney in the setting of liver disease continues unabated. Few breakthroughs have occurred, but a large amount of new experimental and clinical information has become available. The major advances have been in the areas of an increasing experience with the portocaval shunt, the development of new experimental models of liver disease, an increasing awareness of the participation of additional humoral mediators in the pathogenesis of renal dysfunction, and the appreciation of more rational and less hazardous ways to use drugs which are well established.

In the second edition of *THE KIDNEY IN LIVER DISEASE*, the contributors have once again attempted to review critically the available literature dealing with specific facets of renal functional alterations in liver disease. As returning readers will note, a number of the chapters in this volume are revisions of those which appeared in the earlier edition. In addition, we have added much-needed chapters on a wide range of new subjects including glomerular abnormalities in liver disease, the wide spectrum of acid-base derangements in liver disease, a review of the derangements in potassium metabolism, alterations in calcium, phosphate, and magnesium homeostasis as well as vitamin D metabolism, and the hemodynamic aspects of ascites formation and removal. Moreover, the scope of hormonal and neural aspects has been broadened to include discussions of natriuretic hormone, the sym-

pathetic nervous system and experimental aspects of the neurology of hepatic osmoreceptors.

The focus of some of the repeating chapters has been broadened or changed to keep abreast of new developments, reflecting in part the special talents and interests of new authors. The acid-base chapter presents a broadened and detailed review of the spectrum of acid-base alterations which complicate advanced liver disease. The prostaglandin chapter has been expanded to include more aspects of this important subject. The chapter on bile duct ligation emphasizes the extrapolation of the model to diverse species and conveys new knowledge on the systemic and hemodynamic alterations which attend bile duct ligation. In a departure from the first edition, I have charged Dr. Solomon Papper with a unique task; to write a prologue describing the explosive growth of this area from a minor curiosity or hobby of a few select investigators to its present position as an area of clinical investigative interest which attracts the attention of numerous clinicians and investigators. Dr. Papper has aptly met this challenge and conveys with fidelity the heady atmosphere in the Boston of the early 1950s when there was a renaissance of investigative interest in this area by giants in the field including Maurice Strauss, George Gabuzda, and by Dr. Papper himself.

The book has been divided into eight sections. The first section begins with a thoughtful review of some current views of normal volume regulation and the perturbations of volume homeostasis which complicate advanced liver and renal disease. The second section reviews the clinical features of the renal abnormalities of liver disease, beginning with the pathophysiological aspects of sodium homeostasis in cirrhosis. The next section considers hemodynamic aspects of ascites formation. The fourth section reviews several of the animal models of liver and biliary diseases and their implications for understanding the derangements of sodium and water excretion in man.

The fifth section of this book deals with the pivotal role of the renin-angiotensin-aldosterone system that is thought to mediate many of the clinical abnormalities delineated in earlier presentations. I have attempted to provide an overview of the renin-angiotensin system and aldosterone metabolism in the setting of advanced liver disease. As such, this chapter constitutes a framework within which subsequent chapters consider specific problems related to the renin-angiotensin-aldosterone system. Dr. Norman K. Hollenberg reviews the evidence favoring a role for the renin-angiotensin system in the control of renal function. He provides an in-depth discussion of the development of new competitive analogues of angiotensin II which enable clinicians and investigators to interrupt the renin-angiotensin system pharmacologically in order to assess its role in the control of renal perfusion and function.

The next section of this book is devoted to an examination of the role of additional hormonal systems other than renin-angiotensin since the importance of these systems in the modulation of renal function is becoming increasingly apparent. In addition to reviewing renal prostaglandins and the kallikrein-kinin system, Drs. Buckalew and Gruber, and Dr. Krakoff critically examine the possible contributions of a humoral natriuretic hormone and the sympathetic nervous system to the pathogenesis of several of the renal functional abnormalities of cirrhosis.

The seventh section deals with non-endocrine alterations and their possible pathogenetic role. Specifically, the possibility that derangements in endotoxins and

amino acid metabolism may participate in the pathogenesis of the renal failure of liver disease is examined.

The final section of this monograph is devoted to a discussion of treatment modalities of many of the renal complications of liver disease enumerated above. Dr. Linas and his colleagues set forth recommendations for a rational diuretic program in patients with sodium retention. Finally in light of the coming of age of the peritoneovenous shunt, the final two chapters of this edition are devoted to an examination of the effects and morbidity of peritoneovenous shunting and its possible role in the current management of ascites and the hepatorenal syndrome.

To the various contributors, I wish to express my gratitude for their excellent and willing cooperation. I have considered it good fortune indeed to have been associated with them in this undertaking. I wish to express my thanks to James R. Oster for his many helpful suggestions. Finally, I would like to express my deep gratitude to my wife for her continuing support and encouragement in seeing this undertaking through to fruition.

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