CHOLESCINTIGRAPHY

DEVELOPMENTS IN NUCLEAR MEDICINE

VOLUME 1

Cholescintigraphy

edited by

P.H. COX

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FOREWORD

This book is timely and fills a void in the area of cholescintigraphy in Nuclear Medicine. It is true that many articles and papers from symposia on this subject are available but they are all scattered through a voluminous literature. Dr Cox and his colleagues have brought together in an orderly fashion the current available material on hepatobiliary scintigraphy in an excellent volume suitable for both the clinician as well as the clinical scientist.

This volume begins with a detailed discussion of anatomy and physiological functions of the liver and biliary tract followed by a section on scintigraphic functional imaging of the liver. A description of the chemistry and pharmaceutical considerations of Tc^{99m} labeled hepatobiliary agents, especially those of Ida-derivatives is included. Next the text follows the usual pattern of discussion on the pharmacodynamics of radiopharmaceuticals, followed by a description of various clinical disease patterns of the liver and the use of cholescintigraphy in evaluating these diseases. The last sections deal with computer applications in quantitation of liver function followed by a discussion of the clinical role for Tc^{99m} labeled hepatobiliary agents in comparison to ultrasonography, CT, radiography and in vitro laboratory tests.

One notable feature of this book is its discussion on the evaluation of new agents in normal experimental animals and in animals with induced liver disease, correlating this data to define the best radiopharmaceutical and then evaluating the same in patients. This type of methodological treatment of the subject matter is commendable.

This volume also reflects the change in the conduct of nuclear imaging from an organ imaging concept to dynamic functional imaging. Hepatobiliary studies using Tc^{99m} labeled radiopharmaceuticals have really opened up a new area of imaging and quantitation of hepatocyte function. Newer agents may fulfill this latter objective more effectively.

To help clinicians from various other disciplines, Nuclear Medicine physicians must find out where scintigraphic methods can eliminate diagnostic uncertainties better than other approaches. They must also know the various drawbacks and pitfalls associated with every Nuclear Medicine procedure. Books like this one can help Nuclear Medicine clinicians in that respect. Certainly this text discusses the fundamentals, clinical applications and more importantly the limitations of cholescintigraphy in Nuclear Medicine. Dr Cox and his colleagues have clearly provided an excellent perspective on this subject.

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INTRODUCTION

The importance of the liver has long been recognized. Around 2000 BC the Sumarians reported it as being a collecting centre for blood and therefore the seat of life. This point of view was assimilated into the Assyrian and Babylonian cultures and in Plato's *timaeus* the liver is described as mirror reflecting the thought of the intelligent spirit which appeared to have a moral function and was influenced by bile and sweetness.

In twentieth century western medicine the liver is still regarded as being the seat of life but for different reasons and much time and energy has been utilized to develop ways and means of evaluating liver function.

The use of scintigraphy to visualize the liver is a well known and trusted technique. This has primarily been centred around the use of radioactive colloidal substances which accumulate in the Kupffer cells. For a variety of technical reasons reagents, such as Iodinated rose bengal and bromsulphophtalein which localize in hepatocytes have been little used.

In recent years, however, the development of Technetium labeled compounds which accumulate in hepatocytes and are rapidly excreted in the bile have represented a potential major breakthrough in the use of non-invasive methods for the investigation of liver disease. Of these reagents the most widely used have been derivatives of iminodiacetic acid (IDA) and in particular Diethylida.

By following the biological distribution of this reagent with time by means of serial scintigrams obtained with a gamma camera and by recording quantitative information in the form of time activity curves or functional images it is possible to obtain macroscopic information concerning liver morphology, to demonstrate biliary obstruction and to evaluate hepatocyte function in one study.

In this volume the scientific basis of cholescintigraphy has been outlined together with the application of this knowledge to the clinical situation. The results have been compared with those obtained using other diagnostic methods to demonstrate its value to the clinician especially in the study of the highly jaundiced patient when other studies may be of little value or even contraindicated.

There is little doubt that cholescintigraphy has not yet reached its full potential. We hope that this volume will stimulate the optimum usage of this technique by providing a comprehensive basis upon which clinicians can form their own opinions.

P.H. Cox.