

Diseases of the Liver and Biliary System

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Preface

Seven years have elapsed since the fourth edition. This new edition has been completely rewritten to reflect the new and exciting advances which have transformed hepatology into a major discipline in its own right. Old concepts have been discarded to make room for these important recent advances—the hepatitis B virus and its relation to chronic hepatitis, cirrhosis and liver cancer; the immunology of liver disease and of drug reactions; enzyme induction and direct liver-toxicity; more rational therapy of acute hepatic failure and the present position of hepatic transplantation. Many new radiological techniques are evaluated including endoscopic retrograde cholangiography for hepatobiliary and pancreatic disease. The physico-chemical composition of the bile and other newly recognized factors contributing to gallstone formation are reviewed and the role of chenodeoxycholic acid in dissolving gallstones is assessed.

These many new topics have necessitated the introduction of 141 fresh figures making a total of 370 illustrations in this fifth edition. These have been accommodated by ruthless pruning of out-dated material.

Again I owe much to the co-operation of my colleagues, both at the old (Hut-on-the-Roof) Royal Free Hospital, and the new magnificent Royal Free Hospital in Hampstead, London. I would particularly like to express my indebtedness for help from Dr. Michael Barry, Professor Barbara Billing, Professor I. A. D. Bouchier, Dr. Robert Dick, Dr. Frank Dudley, Dr. Elwyn Elias, Dr. Roy Fox, Miss Phyllis George, Dr. Jenny Heathcote, Dr. Oliver James, Dr. E. Antony Jones, Dr. Neil McIntyre, Professor Peter Scheuer, Dr. Anthony Tavill and Dr. David Zimmon.

Miss S. C. Lees has continued to show outstanding loyalty despite all the stresses of being my secretary. The additional artistic work is largely that of Miss Jenny Middleton and Miss Janice Cox. Miss D. F. Atkins has applied her customary high standards to the references. The production of this largely re-written fifth edition owes much to the continued support and co-operation of Mr. Per Saugman and Mr. J. L. Robson. Blackwell Scientific Publications really makes an author's life easy.

My family have helped to keep me up to date by giving me time off to collect my thoughts and to rewrite. Mandy has checked the literature and Auriole has sent out numerous reprint request cards. They and my husband, Dr. D. Geraint James, have now become so interested in hepatology that already they clamour for yet another edition.

SHEILA SHERLOCK

London
June 1975

Preface to the First Edition

My aim in writing this book has been to present a comprehensive and up-to-date account of diseases of the liver and biliary system, which I hope will be of value to physicians, surgeons and pathologists and also a reference book for the clinical student. The modern literature has been reviewed with special reference to articles of general interest. Many older more specialized classical contributions have therefore inevitably been excluded.

Disorders of the liver and biliary system may be classified under the traditional concept of individual diseases. Alternatively, as I have endeavoured in this book, they may be described by the functional and morphological changes which they produce. In the clinical management of a patient with liver disease, it is important to assess the degree of disturbance of four functional and morphological components of the liver—hepatic cells, vascular system (portal vein, hepatic artery and hepatic veins), bile ducts and reticulo-endothelial system. The typical reaction pattern is thus sought and recognized before attempting to diagnose the causative insult. Clinical and laboratory methods of assessing each of these components are therefore considered early in the book. Descriptions of individual diseases follow as illustrative examples. It will be seen that the features of hepato-cellular failure and portal hypertension are described in general terms as a foundation for subsequent discussion of virus hepatitis, nutrition liver disease and the cirrheses. Similarly blood diseases and infections of the liver are included with the reticulo-endothelial system, and disorders of the biliary tract follow descriptions of acute and chronic bile duct obstruction.

I would like to acknowledge my indebtedness to my teachers, Professor J. Henry Dible, the late Professor Sir James Learmonth and Professor Sir John McMichael, who stimulated my interest in hepatic disease, and to my colleagues at the Postgraduate Medical School and elsewhere who have generously invited me to see patients under their care. I am grateful to Dr. A. G. Bearn for criticizing part of the typescript and to Dr. A. Paton for his criticisms and careful proof reading. Miss D. F. Atkins gave much assistance with proof reading and with the bibliography. Mr. Per Saugman and Mrs. J. M. Green of Blackwell Scientific Publications have co-operated enthusiastically in the production of this book.

The photomicrographs were taken by Mr. E. V. Willmott, F.R.P.S., and Mr. C. A. P. Graham from sections prepared by Mr. J. G. Griffin and the histology staff of the Postgraduate Medical School. Clinical photographs are the work of Mr. C. R. Brecknell and his assistants. The black and white drawings were made

by Mrs. H. M. G. Wilson, and Mr. D. Simmonds. I am indebted to them all for their patience and skill.

The text includes part of unpublished material included in a thesis submitted in 1944 to the University of Edinburgh for the degree of M. D., and part of an essay awarded the Buckston-Browne prize of the Harveian Society of London in 1953. Colleagues have allowed me to include published work of which they are jointly responsible. Dr. Patricia P. Franklyn and Dr. R. E. Steiner have kindly loaned me radiographs. Many authors have given me permission to reproduce illustrations and detailed acknowledgments are given in the text. I wish also to thank the editors of the following journals for permission to include illustrations: *American Journal of Medicine*, *Archives of Pathology*, *British Heart Journal*, *Circulation*, *Clinical Science*, *Edinburgh Medical Journal*, *Journal of Clinical Investigation*, *Journal of Laboratory and Clinical Investigation*, *Journal of Pathology and Bacteriology*, *Lancet*, *Postgraduate Medical Journal*, *Proceedings of the Staff Meetings of the Mayo Clinic*, *Quarterly Journal of Medicine*, *Thorax* and also the following publishers: Butterworth's Medical Publications, J. & A. Churchill Ltd., The Josiah Macy Junior Foundation and G. D. Searle & Co.

Finally I must thank my husband, Dr. D. Geraint James who, at considerable personal inconvenience, encouraged me to undertake the writing of this book and also criticized and rewrote most of it. He will not allow me to dedicate it to him.

Microphotographs of the liver, hepatic cells, vascular system, vein, hepatic artery and hepatic veins, the liver and kidneys and the liver. The typical reaction pattern is thus sought and recognized before attempting to measure the causative insult. Clinical and laboratory methods of assessing each of these components are therefore considered early in the book. Descriptions of individual diseases follow as illustrative examples. It will be seen that the features of hepato-renal failure and portal hypertension are described in general terms as a foundation for subsequent discussion of virus hepatitis, biliary liver disease and the extrahepatic biliary blood diseases and conditions of the liver are included with the extrahepatic biliary system, and disorders of the biliary tract follow descriptions of acute and chronic bile duct obstruction.

I would like to acknowledge my indebtedness to my teachers, Professor J. Henry Duke, the late Professor Sir James L. Cunningham and Professor Sir John MacMichael who stimulated my interest in hepatic disease, and to my colleagues at the Postgraduate Medical School and elsewhere who have generously invited me to see patients and their care. I am grateful to Dr. A. G. Burns for endorsing part of the manuscript and to Dr. A. Wilson for his criticisms and careful proof reading. Miss D. P. Atkins gave much assistance with proof reading and with the bibliography. Mr. P. Saegmann and Mr. J. M. Green of Blackwell Scientific Publications have co-operated enthusiastically in the production of this book. The photomicrographs were taken by Mr. E. V. Williams, F.R.S., and Mr. C. A. P. Graham from sections prepared by Mr. J. G. Griffin and the histology staff of the Postgraduate Medical School. Clinical photographs and the work of Mr. C. R. Brecknell and his assistants. The black and white drawings were made

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Anatomy of the Liver



The liver, the largest organ in the body, weighs 1200–1500 g and comprises one-fiftieth of the total adult body weight. It is relatively larger in infancy, comprising one-eighteenth of the birth weight. This is mainly due to a large left lobe, which accounts for the bulging abdomen in infants.

Sheltered by the ribs in the right upper quadrant, it is shaped like a pyramid whose apex reaches the xiphisternum (figs. 1, 2, 3). The upper border lies approximately at the level of the nipples. There are two anatomical lobes, the right being about six times the size of the left in adult life, but only three times as large in infancy. Lesser segments of the right lobe are the *quadrate lobe*, on its inferior surface, and the *caudate lobe* on the posterior surface. The right and left lobes are separated anteriorly by a fold of peritoneum called the falciform ligament, inferiorly by the fissure for the ligamentum teres, and posteriorly by the fissure for the ligamentum venosum.

The liver has a double blood supply. The *portal vein* brings venous blood from the intestines and spleen and the *hepatic artery*, coming from the coeliac axis, supplies the liver with arterial blood. These vessels enter the liver through a fissure, the *porta hepatis*, which lies far back on the inferior surface of the right lobe. Inside the porta, the portal vein and hepatic artery divide into branches to the right and left lobes, and the right and left hepatic bile ducts join to form the common hepatic duct. The *hepatic nerve plexus* contains fibres from both sympathetic ganglia T7 to T10 which synapse in the coeliac plexus, the right and left vagi and the right phrenic nerve. It accompanies the hepatic artery and bile ducts into their finest ramifications, even to the portal tracts and hepatic parenchyma.

The *ligamentum venosum*, a slender remnant of the ductus venosus of the foetus, arises from the left branch of the portal vein and fuses with the inferior vena cava at the entrance of the left hepatic vein. The *ligamentum teres*, a remnant of the umbilical vein of the foetus, runs in the free edge of the falciform ligament from the umbilicus to the inferior border of the liver and joins the left branch of the portal vein. Small veins accompanying it connect the portal vein with veins around the umbilicus. These become prominent when the portal venous system is obstructed inside the liver.

The venous drainage from the liver is into the *right and left hepatic veins* which issue from the back of the liver and at once enter the inferior vena cava very near its point of entry in the right auricle.

Lymphatic vessels terminate in small groups of glands around the porta

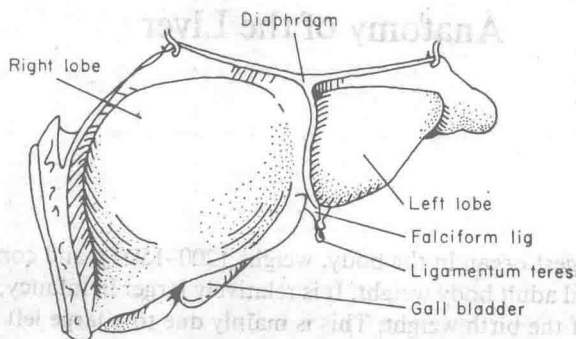


Fig. 1. Anterior view of the liver.

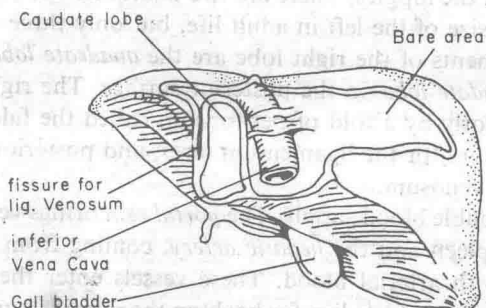


Fig. 2. Posterior view of the liver.

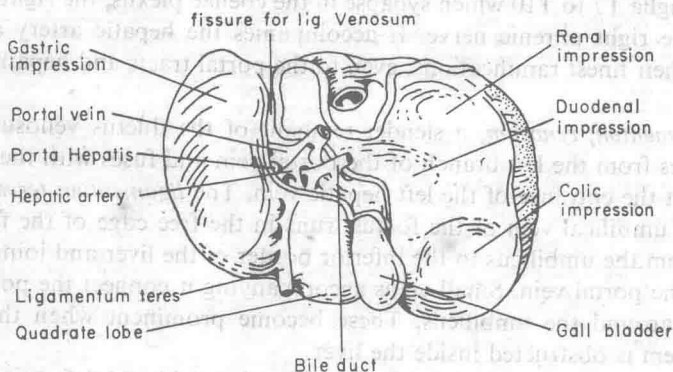


Fig. 3. Inferior view of the liver.

hepatis. Efferent vessels drain into glands around the coeliac axis. Some superficial hepatic lymphatics pass through the diaphragm in the falciform ligament and finally reach the mediastinal glands. Another group accompanies the inferior vena cava into the thorax and ends in a few small glands around the intrathoracic portion of the inferior vena cava.

The *inferior vena cava* makes a deep groove to the right of the caudate lobe about an inch from the mid-line.

The *gall-bladder* lies in a fossa extending from the inferior border of the liver to the right end of the porta hepatis.

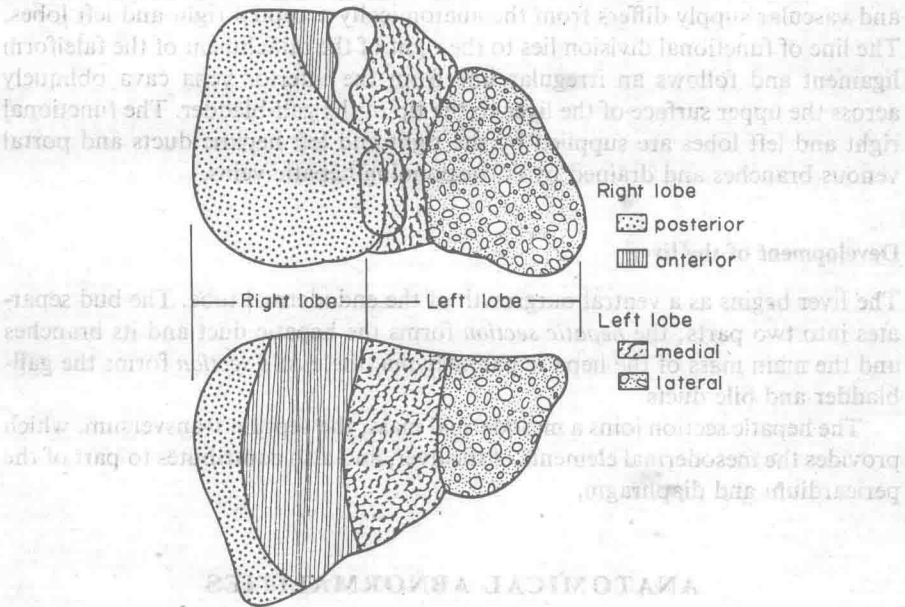


Fig. 4. The segments of the human liver (Healey, 1970).

The liver is completely covered with peritoneum except in three places. It comes into direct contact with the diaphragm through the bare area which lies to the right of the fossa for the inferior vena cava. The other areas without peritoneal covering are the fossae for the inferior vena cava and gall-bladder.

The liver is kept in position by peritoneal ligaments and by the intra-abdominal pressure transmitted by the tone of the muscles of the abdominal wall.

Segmental anatomy

Injection-corrosion techniques, combined with radiology, allow an architectural pattern of the liver to be built up similar to that of the lung [12] (fig. 4). One lobar fissure is in line with the fissure of the inferior vena cava above and the

fossa of the gall-bladder below. This fissure takes an oblique course from left to right to the porta hepatis and divides the liver into two anatomical left and right lobes. The left segmental fissure divides the two left lobes into medial and lateral segments. The right segmental fissure divides the right lobe into an anterior and a posterior segment. Knowledge of this anatomy is particularly valuable in planning hepatic resection and lobectomies.

Functional divisions of the liver

The functional division into right and left lobes with respect to biliary drainage and vascular supply differs from the anatomically accepted right and left lobes. The line of functional division lies to the right of the attachment of the falciform ligament and follows an irregular line from the inferior vena cava obliquely across the upper surface of the liver to the tip of the gall-bladder. The functional right and left lobes are supplied by the right and left hepatic ducts and portal venous branches and drained by corresponding hepatic veins.

Development of the liver

The liver begins as a ventral outgrowth of the endodermal tube. The bud separates into two parts; the *hepatic section* forms the hepatic duct and its branches and the main mass of the hepatic parenchyma, the *cystic section* forms the gall-bladder and bile ducts.

The hepatic section joins a mesodermal mass, the septum transversum, which provides the mesodermal elements of the liver, and also contributes to part of the pericardium and diaphragm.

ANATOMICAL ABNORMALITIES

Accessory lobes [8]. The liver of the pig, dog and camel is divided into distinct and separate lobes by strands of connective tissue. Occasionally the human liver may show this reversion and up to sixteen lobes have been reported. This abnormality is a rare one and without clinical significance. The lobes are small and usually on the under surface of the liver so that they are not detected clinically, but noted incidentally at operation or necropsy. Rarely they are intra-thoracic. An accessory lobe may have its own mesentery containing hepatic artery, portal vein, bile duct and hepatic vein. This may twist and demand surgical intervention.

Riedel's lobe [28] is fairly common and is a downward tongue-like projection of the right lobe of the liver. It is a simple anatomical variation; it is not a true accessory lobe.

The condition is much more frequent in women. It is detected as a mobile tumour on the right side of the abdomen, which descends with the diaphragm and on respiration. It may come down as low as the right iliac region. It is easily