SURGERY OF THE BILIARY TRACT

Second Edition

Edited by

Bjorn Thorbjarnarson, M.D.

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Volume XVI in the Series
MAJOR PROBLEMS IN CLINICAL SURGERY

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Consulting Editor

1982 W. B. Saunders Company
Philadelphia, London, Toronto, Mexico City, Rio de Janeiro, Sydney, Tokyo

Foreword

The purpose of this monograph is to elucidate the status of surgery of the biliary tract. Dr. Thorbjarnarson has had extensive experience in diseases of this area and presents the pathophysiology, diagnosis, and treatment in a manner that should be helpful to all involved in surgical practice. The high frequency of diseases of the biliary system makes a thorough understanding of them necessary. Too often the gallbladder and bile ducts are regarded lightly by both internist and surgeon, yet there is no other system so likely to produce chronic and recurrent problems if the initial therapy is incorrect. Dr. Dunphy, who so capably guided the Major Problems in Clinical Surgery through its first fifteen volumes, has over the years stressed the high number of chronic debilitating complications resulting from surgical mismanagement of the biliary system. It is a pleasure, then, for me to introduce my first nomination for the series, one that I hope will be most useful in bringing improvement to our approach to patients with biliary disease.

PAUL A. EBERT, M.D.

Surgery of the Biliary Tract ISBN 0-7216-8853-5

Last digit is the print number: 9 8 7 6 5 4 3 2 1

Preface to the Second Edition

As previously, this monograph on surgery of biliary tract disease is a rather personal one. The methods advocated and described are for the most part time-tested and in daily use in the operating rooms of the New York Hospital. As in other fields of surgery, disagreements exist. Sometimes these are valid; sometimes they are caused by different patient populations. The fact that I rarely find occasion to perform a choledochoduodenostomy for stones does not necessarily mean that it is always a bad operation but rather that I have found sphincteroplasty or Roux-Y choledochoenterostomy to be safer and more physiologically satisfactory procedures. My thanks to Drs. Kevin Morrissey, Frank Redo, George Grey, and Elias Kazam for their contributions that are beyond my own expertise. A surgeon's success depends in no small part on the aid given by the radiologists and pathologists that he works with. In this respect I am most fortunate, and Drs. Kazam and Grey are representatives of this group of doctors.

Progress is continuous even in such a well-established field as biliary tract surgery, and this edition does focus on some of the newer developments, such as endoscopy and percutaneous drainage and stenting of obstructing lesions of the biliary tree.

My thanks also to Dr. Paul Ebert and the W. B. Saunders Company for making this second edition possible.

BJORN THORBJARNARSON, M.D.

Preface to the First Edition

This book is written as a comprehensive approach to the surgical care of biliary tract disease in adult life. It is a very personal approach, but I have tried to eliminate quirks of the sort that many of us are personally fond of but that really do not help the vast number of surgeons doing biliary surgery. Gadgetry dictated by individual tastes and idiosyncrasies usually is not applicable to our generation of surgeons as a whole. Since 300,000 to 400,000 cholecystectomies are done each year in the United States, it is obvious that these operations are done in most hospitals and by most general surgeons. Thus, the approach to the problem should be as simple as possible if the largest number of patients are to receive the greatest possible benefit.

The results of biliary tract surgery, when performed by the properly trained surgeon utilizing well founded principles, are very good at present and have never been better. This does not mean that there is not room for improvement, and this improvement is bound to come, particularly in the realm of possible dissolution of gallstones without surgery, the diagnosis of jaundice through retrograde cholangiography, and improved ways of finding common duct stones intraoperatively.

No one reading this book will fail to see how the work and spirit of Dr. Frank Glenn has influenced its making. His influence as my teacher and the leader of the past and present generation of biliary tract surgeons will be noted for years to come.

My thanks also to Dr. Kevin Morrissey for the chapter on physiology and biochemistry of the system and to Dr. Paul Ebert for his encouragement in the writing of this book.

New York BJORN THORBJARNARSON, M.D.

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Chapter One

HISTORY OF BILIARY TRACT SURGERY

The history of biliary tract operations goes back to the Middle Ages or earlier, although documentation of early experiments is difficult. Fabricius Hildaneus was supposed to have removed gallstones from the gallbladder in the year 1618, but it is not stated whether the operation was performed on a living human being.[1] In the 17th century animal experiments were frequently undertaken. In 1667 the gallbladder was removed from a dog by Teckop in Leiden, Holland. The first known suggestion to remove gallstones from human beings came from J. L. Petit, but it apparently did not create any enthusiasm and was not undertaken. A. G. Richter suggested that a pus-filled gallbladder might be emptied by means of a trocar through the abdominal wall. In 1859 Thudichum suggested that a cholecystostomy could be done in two stages — first, creating adhesions between the gallbladder and the abdominal wall; then incising and draining the gallbladder without danger of spilling bile into the peritoneal cavity. This was not carried out either, as far as is known.

In 1867 John Bobbs in Indianapolis carried out the first documented cholecystostomy.[1,2] This was not a planned cholecystostomy, however, but rather an operation for a tumor in the abdomen. When the tumor was opened, large numbers of gallstones emerged unexpectedly. In 1882 König performed an operation on the gallbladder by cholecystotomy in two stages. Before König's operation, however, the first known planned operation on the biliary tree was done in 1878 by J. Marion Sims, an American surgeon who at that time was practicing in France.[3] Dr. Sims did a cholecystostomy on a woman who was suffering from long-standing jaundice and gallbladder colic. The operation itself was successful, and the woman was greatly relieved.

However, she died 10 days later from massive internal hemorrhage, probably brought on by lack of vitamin K absorption from the intestine and prolonged prothrombin time. The reason for this was not evident at that time.

In 1882 Langenbuch in Germany initiated modern surgery of the biliary tree by removing the gallbladder in its entirety, together with the stones contained within it. Langenbuch thought that gallstones were formed in the gallbladder and that only removal of the gallbladder itself would prevent re-formation of the stones. Following Langenbuch's operation, progress was rapid, and soon thereafter the common bile duct was opened surgically and stones retrieved from the common duct. Courvoisier was one of the first surgeons to open the common duct for removal of stones. It should be mentioned that prior to surgical intervention for biliary tract disease, the fate of persons with gallstones was a rather sorry one. The only hope for the sufferers of common duct obstruction from stones or acute purulent infection from the gallbladder was that fistulas from the outside of the internal organs would form, permitting stones to be extruded either into the intestine or to the outside. This would create a biliary fistula with decompression of the biliary system and consequent relief of jaundice or septic infection.

REFERENCES

1. Kleinschmidt, O.: Operative Chirurgie. Berlin, Springer-Verlag, 1948, p. 1234.
2. Glen, F., and Grafe, W. F.: Historical events in biliary tract surgery. Arch. Surg., 93:848, 1966.
3. Sims, J. M.: Remarks on cholecystostomy in dropsy of the gallbladder. Br. Med. J., June 8, 1879, p. 811.

Chapter Two

DIAGNOSIS OF BILIARY TRACT DISEASE

THE DIFFERENTIAL DIAGNOSIS OF JAUNDICE[1]

Jaundice is caused by the accumulation of bile pigment bilirubin in the blood. The accumulation of bile pigments may result from overproduction, that is, excessive breakdown of red blood cells in the spleen, from interference with the excretion of bilirubin by the liver, or from blockage of the bile after it leaves the liver, that is, obstruction in the ductal system. I prefer to think in terms of prehepatic, hepatic, and posthepatic jaundice. As surgeons, we are called upon to correct some prehepatic and posthepatic jaundice by surgery, and we must be able to weed out the patients with hepatic jaundice, since surgery is not likely to be helpful except for diagnostic purposes.

Prehepatic Jaundice

Prehepatic jaundice is usually caused by excessive hemolysis of the red cells by the reticuloendothelial system and is found in both inherited and acquired hemolytic anemias. It may be involved in absorption of large hematomas or found in patients with sepsis. This type of jaundice, also called retention jaundice, is caused by an overload of unconjugated bilirubin. Usually, it is easily diagnosed by a characteristic history, normal liver function tests, the absence of urobilinogen in the urine, and normal-colored stools. Visualization of the biliary tree is possible by oral or intravenous administration of iodized preparations (Fig. 2–1).

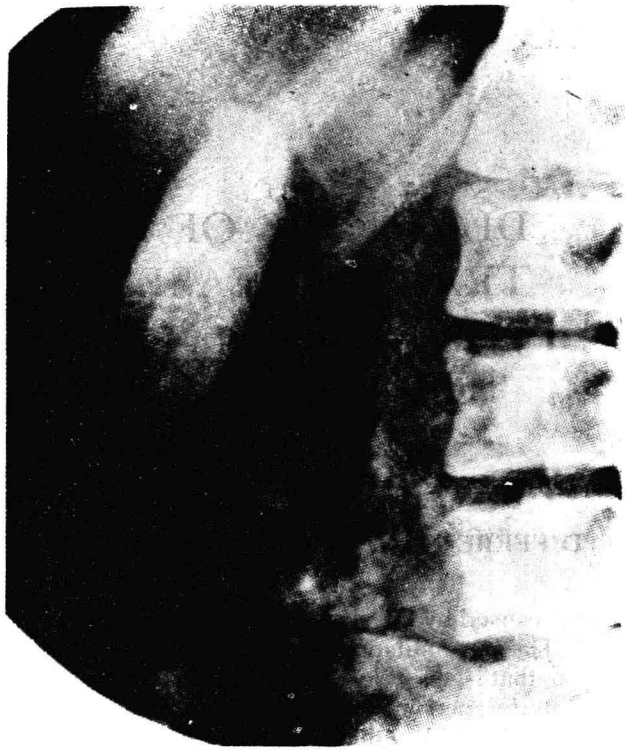

Figure 2–1. A cholecystogram from a jaundiced patient with hemolytic anemia. In spite of the jaundice the liver function is normal, and the gallbladder, containing multiple small stones, is well visualized. A small part of the common bile duct is also seen and is the normal size. Only in hemolytic jaundice, in which liver function is normal, does visualization of the biliary tree occur.

Hepatic Jaundice

Jaundice caused by primary damage to the liver cell constitutes one of the most common types of jaundice. The bilirubin in the blood is of both the conjugated and unconjugated types: The inability of the damaged hepatic cells to accept all the breakdown products of the hemoglobin causes the presence of the unconjugated type; the presence of a significant amount of the conjugated portion (regurgitation jaundice) is caused by failure of the hepatic cell to excrete bilirubin after conjugation. Typically this is the jaundice of viral hepatitis, but it also includes liver damage from other causes — drugs, alcohol, and

serum hepatitis. Usually, there is evidence of relatively increased amounts of unconjugated bilirubin in the blood; the liver enzymes, serum glutamic-oxaloacetic transaminase and serum glutamic-pyruvic transaminase (SGOT and SGPT), are elevated to 600 to 700 U per ml or over; the alkaline phosphatase level is normal or only slightly elevated; the prothrombin time is prolonged and responds poorly to vitamin K; the stool contains bile; and there is urobilinogen in the urine.

Posthepatic Jaundice

Posthepatic jaundice, the jaundice with which surgeons are primarily involved, is of the same nature as the hepatic type of jaundice, except that in the beginning the bilirubin is mainly or solely of the conjugated type, having passed through the liver cells and then having been regurgitated because of the obstruction in the bile duct. This is the jaundice caused by tumors, stones, or strictures in the extrahepatic ductal system. The history is usually typical: Either a patient has pain and fever of biliary colic preceding the jaundice or an otherwise healthy person notices dark urine, itching, and scleral icterus caused by a malignant tumor of the extrahepatic ductal system. Typically, the liver function tests are normal or only slightly abnormal in the beginning, except for an elevated alkaline phosphatase level. This picture predominates in carcinomatous obstruction of the pancreas or bile duct. Bile duct obstruction caused by a common duct stone or acute cholecystitis may show different results, since the cholangitis accompanying the obstruction may cause early damage to the liver cells, resulting in high levels of liver enzymes with only slightly increased alkaline phosphatase. In these patients serial observations of blood tests are important; usually within a week the obstructive nature of the inflammatory illness is clearly evident.

Investigation of the Patient with Jaundice

Taking the History

The taking of a history from a patient with jaundice may often provide the basis for a tentative diagnosis. A history of exposure to hepatotoxic agents (ingestion of drugs known to be hepatotoxic, including alcohol, drug habit), transfusions, anemia, or familial jaundice may be of importance. Previous symptoms of cholelithiasis or known cholelithiasis may support a diagnosis of obstruction. The painless jaundice of malignancy occurring in an otherwise healthy person is also typical.

Physical Examination

Together with the history, the physical examination often clinches the diagnosis. The most accurate and valuable finding is a Courvoisier's gallbladder. The finding of a distended, nontender gallbladder with a history of painless jaundice establishes the diagnosis of a carcinomatous obstruction distal to the cystic duct and is the only physical finding that establishes a diagnosis in jaundice. Other important findings are the cholesterol skin deposits and extensive scratch marks of biliary cirrhosis. The finding of an enlarged spleen may be evidence of primary hepatocellular disease, but it also may indicate carcinoma of the body of the pancreas blocking the splenic vein. In either case the history will usually confirm the correct diagnosis. Spider angiomas with gynecomastia, testicular atrophy, and palmar erythema should indicate primary liver cell disease, and a history of excessive alcohol intake would support that diagnosis. Ascites usually indicates primary liver cell disease and cirrhosis, but it may also occur in carcinoma of the pancreas and biliary tree.

For the surgeon, the history and physical examination may indicate surgical disease or may point to the necessity for particularly careful evaluation. The evidence of surgical disease is found primarily in the patient with painless jaundice and palpable gallbladder or with a history of gallbladder disease with stones, leading to an acute attack of pain with jaundice following. Careful evaluation must be made of the young patient with considerable prodromata before the onset of jaundice, of the patient with ascites or splenomegaly or both, of the patient with a drug habit, and of the alcoholic with the usual signs of cirrhosis.

Clinical Tests for Patients with Jaundice

There are many blood tests that assist the surgeon in the differential diagnosis of nonobstructive and obstructive jaundice. These tests are not specific, but they do help in separating patients into broad groups. The tests indicate liver function, liver cell obstruction, and bile regurgitation. The test that best indicates liver function is the prothrombin time, and it is quite valuable, particularly when also evaluated in response to vitamin K administration. Vitamin K is fat-soluble and is absorbed from the intestines only in the presence of bile. Prothrombin is made in the liver and can be produced adequately only in the presence of healthy liver cells and vitamin K. The prothrombin time is affected earlier in liver damage than in vitamin K deficiency and thus becomes abnormal sooner in parenchymatous or hepatocellular diseases than in pure biliary obstruction. When vitamin K is given intramuscularly, there is usually a poor response in