ACUTE CHOLECYSTITIS

Clarence J. Schein M.D.

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PROFESSOR OF SURGERY,
ALBERT EINSTEIN COLLEGE OF MEDICINE
OF YESHIVA UNIVERSITY
AND MONTEFIORE HOSPITAL MEDICAL CENTER,
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Preface

The importance of gallbladder disease derives from its frequency and pathologic potential. Cholelithiasis and its complications constitute the fourth most frequent cause for hospitalization and the most common indication for abdominal surgery in the adult; in the United States alone, about half a million operations are performed annually to manage this problem. Thus, there is justifiable public and professional concern about a disorder which affects 20 to 30 per cent of the mature population, and about whose etiology we know so little that it is impossible even to advocate a prophylactic regime for the prevention of complications. As life expectancy is extended, it can be anticipated that the incidence of gallbladder disease will increase. One aspect of this mechanical-metabolic disorder is acute cholecystitis, which affects 20 to 25 per cent of patients with symptomatic cholelithiasis.

It is the aim of this book to examine the subject of acute cholecystitis and its complications and to review the pertinent literature. The book presents data derived from direct personal experience with 300 such patients in private practice and teaching-service experience with another 200 patients, some of whom have been followed for as long as 15 years after surgical management of the disease. The separate series of 100 consecutive diabetic patients was compiled in a similar manner. The number of cases in each sample was chosen to facilitate statistical review and to circumscribe the study to the contemporary surgical scene. The Montefiore Hospital Medical Center experience is referred to in the text as the MHMC series. Some of the preoperative and postoperative problems discussed were encountered as part of an extramural consultation practice.

This monograph is based on the premise that the surgeon has an involvement with all phases of this disorder. The proper management of acute cholecystitis requires experience in the interpretation of the oral, intravenous, and operative cholangiogram. The accurate interpretation of the area of the choledochoduodenal junction is necessary to differentiate between stone, tumor, ampullary fibrosis, and pseudocalculus. The diagnostic aspects and medical management of acute cholecystitis are so intrinsic to preoperative care that, of necessity, they have become part of the surgical discipline. The surgeon is

specifically concerned with the details of all phases of the operative technique in the interest of developing clean, safe, accurate, and deliberate maneuvers for the complete correction of the disorder. Surgery should not be limited to the routine execution of a repetitive technique; each case is an anatomic and physiologic exercise involving a precise delineation of the anatomy and the correction of all mechanical abnormalities at the primary operation.

Certain aspects of the operative technique, especially those concerning management of distortions brought about by the inflammatory process and decisions required for evaluation and treatment of its extracholecystic manifestations, require choices that can only be referred to as "personal operative judgment." Surgical attitudes are presented as they have been derived in teaching a variety of residents at different stages in their surgical experience and with varying degrees of natural and acquired technical aptitudes. I have learned that nothing is to be taken for granted. Some aspects are presented in great detail because this has proved to be profitable on the teaching service.

Nonsurgical management is of varying success, but its results are only symptomatic, and there is no reliable way of predicting the behavior of the established biliary diseases or of eliminating the calculus which is the prime offender. On the other hand, biliary surgery has still to lower its mortality rate and to eliminate the organic causes for the postcholecystectomy syndrome. Special problems are encountered in elderly patients with cardiovascular vulnerabilities in whom there is often an associated inflammatory component in the pancreas or bile ducts. The approximately 10 per cent incidence of gangrene and perforation in acute-phase surgery still carries a mortality rate in the 10 to 25 per cent range.

Improvements in the care of these patients is directly correlated with the application of those advances in roentgenology that allow for preoperative confirmation of the diagnosis, and for the intraoperative evaluation of the extrahepatic biliary tree by direct and immediate cholangiography. The use of balanced anesthesia and muscle relaxants has made it possible to carry out the technical maneuvers under conditions of adequate relaxation without adversely compromising the general body economy. Such roentgenographic and anesthetic advances are within the experience of this series.

Certain statistics and some of the infectious complications of the era before 1945 are now relegated to medical history. The resident training program has greatly reduced the number of intraoperative accidents, as cholangiography and choledochoscopy have reduced the incidence of retained calculi. In the MHMC series there have been no ductal injuries and no deaths from bleeding. Physiologic considerations are now directed at preventing postoperative biliary stasis. Much directly relevant information has been obtained from the manometric, cholangiographic and cinefluorographic techniques used in the evaluation of the common bile duct and duodenal junction as these structures are affected by the acute inflammatory process in the gallbladder.

The bibliography on this subject is bewildering by the sheer number of publications. The references included have, therefore, been limited to those publications that I have consulted with profit. Selected citations of older references have been predicated on the assumption that what is old is not necessarily useless.

The attitudes and methods derived from this series of patients, and from this selective interpretation and harvesting of the published data, are those that I regard as of experience-tested value. Other methods may be equally effective in the context of different case material and alternate attitudes toward the adjunctive diagnostic and therapeutic methods. For some problems there are no absolute answers.

The book is directed to those who treat cholecystitis with the intent of providing a well-functioning biliary system within the problems imposed by the age, physiologic background, and life expectancy of the individual patient.

Bronx, New York

C.J.S.

Acknowledgments

Various aspects of the experience upon which this monograph is based have been derived from close associations with other interested individuals, and I appreciate this opportunity to acknowledge the specific help of some of these co-workers: Dr. T. C. Beneventano, of the Division of Diagnostic Radiology of the Montefiore Hospital Medical Center, who has actively participated in the roentgenographic aspects of the diagnosis of this disease and in the elucidation of some aspects of its choledochal physiology and pathology; and Dr. N. Becker, of the Pathology Division of the Montefiore Hospital Medical Center, who has helped in the pathologic studies with the assumption that there are still things to be learned.

Mr. Robert Zerafa compiled the tables and prepared most of the roentgenographic and photographic reproductions. Mr. George Tamis also contributed some of the roentgenographic reproductions. Mr. Stanley Waine, Director of the Audio-Visual Department of the Albert Einstein College of Medicine, drew the line illustrations with such competence that they add a valuable visual dimension to the text that I could not have achieved by words alone.

Mrs. Carol Grossman gave unselfishly and enthusiastically of her time, considerable talent, and patience to the collection of reprints, photographs, and charts and the seemingly endless alterations in typing and retyping of the manuscript.

Finally, I should especially like to recall those examples of high-level professional excellence in all standards of patient care as I have encountered it in my association with Drs. Abraham L. Feldman, Samuel O. Freedlander, Carlo Grossi, and Benjamin Schein.

Bronx, New York

C.J.S.

Contents

PREFACE xi
ACKNOWLEDGMENTS xv

Chapter 1

HISTORICAL BACKGROUND AND BIOGRAPHICAL SKETCHES 1

Chapter 2

ETIOLOGY: EXPERIMENTAL AND CLINICAL DATA 15

EXPERIMENTAL MODELS: STASIS AND OBSTRUCTION, INFECTION, METABOLIC CONSIDERATIONS, BILE SALTS, NEUROGENIC CONSIDERATIONS
CLINICAL DATA: GALLSTONES, ANATOMIC FEATURES, INFLAMMATORY FACTORS, VASCULAR CONSIDERATIONS, AUTONOMIC NERVOUS SYSTEM INFLUENCES, HUMORAL CONSIDERATIONS, FUNCTIONAL ELEMENTS, PHYLOGENETIC FACTORS, FURTHER RESEARCH AREAS

Chapter 3

PATHOPHYSIOLOGY 35

PATHOLOGIC SEMANTICS AT ISSUE; THE INCRIMINATED GALLSTONE; THE CYSTIC DUCT CONDUIT; THE GALLBLADDER CONTENTS; "WHITE BILE"; FIRST STAGE: INFLAMMATORY REACTION; SECOND STAGE: CELLULAR RESPONSE; THIRD STAGE: VASCULAR AND BACTERIAL COMPLICATIONS; CHRONIC INFLAMMATORY ANTECEDENTS; PATHOLOGIC CHANGES AND THEIR CLINICAL TIMING: LYMPH NODE REACTION, THE HEPATIC REACTION, THE CHOLANGITIC REACTION; PERFORATIONS AND FISTULAS

Chapter 4

CLINICAL DIAGNOSIS 55

VISCERAL AND REFERRED PAIN PATTERNS: DIFFERENTIATION FROM COLIC; PALPATORY FINDINGS; VOMITING; JAUNDICE; LABORATORY DATA; PERFORATIONS; SERUM AMYLASE LEVELS; HEPATITIS; PLEUROPULMONARY DISEASE; THE CARDIAC DIFFERENTIAL; INTERVAL ATTITUDES

Chapter 5

ROENTGEN DIAGNOSIS 73

CHEST FILM; PLAIN FILM OF THE ABDOMEN; INTRAVENOUS CHOLANGIOGRAPHY; ORAL CHOLECYSTOGRAPHY; SELECTIVE ARTERIOGRAPHY; OPERATIVE CHOLANGIOGRAPHY: PHYSIOLOGIC BASIS OF CHOLANGIOGRAPHIC INTERPRETATION; CHOLANGIOMANOMETRY

Chapter 6

MEDICAL MANAGEMENT: RATIONALE AND GUIDELINES 97

ALTERNATIVES IN MANAGEMENT ROUTINE; ANTISPASMODICS: EVALUATION OF DRUG THERAPY; NASOGASTRIC SUCTION; ANALGESICS; BACTERIOLOGY AND ANTIBIOTICS; GUIDES TO CLINICAL PROGRESS; DETERMINANTS IN THERAPEUTIC CHOICES; CAUSES OF MORTALITY; STATISTICAL RESULTS OF NONOPERATIVE METHODS; INTERVAL MANAGEMENT AND THE INCIDENCE OF RELAPSE; TIMING THE SURGICAL APPROACH

Chapter 7

OPERATIVE TECHNIQUE: CHOLECYSTECTOMY AND CHOLECYSTOSTOMY 115

CHOLECYSTECTOMY: PREOPERATIVE PREPARATIONS, CONFIRMATION OF THE DIAGNOSIS, THE PATTERN OF ADHESIONS, SURGICAL ANATOMY OF THE CYSTIC ARTERY, SURGICAL ANATOMY OF THE CYSTIC DUCT, SURGICAL ANATOMY OF THE LIVER BED AND GALLBLADDER MESENTERIES, INCISION AND EXPOSURE, INTERPRETATION OF THE INTRAOPERATIVE FLUID, SEQUENCE OF DISSECTION, MANAGEMENT OF THE DISTENDED GALLBLADDER, LIGATION OF THE CYSTIC ARTERY, LIGATION OF THE CYSTIC DUCT, ANCILLARY PROCEDURES, DRAINAGE AND CLOSURE
CHOLECYSTOSTOMY: INDICATIONS, THE PLANNED CHOLECYSTOSTOMY, THE ABANDONED CHOLECYSTECTOMY, DUCTAL CONSIDERATIONS, OPERATIVE TECHNIQUE, POSTOPERATIVE CHOLECYSTOCHOLANGIOGRAPHY, RETAINED GALLSTONE, THE LATER PROGNOSIS

Chapter 8

OPERATIVE AND POSTOPERATIVE PROBLEMS AND COMPLICATIONS 157

ROUTINE POSTOPERATIVE MEASURES; INCISIONAL PROBLEMS; PULMONARY PROBLEMS; INTRA-ABDOMINAL INFECTION; POSTOPERATIVE PANCREATITIS; POSTOPERATIVE HEMORRHAGE; BILE LEAKS AND BILIARY FISTULAS; POSTOPERATIVE JAUNDICE; HAZARD OF INADVERTENT HEPATIC ARTERY LIGATION; CARDIOVASCULAR MORBIDITY

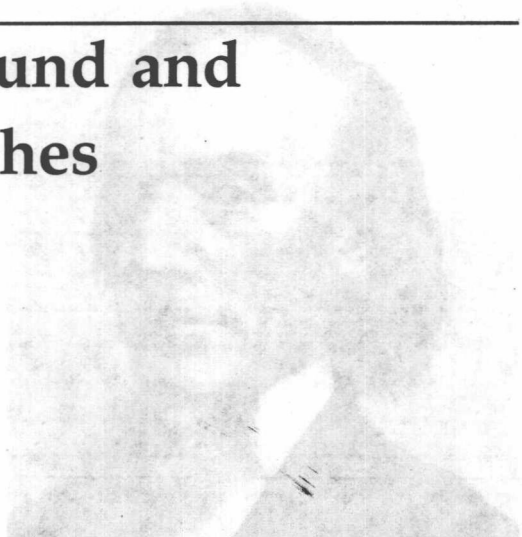
Chapter 9

SPECIAL PROBLEMS 179

THE COMMON BILE DUCT IN ACUTE CHOLECYSTITIS; ACUTE CHOLECYSTITIS IN THE DIABETIC; PANCREATIC PROBLEMS IN ACUTE CHOLECYSTITIS; ACUTE CHOLECYSTITIS IN THE ASTHMATIC, OBESE, OR PREGNANT PATIENT; ACALCULUS CHOLECYSTITIS; IATROGENIC ACUTE CHOLECYSTITIS; ACUTE CHOLECYSTITIS FOLLOWING UNRELATED SURGERY; VAGAL FACTORS IN CHOLECYSTITIS; PNEUMOCHOLECYSTITIS; ACUTE CHOLECYSTITIS IN CHILDHOOD; CARCINOMA OF THE GALLBLADDER WITH ACUTE CHOLECYSTITIS; BILIARY INFECTION AND ANTIBIOTICS; POSTCHOLECYSTECTOMY SYNDROME AFTER SURGERY FOR ACUTE CHOLECYSTITIS; PROPHYLACTIC CONSIDERATIONS; THE UNSOLVED PROBLEMS

REFERENCES 257
MONOGRAPHS IN BILIARY SURGERY 281
MOTION PICTURE REFERENCES 291
INDEX 295

CHAPTER 1
Historical Background and Biographical Sketches



This collection of short biographical sketches is intended so that the good may not "be interred with their bones." It concerns certain deceased individuals who have contributed to the management of disorders of the biliary tract. Some remain immortalized in the surgical literature as eponyms (i.e., "Courvoisier's gallbladder," "Morison's pouch," "the Kehr tube") while others have contributed technical details or attitudes that are the everyday paraphernalia of the surgeon. This collection is necessarily eclectic. Other significant contributors are not recorded here since they were not primarily surgeons or because the biliary contribution constitutes only a minor aspect of more significant contributions in other areas. They are eponymically documented in: Calot's triangle, Charcot's biliary fever, Glisson's capsule, Hartmann's pouch, Heister's valves, Luschka's ducts, Lutken's sphincter, Lyons-Meltzer drainage, McBurney's sphinterotomy, Oddi's sphincter, Osler's ball-valve stone, Rokitansky's sinuses, Robson's incision, Saint's triad, Vater's papilla, and Wilkie's artery. Radiologists, other pathologists, gastroenterologists, and basic scientists in this field get recognition from their own co-specialists.

Important surgical contributors of the past not mentioned in detail include Kümmell who did one of the early choledochal explorations, Thudichum who advocated a two-stage cholecystostomy, Spencer Wells who recommended cholecystendysis as the ideal cholecystotomy, Hochenegg who was the first to remove a malignant tumor of the gallbladder, von Winiwarter who carried out, in six stages, the first cholecysto-enterostomy, and Riedel and Sprengel who advanced the use of the choledochoduodenostomy.

JOHN STOUGH BOBBS (1809–1870)

Born in Pennsylvania, Bobbs (Fig. 1-1) secured a preceptorship in Harrisburg and then attended the Jefferson Medical College in Philadelphia. His subsequent professional career was spent in Indianapolis, Indiana. He was a prime force in establishing the Indiana State Medical Society and the Indiana Medical College, in which institution he served as president of the faculty and professor of surgery. He performed the first gallbladder operation.

Bobbs reported the details of this procedure as a "Case of Lithotomy of the Gallbladder" in the *Transactions of the Indiana State Medical Society 18*:68, 1868. The patient, Mary Wiggins, was 32 years old and had a large abdominal mass that

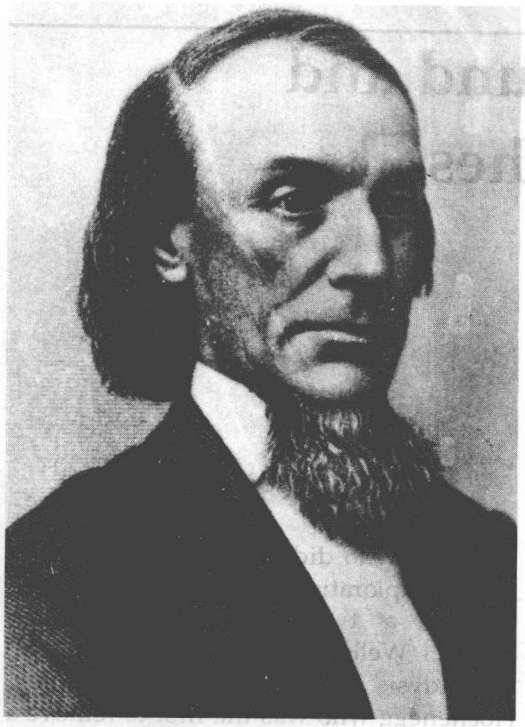


Fig. 1-1. John Stough Bobbs. *(Courtesy of Dr. L. W. Spolyar, Assistant Commissioner, State Board of Health, Indianapolis, Indiana.)*

interfered with walking. Although no diagnosis was made, Bobbs suspected that the mass was not ovarian in origin. The operation was performed on June 15, 1867 under chloroform anesthesia on the third floor of a wholesale drug company in downtown Indianapolis. He evacuated a large mass, a clear serous fluid, and many calculi and ". . . put a stitch in its walls in the event of its refilling . . . would become adherent . . . and be within the reach of a trochar. . . ." Digital examination of the gallbladder revealed a retained calculus. He postulated that the ". . . cystic duct was probably obliterated from irritation produced by these concretions. . . ." The patient lived for 45 years after this operation, presumably with the retained stone. She died at age 77 of arteriosclerosis.

There is no record of Bobbs doing another such operation. In 1878 Sims, Kocher, and Kehr independently reported on gallbladder operations, each apparently unaware of Bobbs' earlier experience. The importance of Bobbs' feat lies not only in the successful cholecystostomy but also in his terse comments on the differential diagnosis, operative considerations, and prognostications regarding the subsequent health of his patient. The first cholecystectomy in America was performed in 1886 by John Ohage of St. Paul, Minnesota.

JAMES MARION SIMS (1818–1883)

Born in the Lancaster district of South Carolina, Sims first studied medicine with a local practitioner, then went on to the Medical College of Charleston and finally was graduated from Jefferson Medical College in Philadelphia in 1835. He did 18 years of general practice in Alabama before beginning a specialty career in New York City. While in Alabama an experience with a patient who fell from a horse and sustained an acute displacement of the uterus, indicated to Sims the value of the knee-chest and the left-lateral decubitus position for the pelvic examination. In 1849 and 1852 he published papers on the perplexing problem of vesicovaginal fistulas and of their successful management with silver sutures.

With the start of the Civil War he left for London and Paris: "In 1862 I voluntarily left my own country, on account of its political troubles." Absent for 6 years, he subsequently became a surgeon at the Woman's Hospital, New York City, in 1872, President of the American Medical Association in 1876, and President of the American Gynecological Society in 1880 (Fig. 1-2).

Sims' important contribution to biliary surgery is described in his article: "Re-

Fig. 1-2. James Marion Sims. *(Courtesy of National Library of Medicine, Department of Health, Education and Welfare, Bethesda, Maryland.)*

marks on Cholecystostomy in Dropsy of the Gallbladder" published in the *British Medical Journal* 1:811, 1878. He reports on a 45-year-old woman with jaundice, pain, and ". . . some unnatural swelling about the lower border of the liver." She had shown some improvement after aspiration of the fluctuation. He planned to treat the disorder by creating a fistula. In an operation requiring 76 minutes he removed a half dozen or more gallstones and exteriorized the 8-inch long gallbladder with carbolized silk. The patient died on the eighth postoperative day.

Sims commented on the frequency of this disorder of the gallbladder. He suggested that in the presence of jaundice, nausea, and itching it was not advisable "to wait for the organ to become dropsical" but to follow the suggestion of Handfield, Jones, Spencer-Wells, and other ovariotomists who advocated making exploratory incisions to determine the nature of such doubtful tumors. This approach he predicted ". . . will open up a new field in the great domain of abdominal surgery." His was the first planned cholecystostomy.

THEODOR KOCHER (1841–1917)

Kocher was the first surgeon to be awarded the Nobel Prize; he received this honor in 1909 for his contributions to the physiology and surgery of the thyroid. He also made several important contributions to the surgery of the biliary tract. Kocher was born in Bern and spent his entire professional life there apart from an early trip visiting the clinics and laboratories of Langenbeck, Billroth, Lister, Spencer-Wells, and Virchow. In 1872 he was appointed professor of surgery in Bern after a heated faculty-student conflict over the successor to Lücke. He maintained a productivity of 45 years that made his clinic one of the most honored and visited in Europe (Fig. 1-3).

Kocher popularized the right subcostal incisional approach to the biliary tract, and, if he did not originate it, he at least standardized the mobilization of the second portion of the duodenum originally

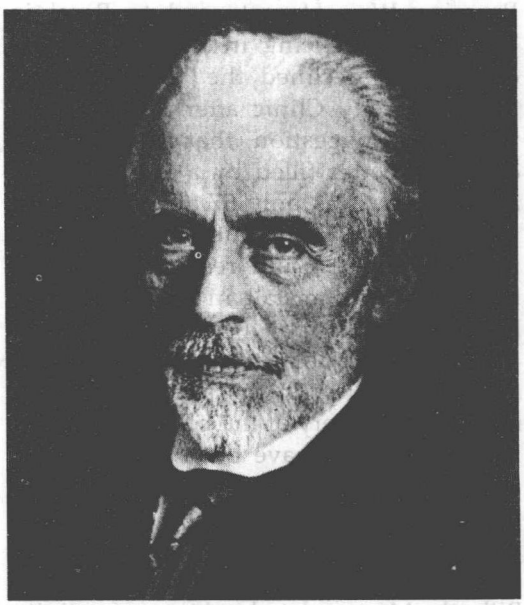


Fig. 1-3. Theodor Kocher. *(Courtesy of Medical History Library of the University of Bern, Bern, Switzerland.)*

intended as an adjunct to gastric surgery, as a prerequisite to adequate examination and exploration of the distal common bile duct. In 1911 he published a technique for sphincteroplasty, as a method of managing distal choledochal obstructions. He suggested direct-suture, transduodenal, internal ampulla-duodenostomy as he had performed it in 1894 and 1899. This is the origin of the current plastic procedures on the choledochal sphincter. It remains one of the most effective and least dangerous operations. Albeit present-day indications for its performance are infrequent, they are nevertheless very specific.

LUDWIG G. COURVOISIER (1843–1918)

Courvoisier was graduated from the University of Basel, summa cum laude, with a student prize for his dissertation on the histology of the sympathetic nervous system. His early surgical training was as assistant to Soun both at the University Surgical Clinic and during the Franco-Prussian War. He returned to Basel in 1883 after practicing in Reihen. He was offered but declined the directorship of the University Clinic after Soun's death with the suggestion that the position could be better filled by a younger man although he was only 57 at the time. He functioned in Basel but maintained his teaching interest and responsibilities in the Diakonesenanstalt in Reihen for his life time (Fig. 1-4).

His major publications between 1884 and 1913 deal with the pathology, diagnosis, and surgery of the biliary passages. He appeared to have been a methodical and thorough worker, well known in the international surgical community for his professional ability and modesty. He was friendly with Wood, Spencer-Wells, and Billroth. Many related spheres of activity enjoyed his interest. He stimulated the formation of a sick fund for insurance

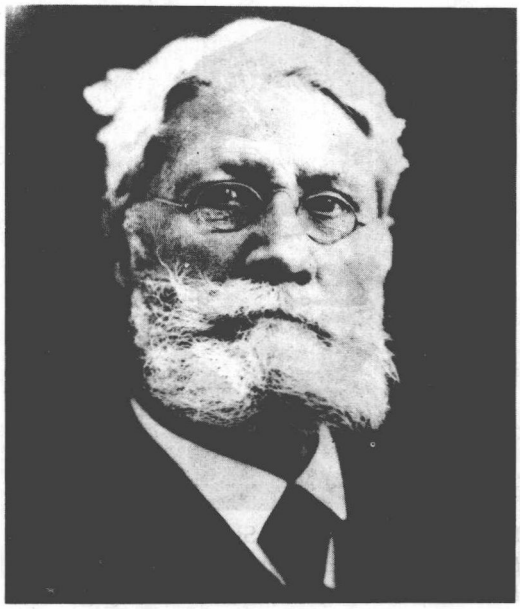


Fig. 1-4. Ludwig G. Courvoisier. *(Courtesy of Medizinhistorische Bibliothek, Basel, Switzerland.)*

benefits during illness, published many entomologic studies, and left a remarkable collection of butterflies to the museum in Basel. He also wrote a text on the nursing of patients at home which went into four editions, and served as president of the Swiss Board of Medical Examiners.

The eponym "Courvoisier's gallbladder" is founded on the statistical study of Biliary tract cases in: *Kasuistisch-statistiche Beitraege zur Patholgie and Chirurgie der Gallenwege* published by F. C. W. Vogel of Leipzig in 1890. In a review of 187 cases he indicated that ". . . with stone obstruction of the common duct dilation of the gallbladder is rare . . . usually that organ is already shrunken . . . with obstruction due to other causes, dilation is common." In addition to the scholarly pursuits of his own case material from which analysis stems the eponym Courvoisier's gallbladder as applied in the diagnosis of cancer of the head of the pancreas, he is also credited with the first successful choledocholithotomy.

CARL LANGENBUCH (1846–1901)

Langenbuch (Fig. 1-5) performed the first planned cholecystectomy. This was accomplished at the Lazarus Krankenhaus in Berlin on July 15, 1882. After graduating from the University of Kiel in 1869, he had trained as Wilms' assistant at the Krankenhaus Bethanien in Berlin. He was 36 years old at the time and had prepared for this procedure by practicing on cadavers and animals. The patient was a 43-year-old man with severe morphine-dependent intermittent pain, fever, and jaundice associated with recent marked weight loss. The patient was discharged from the hospital 8 weeks postoperatively. Langenbuch's new procedure engendered much criticism from his peers.

In his original article entitled "Ein Fall von Exstirpation der Gallenblase wegen chronischer Cholelithiasis; Heilung" ("A Case of Gallbladder Removal for Chronic Cholelithiasis; Healed"), published in the Berlin *Klinishe Wochenshrift 19*:725, 1882, Langenbuch stressed the need for definitive surgery by cholecystectomy rather than the lesser procedures of cholecystostomy or cholecystendesis. "The gallbladder should be removed not because it contains stones, but because it forms them." He emphasized that operation was only to be advised when both physician and patient had come to the end of their patience with other methods of management.

By 1889 he had performed 24 such operations and in 1894 published the first volume of his *Chirurgie der Leber and Gallenblase*. Ironically he died of appendiceal peritonitis. His contribution was not only the concept of a curative procedure for the consequences of cholelithiasis, but also the working out of its technical details.

Fig. 1-5. Carl Langenbuch. *(Courtesy of Dr. E. Feiner, Institut für Geschichte der Medizin und Pharmazie der Christian-Albrechts-Universitat in Kiel and the Lazarus Kranken-Diakonissenhaus in Berlin.)*

WILLIAM S. HALSTED (1852–1922)

Halsted's position in American surgery can be compared only to that of Billroth's on the continent. Both were not innovators of surgical procedures, techniques, and attitudes in the science of surgery alone, but were also founders of surgical schools with a large retinue of important students who subsequently managed their own important departments. He visited German clinics before assuming roles at the Bellevue and Roosevelt hospitals in New York City and finally took the post of Professor of Surgery at Johns Hopkins Medical School in Baltimore (Fig. 1-6).

His first biliary operation was performed in 1881 on his aged mother at her home in Albany. She was desperately sick with jaundice, fever, and an abdominal mass. He incised the mass, releasing pus and gallstones. She recovered but died 2 years later of a recurrence. Halsted con-

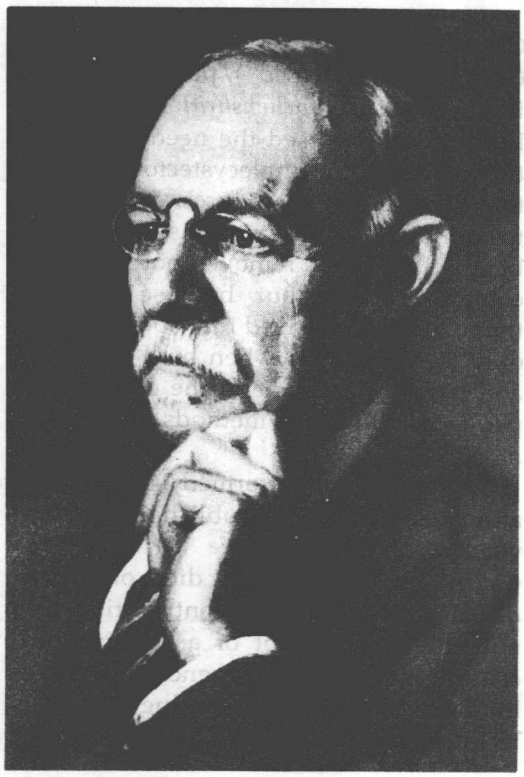


Fig. 1-6. William S. Halsted. *(Courtesy of Johns Hopkins University, Institute of History of Medicine, Baltimore, Md.)*

tributed to the technical details and armamentarium for the exploration of the common duct and did the first local excision and reconstruction for a carcinoma of the ampulla. Ironically, he died of the complications of a secondary biliary tract operation undertaken for a common duct stone.

RUTHERFORD MORISON (1853–1939)

Morison was born in Great Britain and held the position of emeritus professor of surgery at the University of Durham in England (Fig. 1-7). He is best known for the pouch which he described in "The Anatomy of the Right Hypochondrium Relating Especially to Operations for Gall Stones" which appeared in the *British Medical Journal,* November 3, 1894. He described this area as having "natural barricades" that separate it from the general peritoneal cavity, and whose drainage would serve a useful purpose in gallbladder surgery. The pouch ". . . can be effectively drained by an opening made through the posterior parietes immediately below the lower end of the right kidney." His diagram indicates that the site for drainage is lateral and to the right of the lower pole of the right kidney. This pouch is more often drained in name than fact for the drain is often placed at the upper pole of the kidney in the subhepatic fossa without reflecting the right colon.

HANS KEHR (1862–1916)

Kehr was born in the Thuringian area of Germany. His father was a well-known pedagogue. His medical studies were in Jena, Halle, and Freiburg. He established

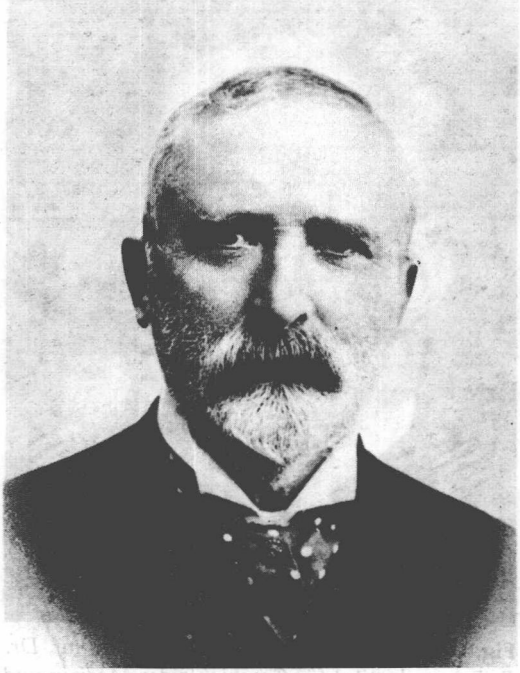


Fig. 1-7. Rutherford Morison. *(Courtesy of Wellcome Institute of the History of Medicine, London.)*

a private clinic in Halberstadt and from 1890 to 1910 devoted himself solely to surgery of the biliary tract. He became world renowned and patients came to him from all over the world. In 1910 he moved his activities to Berlin as Geheimes Sanitatstrat. Kehr died as the result of an infection acquired during an operation (Fig. 1-8).

He is known for the T tube (which on the continent is often referred to as the Kehr tube), the Kehr incision, for the successful ligation of a hepatic artery aneurysm, for reconstructive surgery of the bile ducts, and for a surgical activity comprising 2600 biliary tract procedures. This experience forms the basis of his masterly two-volume text on the surgery of the biliary tract.[M-6] Kehr regarded himself as a disciple of Langenbuch and defended the viewpoint that corrective surgery for calculus disease requires the removal of the gallbladder and the clearing of the extrahepatic passages.

Fig. 1-8. Hans Kehr. *(Courtesy of the Kehr family and Professor G. Jorns of the Kreiskrankenanstalten, Arnstadt, Germany.)*

His text, as valuable today as it was in 1913, is an example of superb surgical scholarship. The surgical pathology and the technical details and their variants are presented in a manner which has rarely been equaled.

BERKELEY GEORGE ANDREW MOYNIHAN (1865–1936)

Moynihan was of Irish ancestry and came from a military family background. In deference to his mother's wishes he undertook a medical career at the Leeds Medical School. He qualified at the University of London in 1887. Moynihan spent most of his surgical career as a teacher and practicing surgeon in Leeds General Infirmary, much of it in association with Robson. For 6 years he served as the president of the Royal College of Surgeons, and attained the distinction of being the first practicing physician, after Lister, to enter the House of Lords (Fig. 1-9).

His varied monographs deal with retroperitoneal hernia and diseases of the stomach, duodenum, and gallbladder. He was one of the sponsors of the *British Journal of Surgery* which first appeared in 1913. His early biliary contributions are in the monograph *Gall Stones and Their Surgical Treatment* published in 1904. It is from an intensive study and detailed analysis of his own case material that he evolved a rationale and technique for doing cholecystectomy as a definitive approach to the complications of cholelithiasis. One has only to read the descriptions of operating in the patient's bedroom with one assistant, ". . . preferably with gloves," to appreciate the early problems. In 1909 he offered the first pathologic description of cholesterolosis. During the first decade of this century, Moynihan was one of the most important advocates of cholecystectomy for the management of