英 文 影 印 版
(第 2 版) SECOND EDITION

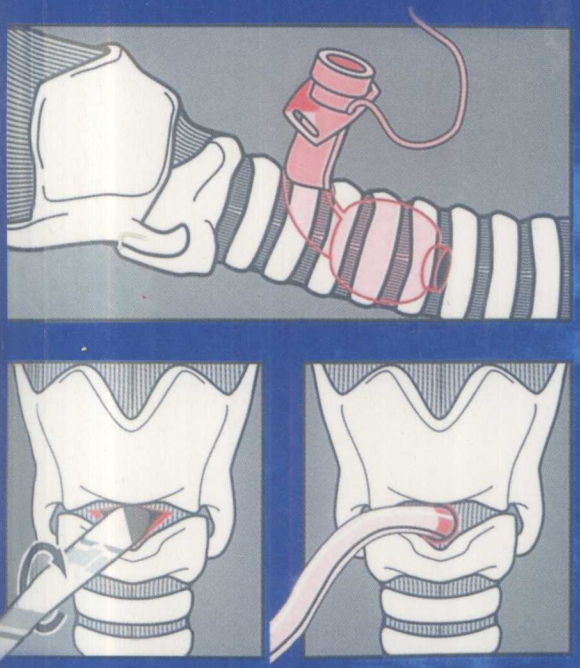
# 外科学基础

# ESSENTIAL SURGERY

## PROBLEMS, DIAGNOSIS AND MANAGEMENT

H.George Burkitt
Clive R.G.Quick
Dennis Gatt

Drawings by
Philip J. Deakin



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# ESSENTIAL SURGERY

## PROBLEMS, DIAGNOSIS AND MANAGEMENT

**SECOND EDITION**


**H. George Burkitt**

BDSc Hons (Queensland), FRACDS MMedSci (Nottingham), MB BChir (Cambridge)
Medical Author and General Medical Practitioner, Newcastle, NSW, Australia

**Clive R. G. Quick**

FDS FRCS (England), MS (London), MA (Cambridge)
Consultant General and Vascular Surgeon, Hinchingbrooke Hospital, Huntingdon, and Addenbrooke's Hospital, Cambridge; Associate Lecturer in Surgery, University of Cambridge; Examiner in Basic Sciences and Clinical Surgery for FRCS (England)

**Dennis T. Gatt**

LRCP (London), FRCS (England), FRCS (Edinburgh) IOM
Consultant General, Vascular and Thoracic Surgeon, St Luke's Hospital, G'Mangia; Lecturer and Examiner in Surgery for MD degree, University of Malta, Malta

*Drawings by*
**Philip J. Deakin**
BScHons, MBChB (Sheffield)
General Medical Practitioner, Sheffield, UK



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# Preface

Our initial purpose in producing yet another textbook of surgery was to present the subject in a new and invigorating way. The enthusiastic responses of students and teachers confirm the value of this approach and highlight the need for this updated and expanded second edition. A Spanish edition has also proved most successful. With this new edition we have taken account of the large amount of comment, much favourable and some critical, and we hope this will further widen its appeal.

This book is written primarily for clinical students and provides an exposition of the whole field of general surgery and urology suitable for modern clinical courses. It should also serve well as a primer for trainee surgeons for whom there is increasing emphasis on the applied basic sciences and essential principles of surgery rather than details of operative technique. In addition this book is designed to be a continuing reference text for doctors in other specialities, including family practice. We believe that *Essential Surgery* will have greatest appeal for those readers who want to understand surgery rather than merely pass examinations.

There are several major differences between this book and standard surgical textbooks. First, the pathophysiological basis of surgical diseases and of their management is presented so as to bridge the gap between basic medical sciences and clinical problems. Second, we have tried to adopt a problem-solving rather than a disease-orientated approach to diagnosis and treatment, believing that understanding how diagnoses are made and why particular treatments are used, is more effective and more memorable than rote learning. An important area of concern for the student and junior surgical doctor is the multiplicity of management decisions that must be made during assessment, as well as during preoperative and postoperative care. For example, 'Is the patient fit for anaesthesia?', 'Will blood transfusion be necessary?', 'What intravenous fluids are required?', and 'Why is this postoperative patient febrile?' are surgical questions that are frequently asked. Throughout the book, we have attempted to view the practical management of patients through the eyes of the trainee.

Third, we have incorporated epidemiology, preventive strategies and issues affecting surgical services so as to integrate the subject into the wider community and health care context. Fourth, original illustrative material is used extensively to emphasise important concepts, to avoid unnecessary text, and to assist revision. This includes photographs of clinical cases and pathological specimens, radiographs, anatomical and operative diagrams, tables and summaries of the text. The clinical material is largely drawn from our day-to-day practice and we have tried to choose typical rather than gross examples of disorders so the reader can see how patients most commonly present. Fifth, outlines of common surgical operations are included to enable students and junior doctors to explain operations to patients, to participate intelligently in the operating department, to understand and prevent complications and to perform certain minor operations themselves. Finally, there is a major section on accident surgery as this is an important part of general surgical training and practice.

In preparing the new edition of *Essential Surgery*, the entire text and all the illustrations have been closely scrutinised and extensively redrafted to take account of progress in surgery and anaesthesia. In response to requests from readers of the first edition, we have added a new chapter on cardiothoracic surgery (Ch. 27) and have expanded statistical information on the incidence, prevalence and results of treatment of various disorders presenting, where available, comparative figures for Europe. North America and Australasia. Less obvious changes include extensive rewriting of the existing text to improve fluency, correct typographical and factual errors and ensure consistency between text and illustrations. A completely new and much more

extensive index is provided and references to the illustrations have been included in the index for the first time. A few drawings have been modified to improve their accessibility and some new ones added. Several radiographs have been replaced where necessary to illustrate points more clearly.

In most areas, major changes in the book represent the evolution and refinement in surgery over the 5 years since publication of the first edition. Over this period, there have been steady advances in endoscopic, ultrasonographic and radiological scanning equipment which have broadened diagnostic and particularly, therapeutic applications. Consensus guidelines incorporating evidence from clinical studies have emerged for managing several common diseases such as breast cancer and these recommendations have been incorporated in the text.

The classification of bacteria of surgical importance has been modernised in Chapter 1 and a new section added on surgically relevant viruses, particularly HIV and hepatitis. Avoiding inadvertent infection of health care workers from patients is given prominence in Chapter 3, with discussion of 'Universal blood and body fluid precautions' and a protocol for managing 'sharps injuries'. Minimal access techniques have made great strides over the last few years. Laparoscopic general surgery in particular has enjoyed an excess of media attention, often ignoring the fact that the applications and indications are still undergoing evolution and evaluation. The principles are discussed in Chapters 2 and 3 and individual techniques are described in relevant places throughout the text.

In Chapter 3, the principles of tissue transfer techniques in plastic surgery, organ transplantation and blood transfusion have undergone major revision. Chapter 4, the principles of cancer management, has been brought up to date in many respects and several new figures included. The section on palliative care has been greatly enhanced. The general topic of population screening has been expanded reflecting its increasing role in breast cancer detection in many countries and its potential in other diseases. In trauma surgery, advances in the understanding of the pathophysiology of head injury and the concept of diffuse axonal injury have been incorporated in Chapter 5.

The value of combined medical and surgical management of upper GI haemorrhage is emphasised in Chapter 7, together with a protocol which can substantially reduce mortality. Acute variceal haemorrhage in Chapter 10 has also been radically revised. In Chapter 8, the ascendancy of ultrasonography for investigating gallstone disease is recognised and older investigations such as cholecystography have been downgraded. In Chapter 9, the place of Helicobacter pylori in the aetiology of peptic ulcer disorders is discussed. Gastric cancer (Ch. 11) has attracted renewed attention due to progress in understanding the aetiology as well as improving results of surgery employing radical gastrectomies originating in Japan.

The section on pancreatic tumours (Ch. 12) has been largely rewritten to take account of modern diagnostic and therapeutic methods. In Chapter 15, the pathology and malignant potential of polyps has been clarified. New understanding of the genetic basis of Familial Adenomatous Polyposis has been included, together with its ramifications in the development of colonic cancer. In Chapter 18, there has been a major rewrite of anorectal abscesses and fistulas and in Chapter 19 there is a new section on hernia repairs including up-to-date information on recommended techniques; laparoscopic hernia repair is also discussed. Also in this chapter, the classification, treatment and outcomes of testicular tumours have been entirely rewritten. In the chapter on prostate disorders, current drug treatments and a range of physical treatments for benign diseases have been added and the section on cancer rewritten to update incidence, pathology, screening, radical surgery and drug treatment.

In the chapter on vascular disorders, minimally invasive radiology for obliterative arterial disease and the management of acute ischaemia have been brought up to date. The surgical management of carotid artery disease has been modernised, with discussion of the place of duplex Doppler and current indications for surgical endarterectomy. In Chapter 28, the subject of breast cancer has been entirely restructured to take account of published consensus views regarding diagnosis, management and psychological support. In the skin chapter, malignant melanoma has been extensively revised. The chapter on thyroid and parathyroid disorders has been updated to emphasise the importance of fine needle aspiration cytology in the management of thyroid lumps and the section on thyroid malignancy has been radically revised. In the chapter on paediatric surgery, the entire neonatal section has been replaced with new material. Chapter 33 on the medical management of surgical patients has been extensively rewritten. In Chapter 34 on complications of surgery and trauma, a new section on multiple organ failure and sepsis syndrome has been added.

Teaching surgeons are often unaware of the medical and social aspects of patient care, yet these are often of vital concern to doctors in training and their patients. Furthermore, only a small proportion of 'surgical conditions' such as abdominal pain, urinary tract infections and minor injuries ever reach a surgical specialist. For these reasons, we have tried throughout to present a balanced community perspective of surgery encompassing disease prevention, primary care and allocation of finite resources for overall health care.

We do not pretend that surgery can be taught entirely by a problem-orientated method and at various stages descriptions of individual diseases have to be included in a more conventional manner. Nevertheless, we believe that the benefits of our approach are apparent and any disadvantages largely overcome by extensive cross-references. We hope that readers will continue to enjoy our fresh approach and appreciate the continuing process required to keep pace with rapid change. Above all, it is our ambition to stimulate the reader to a greater enjoyment and understanding of the practice of surgery.

Australia, UK and Malta, 1996

H.G.B.
C.R.G.Q.
D.G.

# Acknowledgements

We are grateful for the considerable and unstinting help we have received from colleagues and friends in preparing this Second Edition. In particular, major contributions were made by Drs Tony Booth, Catherine Hubbard and Adrian Warner, consultant radiologists, Hinchingbrooke Hospital, who have proved worthy successors to Dr Graham Hurst in revising Chapter 2 as well as reviewing all other radiology in the book and providing a number of new X-ray illustrations. Mr Stephen Large, consultant cardiothoracic surgeon at Papworth Hospital, provided most of the excellent material in Chapter 27; Mr Ted Howard, paediatric surgeon at King's College Hospital London, rewrote the section on neonatal surgery in Chapter 32 and Dr Paul Siklos, consultant physician, West Suffolk Hospital, radically revised Chapter 33. Mr Neville Jamieson, lecturer in Surgery and Honorary Consultant Surgeon at Addenbrooke's Hospital, Cambridge performed major revisions on the section on Organ Transplantation in Chapter 3.

Dr Julian Sale provided an extensive critique of the First Edition, which gave us a useful starting point when revising it. In addition, we are extremely grateful to all those colleagues who have reviewed and constructively criticised sections in their own specialist fields. We hope their comments have helped us to present the 'state-of-the-art' in most areas. Many invaluable contributors are based at Hinchingbrooke Hospital, Huntingdon or Addenbrooke's Hospital, Cambridge, England and include Dr Trevor Baglin (blood transfusion), Mr George Cormack (principles of plastic surgery), Dr Dick Dickinson (Chs 8, 9, 10 and 16), Mr Andrew Higgins (Chs 20–25), Mr Richard Miller (Chs 15 and 16), Mr Alistair Smellie (Chs 28 and 33) and Dr Michael Williams, consultant radiotherapist (Chs 4 and 28). Other important contributors were Mr David Leaper of Bristol Southmead Hospital (Ch. 28) and in Australia, Drs Hugh Merrell (microbiology) and Peter Saul (Ch. 37), both of John Hunter Hospital, Newcastle and Dr Michael Ashby of Calvary Hospital, Adelaide (Ch. 4). To all of our colleagues and contributors, we offer our sincere thanks.

All who assisted with the preparation of the First Edition deserve our continuing thanks, and in particular we acknowledge the following: Dr Graham Hurst, formerly consultant radiologist at Hinchingbrooke Hospital, sought out and provided nearly all of the superb radiographs in the book as well as most of the radiological information in Chapter 2. The late Dr Paul Wheater of Cambridge provided and photographed the histopathological specimens. Other clinical illustrations were provided by Mr David Matthews, Mr W.G. Everett, Dr D. Carr-Locke, Mr M. Owen-Smith and Dr Campbell Calder. To them all, we remain greatly indebted.

The photographs of surgical equipment and the reproductions of all radiographs and clinical slides were meticulously and painstakingly prepared by Mr Leonard Beard, former director of the department of medical photography at Hinchingbrooke Hospital. Many other friends and colleagues, junior staff and students willingly contributed time and ideas during the formative stages. As the project neared completion, Dr Jane Hailey, initially as a medical student and later whilst a surgical house officer (intern) to C.R.G.Q., spent countless hours reviewing the whole text in meticulous detail, simplifying the language and turning obscurity into clarity. We owe her a great debt of gratitude.

## PUBLISHERS' NOTE ABOUT THE AUTHORS

The authorship of this book is unusual in that at the time it was first written only one of the authors was a consultant surgeon (C.R.G.Q.), while the other two were junior hospital doctors. We believe this resulted in a radically new and refreshing approach

which has proved deservedly popular with its readers.

**George Burkitt** obtained qualifications in dental surgery and community medicine before studying clinical medicine as a mature student in Cambridge, England. This book was written while he was a senior house officer and represents the book he would like to have had during his training. He has a deep interest in medical education and is co-author of two other best selling student texts by the same publisher. These are *Wheater's Functional Histology* and *Basic Histopathology*, the former written whilst a preclinical medical student in Nottingham, and the latter as a clinical student in Cambridge. He has now returned to Australia where he is a family practitioner in Newcastle, NSW. He has also been a part-time specialist in palliative care for the past 6 years and has a special interest in the emerging subject of men's health.

**Clive Quick** also trained initially as a dental surgeon but is now a consultant general and vascular surgeon at the teaching hospitals associated with the Clinical School of the University of Cambridge. He has a strong interest in computers as tools of communication. As an associate lecturer in the University, he teaches and examines clinical students in surgery. He is also heavily involved in training junior surgeons which is how he came to know his two co-authors. He has also been the organiser of the Cambridge FRCS course and the Cambridge Anastomosis Workshop and is a member of the Court of Examiners of the Royal College of Surgeons of England.

**Dennis Gatt** is now a consultant general, thoracic and vascular surgeon in his home country of Malta, having become associated with his co-authors whilst undergoing postgraduate surgical training in the Cambridge area. He played a vital role in the conception and planning of the first edition of the book.

Thus the authors brought the book together, discussing each point (often heatedly and at length) before agreeing that the topic had been explained as clearly and unambiguously as it could. By this method they ensured that their text was carefully crafted for the final reader and it is a great encouragement to them to have received such praise for their efforts.

The artist, **Philip Deakin**, first trained in physiology and later in medicine and is now a family practitioner in Sheffield, England. He previously made the drawings for the afore-mentioned *Functional Histology*. For this book, he prepared the drawings from preliminary work by two of the authors, C.R.G.Q. and D.G., using his professional knowledge to achieve unusual accuracy whilst retaining an attractive simplicity and clarity of style.

# Contents

SECTION ONE

# BASIC SURGICAL PRINCIPLES

# 1 Pathophysiological processes of surgical importance



## INTRODUCTION

The traditional approach to teaching surgical diagnosis is for the student to attempt to match a patient's symptoms and signs with standard sets of symptoms and signs known to characterise each disease. But while most diagnoses match their classical descriptions at certain stages in their evolution, this may not be so at the particular moment the patient presents for treatment; patients commonly present before recognisable patterns have evolved or else at a late stage, with the typical clinical picture having been missed or ignored on the way.

The diagnostic process can also be confusing if not all the symptoms and signs expected for a particular diagnosis are present or if the symptoms and signs seem inconsistent with the working diagnosis.

This book seeks to develop a more logical and reliable approach to diagnosis than simple pattern recognition by attempting to explain clinical features on the basis of the evolving pathophysiology and local anatomy. This chapter provides a review of the main mechanisms of 'surgical' disease against a background of the basic medical sciences.

**Box 1.1 Principal mechanisms of surgical disease**

- Trauma
- Anatomical abnormalities—congenital or acquired
- Disorders of normal function
- Inflammation—infection, chemical and immunological mechanisms
- Ischaemia and infarction
- Metabolic and hormonal disorders
- Neoplasia—benign and malignant
- Other abnormalities of growth

## PRINCIPAL MECHANISMS OF SURGICAL DISEASE

### 1. TRAUMA

Tissue trauma, literally injury, includes in its wider sense damage inflicted by any physical means, i.e. mechanical, thermal, chemical, electrical mechanisms or ionising radiation. Common usage, however, tends to imply mechanical injury, either blunt or penetrating, as caused by accidents in industry or in the home, road traffic accidents, fights, firearms and other missile injuries. Damage varies according to the nature of the

causative agent, and the visible surface injuries may give little indication of the extent of deep tissue damage as for example in head injuries or bullet wounds.

## 2. ANATOMICAL ABNORMALITIES

Anatomical abnormalities can be developmental in origin i.e. **congenital**, or else **acquired** as a result of trauma or some other disease process.

**Congenital abnormalities** of surgical interest range from potentially fatal conditions such as urethral valves or various gut atresias to minor cosmetic deformities. Developmental abnormalities may become manifest at any time between fetal life and old age, although the majority are present at birth or appear in early childhood. For example, gut atresias often present with grossly excessive amniotic fluid (**polyhydramnios**) during pregnancy, whereas urethral valves present in the neonatal period with obstructive renal failure. A patent processus vaginalis may result in an inguinal hernia at any stage from birth to early adulthood, whilst renal abnormalities such as polycystic kidney may present in middle life as an abdominal mass or with renal failure or haematuria.

Whilst many congenital abnormalities give rise to disease by direct **anatomical effects**, other abnormalities produce disease by more subtle **disruption of function**, with the underlying disorder only revealed on appropriate investigation. For example, ureteric abnormalities which allow urinary reflux from the bladder predispose to recurrent kidney infections.

**Acquired anatomical abnormalities** result from direct or indirect **damage** inflicted by trauma or disease, from the body's **response** to these or as an effect or side effect of **treatment**. For example, obstruction of the bladder outlet may result from benign prostatic hypertrophy, from the fibrotic response to gonococcal urethritis or from damage inflicted during urethral instrumentation.

## 3. DISORDERS OF FUNCTION

A variety of common disorders owe their origin to abnormalities of function. The gastrointestinal tract is particularly susceptible; for example, large bowel malfunction leads to constipation, irritable bowel syndrome and diverticular disease. The modern low-fibre diet is undoubtedly an important cause of these disorders, the colon having evolved on a diet high in fibre.

## 4. INFLAMMATION

Many surgical disorders result from inflammatory processes, most often resulting from infection. Surgical admissions for infection have markedly decreased since the advent of antibiotics but unfortunately, infection remains a common complication of operative surgery. Inflammation may also result from physical irritation, particularly by noxious chemical agents, e.g. gastric acid/pepsin in peptic ulcer disease or pancreatic enzymes in acute pancreatitis. Immunological mechanisms play a part in the inflammatory bowel disorders of ulcerative colitis and Crohn's disease but whether they constitute cause or effect is not yet known.

## 5. ISCHAEMIA AND INFARCTION

**Obliterative atherosclerosis** is a cause of enormous morbidity and mortality, particularly in later life. When the disease restricts blood flow in large distributing arteries to the point of causing chronic or severe ischaemia, it is often possible to improve flow by surgical or radiological procedures (e.g. aorto-femoral bypass grafting or angioplasty); when atherosclerosis is severe and generalised, however, reconstructive surgery may not be possible and amputation of an ischaemic limb may be the only alternative.

**Arterial embolism** is a cause of acute ischaemia of limbs, intestine or brain. These emboli usually originate in the heart. Surgical embolectomy can often restore flow in the femoral arteries and occasionally in the superior mesenteric artery by retrieving the occluding material. This is not possible in the brain but surgery to the carotid disease may prevent further embolic episodes. Atherosclerosis of the carotid bifurcation and other extracranial arteries causes disease in two ways: first, by vascular narrowing or occlusion **restricting the blood supply** and, second, by accumulation of platelet thrombi on atherosclerotic ulcers which then **embolise** into the brain causing strokes or transient ischaemic attacks. Either type of disease may require surgical reconstruction.

When a portion of bowel becomes strangulated, the initial mechanism of tissue damage is venous obstruction and this fairly rapidly progresses to arterial ischaemia and infarction. Chronic **venous insufficiency** in the lower limb is responsible for the majority of chronic leg ulcers. The elevated hydrostatic venous pressure interferes with nutrition and gas exchange in the superficial tissues of the leg leading to tissue breakdown and retarded healing.

### 6. METABOLIC DISORDERS

The lower limb complications of diabetes, particularly neuropathy and infection lead to the **diabetic foot** which represents an important surgical problem. In addition, diabetes predisposes to atherosclerosis. Diabetes also poses special management problems in a patient undergoing surgery.

Hypersecretion of certain hormones, as in thyrotoxicosis and hyperparathyroidism, may require surgical reduction of glandular tissue. Other metabolic disorders may cause stones in the gall bladder (e.g. haemolytic diseases causing pigment stones) or in the urinary tract (e.g. hypercalciuria and hyperuricaemia causing calcium and uric acid stones respectively).

### 7. NEOPLASIA

**Malignant tumours** are responsible for a large part of the general surgical workload. Many surgical referrals are initiated by a fear or suspicion of cancer and many investigations and some operations are performed in the hope of refuting the diagnosis. Some malignant neoplasms can be cured by operative surgery but all too often the appearance of distant metastases or recurrent disease dashes the hope of a cure. In incurable cases, worthwhile surgical palliation may improve the quality of life or even extend life expectancy.

Certain **benign tumours** such as lipomas are very common and require surgery mainly for cosmetic or mechanical reasons. Less commonly, benign tumours are removed because of obstruction of a hollow viscus or because of surface bleeding. Benign endocrine tumours may have to be removed because of excess hormone secretion, e.g. an insulinoma causing hypoglycaemia or a parathyroid adenoma causing hypercalcaemia. Finally, benign tumours may be clinically indistinguishable from malignant tumours and are removed to obtain a histological diagnosis.

### 8. OTHER ABNORMALITIES OF TISSUE GROWTH

In surgery, the term **cyst** is imprecisely used to describe a mass which appears to contain fluid because of its characteristic fluctuance and transilluminability. In true pathological terms, cysts are epithelium-lined cavities; most represent ducts dilated by retained secretion usually due to obstruction. In some cases there is epithelial hyperplasia, excessive secretion and structural distortion as, for example, in breast cysts. Some cysts arise from ectopic epithelial remnants or as a result of necrosis in the centre of an epithelial mass. Cysts commonly require surgical removal (or drainage) for aesthetic reasons or to exclude malignancy, e.g. epidermal cysts, epididymal cysts, breast cysts.

Other growth disturbances such as **hyperplasia** and **hypertrophy** give rise to surgical problems, in particular benign prostatic hyperplasia, fibroadenosis of the breast and thyroid goitres.

#### 'The surgical sieve'

The foregoing mechanisms of surgical disease may provide a useful 'first principles' framework or aide memoire upon which to construct a differential diagnosis. This is particularly useful when the symptoms and signs do not immediately point to a diagnosis. This approach is often referred to as the 'surgical sieve'. However, it should not become a substitute for logical thought based on the clinical findings.

## ACUTE INFLAMMATION

**Acute inflammation** is the principal mechanism by which living tissues respond to injury. The purpose of the inflammatory response is to neutralise the injurious agent, to remove damaged or necrotic tissue and to restore the tissue to useful function. The central feature of acute inflammation is the formation of an inflammatory exudate. This has three principal components: **serum,**