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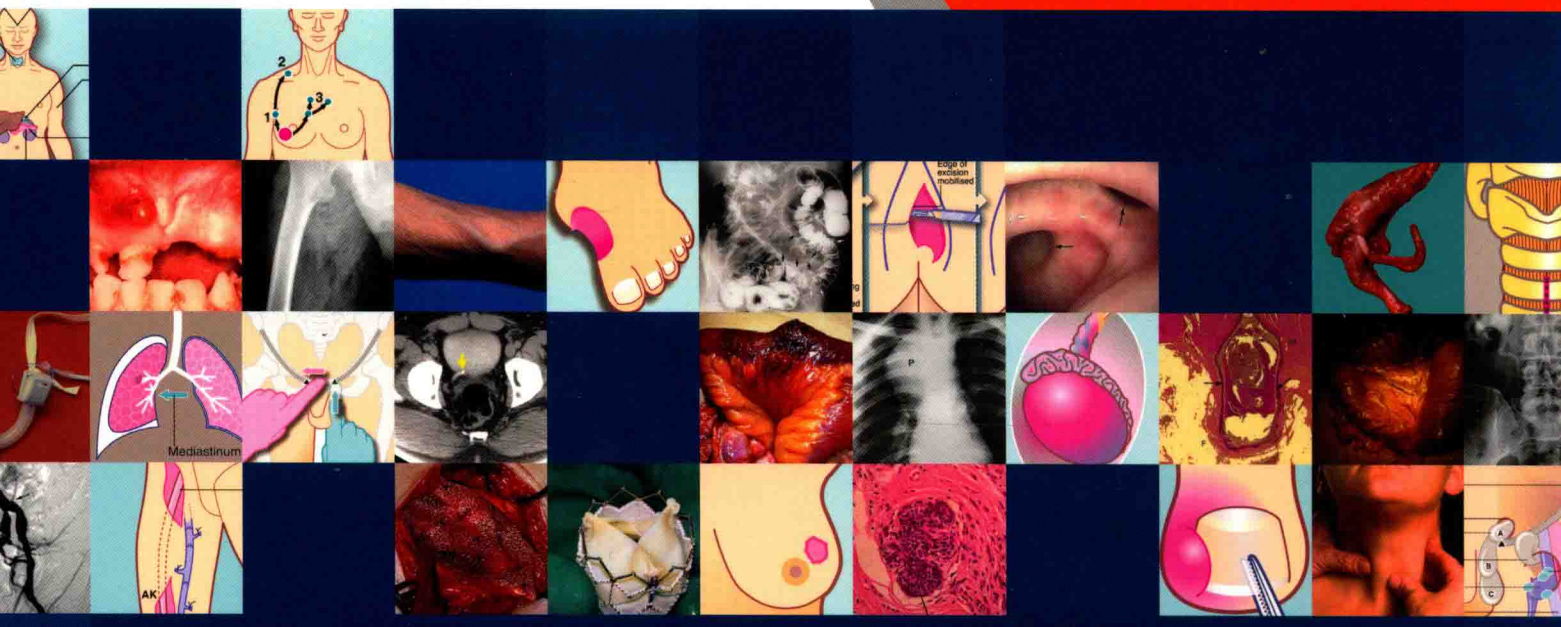

Essential Surgery

FIFTH EDITION

PROBLEMS, DIAGNOSIS AND MANAGEMENT

CLIVE R. G. QUICK
JOANNA B. REED
SIMON J. F. HARPER
KOUROSH SAEB-PARSY

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FOREWORD BY
ANDREW T. RAFTERY

CHURCHILL
LIVINGSTONE
ELSEVIER

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Essential Surgery

FIFTH EDITION

PROBLEMS, DIAGNOSIS AND MANAGEMENT

Publisher's note about the authors

Clive Quick trained as a dental surgeon before changing track to become a general and vascular surgeon in Cambridge. He taught and examined clinical students in surgery as an associate lecturer at Cambridge University, and is now involved in training junior surgeons in advanced anastomosis skills at workshops, and in teaching surgical techniques and emergency surgery in Africa. He has been a member of the Court of Examiners of the Royal College of Surgeons of England for the old FRCS and now for the MRCS.

Joanna Reed is a consultant general and upper gastrointestinal surgeon in Colchester. She has a strong commitment to surgical training and teaches widely on practical laparoscopic courses at the Royal College of Surgeons of England, Addenbrooke's Hospital and elsewhere. She strongly believes a broad training in surgery is essential for any practising surgeon.

Simon Harper is a consultant hepatopancreatobiliary and transplant surgeon at Addenbrooke's Hospital. Whilst a Clinical Lecturer at Cambridge University, he had extensive experience in teaching, surgical training and examining at undergraduate and postgraduate levels. Having recently completed his own higher training, he has a keen insight into and knowledge of the vast changes in surgical teaching he has observed over recent years and understands the challenges and opportunities facing today's junior surgeons.

Kourosh Saeb-Parsy is a University Lecturer and consultant transplant surgeon at Cambridge University Hospitals NHS Trust. As a Fellow and Director of Studies in Clinical Medicine at Fitzwilliam College, University of Cambridge, he has been deeply involved in the teaching of preclinical and clinical medical students for many years. He is passionate about the provision of effective and consistent post-graduate surgical training and considers that being a good trainer is a pre-requisite for exemplary surgical practice.

Our artist, **Philip Deakin**, first trained in physiology and later in medicine and is currently a family practitioner in Sheffield. He continues to prepare the drawings for each edition of this book, employing his medical knowledge and artistic skill to achieve accuracy and immediacy whilst demonstrating an attractive economy and clarity of style.

We would like to acknowledge the debt we owe to founding author **George Burkitt**. George was one of the original creators of this book along with Clive Quick, Dennis Gatt and Phil Deakin. He obtained qualifications in dentistry and community medicine before studying clinical medicine as a mature student in Cambridge. He was a co-author of the first three editions of *Wheater's Functional Histology* and *Basic Histopathology*. George returned to his native Australia where he has been involved in family practice, palliative care and men's health.

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Foreword

It is a pleasure and a privilege to be asked to write the foreword to the Fifth Edition of *Essential Surgery*. The fact that there is a Fifth Edition attests to the popularity of this excellent textbook of surgery. It is over 20 years since the First Edition appeared and the book has maintained its impact in subsequent editions. It is hardly surprising that the Fourth Edition won first prize in the British Medical Association Surgical Book Awards in 2008. When the First Edition appeared in 1990 it was particularly impressive, in that at the time, only the senior author (Clive Quick) was a consultant surgeon while two other authors were junior hospital doctors. Dennis Gatt retired from the Third Edition and now George Burkitt, another founding author, has retired from the Fifth Edition. Clive Quick remains as managing author, bringing with him years of experience as an outstanding clinical teacher and examiner who for many years was a colleague of mine on the Court of Examiners of the Royal College of Surgeons of England. Joanna Reed, a Consultant Surgeon with a particular expertise in minimally invasive surgery also remains from the Fourth Edition and has been joined by two new authors, Simon Harper and Kourosh Saeb-Parsy, both newly appointed consultant surgeons who bring with them a more recent perspective on surgical training and education. The line-up is completed by Phil Deakin, a family practitioner and one of the founding authors, who combines his medical knowledge with considerable artistic skills to produce outstanding diagrams which are easy to interpret and understand, providing one of the great strengths of the book.

Although written primarily for medical students, who will appreciate its clarity and style, the authors have ensured that there is more than enough in the present edition for the basic surgical trainee (to whom I would strongly recommend this book in preparing for the MRCS examination) and indeed some of the chapters will also provide excellent revision material for the higher surgical trainee sitting the UK Intercollegiate FRCS examination in general surgery. *Essential Surgery* is written in a different way from other standard surgical textbooks, describing sound principles of surgery on which to expand one's learning and presenting material in a problem-orientated style. In the Fifth Edition, much of the text has been updated and sections added on ethics, audit and research, orthopaedic surgery, the use on monoclonal antibodies in surgical oncology and damage control surgery in trauma management. The clinical photographs and images throughout the book are of extremely high quality and well labelled to aid interpretation. In Chapter 1 Harold Ellis reminds us of our surgical heritage, commenting on the introduction of the application of basic sciences to surgery in centuries past. This is a ready reminder of their importance today, demonstrated throughout this book in places where the pathophysiological basis of disease is presented in a way that bridges the gap between basic medical science and clinical surgery.

The authors are to be congratulated on the production of this Fifth Edition. This book continues to go from strength to strength and I believe that the reader will enjoy the style of presentation and find it easy to read and to assimilate knowledge. This book has much in it for both undergraduate and postgraduate alike. I wish it the success that it deserves.

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2014

Preface

When we first set about writing this book, we felt we had something worthwhile to say about how surgery worked. If readers could acquire this knowledge and implement it, we believed surgical practice would improve, as would outcomes for patients. We wrote the book in an entirely different way from most medical books, determined to avoid propagating myths and giving inadequate explanations. To achieve this, the authors discussed each topic in depth before writing an agreed version. Many original ideas came in the form of diagrams from Dennis Gatt. We have continued this method for each new edition, and now have the advantage of rapid internet access to check facts and investigate trends. We believe our approach has helped us understand the subjects better and put them across with exceptional clarity.

The original authorship was unusual in that only Clive Quick was a consultant surgeon: George Burkitt was a junior doctor-cum-medical author; Dennis Gatt was a junior surgical trainee (later consultant surgeon); whilst Phil Deakin was a family practitioner. This mix enabled us to address surgical problems from the viewpoint of the student and junior doctor and to this end, trainee doctors have assisted in every edition (Emma McGrath, on the Fourth Edition; Olivia Will and Antonia Wells on both the Fourth and Fifth editions; and Kasra Saeb Parsy on this Fifth edition).

For this edition, Clive Quick has continued in his role as managing author. Joanna Reed is once again an author, giving the fresh perspective of the younger consultant, and one with a particular interest in minimally invasive surgery. Two other authors have joined the author team for this edition, both from Addenbrooke's Hospital: Kourosh Saeb Parsy brings a broad experience of teaching and training and Simon Harper has a personal perspective on surgical training, having recently completed his higher surgical training.

Our overall concept has always been to produce an authored rather than an edited book, so as to retain control over content, to give uniformity of style and apply our own high standard of elucidation so readers could grasp the main ideas easily and effortlessly in one reading. Nevertheless, an enormous amount of help has been generously given over the years by colleagues in specialist areas. Their invaluable contributions have been integrated and edited to emphasise lucidity and fluency (see detail in the Acknowledgements section).

Finally, when complete, the whole text is re-read several times by the authors and given a concluding 'polish'. Writing in this manner is time consuming but if the text proves enjoyable to read and draws the reader in as we intend, we feel it will have been worthwhile.

The book covers general surgery, trauma, orthopaedics, cardiothoracic surgery and urology in detail, with sufficient basic science for modern clinical courses, and we have endeavoured to present sometimes complex ideas in ways accessible to anyone with a moderate understanding of human biology, and yet still prove valuable to readers at more advanced levels.

Changes for this edition

The continuing enthusiasm of students and teachers for this book has highlighted the need for this updated edition which was written for clinical medical students seeking a comprehensive understanding of surgical principles and practice as well as for junior surgical trainees (particularly those preparing for MRCS examinations). We have tried to build on the quality and content of the original without increasing its length. The content of each chapter has been carefully revised, often with input from colleagues with some sections relocated to facilitate navigation. At the same time, we have used the opportunity to match the book's content with the UK Intercollegiate MRCS examination curriculum, rendering the book appropriate for junior surgical trainees. Other major changes represent the evolution and refinement of surgery and our approach to it over the five or so years since the previous edition.

All of the text has been brought up to date, adding new concepts where medical understanding has advanced, for example monoclonal antibodies in surgical oncology and damage control surgery in trauma management. Covering the MRCS curriculum has required adding several new sections including surgical ethics, audit and research, and orthopaedic surgery. New consensus guidelines for managing common disorders have been incorporated where appropriate. We believe that *Essential Surgery* will continue to have the greatest appeal for readers who want to understand surgery rather than merely pass examinations.

Previous editions have demonstrated a broad appeal beyond medical students and junior surgeons, from surgical

nurses and trainees in professions allied to medicine, to dentists. In addition, the book was designed to be a continuing reference text for doctors in other specialties, including family practice. We have employed a problem-solving approach to diagnosis and treatment where practicable, believing that understanding how diagnoses are made and why particular treatments are used is more memorable than rote learning. With this in mind, we have tried to view the practical management of patients through the eyes of the trainee or student. In particular, the pathophysiological basis of surgical diseases and management is presented to bridge the gap between basic medical sciences and clinical problems.

Throughout the book we have used original illustrative material to emphasise important concepts, avoid unnecessary text and assist revision for exams. This includes photographs of clinical cases, operations and pathological specimens, radiographs, anatomical and operative diagrams, and tables and box summaries of the text. We believe the illustrations are one of the particular strengths of the book, and have all been reviewed and updated or replaced as necessary. The clinical material is largely drawn from our day-to-day practice and we have generally chosen typical rather than gross examples so the reader can see how patients present most commonly. We have tried to teach in a problem-oriented way where possible, but we believe descriptions of individual diseases are also required and these have been covered in a more conventional manner.

Operative surgery

We make no apology for including outlines of common surgical operations. This is to enable students and trainee surgeons to explain operations to patients, to participate intelligently in the operating department, to understand and thereby prevent complications, as well as to help them perform certain operations themselves.

We hope our readers will continue to enjoy the book and will appreciate the continuing efforts we have made to keep pace with change. Above all, it remains our ambition to stimulate the reader to a greater enjoyment and understanding of the practice of surgery.

C. R. G. Q.
J. B. R.
K. S. P.
S. J. F. H.

Acknowledgements

As in all previous editions, the authors are deeply indebted to contributing authors for helping us keep the book up-to-date and accurate. Some have contributed a large amount of material and others in lesser ways, but without them all, the book would not be what it is.

A continuing debt of gratitude is owed to all who have contributed to each of the editions of *Essential Surgery*, including of course, any whose names are not mentioned here. A substantial part of the book's success is due to them.

In previous editions: we gratefully acknowledge the huge contributions made by Dennis Gatt, now a surgeon in Malta, the late Leonard Beard, medical photographer, Dr Graham Hurst, radiologist, Michael Williams, oncologist and the late Andrew Higgins, urologist. We also owe a tremendous debt to Jane Hailey, then a junior trainee and now a paediatrician in Canada, who helped turn our first edition prose into accessible and fluent text. We owe grateful thanks for contributions from Prof Ted Howard, Stephen Large, Grant Williams, Mark Farrington, Richard Miller, John Benson, Neville Jamieson, Jeffrey Brain, Madan Samuel, Nimish Shah, Sue Clark, Paul Perkins, Adrian Harris, Dr Anita Gibbons, Dr Suzanna Lishman, Dr Helen Smith, David Adlam, Nick Skelton, Paul Hayes, Roger Gray and Elizabeth Ambler.

For this edition we are once again grateful for the substantial and unstinting help we have received from colleagues and friends. Most are based at Hinchingbrooke Hospital, Huntingdon or Addenbrooke's Hospital Cambridge.

We would particularly like to thank Prof Harold Ellis for his contribution 'A brief history of surgery', Mr William Hage for his contribution on 'Elective orthopaedics' and Ms Melanie Sharp and Mr Robert Macfarlane for their contribution on 'Elective neurosurgery' and head injuries.

We would also like to thank the following colleagues and friends for their help with reviewing chapters for the Fifth Edition:

Dr Donald Bermingham, consultant psychiatrist (Breaking bad news in Surgery);

Dr Hemantha Alawattegama, consultant anaesthetist, Addenbrooke's Hospital (Managing physiological change in the surgical patient; Shock and resuscitation);

Dr Andreas Karas, consultant microbiologist, Addenbrooke's Hospital (Immunity, inflammation and infection);

Dr Tony Booth, consultant radiologist, Hinchingbrooke Hospital (Imaging and interventional techniques in surgery);

Dr Catherine Hubbard, consultant radiologist, Hinchingbrooke Hospital (Imaging and interventional techniques in surgery);

Dr Claire Cousins, consultant radiologist, Addenbrooke's Hospital (Imaging and interventional techniques in vascular surgery);

Dr Paul Siklos, consultant physician, West Suffolk Hospital (Medical problems in Surgical Patients);

Dr Katy Hoggarth, consultant haematologist, Hinchingbrooke Hospital (Blood transfusion);

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Dr Antonia Wells, specialist registrar in surgery Addenbrookes Hospital (Major trauma);

Mr Aman Coonar, consultant thoracic surgeon, Papworth Hospital (Thoracic surgery);

Prof Peter Brennan, consultant Oral and Maxillofacial Surgeon at Portsmouth Hospitals NHS Trust and Chair of RCS Eng Court of Examiners (Head and maxillofacial injuries; Lumps in the head and neck and salivary calculi; Disorders of the mouth);

Mr George Lamberty, consultant plastic and reconstructive surgeon, Addenbrooke's Hospital (Soft tissue injuries and burns);

Dr Adrian Bomford, reader in hepatology, King's College Hospital (Tumours of the pancreas and hepatobiliary system);

Dr Olivia Will, specialist registrar, Addenbrooke's Hospital (Colorectal carcinoma; Chronic inflammatory disorders of the bowel; Anal and perianal disorders);

Mr Paul Toomey, consultant colorectal surgeon, Epsom and St Helier University Hospitals NHS Trust (Colorectal carcinoma; Anal and perianal disorders);

Mr Kasra Saeb-Parsy, Specialty Registrar in Urology, Addenbrooke's Hospital (Disorders of the male genitalia; Symptoms, signs and investigation of urinary tract disorders; Disorders of the prostate; Tumours of the kidney and urinary tract; Stone disease of the urinary tract; Urinary tract infections; Congenital disorders and diseases secondarily involving the urinary tract)

Mr Patrick Coughlin, consultant vascular surgeon, Addenbrooke's Hospital (Pathophysiology, clinical features and diagnosis of vascular disease affecting the limbs; Managing lower limb arterial insufficiency, the diabetic foot and major amputations; Aneurysms and

other peripheral arterial disorders; Venous disorders of the lower limb);
Mr Stephen Tsui, consultant cardiac surgeon, Papworth Hospital (Cardiac surgery);
Ms Liz Ball, consultant breast surgeon, West Suffolk Hospital, Bury St Edmunds (Disorders of the breast);
Dr Cedric Banfield, consultant dermatologist, Peterborough Hospitals (Disorders of the skin);
Mr Daniel Carroll, consultant paediatric surgeon, Addenbrooke's Hospital (Acute surgical problems in children; Non-acute abdominal and urological problems in children)

Special thanks also to Dr Tony Booth and Dr Catherine Hubbard, consultant radiologists, Hinchingbrooke Hospital for the images they have contributed to the book.

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Mechanisms of surgical disease and surgery in practice

1

A SHORT HISTORY OF SURGERY

Prof. Harold Ellis CBE MCh FRCS

There is no doubt that the first surgeons were the men and women who bound up the lacerations, contusions, fractures, impalements and eviscerations to which man has been subject since appearing on Earth. Since man is the most vicious of all creatures, many of these injuries were inflicted by man upon man. Indeed, the battlefield has always been a training ground for surgery. Right up to the 15th century, surgeons dealing with trauma were surprisingly efficient. They knew their limitations—they could splint fractures, reduce dislocations and bind up lacerations, but were only too aware that open wounds of the skull, chest and abdomen were lethal and were best left alone, as were wounds involving major blood vessels or spinal injuries with paralysis. They observed that wounds would usually discharge yellow pus for a time; indeed this was regarded as a good prognostic sign and was labelled 'laudable pus'.

The 15th century heralded a new and dreaded pathology—the gunshot wound. These injuries would stink, swell and bubble with gas. There was profound systemic toxicity and a high mortality. Of course, we now know that this was the result of clostridial infection of wounds with extensive anaerobic tissue damage caused by shot and shell. The surgeons of those times were shrewd clinical observers but surmised that these malign effects were due to gunpowder acting as a poison, for it was not until centuries later that the bacterial basis of wound infection became evident. At that period the remedy was to destroy the poison with boiling oil or cautery. Boiling oil was the more popular since it was advocated by the Italian surgeon Giovanni da Vigo (1460–1525), the author of the standard text of the day, *Practica In Arte Chirurgica Compendiosa*. These treatments not only produced intense pain but also made matters worse by increasing tissue necrosis.

The first scientific departure from this barbaric treatment was by the great French military surgeon Ambroise Paré (1510–1590) who, while still a young man, revolutionised the treatment of wounds by using only simple dressings, abandoning cautery and introducing ligatures to control haemorrhage. He established that his results were much better than could be achieved by the old methods.

Ignorance of the basic sciences behind the practice of surgery was slowly overcome. The publications of *The Fabric of the Human Body* in 1543 by Andreas Vesalius (1514–1564) and of *The Motion of the Heart* by William Harvey (1578–1657) in 1628 were two notable landmarks.

Surgical progress, however, was still limited by two major obstacles. First, the agony of the knife: patients would only undergo an operation to relieve intolerable suffering (for example from a gangrenous limb, a bladder stone or a strangulated rupture) and, of course, the surgeon needed to operate at lightning speed. Second, there was the inevitability of suppuration, with its prolonged disability and high mortality, often as high as 50% after amputation. Amazingly, both these barriers were overcome in the same couple of decades.

In 1846, William Morton (1819–1868), a dentist working in Boston, Massachusetts, introduced ether as a general anaesthetic. This was followed a year later by chloroform, employed by James Young Simpson (1811–1870) in Edinburgh, mainly in midwifery. These agents were taken up with immense enthusiasm across the world in a matter of weeks.

The work of the French chemist Louis Pasteur (1822–1895) demonstrated the link between wound suppuration and microbes. This led Joseph Lister (1827–1912), then a young professor of surgery in Edinburgh, to perform the first operation under sterile conditions in 1865. This was treatment of a compound tibial fracture in which crude carbolic acid was used as an antiseptic. The development of antiseptic surgery and, later, modern aseptic surgery progressed from there.

So at last, in the 1870s, the scene was set for the coming enormous advances in every branch of surgery whose breadth and successes form the basis of this book.

APPROACHES TO SURGICAL PROBLEMS

WHAT DO SURGEONS DO?

Surgeons are perceived as doctors who do operations, i.e. cutting tissue to treat disease, usually under anaesthesia, but this is only a small part of surgical practice. The range individual surgeons undertake varies with the culture, the resources available, the nature and breadth of their specialisation, which other specialists are available, and local needs. The principles of operative surgery—access, dissection, haemostasis, repair, reconstruction, preservation of vital structures and closure—are similar in all specialties.

A **general surgeon** is one who undertakes general surgical emergency work and elective abdominal gastrointestinal (GI) surgery. In geographically isolated areas, such a surgeon might also undertake gynaecology, obstetrics, urology, paediatric surgery, orthopaedic and trauma surgery and perhaps basic ear, nose and throat (ENT), and ophthalmology. Conversely, in developed countries, there is a trend towards greater specialisation. GI surgery, for example, is often divided into 'upper' and 'lower' and upper GI surgery may further subdivide into hepatobiliary, laparoscopic, pancreatic and gastro-oesophageal cancer surgery.

Surgeons are not simply 'cutting and sewing' doctors. The drama of surgery may seem attractive but good surgery is rarely dramatic. Only when things go wrong does the drama increase, and this is uncomfortable. Surgery is an art or craft as well as a science, and judgement, coping under pressure, taking decisive action, teaching and training and managing people skilfully are essential qualities. Operating can be learnt by most people, but the skills involved in deciding when it is in the patient's best interests to operate are essential and must be actively learnt and practised.

Surgeons play an important role in diagnosis, using clinical method and selecting appropriate investigations. Many undertake diagnostic and therapeutic endoscopy including gastroscopy, colonoscopy, urological endoscopy, thoracoscopy and arthroscopy. Indications for laparoscopic surgery, supported by good quality clinical trials, continue to broaden as equipment and skills become more sophisticated.

What sort of patients come to surgeons?

Different types of surgeon practise in very different ways. In the UK, most patients are referred by another doctor, e.g. GP, accident and emergency (ER) officer or physician. The exceptions include trauma patients who self-refer or arrive by ambulance. In some countries, patients can self-refer to the specialist they consider most appropriate. Regardless of the route, surgical patients fall into the following categories:

- **Emergency/acute**, i.e. symptoms lasting minutes to hours or up to a day or two—often obviously surgical conditions such as traumatic wounds, fractures, abscesses, acute abdominal pain or gastrointestinal bleeding
- **Intermediate urgency**—usually referrals from other doctors based on suspicious symptoms and signs and sometimes investigations, e.g. suspected colonic cancer, gallstones, renal or ureteric stones
- **Chronic conditions** likely to need surgery, e.g. varicose veins, hernias, arthritic joints, cardiac ischaemia or rectal prolapse

The diagnostic process

To manage surgical patients optimally, a **working diagnosis** needs to be formulated to guide whether investigations are necessary and their type and urgency, and to determine what intervention is necessary. The process depends upon whether immediate life-saving intervention is required or, if not, the perceived urgency of the case. For example, a patient bleeding from a stab wound might need pressure applied to the wound immediately whilst resuscitation and detailed assessment are carried out. At the other end of the scale, if symptoms suggest rectal carcinoma, a systematic approach is needed to obtain visual and histological confirmation of the diagnosis by colonoscopy and radiological imaging. **Tumour staging** (see Ch. 13, p. 178) aims to determine the extent of cancer spread to direct how radical treatment needs to be. Treatment may be **curative** (surgery, chemotherapy, radiotherapy) or **palliative** if clearly beyond cure (stenting to prevent obstruction, local tumour destruction using laser, palliative radiotherapy).

Formulating a diagnosis

The traditional approach to surgical diagnosis is to attempt to correlate a patient's symptoms and signs with recognised sets of clinical features known to characterise each disease. While most diagnoses match their 'classical' descriptions at certain stages, this may not be so when the patient presents. Patients often present before a recognisable pattern has evolved or at an advanced stage when the typical clinical picture has become obscured. Diagnosis can be confusing if all the clinical features for a particular diagnosis are not present, or if some seem inconsistent with the working diagnosis.

This book seeks to develop a more logical and reliable approach to diagnostic method than pattern recognition, by attempting to explain how the evolving pathophysiology of the disease and its effect on the anatomy bring about the clinical features. The overall aim is to target investigations and management that give the best chance of cure or symptom relief with the least harm to the patient.

PRINCIPAL MECHANISMS OF SURGICAL DISEASE

Surgical patients present with disorders resulting from inherited abnormalities, environmental factors or combinations in varying proportions. These are summarised in Box 1.1, as a useful 'first principles' framework or *aide-mémoire* upon which to construct a differential diagnosis. This is useful when clinical features do not immediately point to a diagnosis. This approach is known as the 'surgical sieve'; however, it is not a substitute for logical thought based on the clinical findings.

Box 1.1 The surgical sieve

When considering the causes of a particular condition, it may be helpful to run through the range of causes listed here. This should only be a first step and not a substitute for thought. This approach gives no indication of the likely severity, frequency or importance of the cause.

Congenital

- Genetic
- Environmental influences in utero

Acquired

- Trauma—accidents in the home, at work or during leisure activities, personal violence, road traffic collisions
- Inflammation—physical or immunological mechanisms
- Infection—viral, bacterial, fungal, protozoal, parasitic
- Neoplasia—benign, premalignant or malignant
- Vascular—ischaemia, infarction, reperfusion syndrome, aneurysms, venous insufficiency
- Degenerative—osteoporosis, glaucoma, osteoarthritis, rectal prolapse
- Metabolic disorders—gallstones, urinary tract stones
- Endocrine disorders and therapy—thyroid function abnormalities, Cushing's syndrome, phaeochromocytoma
- Other abnormalities of tissue growth—hyperplasia, hypertrophy and cyst formation
- Iatrogenic disorders—damage or injury resulting from the action of a doctor or other health care worker; may be misadventure, negligence or, more commonly, system failure
- Drugs, toxins, diet, exercise and environment
  - Prescription drugs—toxic effects of powerful drugs, maladministration, idiosyncratic reactions, drug interactions
  - Smoking—atherosclerosis, cancers, peptic ulcer
  - Alcohol abuse—personal violence, traffic collisions
  - Substance abuse—accidents, injection site problems
  - 'Western diet'—obesity, atherosclerosis, cancers
  - Lack of exercise—obesity, osteoporosis, aches and pains
  - Venomous snakes, spiders, scorpions and other creatures—local and systemic toxicity
  - Atmospheric pollution—pulmonary problems
- Psychogenic—Munchausen syndrome leading to repeated operations, problems of indigent living, ingestion of foreign bodies, self-harm
- Disorders of function—diverticular disease, some swallowing disorders

CONGENITAL CONDITIONS

The term **congenital** defines a condition present at birth, as a result of genetic changes and/or environmental influences in utero such as ischaemia, incomplete development or maternal ingestion of drugs such as thalidomide. Congenital abnormalities of surgical interest range from minor cosmetic deformities such as skin tags through to potentially fatal conditions such as congenital heart defects, urethral valves and gut atresias.

Congenital abnormalities become manifest any time between conception and old age, although most are evident at birth or in early childhood. Some are diagnosed *antenatally*, for example, fetal gut atresias with grossly excessive amniotic fluid (polyhydramnios). There are expanding specialist areas involving *intrauterine* or fetal surgery, for example, for urinary tract obstruction. During *infancy*, conditions such as congenital hypertrophic pyloric stenosis come to light. In *childhood*, incompletely descended testis may become evident. Finally, some disorders may present at *any stage*. For example, a patent processus vaginalis may predispose to an inguinal hernia even into late middle age.

Whilst many congenital abnormalities give rise to disease by direct **anatomical effects**, others cause disease by **disrupting function**, with the underlying disorder revealed only on investigation. For example, ureteric abnormalities allowing urinary reflux predispose to recurrent kidney infections.

ACQUIRED CONDITIONS

Acquired surgical disorders result from trauma or disease or from the body's response to them, or else present as an effect or side-effect of treatment. For example, bladder outlet obstruction may result from prostatic hypertrophy, from fibrosis after gonococcal urethritis or from damage inflicted during urethral instrumentation. The classification detailed here is a framework, but conditions may fit more than one heading, and the mechanism behind some disorders is still poorly understood.

Trauma

Tissue trauma, literally injury, includes damage inflicted by any physical means, i.e. mechanical, thermal, chemical or electrical mechanisms or ionising radiation. Common usage tends to imply blunt or penetrating mechanical injury, caused by accidents in industry or in the home, road traffic collisions, fights, firearm and missile injuries or natural disasters such as floods and earthquakes. Damage varies with the causative agent, and the visible injuries may not indicate the extent of deep tissue damage.

Inflammation

Many surgical disorders result from inflammatory processes, most often stemming from infection. However, inflammation also results from physical irritation, particularly by chemical agents, e.g. gastric acid/pepsin in peptic ulcer disease or pancreatic enzymes in acute pancreatitis.

Inflammation may also result from immunological processes such as in ulcerative colitis and Crohn's disease. Autoimmunity, where an immune response is directed at the body's constituents, is recognised in a growing number of surgical diseases such as Hashimoto's thyroiditis and rheumatoid disease.

Infection

Primary infections presenting to surgeons include abscesses and cellulitis, primary joint infections and tonsillitis. Typhoid