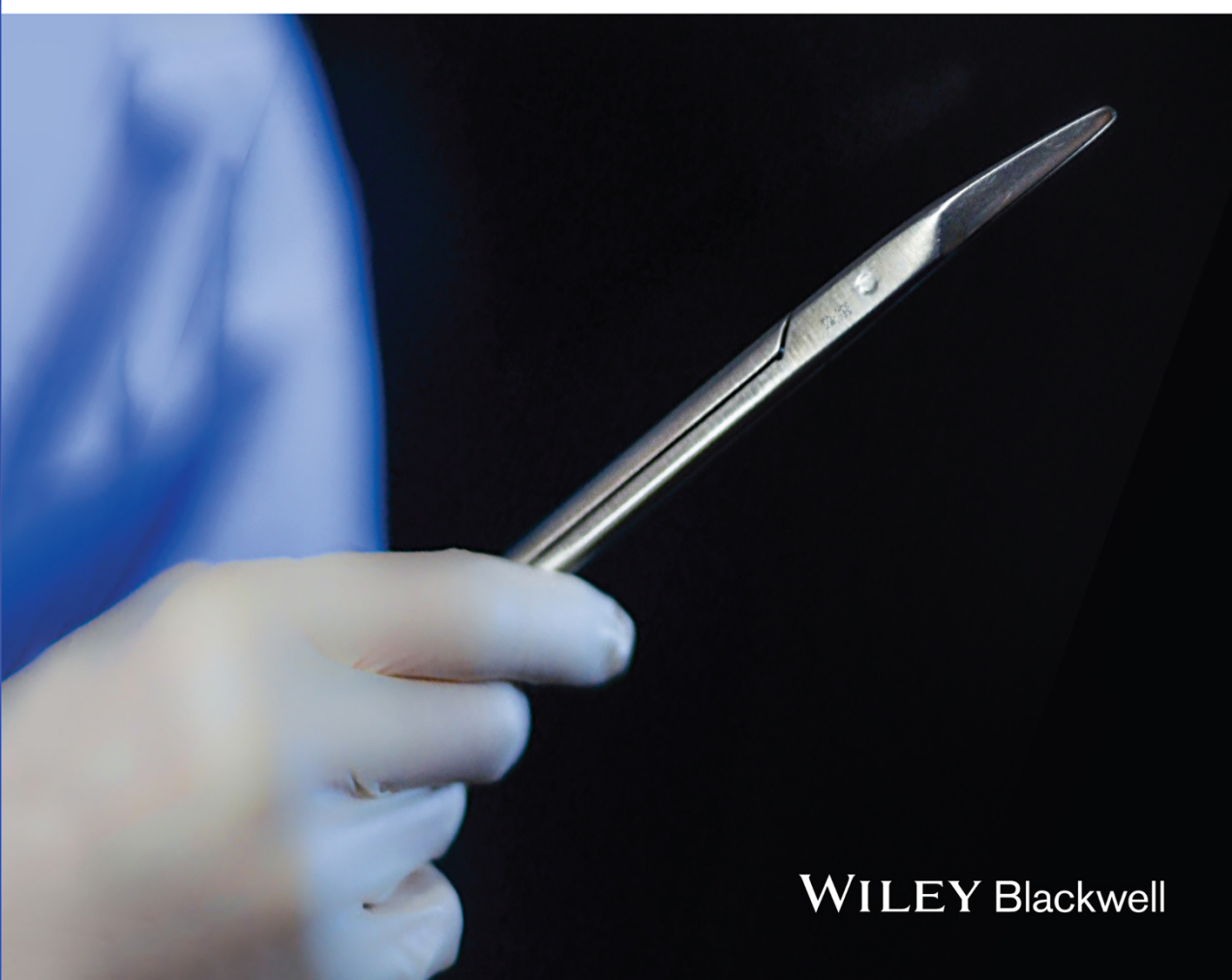


12th edition

BONNEY'S GYNAECOLOGICAL SURGERY

Tito Lopes, Nick M. Spirtos,
Paul Hilton, John M. Monaghan



WILEY Blackwell

Bonney's Gynaecological Surgery



This book is dedicated to the memory of Victor Bonney.

It is also dedicated to Jane, Vicki, Lucia, and Maggie for their support, understanding, patience and love, which they have shown us in our lives together.

Bonney's Gynaecological Surgery

TWELFTH EDITION

Alberto (Tito) de Barros Lopes, MB ChB, FRCOG

Honorary Clinical Senior Research Fellow
University of Exeter Medical School
Retired Consultant Gynaecological Oncologist
Northern Gynaecological Oncology Centre
Queen Elizabeth Hospital, Gateshead
Royal Cornwall Hospital, Truro, UK

Nick M. Spirtos, MD, FACOG

Clinical Professor, University of Nevada Las Vegas School of Medicine
Medical Director, Women's Cancer Center of Nevada
Las Vegas, NV, USA

Paul Hilton, MD, FRCOG

Guest Clinical Senior Lecturer, Newcastle University
Retired Consultant Gynaecologist & Urogynaecologist
Newcastle upon Tyne Hospitals NHS Foundation Trust
Newcastle upon Tyne, UK

John M. Monaghan, MB, FRCS (Ed), FRCOG

Retired Senior Lecturer in Gynaecological Oncology
University of Newcastle Upon Tyne
Retired Gynaecological Oncologist
Regional Department of Gynaecological Oncology
Queen Elizabeth Hospital, Gateshead, UK

WILEY Blackwell

This twelfth edition first published 2018 © 2018 by John Wiley & Sons Ltd

Edition History

John Wiley & Sons Ltd (11e, 2011)

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, except as permitted by law. Advice on how to obtain permission to reuse material from this title is available at <http://www.wiley.com/go/permissions>.

The right of Alberto (Tito) de Barros Lopes, Nick M. Spirtos, Paul Hilton, and John M. Monaghan to be identified as the authors in this work has been asserted in accordance with law.

Registered Office(s)

John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ 07030, USA

John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

Editorial Office

9600 Garsington Road, Oxford, OX4 2DQ, UK

For details of our global editorial offices, customer services, and more information about Wiley products visit us at www.wiley.com.

Wiley also publishes its books in a variety of electronic formats and by print-on-demand. Some content that appears in standard print versions of this book may not be available in other formats.

Limit of Liability/Disclaimer of Warranty

The contents of this work are intended to further general scientific research, understanding, and discussion only and are not intended and should not be relied upon as recommending or promoting scientific method, diagnosis, or treatment by physicians for any particular patient. In view of ongoing research, equipment modifications, changes in governmental regulations, and the constant flow of information relating to the use of medicines, equipment, and devices, the reader is urged to review and evaluate the information provided in the package insert or instructions for each medicine, equipment, or device for, among other things, any changes in the instructions or indication of usage and for added warnings and precautions. While the publisher and authors have used their best efforts in preparing this work, they make no representations or warranties with respect to the accuracy or completeness of the contents of this work and specifically disclaim all warranties, including without limitation any implied warranties of merchantability or fitness for a particular purpose. No warranty may be created or extended by sales representatives, written sales materials or promotional statements for this work. The fact that an organization, website, or product is referred to in this work as a citation and/or potential source of further information does not mean that the publisher and authors endorse the information or services the organization, website, or product may provide or recommendations it may make. This work is sold with the understanding that the publisher is not engaged in rendering professional services. The advice and strategies contained herein may not be suitable for your situation. You should consult with a specialist where appropriate. Further, readers should be aware that websites listed in this work may have changed or disappeared between when this work was written and when it is read. Neither the publisher nor authors shall be liable for any loss of profit or any other commercial damages, including but not limited to special, incidental, consequential, or other damages.

Library of Congress Cataloging-in-Publication Data

Names: de Barros Lopes, Alberto (Tito), author. | Spirtos, Nick M., author. | Hilton, Paul (Urogynaecologist), author. | Monaghan, John M., author.

Title: Bonney's gynaecological surgery / Alberto (Tito) de Barros Lopes, Nick M. Spirtos, Paul Hilton and John M. Monaghan.

Other titles: Gynaecological surgery

Description: 12th edition. | Hoboken, NJ : Wiley, 2017. | Preceded by Bonney's gynaecological surgery. 11th ed. / Tito Lopes ... [et al.]. c2011. | Includes bibliographical references and index. |

Identifiers: LCCN 2017056122 (print) | LCCN 2017056804 (ebook) | ISBN 9781119266921 (pdf) | ISBN 9781119266914 (epub) | ISBN 9781119266785 (hardback)

Subjects: | MESH: Gynecologic Surgical Procedures | Genitalia, Female—surgery

Classification: LCC RG104 (ebook) | LCC RG104 (print) | NLM WP 660 | DDC 618.1—dc23

LC record available at <https://lcn.loc.gov/2017056122>

Cover Design: Wiley

Cover Image: Courtesy of Chris Kevern

Set in 8.5/12pt Meriden by SPi Global, Pondicherry, India

Contents

Preface, vii

Part 1: General

- 1** Introduction and prologue, 3
- 2** Preparation for surgery, 7
- 3** Instruments, operative materials and basic surgical techniques, 17
- 4** Opening and closing the abdominal cavity, 33
- 5** The laparoscopic approach in gynaecology, 45
- 6** Postoperative care and complications, 55

Part 2: Anatomical

For the general gynaecologist and gynaecologist in training

- 7** Operations on the vulva, 63
- 8** Operations on the vagina, 71
- 9** Operations on the cervix, 83
- 10** Operations on the uterine cavity, 101
- 11** Operations on the uterus, 107
- 12** Uterine fibroids, 127
- 13** Operations on the fallopian tubes, 135
- 14** Operations on the ovaries, 141
- 15** Caesarean section, 147

Part 3: Urogynaecology

- 16** Operations for pelvic organ prolapse, 161
- 17** Operations for urinary incontinence, 193
- 18** Operations for urogenital fistulae, 231

Part 4: Oncology

- 19** Surgery for carcinoma of the vulva, 269
- 20** Vaginal cancer surgery, 281
- 21** Cervical cancer, 285
- 22** Uterine cancer, 309
- 23** Ovarian cancer, 313
- 24** Exenterative surgery, 319

Part 5: Operations on other organs

- 25** Vascular surgery: applications in gynaecology and gynaecological oncology, 331
- 26** Management of injuries to the urinary tract, 335
- 27** Operations on the intestinal tract for the gynaecologist, 349
- 28** Reconstructive procedures, 361

Index, 365

Preface

"The human form is a very delicate organization. It is not a thing which should be meddled with by people who do not know it as intimately as it is possible to know it"

Sir Watson Cheyne, Scottish surgeon and bacteriologist (1852–1932)

It is now more than 100 years since Comyns Berkeley and Victor Bonney published the first edition of what became the bible of gynaecological surgery in the UK. It is also over 30 years since, in 1984, one of the current editors, John Monaghan, was asked to take on the ninth edition as a major revision; little did he realise that he would continue as an editor for another three editions. Over these 30 years much has changed, not only in gynaecology and gynaecological surgery but also in the way in which we access information both textually and visually, with the invention of the World Wide Web in 1989 and the founding of YouTube in 2005.

What makes this textbook so successful is that it continues to be published in print well into the first quarter of the 21st century? Sir Watson Cheyne's statement reminds us that one should not undertake surgery without knowing the subject intimately, and 'Bonney' provides the foundation for developing the skills needed to become a competent if not a great gynaecological surgeon.

This edition continues the format introduced in the last edition, being divided into sections, the first section covering general principles and basic

techniques, the second section, presented by anatomical site, covers the common procedures undertaken in day-to-day benign gynaecology and the remaining sections concentrate on the two surgical subspecialties of urogynaecology and gynaecological oncology. The editorial team has changed slightly from the previous edition, bringing in the internationally recognized skill of Paul Hilton to write the section on urogynaecology, which includes over 100 new drawings.

All the chapters have been updated based on new technologies and level 1 and 2 evidence. Over 160 references and articles, published since the last edition, have been added and these include 13 randomized controlled trials, 30 Cochrane reviews and over 20 specialist guidelines.

We would like to thank Wiley-Blackwell for inviting us to produce this edition of *Bonney's Gynaecological Surgery*. We also thank the production team for their assistance in the pleasant process of communicating our views of gynaecological surgery. Our special thanks go to Chris Kevern who produced the cover photograph for this edition.

Finally, we each thank the others in our editorial team for their skill, companionship and friendship which has not been impaired by production of this latest edition of 'Bonney'.

The Editors
November 2017

PART 1

General

CHAPTER 1

Introduction and prologue

Surgery remains only as safe as those wielding the scalpel.

Tito Lopes

Introduction

Surgical training

Surgical training in gynaecology has seen dramatic changes in both the UK and the USA over the past 20–30 years. When the current editors were in training, there were no restrictions on the number of hours that they could be asked to work. It was common to be resident on call every third night in addition to daytime work, which often resulted in a working week in excess of 110 hours. In the UK, the European Working Time Directive was extended to junior doctors in 2004 thereby reducing the working week to an average of 48 hours. In the United States, the Accreditation Council for Graduate Medical Education in 2003 required duty hours to be limited to 80 hours per week.

Although the reduction in working hours is important for one's work–life balance as well as patient safety, it inevitably has had a major impact on surgical training. The concept of the surgical team or firm to which a trainee was attached has all but disappeared. The introduction of shift systems has made it difficult, and in some cases impossible, for trainees to attend the surgical and clinical sessions of their team. This has resulted in some trainees failing to comprehend the continuity of care of a surgical patient, running the risk of producing technicians rather than doctors.

At the same time, there has been a marked reduction in the number of hysterectomies performed as a result of more conservative management options for dysfunctional uterine bleeding. In the nine-year period from 1995 to 2004, there was a 46% reduction in the number of hysterectomy operations performed in NHS hospitals in England and between 2008 and 2012 there was a further 7% fall in hysterectomies in the UK.

With the increasing use of laparoscopic surgery in elective gynaecology, including for hysterectomy, the 'open' approach to gynaecological surgery, traditionally the surgical 'bread and butter' for trainees, is also on the decline. Equally, a large number of ectopic pregnancies are now managed conservatively meaning that trainees are lacking exposure to emergency laparoscopic surgery for tubal pregnancies.

It is vital that standard safe techniques continue to be taught to all trainees. Thus, although many procedures have been translated into minimal access operations the principles and practice of the open version must be learned alongside the minimal access approach. This is especially relevant wherever a minimal access procedure has to be translated into an open procedure because of difficulties and complications experienced during the operation. It is a concern of the editors that the 'unusual' is not being experienced on a satisfactory scale by trainees. Nothing can replace time spent in the operating room for building up skills and confidence in dealing with the unusual and unexpected. A recent comment by a president of a Royal College compared the time limited training of a surgeon to

the limitless time application of an Olympic athlete. Very few gold medals would be won if the Working Time Directive was followed!

Gynaecology training

Current training in the UK is a competency-based process and it is envisaged that the majority of trainees will take seven years to complete the programme. In the last two years of training, the trainees are required to undertake a minimum of two of twenty available advanced training skills modules or they can apply for subspecialty training in gynaecological oncology, maternal and fetal medicine, reproductive medicine or urogynaecology. It is disappointing that as part of the current training programme the trainee must be deemed competent in opening and closing a transverse incision at caesarean section before commencing his or her second year but need only be assessed as competent for opening and closing a vertical abdominal incision if undertaking the advanced module for benign surgery in years six and seven.

Basic skills and training opportunities

Trainees wishing to develop as gynaecological surgeons should attend appropriate courses, including cadaver and live animal workshops. However, these are no substitutes for learning the basic surgical skills and picking up good habits, early in training; bad habits are difficult to lose at a later stage. As assistants, they should question any variations in technique among the surgeons. As surgeons, they should review every operation they perform to assess how they could have done better.

In relation to laparoscopic surgery, there is no excuse for trainees not practising with laparoscopic simulators, which are often readily available and easy to construct. It is readily apparent to trainers which trainees have spent adequate time on simulators.

Sadly, a consequence of the new training is an inevitable lack of knowledge and experience of the 'unusual', with the all too frequent result of difficulties for both the patient and the surgeon. These difficulties are often manifest in an almost complete failure to appreciate the wide range of possibilities for management. Previous editors of this text have advocated that any surgery should be tailored to the specific needs of the patient and her condition. Unfortunately, modern patients are in real danger

of being treated by surgeons with a limited experience and a narrow range of skills which may be applied in a 'one size fits all' pattern. In this text, we have attempted to provide a wide range of options for management, which we would encourage all trainees to practise assiduously to give their patients the very best possible chance of a successful outcome.

Despite the recent changes in gynaecological training, the essence of surgery remains essentially unchanged. The editors have, as with previous editions, felt it appropriate to retain the prologue written for the 9th and 10th editions by JM Monaghan based on that of the 1st edition of this series, *A Text-book of Gynaecological Surgery*, published in 1911 by Comyns Berkeley and Victor Bonney. It remains just as relevant today as it was a century ago.

Prologue: after Comyns Berkeley and Victor Bonney, (JM Monaghan)

The bearing of the surgeon

A surgeon when operating should always remember that the character of the work of his subordinates will be largely influenced by his own bearing. While it is impossible to lay down definite rules suitable for all temperaments, nevertheless there are certain considerations which will prove useful to those embarking on a gynaecological career. Anyone who has taken the trouble to study the work of other operators cannot fail to have observed how variously the stress and strain of operating is borne by different minds and will deduce from a consideration of the strong and weak points of each operator some conception of the ideal.

The thoughtful surgeon, influenced by this study, will endeavour to discipline himself so that he will strive constantly to achieve the ideal. By so doing, he will encourage all who work in the wards and theatres with him – young colleagues in training, anaesthetists, nurses, theatre assistants and orderlies – to appreciate the privileges and responsibilities of their common task. Expert coordinated teamwork is essential to the success of modern surgery. This teamwork has resulted in a significant lowering of operative morbidity and mortality.

However, it is important to recognize the enormous contribution to the safety of modern surgery

made by other disciplines, especially anaesthesiology. The preoperative assessment and the postoperative care carried out by the anaesthetist has rendered surgery safer and has also allowed patients who would not in the past have been considered eligible for surgery to have their procedures performed successfully. The role of specialties such as haematology, biochemistry, microbiology, radiology, pathology and physiotherapy are also well recognized.

Bonney maintained that the keystone of a surgeon's bearing should be his self-control; and while it is his duty to keep a general eye on all that takes place in the operating theatre and without hesitation correct mistakes, he should guard against becoming irritable or losing temper. The surgeon who when faced with difficulties loses control has mistaken his vocation, however dexterous he may be, or however learned in the technical details of the art. The habit of abusing the assistants, the instruments or the anaesthetist, so easy to acquire and so hard to lose, is not one to be commended; the lack of personal confidence from which such behaviour stems will inevitably spread to other members of staff, so that at the very time the surgeon needs effective help it is likely to be found wanting. However, the converse of accepting poor standards of care and behaviour is not to be condoned. The continual presentation of inadequately prepared instrumentation should not be accepted. There is little excuse for staff or equipment to arrive in theatre in a state ill prepared for the task ahead.

The whole team should look forward to a theatre session as a period of pleasure, stimulation and achievement, not as a chore and a period of misery to be suffered. The surgeon should also remember that he is on 'display' and his ability to cope with adversity as well as his manner when the surgery is going well will be keenly observed. The surgeon should teach continuously, pointing out to assistants and observers the small points of technique as well as related facts to the case in hand.

Bonney enjoined that the surgeon should not gossip; the present editors feel that day-to-day chitchat is not out of place in the operating theatre and is to be preferred to the media view of an operating theatre as a place of knife-like tension fraught with grave interpersonal relationships. However, the mark of the good surgeon and his team is that, at the time of stress, the noise level in theatre should fall rather than rise, as each member of the

team goes about his or her task with speed and efficiency.

It is inevitable that at some point the surgeon will come face to face with imminent disaster; even the most stalwart individual will feel his heart sink at such a moment. The operator should always remember that at such moments if basic surgical principles are applied quickly and accurately the situation will be rapidly rescued. Hesitation and uncertainty will all too often terminate in disaster. A sturdy belief in his or her own powers and a refusal to accept defeat are the best assets of a calling which pre-eminently demands moral courage.

Before operating, the surgeon should prepare by going over in his or her own mind the various possibilities in the projected procedure, so that there may be no surprises and he or she may all the better meet any eventuality. Likewise, following the procedure it is valuable to go over in one's mind every step in the operation in order to analyze any deficiencies and difficulties experienced; it is only by this continuous self-assessment and analysis that surgeons can from their own efforts improve their practice.

It is of increasing importance that the surgeon understands the need for meticulous record-keeping in order to build a comprehensive database for future analysis. The modern surgeon has to continually examine his and others' work in order to practice to the highest possible standards. More and more guidelines are being generated; the surgeon has to be sure that his work meets the quality requirements of modern practice. Patients, purchasers and professional bodies wish to be able to access the best possible practices. Transparency of standards is essential to modern medical practice. The high-quality surgeon has little to fear from the implementation of guidelines and should look upon these times as opportunities for developing the highest quality of care.

Surgery is physically and mentally tiring. The surgeon should be sure to be adequately equipped in both these areas to meet the demands of theatre. It is important to remember that driving the staff on for long, tiring sessions is counterproductive; there is little merit in performing long procedures with an already exhausted staff. The surgeon's hands and mind become less steady, the assistants less attentive and the nurses tired and disillusioned. It is under these circumstances that mistakes occur.

It is important, however, not to be dogmatic about the ideal length either of individual operations or of operating lists. A full day in the operating theatre may suit one surgical team but be anathema to another.

Speed in operating

Speed, as an indication of perfect operative technique, is as characteristic of a fine surgeon, as striving for after-effect is the stock-in-trade of the charlatan. An operation rapidly yet correctly performed has many advantages over one as technically correct yet laboriously and tediously accomplished. The period over which haemorrhage may occur is shortened, the tissues are handled less and are therefore less bruised, the time the peritoneum is open and exposed is shortened, the amount and length of anaesthesia is shortened and the impact of the operative shock, which is an accumulation of all these factors, is lessened. Moreover, less strain is put upon the temper and legs of the operator and assistants with the result that the interest of the latter and the onlookers is maintained at the highest level. However, this speed must be tempered with attention to detail, particularly of haemostasis, and by a conscious effort not to unnecessarily handle tissue.

Operative manipulation

The surgeon should continually endeavour to reduce the number of manipulations involved in a procedure to the absolute minimum consistent with sound performance. If an operation is observed critically, one is struck by the vast number of unnecessary movements performed, the majority of which are due to the uncertainty and inexperience of the operator. In older surgeons, unless care is taken to analyze these movements and eliminate them they will become part of the habits and ritual of the procedure.

Minimizing trauma is of fundamental importance for uncomplicated wound healing. The art of gentle surgery must be developed (Moynihan). Sadly, many surgeons achieve speed by being rough with tissue, particularly by direct handling. This must be avoided at all costs, and the temptation to tear tissue with the hands rather than to delicately incise and dissect with instruments is to be eschewed. All operative manipulations should be gentle; force is occasionally essential but should be applied with accuracy, only to the tissue to be removed and for limited periods of time. The surgeon who tears and traumatizes tissue will see the error of his ways in the long recovery periods that his patients require and in the high complication rate.

Moynihan spoke in 1920 at the inaugural meeting of the British Association of Surgeons on 'The ritual of a surgical operation', stating that 'he [the surgeon] must set endeavour in continual motion, and seek always and earnestly for simpler methods and a better way. In the craft of surgery the master word is simplicity'.

Further reading

- Berkeley C, Bonney V. *A Text-book of Gynaecological Surgery*. London: Cassell and Company, 1911. Available at the Internet Archive <https://archive.org/details/atextbookgyncol00bonngoog> (accessed 10 October 2017). This copy is a 1913 reprint of the first edition.
- Hospital Episode Statistics. NHS Digital. Available at www.hesonline.nhs.uk (accessed 21 September 2017).
- Moynihan BGA. The ritual of a surgical operation. *Br J Surg* 1920;8:27–35.
- Eurostat. Surgical operations and procedures statistics. October 2016. Available at http://ec.europa.eu/eurostat/statistics-explained/index.php/Surgical_operations_and_procedures_statistics (accessed 21 September 2017).

CHAPTER 2

Preparation for surgery

Before major surgery,
Submit yourself to your God, your love to your
beloved and friends and your trust in your doctor.
Lord Gowrie (1999)

Most gynaecological surgery is elective. Consequently, for most patients, preoperative assessment and preparation for surgery must be comprehensive. There should be a departmental protocol in place so that all staff involved with the care of the patient provide consistent high-quality care. A medical history, examination and relevant investigations are undertaken as part of preoperative assessment. The patient is provided with appropriate information, often in conjunction with support from a nurse specialist, and an informed consent is taken. A review of all available information, including preoperative scans and laboratory tests, should be performed prior to surgery. In theatre, patient safety is increased by use of the World Health Organization (WHO) Surgical Safety Checklist.

It is often the culmination of the preoperative assessment, counselling, consent and preparation followed by the eventual surgery that determines a successful outcome. In recent years 'enhanced recovery' programmes have become the norm, attempting to modify the physiological and psychological responses to major surgery, thereby leading to a reduction in complications, hospital stay, earlier return of bowel function and earlier resumption of normal activities. Described initially by Kehlet in the 1990s for colorectal surgery, these programmes rely on an evidence-based multidisciplinary approach at the preoperative, perioperative and postoperative periods.

Clinic information

If at all possible, information in written form should be sent to patients before the first visit. This should not only include details of appointments, parking facilities, transport access and so on but also as many broad details as can be envisaged. This should include warnings about examination, time involved and the advisability of having a partner or companion present. For many specialist clinics, such as those for colposcopy, specific details of procedures can be outlined. A list of contact telephone numbers and departmental and other relevant websites should be included.

Ideally, standardized forms regarding relevant personal, social and medical history should be sent to the patient to complete and bring with her to the initial clinic visit. This is reviewed with the patient and appended if necessary, providing a comprehensive history in a much shorter time.

Initial visit

Most patients will be first seen in the outpatient department, where a preliminary assessment and provisional diagnosis will be made. At this first visit, the clinician should obtain a comprehensive history, fully examine the patient, including the pelvis and abdomen, and organize the next series of steps in the diagnostic process. Once this information is collated, admission dates for surgery, if appropriate, are organized or referral made to the appropriate specialist. In the UK, there is increasing

pressure on clinicians to see patients rapidly, come to a definitive diagnosis and arrange appropriate management as quickly as possible. Although this pressure is most acute in the diagnosis and management of cancer, it is being extended in a more limited fashion to the management of benign conditions.

To attain targets, clinics have to be structured so that referral can be made by telephone, fax or online if necessary and appropriate diagnostic facilities, such as endometrial sampling, ultrasound and colposcopy, are available at the one visit.

History taking and documentation

As the clinician progresses through training, every effort should be made to concentrate on developing a style of clear and concise history taking. Initially, this process of meticulous systematic questioning may seem cumbersome. However, with constant practice, an abbreviated technique will develop which concentrates on the major fields of interest but also allows for peripheral areas of relevance to be included.

Documentation of the history is vital for medico-legal purposes, for transmission of information to colleagues and for analysis in clinical research and audit. The editors have over many years used standardized forms for all patients, as well as for subsequent treatment and follow-up, the details of which build up a complete picture of the patient and the outcome of her treatment. This huge database allows rapid access for office administration, audit, research and analysis.

In an increasingly litigious world, the careful but not necessarily cautious doctor who keeps good records and takes the time to communicate and document all meetings will to a significant extent protect him- or herself from the very distressing circumstances of litigation.

Patient information

Gynaecological patients require considerable support and assistance when making decisions about treatment, particularly surgery. The most important factor is the manner in which the patient conceives the impact of the operation upon herself,

particularly her sexuality. The surgeon must be prepared to spend a considerable amount of time discussing and explaining the content of any surgical procedure. This important process is frequently aided by the use of literature and drawings, copies of which should be included in the medical record. Departmental websites and contact numbers are a great assistance.

It is at this point that the clinician may feel the need to involve other areas of expertise, including a nurse specialist, psychologist, dietician or stoma therapist. A factor that is often of enormous reassurance to the patient is to meet other patients who have been treated for a similar problem and experienced similar procedures.

Clearly, such a detailed approach is not practical for all procedures, especially minor ones; however, it is important not to trivialize minor procedures, especially those involving anaesthesia, as complications can and will occur and warning of the possibility and appropriate consenting is vital for all operations, even those of a diagnostic nature carried out in the outpatient department under local anaesthesia. It is important not to 'talk down' to patients. Always use accurate terminology with appropriate explanation and resist the temptation to use gross inaccuracies, which become perpetuated in the mythology of the subject, such as the vaginal hysterectomy being described as a 'suction' hysterectomy.

The offer to the patient to attend with her partner, a close family member or a friend is also of vital importance in providing support and reassurance to the patient and often contributes to the essential dialogue and communication. Patients take in and understand information at very varying rates; some are comfortable with a brief once-only visit whereas others may need repeat visits or telephone calls to answer questions and seek reassurance. This wide range must be accommodated within a successful practice.

Information sheets and documents

At the end of the clinic visit, it is of inestimable value to be able to give the patient and her accompanying person a sheet of information with an outline summary of what has been said and discussed in the clinic. The type of document will usually have space for drawings and handwritten notes. If the sheet can be of a 'carbon copy' type, the patient

will be able to take home the original and an exact copy is stored within the clinical record. Locally or nationally produced leaflets or booklets regarding the specific condition and operation should also be given to the patient to take home and read.

Drawings

Drawings of procedures indicating tissues to be removed with small annotations alluding to potential complications and future difficulties are of enormous value. The drawings should be made in the clinical record or included in the information sheet mentioned above and the copy kept in the records. Such drawings, however crude and simplistic, are often critical when complaints or legal proceedings occur.

Consent for surgery

In recent years, considerable effort has been expended in trying to improve the whole process of consent. The main reason for this is the extensive publicity given when operations are allegedly performed without 'proper' consent.

Patients must give consent for operation in the light of full knowledge of the procedure, the nature of the condition for which it is being proposed, any serious or frequent complications of the surgery, as well as any reasonable or accepted alternative treatments, including no treatment. In the UK, four standard consent forms have been created for all categories of patients, including for those with parental responsibility and use where the patient is an adult unable to consent. In gynaecology, most patients who are undergoing surgical treatments are able to give consent on their own behalf.

Current legal principles and philosophies require that patients are informed of all potential complications associated with the planned surgical procedure irrespective of the likelihood of their occurrence or rarity. Although many surgeons may oppose such practice because they do not want to burden the patient with fearful information to the point of seriously complicating the patient–doctor relationship and the loss of the patient's trust in the surgeon, it is important to address during the consultation how much information the patient is willing and able to receive through direct questioning and to document

clearly in the notes if she demands an abbreviated list of risks and complications. When the patient prefers a full and thorough discussion then it is important that the surgeon presents the risks of surgery that relate to their own individual and personal practice rather than reference to accepted or published rates, which may differ considerably and will serve only to misguide the patient and surgeon.

Concept of risk

For the majority of patients an understanding of risk is incomplete. Journalistic increases of risk of 50% may sound alarming but explaining that this change involves a move from 0.5% to 0.75% will be immensely reassuring. All populations are bombarded with 'statistics' which require careful analysis and explanation. It is incumbent upon all surgeons preparing patients for operation to be able to translate risk into understandable and meaningful terms. Although it is vital to be scrupulously honest with the patient about all potential risks, putting the risks into perspective is a skill to be developed by all trainees.

The question of consent and the concept of risk has been highlighted recently in the UK by the 2015 Supreme Court judgment in *Montgomery v Lanarkshire Health Board*.¹ When advising a patient as to the risks of any proposed treatment, the crucial passage of the final judgment states:

An adult person of sound mind is entitled to decide which, if any, of the available forms of treatment to undergo, and her consent must be obtained before treatment interfering with her bodily integrity is undertaken. The doctor is therefore under a duty to take reasonable care to ensure that the patient is aware of any material risks involved in any recommended treatment, and of any reasonable alternative or variant treatments. The test of materiality is whether, in the circumstances of the particular case, a reasonable person in the patient's position would be likely to attach significance to the risk, or the doctor is or should reasonably be aware that the particular patient would be likely to attach significance to it (paragraph 87).

Three further points emerge. First, assessing the significance of a risk is fact sensitive and cannot be reduced to percentages. Second, in order to advise, the doctor must engage in dialogue with the patient. Third, the therapeutic exception is limited and should not be abused.

Consent to surgical trials

Recruitment to surgical trials often adds further complexities to the consent process. It requires an understanding of our current knowledge 'or lack of it' in relation to the disease process or treatment procedure being researched and the ability to explain to patients the vital need for research to improve the quality of care for future patients by providing good quality evidence relating to new or currently available treatments. Such consultations can be testing to junior surgeons and it is only through good consultative technique that they are able to translate commonly used terms and research principles for the patient, including 'randomization' and 'blinding'. Although good levels of recruitment are often a proxy of a good consultation, it is crucial not to coerce patients into a trial of which they clearly have no understanding. The employment of a trials nurse, although not diminishing the important need for an enthusiastic approach by the surgeon, can be invaluable in achieving adequate recruitment to available trials while ensuring that the patient has given consent to enter the trial based on sound moral and ethical grounds.

Timing of written consent

There has been considerable discussion about the best time for written consent for an operation to be obtained. The taking of consent as part of the clinic visit has been viewed by supporters as enabling the patient to take this important step away from the stress of admission to hospital and an imminent operation. The contrary view is that, at the time of the clinic visit, there is far too much information to be taken in and that the patient is suffering from information 'overload' and will have problems in making a sensible, balanced decision.

The taking of consent at the time of admission for surgery has been viewed as incorrect because of the stresses already mentioned. This problem has been exacerbated with most admissions being on the day of surgery close to the time of surgery. The positive side of this approach is that the patient has had time to weigh the points of management that have been put to her at the original clinic visit.

The current advice of the Royal College of Surgeons of England is for the patient and surgeon to sign the consent form at the end of the consent discussion, allowing the patient to take a copy for

reference and reflection.² On the day of the procedure, the surgeon should check with the patient whether anything has changed since the consent discussion. If nothing has changed, the surgeon should sign the relevant section on the form to confirm consent.

Preoperative assessment and optimization

In many centres, preoperative assessment clinics have been set up and run by nursing staff at which all preoperative investigations and admission procedures can be performed. This is excellent where patients live close to the hospital; however, making an extra journey to the hospital is either inconvenient or impossible when patients have to travel any distance, as is found in association with centralized services. In this situation, preoperative assessment may be undertaken by the referring hospital or centres may organize the assessment to be undertaken as part of the initial visit. Another alternative is to perform a preliminary telephone assessment and if appropriate, investigations can be performed by the patient's general practitioner.

Preoperative assessment clinics have the added advantage of ensuring that all investigations and information can be obtained well in advance of the intended surgery so that unexpected results can be addressed and the patient's condition optimized without resorting to postponement of surgery, as may be the case when the investigations are performed just prior to the date of surgery. The clinic is becoming increasingly valuable as more patients require specific investigations, such as echocardiograms and pulmonary function tests, in advance of surgery. They also avoid the embarrassing scenario of the surgeon having overlooked the need to discontinue, modify or schedule vital medications at the appropriate times, including clopidogrel and warfarin.

Assessment of medical conditions such as cardiovascular disease, hypertension, diabetes, pulmonary disease and mental state may all require input from an expert in the field. It is important to allow adequate time for appropriate consultation and correction of problems prior to surgery. Often, the expert anaesthetist will be able to give a clear opinion on the physical state of the patient. It is the

editors' opinion that the decision to anaesthetize is taken by the anaesthetist and the decision to operate by the surgeon following on.

Early admission may be necessary on occasions for patients who have specific problems which may need to be corrected prior to surgery. However, the majority can be admitted on the day of, or the day prior to, surgery.

Smoking

Smokers should be informed that they have a significantly higher risk of infectious and noninfectious healing complications after surgery. Stopping smoking at least four weeks before surgery reduces surgical site infections but no other healing complications. There is evidence that providing behavioural support and nicotine replacement therapy helps short-term smoking cessation.

Alcohol

Consumption of alcohol increases postoperative morbidity and this appears to show a dose–response relationship. High alcohol consumption defined as more than 24 g/dl for women and 36 g/dl for men is associated with an increased risk of general postoperative morbidity, general infections, wound complications, pulmonary complications, prolonged stay in hospital and admission to the intensive care unit.³ However, intensive preoperative alcohol cessation interventions may significantly reduce postoperative complication rates but may have no effect on mortality rates and length of stay.

Oral contraception and hormone use

Controversy remains as to whether to stop the combined oral contraceptive pill before major surgery. The small increase in risk of postoperative thromboembolic disease (0.5–1%) needs to be balanced against the possibility of an unwanted pregnancy as a result of stopping the pill. The National Institute for Health and Care Excellence (NICE) recommends that doctors should advise women to consider stopping estrogen-containing oral contraceptives or hormone replacement therapy four weeks before elective surgery.⁴ When considering stopping the combined oral contraceptive pill before elective surgery, the surgeon should discuss the balance of risks and benefits with the patient. Alternative contraception must be provided if the contraceptive pill is

discontinued. If the pill is continued, women should be informed that they will require mechanical and pharmacological venous thromboprophylaxis for their surgery.

Women on high-dose progestogen, hormone replacement therapy and raloxifene are also at an increased risk of thromboembolic disease and will require thromboprophylaxis.

Preoperative investigations

It is not the place of a surgical text to detail all preoperative investigations exhaustively. The guidelines on routine preoperative tests for elective surgery, published by NICE in 2016,⁵ provide a useful assessment of the recommended investigations based on the American Society of Anesthesiologists status and type of surgery. Specific tests are outlined in relevant chapters; only a general outline is provided here.

- 1 Haematological investigations.** Every patient undergoing major surgery should have a full blood count taken, to include haemoglobin, haematocrit, white cell count and differential and platelet count. Women with a haemoglobin less than 120 g/l should be investigated before elective surgery and treated appropriately. Elective non-urgent surgery other than caesarean section should be delayed.⁶
- 2 For all procedures in which there is a significant risk of major bleeding,** serum should be typed so that blood and blood products can be obtained at short notice. In recent times, acceptance of lower haemoglobin levels, especially postoperatively, coupled with a nervousness about blood and blood products and the use of intraoperative cell salvage, have led to a marked reduction in the use of transfusion. A postoperative haemoglobin level of 70 g/l is often treated with oral iron.
- 3 Biochemical investigations.** In most centres it is customary to use computerized assessment of blood, which allows a large range of investigations to be performed rapidly on a small volume of blood. For the majority of procedures, the assessment of the blood electrolytes and liver function test are appropriate.
- 4 Tumour markers.** When malignancy is suspected, it is essential that a range of tumour markers

are sampled to assist in the diagnostic process. This may include one or a number of the following: CA125, carcinoembryonic antigen, CA19-9, CA15-3, alphafetoprotein, human chorionic gonadotrophin, lactate dehydrogenase, squamous cell carcinoma antigen, human epididymis protein 4, inhibin and/or a hormonal profile.

- 5 **Pregnancy tests.** A pregnancy test should be carried out with the woman's consent if there is any doubt about whether she could be pregnant.
- 6 **Urinalysis.** Using simple 'stick' tests, a range of analyses can be performed accurately and rapidly on the urine obtained on admission. These are usually screening tests leading the clinician to more detailed tests when necessary.
- 7 **Radiological investigations.** Chest radiograph, abdominal and transvaginal ultrasound, computed tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET) and other contrast radiology may all be helpful in making a preoperative diagnosis. The specific indications and value of these investigations are discussed in the individual chapters.
- 8 **Methicillin-resistant Staphylococcus aureus (MRSA) screen and decolonization.** Since March 2009, the majority of patients admitted for elective surgery in the UK undergo MRSA screening. Swabs are taken from the patient's nostril and one further site, and all positive patients receive a 'decolonization pack' to use before admission.

Preoperative case review and meeting

It is important before the day of surgery to review the case records and investigation results, including reports following anaesthesia and other specialist assessment. This review provides a further 'failsafe' in the process of patient assessment and preparation by ensuring that nothing has been overlooked, as well as providing the opportunity to reassess the proposed surgery and whether this requires modification based on review of the case and the results of investigations. This review has become increasingly important as most patients now are only admitted on the day of surgery. One of the editors included a weekly 'preoperative meeting' into their

practice, where the surgical team and preoperative assessment nurse met to present and discuss all patients listed for surgery the following week. This contributes to the education of the trainee surgeon, who develops the habit of working as part of a team, learns the importance of careful assessment of patients submitting themselves to surgery, and may also on occasion have to justify clinical decisions on cases they have listed.

Preoperative discussion with the patient regarding the scope of surgery

The preoperative discussion with the patient should be a continuation of the information given at the first clinic visit. Many of the details outlined at the first visit may have been forgotten or misunderstood. It is therefore recommended that the clinician repeat the whole explanation of the need for the operation, as well as the expected findings and outcome. In particular, this should include all that the patient should expect to happen in the postoperative period. The presence of drips, suction drains, catheters and patient-controlled analgesia devices must be described. The likely timing of their removal is often reassuring, especially if the proposed timetable is adhered to. Complex postoperative needs such as the possibility of stomas or prolonged application of devices are often best described by experts such as a stoma therapist.

Preoperative visit by the anaesthetist

For most patients, the major fear associated with surgery is related to anaesthesia. Consequently, a sympathetic, reassuring and confident anaesthetist will help to allay most phobias; some patients have fears about needles, some about masks. The skilled anaesthetist will be able to ensure that a particular technique will or will not be used. Clearly, it is important that the person visiting the patient is the clinician who will be present at the anaesthetic.

Preoperative medication may be prescribed at this visit and its timing carefully organized to fit in with the timing of surgery. Administration of sedatives to reduce anxiety preoperatively should be

reserved for appropriate cases and should not be used routinely, especially in daycare procedures, as they can impair psychomotor function, although there is no evidence that sedatives delay discharge.

Thromboprophylaxis

Since the 1970s, there has been general agreement that efforts to reduce the incidence of venous thromboembolism (VTE) must be made for virtually all patients undergoing major surgery. Current recommendations in the UK are based on the 2010 NICE clinical guideline *Venous Thromboembolism: Reducing the Risk for Patients in Hospital*, which was last updated in 2015.⁴ In the USA, the American College of Chest Physicians evidence-based clinical practice guidelines *Antithrombotic Therapy and Prevention of Thrombosis* were updated in 2016.⁷

In the UK, surgical patients should be assessed at preassessment and on admission for surgery to identify those who are at increased risk of VTE. Patients are regarded as being at increased risk if they meet one of the following criteria:

- surgical procedure with a total anaesthetic and surgical time of more than 60 minutes if the surgery involves the pelvis
- acute surgical admission with inflammatory or intra-abdominal condition
- expected significant reduction in mobility
- One or more of the following risk factors:
 - active cancer or cancer treatment
 - age over 60 years
 - critical care admission
 - dehydration
 - known thrombophilias
 - obesity (body mass index over 30 kg/m²)
 - one or more significant medical comorbidities (for example heart disease; metabolic, endocrine or respiratory pathologies; acute infectious diseases; inflammatory conditions)
 - personal history or first-degree relative with a history of VTE
 - use of hormone replacement therapy
 - use of estrogen-containing contraceptive therapy
 - varicose veins with phlebitis
 - women who are pregnant or who have given birth within the previous six weeks.

Women assessed to be at increased risk are offered VTE prophylaxis with:

- Mechanical VTE prophylaxis, commenced on admission and continued until the patient is significantly mobile.
- Pharmacological VTE prophylaxis for patients who have a low risk of major bleeding, taking into account individual patient factors and according to clinical judgement. This should be continued until the patient no longer has significantly reduced mobility (generally 5–7 days).
- Pharmacological VTE prophylaxis is extended to 28 days postoperatively for patients who have had major cancer surgery in the abdomen or pelvis.

Unfortunately there are no strong evidence-based recommendations relating to the role of VTE prophylaxis in relation to laparoscopic surgical procedures. In 2007, the American College of Obstetricians and Gynecologists recommended that, until more evidence is accumulated, patients undergoing laparoscopic surgery should be stratified by risk category and should receive prophylaxis similar to that provided to patients undergoing laparotomy. Until prospective randomized trials are performed it is unclear how we obtain that evidence.

In relation to gynaecological cancers, several retrospective studies of patients undergoing laparoscopic surgery reported the incidence of VTE within 30 days of surgery low ranging from 0.5% to 1.2%, with no difference in the cohort that received some form of perioperative heparin. Extended prophylaxis was not used in any of the reports.

Other strategies

For major surgical procedures, the use of regional anaesthesia should be encouraged as it reduces the risk of thrombosis compared with general anaesthesia. Vena cava filters should be inserted if the patient has an existing or recent venous thrombosis. Patients must be encouraged to mobilize as soon as possible after surgery. Do not allow patients to become dehydrated during their stay in hospital.

Bowel preparation

Bowel preparation has been used in gynaecological surgery for a variety of reasons.

- **Mechanical:** in both laparoscopic and open procedures, an empty bowel improves access to the pelvis by facilitating bowel retraction away from the pelvis and by producing an empty sigmoid colon and rectum.
- **Vulval soiling:** in vulval and vaginal surgery to reduce the risk of perineal soiling by fecal incontinence resulting in infection of the wounds.
- **Bowel surgery:** in complex operations where bowel surgery is likely to be involved to reduce infectious complications and anastomotic leaks.

Although a 2011 Cochrane review of mechanical bowel preparation in elective colorectal surgery showed no evidence of reduced infectious complications and anastomotic leaks,⁸ opinion continues to shift on whether to perform mechanical bowel preparation, oral antibiotic bowel preparation or both before elective colon operations. Most agree that the majority of gynaecological procedures do not routinely require bowel preparation. However, in complex gynaecological surgery, bowel involvement is often the result of an inflammatory, irradiated or malignant process in which the bowel serosa will not be pristine. The jury is still out regarding the role of oral antibiotic and mechanical bowel preparation. Ultimately, the degree and type of bowel preparation used depends on the surgeon's preference and published evidence.

Dehydration can commonly be associated with preoperative bowel preparation and some patients will require preoperative intravenous hydration to ensure that they are in optimal condition when presented to the surgeon.

Preoperative fasting and carbohydrate treatment

Patients must stop eating solid food for six hours before elective surgery but should be encouraged to drink clear fluids (including water, pulp-free juice and tea or coffee without milk) up to two hours before elective surgery (including caesarean section) to avoid dehydration. It is also safe for patients (including diabetics) to drink carbohydrate-rich drinks up to two hours before surgery, as it is believed that it improves subjective wellbeing, reduces thirst and hunger and reduces postoperative insulin resistance. However, a network meta-analysis concluded that carbohydrate loading before elective surgery only conferred a small reduction in length of postoperative hospital stay

compared with fasting but had no benefit when compared with water or placebo.⁹

In the operating theatre

WHO Surgical Safety Checklist

In June 2008, the WHO launched a second Global Patient Safety Challenge, 'Safe Surgery Saves Lives' to reduce the number of surgical deaths across the world. A core set of safety checks was identified in the form of a surgical safety checklist for use in any operating theatre environment.¹⁰ A study of the checklist in nearly 8000 surgical patients showed a significant reduction in deaths and complications.¹¹ In January 2009, the NHS announced that an adapted WHO Surgical Safety Checklist must be in place in all hospitals in England and Wales.

Prophylactic antibiotics

Prophylactic antibiotics should be used for all major gynaecological operations as they fall under the category of clean-contaminated surgery or contaminated surgery. The choice of antibiotics is often based on the local antibiotic formulary, which will be based on prevalent infective organisms and their antibiotic resistance. A single dose of antibiotic prophylaxis should be administered intravenously on starting anaesthesia.

Hair removal

Traditionally, all patients undergoing gynaecological surgery were given a full abdominal and vulval/pudendal shave to reduce the risk of wound infection. It is now considered that there is no need to remove the hair routinely to reduce the risk of infection, although it may still be appropriate if the incision is in a hair-bearing area if only to ease opening and closing of the wound. If hair must be removed, this is best done with electric clippers with a disposable head immediately before surgery. Razors should not be used as they increase the risk of surgical site infection.

Bladder catheterization

The need for catheterization will depend on the surgical procedure being performed and the personal experience and preference of the surgeon. If catheterization is to be avoided, it is important that the patient empties her bladder immediately before going to theatre.

As with most minor procedures, catheterization using an aseptic technique is rarely taught and often badly performed. The vagina should be prepared at the same time as performing the catheterization. This is the ideal time for the surgeon to perform a bimanual pelvic examination if not recently done, to assess the pelvic organs and guide them as to the most appropriate approach.

Skin preparation

A systematic review of 2017 has concluded that there is moderate-quality evidence supporting the use of chlorhexidine for preoperative skin antisepsis and high-quality evidence that the use of chlorhexidine is associated with fewer positive skin cultures.¹² The skin at the surgical site should be prepared in a methodical fashion starting over the intended site of the incision and radiating out to the edges of the intended area of skin exposure. As alcohol preparations are flammable, it is essential that the prepared area is completely dry before electrocautery instruments are switched on. The solution should be allowed to dry naturally as drying with a swab or sponge reduces the efficacy of the antimicrobial solution.

Preparation of the vagina should be considered as part of the general skin preparation for abdominal procedures when a hysterectomy is being performed. It is best undertaken at the time of bladder catheterization. Povidone–iodine is commonly used but increasingly chlorhexidine gluconate with a low concentration of alcohol (0.5% or 4%) is being used as it has been shown to be more effective than vaginal povidone–iodine in decreasing vaginal bacterial colony counts. For this reason, the American College of Obstetricians and Gynecologists' Committee on Gynecologic Practice recommends that additional randomized studies are needed to determine whether chlorhexidine gluconate with 4% alcohol is more effective at preventing surgical site infection than povidone–iodine for standard surgical preparation of the vagina.¹³

Draping

Drapes should be applied in such a way that the site of the incision and any appropriate landmarks are visible. They must be placed accurately, as they offer lines which the surgeon will use to orientate himself. The use of self-adhesive paper drapes is a vast improvement on the old cloth drapes.

The adhesion to the skin is firm and complete and does not allow soiling beyond the adhesive area. There is no evidence that plastic adhesive drapes over the exposed skin reduce surgical site infection and some evidence that they increase infection rates. To date, wound edge protectors have not been shown to reduce surgical site infection except when using a dual-ring wound edge protector at contaminated laparotomies.

Anaesthesia

Details regarding anaesthetic management are outwith the remit of this book but current recommendations relating to enhanced recovery programmes include the following.

- Short acting anaesthetic agents should be used to allow rapid awakening.
- A ventilation strategy should be employed to reduce postoperative pulmonary complications.
- A multimodal approach should be employed to reduce postoperative nausea and vomiting, with increased use of regional anaesthesia and propofol use, while decreasing or eliminating opioids, neostigmine and volatile anaesthetics.
- Routine nasogastric intubation should be avoided and if inserted during surgery should be removed before reversal of anaesthesia.
- Maintenance of normothermia with suitable active warming devices should be used routinely.
- In major open surgery and for high-risk patients, the use of advanced haemodynamic monitoring, such as oesophageal doppler monitors, should be used.

The operation note

The operation note is often used in medicolegal cases and maintaining a proper and legible record is the professional responsibility of the surgeon. It is our view that the operation note should be written or dictated contemporaneously and should be made by the operating surgeon and not delegated to a junior member of staff. The Royal College of Surgeons of England, in its document *Good Clinical Practice*,¹⁴ recommends that every operation note is clear (preferably typed) and should record:

- date and time
- elective or emergency procedure
- names of the operating surgeon and assistants

- name of the theatre anaesthetist
- operative procedure carried out
- incision
- operative diagnosis
- operative findings
- any problems or complications
- any extra procedure performed and the reason why it was performed
- details of tissue removed, added or altered
- identification of any prosthesis used, including the serial numbers of prostheses and other implanted materials
- details of closure technique
- estimated or measured blood loss
- antibiotic prophylaxis (where applicable)
- DVT prophylaxis (where applicable)
- detailed postoperative care instructions
- signature.

We would also advocate the inclusion of a simple drawing or photos/video (if performed laparoscopically) of findings or special features. It is remarkable how valuable a simple drawing of the anatomy or special findings can be, particularly if there is a future legal action.

References

- 1 United Kingdom Supreme Court. *Montgomery (Appellant) v Lanarkshire Health Board (Respondent) (Scotland)*. [2015] UKSC 11.
- 2 Royal College of Surgeons of England. *Consent: Supported Decision-Making – A Good Practice Guide*. London: RCS; 2016.
- 3 Eliassen M, GrønkJær M, Skov-Ettrup LS, et al. Preoperative alcohol consumption and postoperative complications: a systematic review and meta-analysis. *Ann Surg* 2013;258:930–942.
- 4 National Institute for Health and Care Excellence. *Venous Thromboembolism: Reducing the Risk for Patients in Hospital*. Clinical Guideline [CG92]. London: NICE; 2010.
- 5 National Institute for Health and Care Excellence. *Routine Preoperative Tests for Elective Surgery*. NICE Guideline [NG45]. London: NICE; 2016.
- 6 Association of Anaesthetists of Great Britain and Ireland. *Pre-operative Assessment and Patient Preparation: The Role of the Anaesthetist*. London: AAGBI; 2010.
- 7 Keiron C, Akl EA, Ornelas J et al. *Antithrombotic Therapy for VTE Disease*. CHEST Guideline and Expert Panel Report. *Chest* 2016;149(2):315–352.
- 8 Güenaga KE, Matos D, Wille-Jørgensen P. Mechanical bowel preparation for elective colorectal surgery. *Cochrane Database Syst Rev* 2011;(9): CD001544. doi: 10.1002/14651858.CD001544.pub4.
- 9 Amer MA, Smith MD, Herbison GP et al. Network meta-analysis of the effect of preoperative carbohydrate loading on recovery after elective surgery. *BJS* 2017;104:187–197.
- 10 World Health Organization. *WHO Guidelines for Safe Surgery 2009: Safe Surgery Saves Lives*. Geneva: WHO; 2009.
- 11 de Vries EN, Prins HA, Crolla RM et al. Effect of a comprehensive surgical safety system on patient outcomes. *N Engl J Med* 2010;363:1928–1937.
- 12 Privitera GP, Costa AL, Brusaferrero S. Skin antisepsis with chlorhexidine versus iodine for the prevention of surgical site infection: A systematic review and meta-analysis. *Am J Infect Control* 2017;45:180–189.
- 13 American College of Obstetricians and Gynecologists. Solutions for surgical preparation of the vagina. Committee Opinion No. 571 (reaffirmed 2015). *Obstet Gynecol* 2013;122:718–720.
- 14 Royal College of Surgeons of England. *Good Clinical Practice*. London: RCSE; 2014.

Further reading

- General Medical Council. *Consent: Patients and Doctors Making Decisions Together*. London: GMC; 2008.
- Haynes AB, Weiser TG, Berry WR et al. and the Safe Surgery Saves Lives Study Group. A surgical safety checklist to reduce morbidity and mortality in a global population. *N Engl J Med* 2009;360:491–499.
- Klein AA, Arnold IP, Bingham RM et al. AAGBI guidelines: the use of blood components and their alternatives 2016. *Anaesthesia* 2016;71:829–842.
- National Institute for Health and Care Excellence. *Surgical Site Infections: Prevention and Treatment*. Clinical Guideline [CG74]. London: NICE; 2017.
- Nelson G, Altman AD, Nick A et al. Guidelines for pre- and intra-operative care in gynecologic/oncology surgery: Enhanced Recovery After Surgery (ERAS®) Society recommendations: Part I. *Gynecol Oncol* 2016;140:313–322.
- Oppedal K, Möller AM, Pedersen B, Tønnesen H. Preoperative alcohol cessation prior to elective surgery. *Cochrane Database Syst Rev* 2012(7):CD008343.
- Royal College of Obstetricians and Gynaecologists. *Obtaining Valid Consent*. Clinical Governance Advice No. 6. London: RCOG; 2015.
- Webster J, Alghamdi A. Use of plastic adhesive drapes during surgery for preventing surgical site infection. *Cochrane Database Syst Rev* 2015(4):CD006353.

CHAPTER 3

Instruments, operative materials and basic surgical techniques

The choice of instruments used by a surgeon is influenced by their mentors during the formative years of training. Surgical trainees should develop the habit of questioning their superiors as to why a certain piece of equipment is used in preference to another. They should experiment with the various instruments available to them and critically assess their strengths and weaknesses. Attending surgical procedures in other specialties exposes one to a further plethora of instruments often developed for specific situations but which can be transferrable to gynaecological surgery. With each new training appointment, the surgical trainee should scrutinize the instruments available in the basic trays, recognizing old favourites and rapidly evaluating new ones.

This critical evaluation of instruments should continue throughout a surgeon's professional practice, recognizing that no instrument is ideal for every situation. Currently, the generic tray system remains the central plank of instrument provision for the majority of gynaecological procedures and it is imperative that the surgeon dictates the content of the trays to represent the actual requirements of the surgeons involved. It is essential, however, that a surgeon does not develop a reputation for desiring every minor new development seen at surgical meetings but should insist on a broad but concise range of high-quality functioning equipment that does not continually irritate by failing to work, whether this be a simple pair of scissors or the most sophisticated laparoscopic piece of equipment.

The 'generic' tray should be assessed every so often, removing instruments that are rarely used

and introducing new instruments that the surgeon is using increasingly. With the increasing incidence of morbid obesity, it has become common for many departments to have a 'deep' tray available with extra long instruments.

As with all things, the need for specialized instrumentation has resulted in two major developments. The first is that emerging technologies have produced a number of new instruments aimed at achieving haemostasis during both open and laparoscopic procedures. These include vascular staples and a plethora of coagulation devices. The second is the wide range of disposable instruments developed specifically for laparoscopic surgery. This chapter concentrates on instrumentation and basic surgical techniques related to open surgery relevant to the lower genital tract and the vaginal and abdominal approach to the pelvic organs. However, the majority of sections are relevant to both open and minimal access surgery.

Instruments for major gynaecological procedures

The instruments used by the editors in their general operating set vary based on their preferences and years of experience. As surgeons develop their special interests, they may regularly use instruments not required by the generalist. Boxes 3.1 and 3.2 give examples of a basic major and minor tray suitable for everyday gynaecological surgery.

Box 3.1 Basic gynaecological abdominal set.

4 × Rampley sponge handle forceps
 2 × blade handles, no. 4
 1 × DeBaKey dissecting forceps, 200 mm
 1 × dissecting forceps, toothed, 175 mm
 1 × dissecting forceps, non-toothed
 1 × scissors, straight, 155 mm
 1 × scissors, straight, 200 mm
 1 × Monaghan dissecting scissors
 2 × needle holders, 200 mm
 1 × needle holder, 250 mm
 10 × Spencer Wells forceps, straight, 200 mm
 2 × Meigs (Navratil) artery forceps, long
 5 × Littlewood tissue forceps
 6 × 'Zeppelin' slight curved hysterectomy clamps, 220 mm
 1 × Vulsellum, toothed, 250 mm
 2 × Morris retractors (1 medium, 1 large)
 2 × Langenbeck retractors
 1 × Cushing vessel retractor
 1 × Raytec intra-abdominal pack
 1 × receiver
 2 × gallipots
 1 × ligature tray

Box 3.2 Basic minor procedure set.

1 × Sims vaginal speculum
 2 × sponge handle forceps
 1 × endometrial polyp forceps
 1 × vulsellum, toothed
 1 × uterine sound
 1 × set of cervical dilators
 1 × blade handle, no. 3
 2 × Spencer Wells forceps, straight, 200 mm
 3 × sharp curettes, small, medium and large
 1 × toothed dissecting forceps, 175 mm
 1 × scissors, straight, 155 mm
 1 × needle holder, 200 mm

Editors' picks

The majority of the instruments are standard but this section is dedicated to the editors' favourites that they felt warranted special comment.

Scissors

Bonney dissecting scissors (Figure 3.1) are often marketed as Mayo scissors. They are heavy but have a sureness about them that allows for accurate gentle dissection, particularly of the 'separate and cut' type. The ends of the scissors are relatively blunt and will do little damage when separating tissue, whereas the blades are powerful enough when coupled with the long levers of the handles to cope with the toughest of scar tissue. This latter characteristic is especially important in cancer work when operating on tissues previously treated with radiotherapy.

Monaghan dissecting scissors (Figure 3.2) were developed out of a need for a lighter pair of dissecting scissors which retained the wonderful 'feel' of the Bonney scissor without the weight. This instrument has allowed the scissor dissection technique taught by the editors to reach the level of anatomical dissection required to meet the most stringent standards of cancer surgery. The tips of the instrument remain relatively blunt but do allow for accurate point dissection without the risk of trauma to tissues to be preserved.

Tissue clamps

On many occasions in gynaecological surgery it is necessary to clamp discrete blocks of tissue firmly and then suture the block to occlude the vessels contained within it. It is important that these clamps are strong, that the jaws appose accurately and that tissue does not slide out from between the jaws.

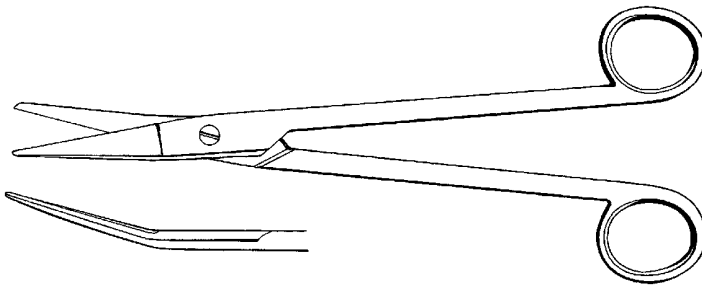


Figure 3.1 Bonney gynaecological scissors.

(a)



(b)

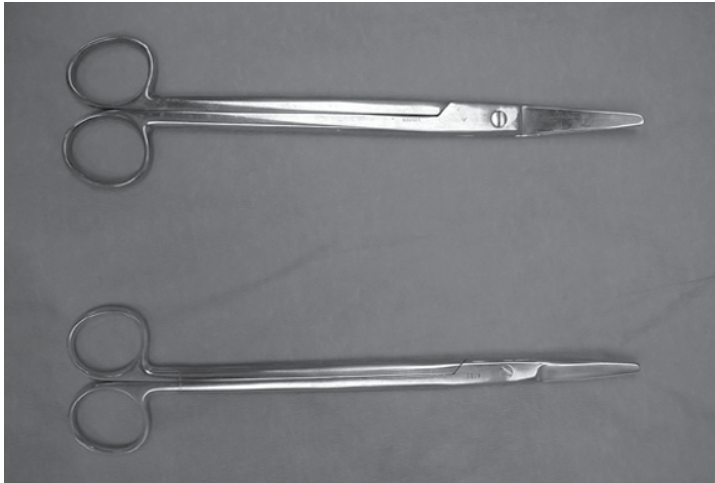


Figure 3.2 (a) Monaghan gynaecological scissors. (b) Comparison of Bonney scissors (top) and Monaghan scissors (bottom).



Figure 3.3 Hysterectomy clamps.

Many different varieties have been designed and produced, which is probably a reflection that these requirements are difficult to achieve. As a general principle, it appears that those designs with longitudinal ridging of the jaws have an advantage over those with transverse ridging.

Hysterectomy clamps (220 mm) with a slight curve and 2/3 atraumatic jaws are shown in Figure 3.3. The *Zeppelin* and *Downs* hysterectomy clamps used by two of the editors are examples of instruments

that meet the requirements mentioned above. Markedly angled clamps are useful when incision of a pedicle is required at right angles to the line of application of the clamps (e.g. when clamping the paracolpos during a Wertheim hysterectomy).

Dissecting forceps

Single forceps (Figure 3.4) are used to grasp the nodal tissue during pelvic and para-aortic node dissection. These instruments are similar to Russian

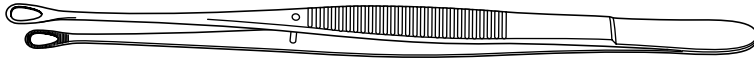


Figure 3.4 Singley forceps.

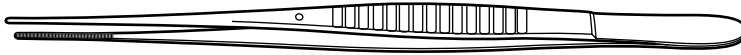


Figure 3.5 DeBakey forceps.

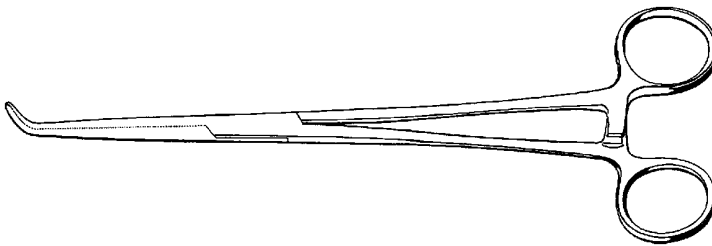
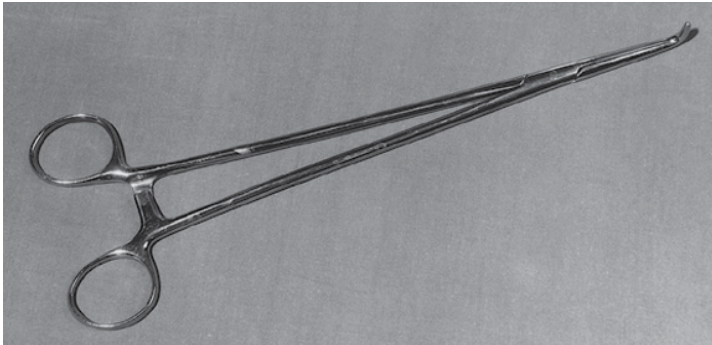


Figure 3.6 Meigs–Navratil forceps.

forceps except they are somewhat lighter as the central defect removes unnecessary weight and, with concentric transverse ridges, allows for an improved ability to grasp and place counter-traction on the nodal tissue.

DeBakey forceps (Figure 3.5) were developed by the famed cardiovascular surgeon for use during cardiothoracic surgery. They provide a fine, delicate and atraumatic surface allowing for the handling of delicate tissues.

Artery forceps

Artery forceps can be straight or curved, based on the surgeon's personal preference, and include the *Meigs–Navratil forceps* (Figure 3.6). The use of right-angled forceps such as these is of great value in dealing with vessels deep in the pelvis; the right angle of the small head of the instrument allows

ties to be accurately placed. The throw of the suture material or tie can be placed around either the points or the heel of the forceps and, if the assistant then rotates the forceps, the opposite end automatically loops around the tie, allowing the surgeon to deal with vessels surely and confidently. As with many instruments in the set, the Meigs–Navratil forceps are long, reaching easily into the depths of the pelvis.

Retractors

Self-retaining retractors

The *Balfour self-retaining retractor* (see Figure 4.6), designed by the gastrointestinal surgeon Donald Balfour, is the standard retractor used by most gynaecologists. The central blade is adequate for standard procedures but in complex cases the editors prefer to use a handheld retractor or the

Martin arm retractor to allow adjustments during the operation.

Ronald Edwards and *Finochietto retractors* have a rack and pinion mechanism and were originally developed as rib spreaders in thoracic surgery. They have been modified for abdominal procedures and are excellent for retraction when a large midline incision has been used.

Martin arm retractors have two joints that allow for 360-degree movement and a locking mechanism that allows the placement of any retractor into its jaws. This is an ideal instrument to hold in place retractors that would normally require multiple assistants. This retractor is particularly effective in performing upper abdominal surgery, providing excellent elevation and retraction of the rib cage and gaining exposure to the retroperitoneal lymph nodes.

The *Bookwalter retractor* is a self-retained retractor system which attaches to the operating table, from which rings of different sizes are attached. A variety of adjustable retracting blades can be placed at any desired location around the suspended ring and the angle of that blade be individualized at the point of fixation on the ring.

Handheld retractors

The *Morris retractor* (see Figure 4.7) has a lip which aids the elevation of the wound edge. The shallower blade of the retractor is less likely to endanger the delicate internal structures, as may occur with deeper retractors. The *Cushing vessel retractor* is an ideal retractor for displacing the iliac vessels during pelvic lymphadenectomy.

Sutures

Suture materials

It is important to understand that there is no ideal, universal, suture material. The purpose of a suture material is to hold tissue in apposition until such time that the tissues have achieved enough tensile strength to maintain the apposition. Successful repair requires not only proper surgical techniques but also knowledge of the physical characteristics and properties of the suture and needle.

Ideal suture characteristics

The characteristics of the ideal suture include good knot security, inertness, adequate tensile strength, flexibility, ease of handling, non-allergenic nature, resistance to infection, smooth passage through the tissues and absorbability. Sutures are classified as natural or synthetic, monofilament or multifilament, absorbable or nonabsorbable. Synthetic materials have all but replaced natural materials such as catgut and silk. The smooth surface of monofilament sutures causes less tissue trauma and prevents harbouring of microorganisms unlike multifilament sutures. However, multifilament sutures have greater strength and are soft and pliable, making handling and knotting easier.

Absorbable sutures provide temporary wound support; with synthetic materials, absorption is by hydrolysis, causing less tissue reaction than natural sutures such as catgut, which is absorbed by proteolytic enzymatic digestion. It is important to recognize that loss of tensile strength and rate of absorption are not related. Table 3.1 lists the absorbable synthetic

Table 3.1 Absorbable suture materials.

Suture, trade name (year developed)	Construction	Time to complete loss of tensile strength (days)	Absorption profile (days)	Uses
<i>Rapidly absorbable sutures:</i>				
Polyglycolic acid, Dexon II (1968–70)	Multifilament	28	60–90	
Polyglactin 910, Vicryl (1974)	Multifilament	28	56–70	Pedicles
Polyglactin 910, Vicryl Rapide (1987)	Multifilament	14	42	Ileal conduit T tube fixation stitch
<i>Slowly absorbable sutures:</i>				
Polydioxanone, PDS II (1981)	Monofilament	63	183–238	Rectus sheath; intestine
Polyglyconate, Maxon (1984)	Monofilament	56	180	
Poliglecaprone 25, Monocryl (1992)	Monofilament	21	91–119	Intestine; urinary tract; subcuticular stitch

suture materials used by the editors with their strength retention and absorption profiles.

Antibacterial forms of some of these sutures have been produced to try to reduce the risk of infection with conflicting results on their benefit in the recent literature.

Nonabsorbable suture material such as nylon or polypropylene is used for permanent wound support in slowly healing tissues, such as for closure of the rectus sheath. Care must be exercised in their use as their permanent nature always runs a small risk of sinus formation to skin or other structures.

Suture selection

As with surgical instruments, once the various characteristics of the available suture materials are understood, the choice depends on the surgeon's training and preference, as numerous suture materials are available for each location and structure. The surgeon should select the finest suture that adequately holds the healing wound edges and the tensile strength of the suture should never exceed the tensile strength of the tissue. Sutures are needed only long enough for a wound to reach maximum strength. The surgeon should therefore consider slowly absorbable or nonabsorbable sutures in skin and fascia (slowly healing tissues), whereas mucosal wounds (rapidly healing tissues) may be repaired with rapidly absorbable sutures.

In the presence of contaminated tissue, monofilament sutures should be used, as multifilament materials are more likely to harbour microorganisms and degrade more rapidly. Common errors of suture use are:

- too many throws, which increases foreign body size and can cause stitch abscesses
- intracuticular rather than subcuticular sutures, which can cause hypertrophic scars
- holding monofilament sutures with instruments reduces tensile strength by over 50%.

Suture needles

Virtually all needles used today are swaged (eyeless) needles in which the needle is drilled and the suture is inserted into the base of the needle, creating a continuous unit. These needles have obvious advantages over the old eyed needles. A modification of the standard permanent swaged suture is the controlled release or 'pop-off' suture, in which the

needle and suture are easily separated by means of a light tug. These sutures facilitate rapid interrupted suturing techniques and are favoured by some surgeons.

Needles have three basic components: the swage as discussed above, the body and the point. The body of the needle is the part grasped by the needle holder and its curvature can vary, giving different characteristics. The curvature may be a one-quarter, three-eighth, one-half or five-eighth circle, with the half-circle probably being the most commonly used in gynaecology. In a deep narrow pelvis or other area with limited space, there is some advantage to using a smaller needle and an increased curve to allow easy passage of the needle.

There are three types of points: cutting, taper and blunt. The cutting needle is designed for cutting through dense tissue such as fascia and skin. The reverse cutting needle has its third cutting edge on the outer convex curvature, reducing the risk of tissue cutout. The taper point has no cutting edge and the needle pierces and spreads the tissue without cutting it, making it ideal for easily penetrated tissue such as bowel, bladder and peritoneum. Blunt point needles dissect rather than cut tissue; they are usually used to avoid needle stick injuries, especially in high-risk patients.

Editors' picks

The editors' favourite sutures include:

- *General*: W9421 – Ethicon polyglactin 910 (coated Vicryl) 1 gauge; 90 cm long with a 40 mm half-circle reverse cutting needle; a general purpose suture, including for hysterectomy pedicles and vaginal vault.
- *Rectus sheath*: W9262 – Ethicon polydioxanone (PDS II) 1-gauge loop; 150 cm long with a 48 mm half-circle taper point needle; for a continuous suture.
- *Skin*: W3650 – Ethicon poliglecaprone 25 (Monocryl) undyed 3/0 gauge; 70 cm long with a 60 mm straight cutting needle; for a subcuticular suture.
- *Bowel*: W3664 – Ethicon poliglecaprone 25 (Monocryl) 3/0 gauge; 70 cm long with a 26 mm half-circle JB Visi-black taper point plus needle.

Suture techniques

Appose not necrose.

John M Monaghan

In previous editions of this book, a large variety of suture techniques were shown. We have selected those that are of most value to the gynaecologist and, where possible, retained some of Bonney's original drawings.

Interrupted sutures

Interrupted sutures use a number of strands to close the wound, with each strand tied and cut separately. This provides a more secure repair than the continuous suture because, if one suture breaks, the remaining sutures will hold the wound edges together. They are used where there is infection present and suture viability might be compromised.

The interrupted suture may be simple (Figure 3.7) or a vertical mattress (Figure 3.8). The mattress suture has the added advantage that haemostasis will be further improved by an increased area of local pressure on fine bleeding points. A horizontal mattress suture spreads tension along a wound and is used for pulling wound edges together over a distance or as the initial suture to anchor two wound edges (holding sutures; Figure 3.9). With both mattress techniques, it is important to note that the suture should be used to appose the tissues, not to necrose them; excessive force must not

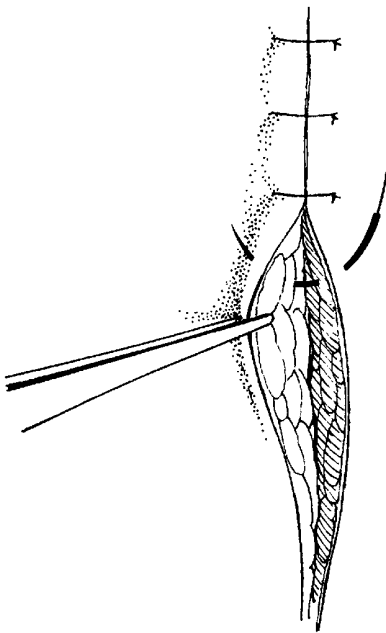


Figure 3.7 Simple interrupted suture.

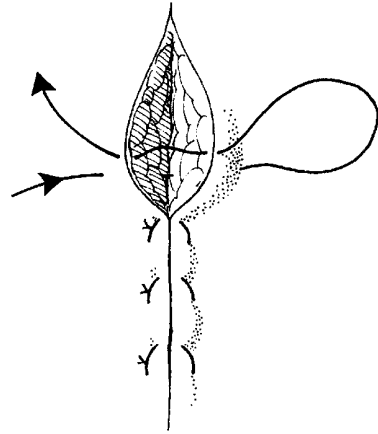


Figure 3.8 Vertical mattress suture.

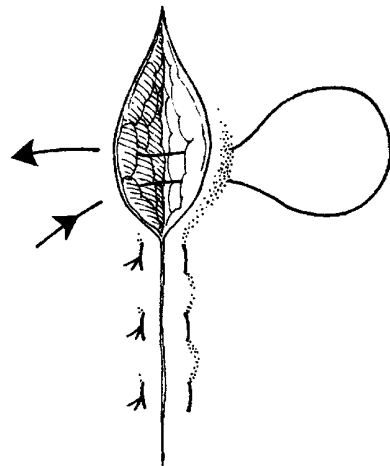


Figure 3.9 Horizontal mattress suture.

be used. Following all surgery, the tissue thickness will initially increase, so the suture can be placed relatively lightly to achieve apposition and haemostasis.

Continuous sutures

Continuous sutures can produce a near perfect closure and apposition of two surfaces with excellent haemostasis. This technique is more rapidly performed than interrupted sutures and obviously requires fewer knots. It derives its strength from tension being distributed evenly along the full length of the suture. In the presence of infection, a monofilament suture should be used to avoid infection being transmitted along its full length.

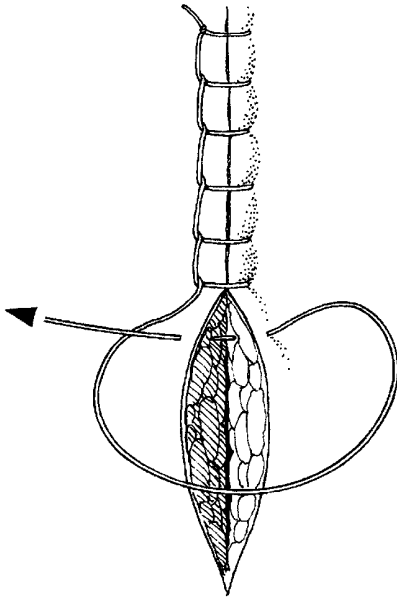


Figure 3.10 Locked or blanket sutures.

Locked or blanket stitches (Figure 3.10) are of great value in achieving haemostasis and are used to oversew the vaginal edge at the completion of the hysterectomy procedure.

Subcuticular sutures

Subcuticular sutures are popular for skin closure as they give an immediate attractive cosmetic effect. They can be performed as a continuous suture or interrupted. A fine absorbable monofilament suture such as Monocryl is ideal for large incisions as it results in minimal scarring and can be left in situ while the wound strength increases.

Other sutures

Puckering sutures are used for shortening tissues and where there is a series of small vessels in a tissue edge which cannot be easily dealt with individually (Figure 3.11).

Purse-string sutures (Figure 3.12) are continuous sutures placed around a lumen and tightened like a drawstring to invert the opening. They can be used prior to inserting a tube, such as for drainage of a large benign ovarian cyst, and to repair small defects in the bladder or bowel. Although traditionally used for burying the stump of the appendix (Figure 3.13), this is now thought to be unnecessary.

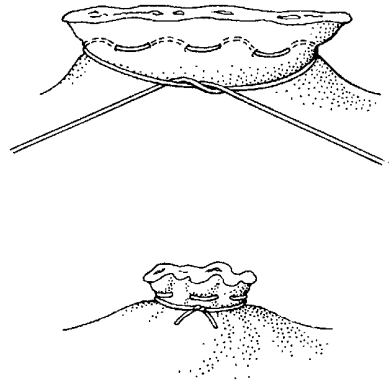


Figure 3.11 Puckering sutures.

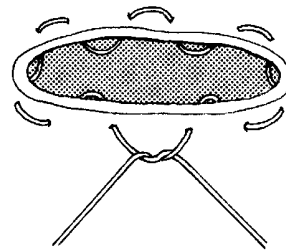


Figure 3.12 Purse-string suture.

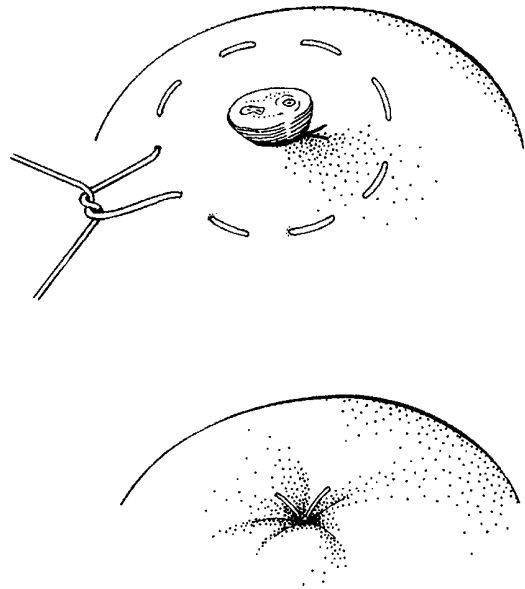


Figure 3.13 Purse-string inverting sutures.

Surgical knots and methods of tying

Facility in tying knots is an important part of the surgical technique in which all young surgeons should attempt to excel. They must also remember that it is not adequate to be competent to tie one knot – they should practice a wide variety, learning the indication for their uses as skills improve. As an assistant, the young surgeon learns to cut the tails of sutures accurately and quickly, taking care to leave a short but adequate length. The cut should be made with the scissors stationary and with due regard to the position of the tips of the blades at the end of the cutting stroke. The assistant must become proficient in cutting sutures with the nondominant hand so as not to be continually transferring instruments between hands. Equally, the surgeon should present the suture in such a way that the assistant can easily see and safely cut without causing any hazard to adjacent tissues or organs.

It is often tempting to try to use very short lengths of suture material in difficult places; this practice must be eschewed. The suture material for knot tying must be presented to the surgeon in at least ‘half lengths’ and, ideally, on the reel so that the surgeon can efficiently continue to tie without continually asking for more suture. This mode of presentation is also more economical in the long term.

The granny knot

The granny knot is the simplest and quickest knot to make, consisting of two identical hitches. It has the advantage that the first hitch is easily held tight while the second is being made and that should the first tie slip the second will tighten it up again. This applies only to monofilament suture materials that slide. If surgeons use multifilament sutures, they must learn to tie all knots as they wish them to end up – the tension on the first knot must be exactly as it is wished to be, as there is no possibility of ‘snugging’ down the second throw. Granny knots are not recommended, as they have a tendency to slip when subjected to increased stress. For this reason, when the granny knot is used, a third opposite throw is an important safety feature.

The reef (square) knot

The reef knot consists of two hitches, one tied with one end of the ligature and one tied with the other end. Figure 3.14 shows the technique of tying as described by Bonney. This two-handed technique produces a firm knot but it is possible, by crossing the hands, to perform a reef knot using the one-handed technique.

The surgeon’s (friction) knot

The surgeon’s knot is a simple modification to the reef knot. It adds an extra twist when tying the first throw, forming a double overhand knot, thus adding friction which makes the knot more secure.

It is important to remember that any suture with a knot in it is significantly weaker than one without. Do not, therefore, be surprised to find suture material breaking at the knot when excess tension is applied.

The single-handed knot

This fast, elegant and simple technique of single-handed tying with the left hand allows the surgeon to operate dexterously and rapidly without putting down the instruments or requiring special tools for tying knots. The technique is shown in Figure 3.15 (1–4).

The instrument tie

The instrument tie is an elegant method of tying, shown in Figure 3.15 (5,6). It is particularly useful when there is only a short piece of suture material available.

Knot tying in deep holes

It has been recommended that the lasso technique be used when a bleeding point occurs in a deep or inaccessible spot. The editors would instead recommend the use of a long, angled clamp such as the Meigs–Navratil. This type of clamp, which has the attributes of gallbladder forceps, will allow the tie to be hooked around either the heel or the tip of the clamp so that it is firmly held while the knot is being made (Figure 3.16). If the bleeding point is extremely difficult to reach, the use of preloaded small metal artery clips such as the Ligaclip MCA (Ethicon Endo-Surgery Inc.) is of enormous value (Figure 3.17).

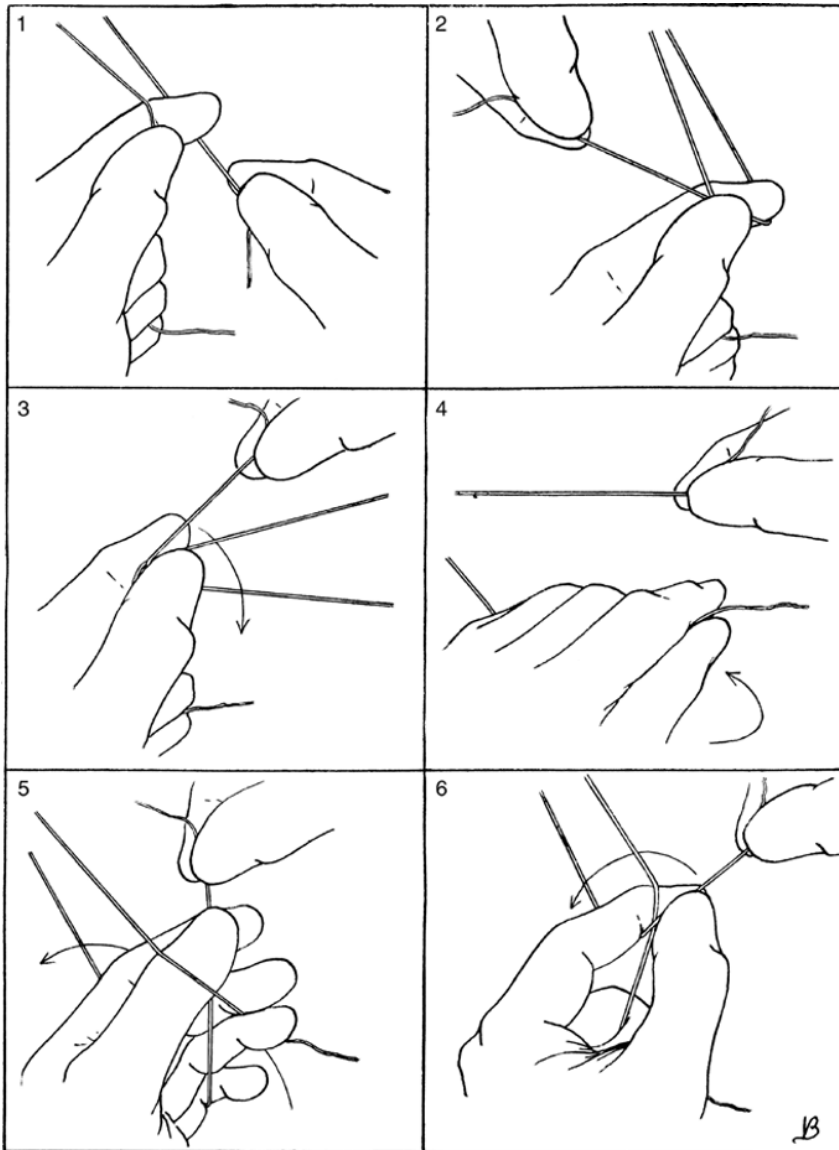


Figure 3.14 Reef knot.

Tying pedicles

In their original textbook, Berkeley and Bonney described nine different ways in which pedicles may be tied but, other than the simple pedicle tie, the others were variations on the transfixion stitch. The material to be ligated is held in a clamp, which is placed so that a small part of the tip projects beyond the tissue to be tied. This allows the suture material to be firmly held by hooking it around the projecting tip while the knot is tied.

Simple pedicle ties

The ligature may be simple, carrying the entire throw around the mass of tissue to be ligated (Figure 3.18a). The major drawback of this method is the potential for slipping; this risk is reduced if the tension is adequate and if the tissue beyond the tie is of a reasonable amount. It is important to remember not to be too ambitious and try to include so large a mass that the edges slip out and produce haemorrhage, which may be difficult to control. Remember that the simple loop pedicle

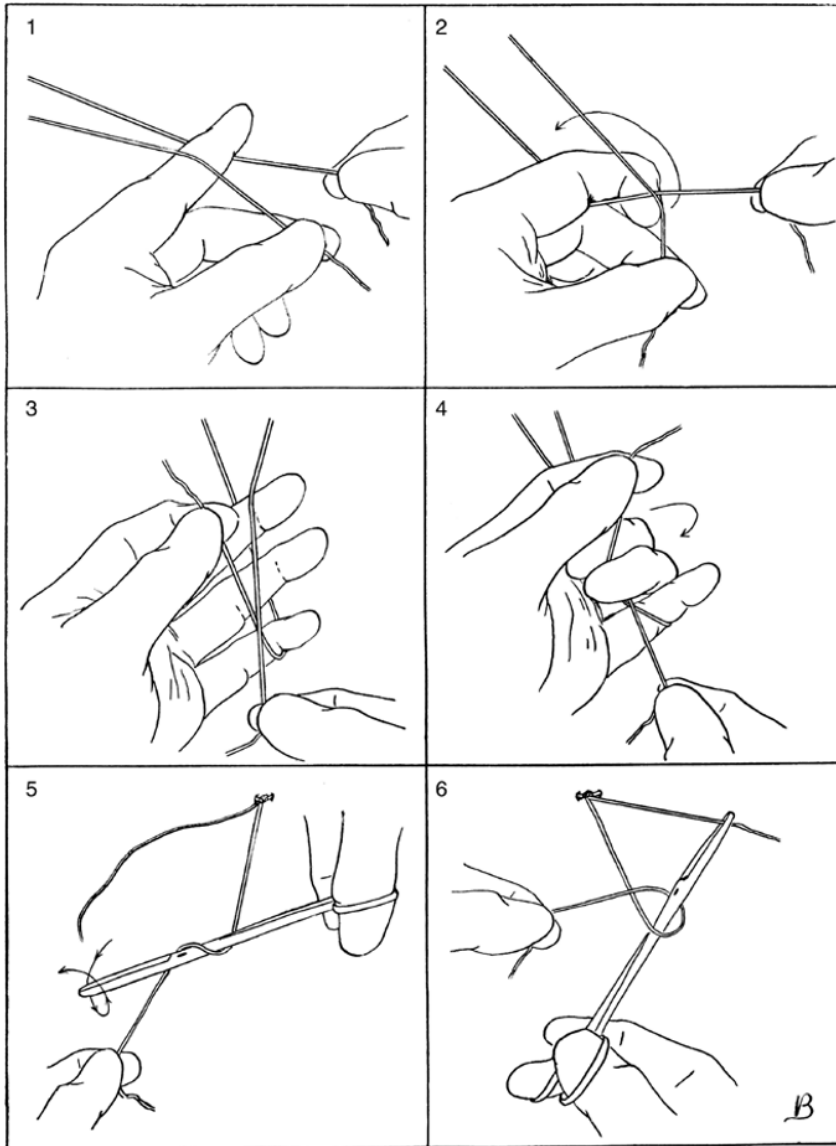


Figure 3.15 (1–4) The single-handed knot and (5, 6) forceps knot (after Bonney).

ligature should never be used if there is tension on the pedicle. Double tying of pedicles should not be used as the tissue distal to the proximal tie is considerable, resulting in a large amount of necrotic material that can become infected.

Transfixion stitches

The mass of material to be ligated can be transfixed at one or both ends (Figure 3.18b,c) so that the ligature will not slip and material escape. The transfixion stitch should be used with great care in

pedicles, which are known to contain significant blood vessels. The risk of damage to vessels is greatest when suturing the ovarian or uterine pedicles during a total hysterectomy. The ovarian vessels in the infundibulopelvic ligament are thin and wide. It is the editors' practice to use a simple tie and not to put any tension upon the pedicle. The uterine artery or a large vein may be pierced when stitch ligaturing the lower pedicles alongside the uterus during a hysterectomy. When this occurs, a rapidly developing haematoma grows into the soft tissues

of the broad ligament behind the pedicle, discolouring the tissues and making identification of bleeding points extremely difficult. It is not usually safe to simply reclamp the bleeding area as the vein or artery often retracts once it is cut so that the pelvic sidewall will need to be opened to identify the bleeder and preventing potentially significant retroperitoneal bleeding.

There is also considerable danger in blindly clamping alongside the uterus and cervix, as the ureter is not far away. It is better to open up the pelvic sidewall, identify the uterine artery at its origin, tie it and then follow it through to the uterus over the top of the ureter. This simple demonstration of the ureter in its lower course is immensely reassuring.

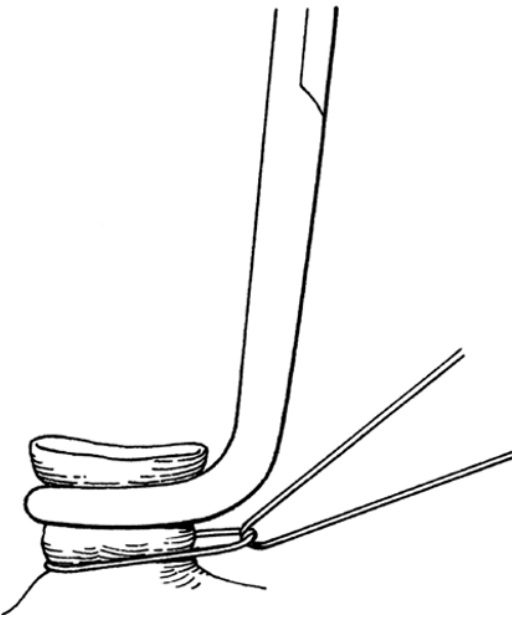


Figure 3.16 Tying a pedicle around Meigs forceps.

Staples

The use of staples in surgery began in Hungary in the early part of the twentieth century when Hultl designed staples that closed into a 'B' shape, setting the standard pattern for the remainder of the century. In general, gynaecology stapling has not enjoyed a significant role except for skin closure.

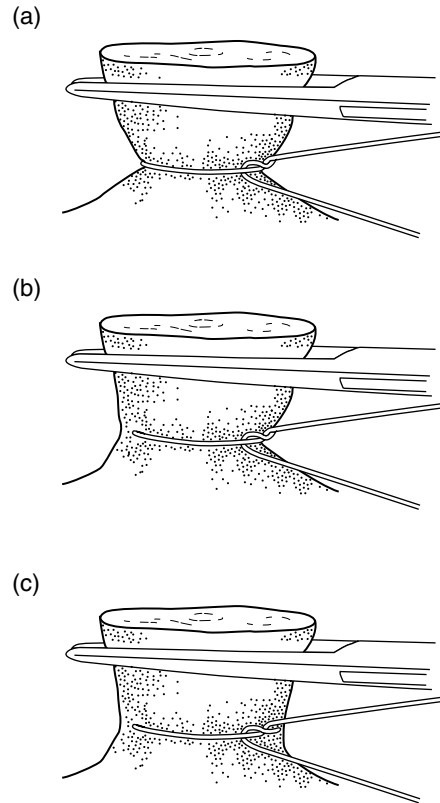


Figure 3.18 (a) Simple pedicle tie. (b) Single-end transfixion tie. (c) Double-ended transfixion tie.

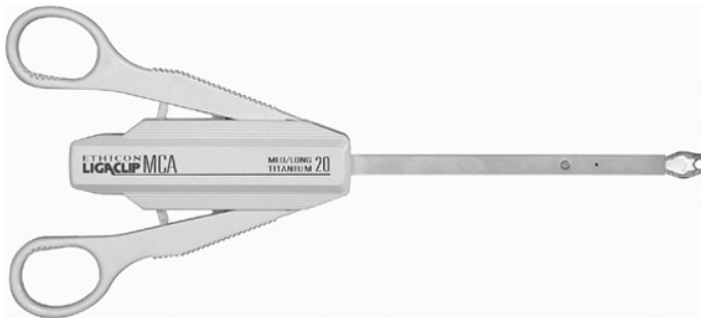


Figure 3.17 A disposable multiple clip applicator. Reproduced with permission from Johnson & Johnson.