Drug Dosage. The authors and the publisher have exerted every effort to ensure that drug selection and dosage set forth in this text are in accord with current recommendations and practice at the time of publication. However, in view of ongoing research, changes in government regulations, and the constant flow of information relating to drug therapy and drug reactions, the reader is urged to check the package insert for
each drug for any
c change in indications and dosage and for added warnings and precautions. This is particularly
important when the
recommended agent is a new and/or infrequently employed drug.

All rights reserved. No part of this publication may be translated into other languages, reproduced
or
utilized in any form or by any means, electronic or mechanical, including photocopying, recording,
 microcopying,
or by any information storage and retrieval system, without permission in writing from the
publisher.

© Copyright 1995 by S. Karger AG, P.O. Box, CH-4009 Basel (Switzerland)
Printed in Switzerland on acid-free paper by Thür AG Offsetdruck, Pratteln
ISBN 3-8055-6031-1

Contents

Preface XI

Basics of Hernia Surgery
General Considerations
Epidemiology, Pathogenesis and Natural History 2
Kingsnorth, A.N. (Liverpool)
Discussion following the Paper by Kingsnorth 6
Anatomy and Variations of the Internal Inguinal Region 8
van Mameren, H.; Go, P.M.N.Y.H. (Maastricht)
Discussion following the Paper by van Mameren and Go 15
Anatomic Considerations for Laparoscopic Herniorrhaphy 16
Annabili, R.; Filipi, C.J.; Fitzgibbons, R.J., Jr.; Quinn, Th.H. (Omaha, Nebr.)
Discussion following the Paper by Annabili et al. 20
Biological Considerations in the Repair of Hernias 22
Ehrlich, H.P. (Hershey, Pa.)
Discussion following the Paper by Ehrlich 26
Value of Ultrasound in the Diagnosis of Undetermined Findings in the Abdominal
Wall and Inguinal Region 29
Truong, S.N.; Pfingsten, F.; Dreuw, B.; Schumpelick, V. (Aachen)
Discussion following the Papers by Truong et al. 42

Classification
Gilbert Classification of Inguinal Hernias: An Anatomic and Functional Tool 44
Gilbert, A.I. (Miami, Fia.)
The TSD Classification: A Nomenclature for Groin Hernias 48
Bendavid, R. (Thornhill, Ont.)

About Classification of Groin Hernias 56
Stoppa, R.; Henry, X. (Amiens)

The Aachen Classification of Inguinal Hernia 60
Arlt, G.; Schumpelick, V. (Aachen)

Discussion following the Session on Classification 63

Pre-Surgical Evaluation
Groin Hernias: Indications and Urgency 65
Devlin, H.B. (Stockton-on-Tees)

Discussion following the Paper by Devlin 68
Indication for Surgery with Special Respect to Comorbidity 69
Kingsnorth, A.N. (Liverpool)

Discussion following the Paper by Kingsnorth 72

Obesity and Hernia Surgery 75
Bendavid, R. (Thornhill, Ont.)

Discussion following the Paper by Bendavid 78
Preparation of Patients for Hernia Surgery 79
Treutner, K.-H. (Aachen)

Discussion following the Paper by Treutner 84

Local Anesthesia
Local Anesthesia for Inguinal-Femoral Hernia Repairs 85
Moran, R.M. (La Puente, Calif.)

Local Anesthesia for Inguinal Hernia Repair 88
Shulman, A.G.; Amid, P.K.; Lichtenstein, I.L. (Los Angeles, Calif.)

Local Anesthesia for the Shouldice Repair of the Inguinal Hernia 92
Peiper, Ch.; Schumpelick, V. (Aachen)

Discussion following the Session on Local Anesthesia 99

Techniques of Hernia Surgery

Open Approach
Open Approach: Skin Incision and Dissection of Hernias 102
Brauns, J. (La Puente, Calif.)

Handling the Nerves, Vessels and Hernia Sacs in Inguinal Hernioplasty 109
Wantz, G.E. (New York, N.Y.)

Contents VI

Open Approach in Surgery for Incarcerated Hernias 117
Zauner, B.; Wayand, W. (Linz)
The Shouldice Repair 122
Bendavid, R. (Thornhill, Ont.)
Technique of Shouldice Repair in Great Britain 135
Barwell, N.J. (Truro)
Technique of Shouldice Repair in Germany 139
Schumpelick, V. (Aachen)
Preperitoneal Repair of Groin Hernias without Mesh 149
Kux, M. (Wien)
Open Approach in Femoral Hernia Repair 152
Barwell, N.J. (Truro)
Bilateral Inguinal Hernia Repair 155
Devlin, H.B. (Stockton-on-Tees)
Discussion following the Paper by Devlin 157
Treatment of Bilateral Hernias by Open Surgery: The Stoppa Preperitoneal Repair 158
Katkhouda, N. (Los Angeles, Calif.)
Discussion following the Session on Open Approach 161

Meshes

Chemistry, Geometry and Physics of Mesh Materials 166
Stoppa, R.; Soler, M. (Amiens)
Mesh Materials in Hernia Repair 172
Brenner, J. (Norderstedt)
Discussion following the Paper by Brenner 180
Meshes: Experimental Results and Review of the Literature 182
Klinge, U. (Aachen)
Open Tension-Free Repair for Primary Inguinal Hernia 195
Shulman, A.G.; Amid, P.K.; Lichtenstein, I.L. (Los Angeles, Calif.)
Gilbert’s Sutureless Repair of Inguinal Hernia. An Open Mesh Technique 201
Gilbert, A.I. (Miami, Na.)
The Moran Repair for Inguinal Hernias 206
Moran, R.M.; Brauns, J.; Petrie, C.R.; Novak, B.P.; Johnsrud, J.M.
(La Puente, Calif.)
Open Mesh Hernia Repair: Stoppa GPRVS Procedure 212
Stoppa, R.; Henry, X. (Amiens)
Preperitoneal Hernioplasty with Mersilene Unilateral Giant Prosthetic Reinforcement of the Visceral Sac 222
Wantz, G.E. (New York, N.Y.)
Discussion following the Session on Meshes 233

Contents VII
Laparoscopic Approach
Laparoscopic Hernia Repair 236
Woisetschläger, R.; Wayand, W. (Linz)

Technique of Laparoscopic Hernia Repair by Transabdominal Preperitoneal Mesh Prosthesis 240
Klaiber, Ch. (Aarberg)

Laparoscopic Treatment of Inguinal Hernias by a Transabdominal Preperitoneal Approach 243
Katkhouda, N. (Los Angeles, Calif.)

Transabdominal Preperitoneal Laparoscopic Herniorrhaphy. Results and Technical Aspects in 720 Repairs 251
Crafton, W.B. (Cincinnati, Ohio)

Transabdominal Preperitoneal Repair: Mesh Size and Fixation Technique 255
Filipi, C.J.; Fitzgibbons, R.J., Jr. (Omaha, Nebr.)

Extraperitoneal Laparoscopic Hernia Repair. A Personal Experience 259
Taylor, R.S. (London)

Extraperitoneal Endoscopic Inguinal Hernia Repair 262
Hourlay, P. (Hasselt)

Laparoscopic Extraperitoneal Approach for Inguinal Hernia Repair 269
Jehaes, C. (Liège)

Discussion following the Papers by Katkhouda, Crafton, Filipi and Fitzgibbons, Hourlay, and Jehaes 273

Training in Laparoscopic Hernia Repair 277
Katkhouda, N. (Los Angeles, Calif.)

Discussion following the Paper by Katkhouda 281

Results of Hernia Surgery

Review of the Literature
Results of Open Approach in Inguinal Hernia Repair. A Review of the Literature 284
Töns, Ch. (Aachen)

Results of Laparoscopic Inguinal Hernia Repair. A Review of the Literature 289
Schippers, E. (Aachen)

Discussion following the Session on Review of the Literature 296

Postoperative Course
Quality Control of Follow-Up in Hernia Surgery 298
Kingsnorth, A.N. (Liverpool)

Discussion following the Paper by Kingsnorth 301

Quality Control in Inguinal Hernia Surgery 303
Arlt, G. (Aachen)

Discussion following the Paper by Arlt 306
Contents VIII

Return to Activity after Groin Hernia Repair in Europe  307
Kux, M. (Wien)
Activity following Herniorrhaphy 310
Bendavid, R. (Thornhill, Ont.)
Discussion following the Papers by Kux and Bendavid 312
Return to Activity after Hernia Repair in the United States 314
Gilbert, A.I. (Miami, Fia.)
Discussion following the Paper by Gilbert 319
Complications
Complications in Open Hernia Surgery 320
Greco, D. (Milan)
Complications in Open Surgery 326
Klinge, U. (Aachen)
Potential Risks and Complications of Laparoscopic Hernia Repair  340
Klaiber, Ch. (Aarberg)
Perfusion of the Testicles and Ischemic Orchitis 345
Wantz, G.E. (New York, N.Y.)
Discussion following the Papers by Klaiber and Wantz 354
Doppler and Duplex Ultrasound Examination of Testicular Blood Flow and
Localization in Recurrent Inguinal Hernia Repair 357
Truing, S.N.; Höfer, M.; Schadde, S.; Schumpelick, V. (Aachen)
Chronic Pain after Hernia Repair 365
Devlin, H.B. (Stockton-on-Tees)

Personal Experience
Inguinal Hernias in Children: Indication, Technique, Causes of Recurrences 368
Willital, G.H. (Münster); Steinau, G. (Aachen)
Discussion following the Paper by Willital and Steinau 377
Results of Open Techniques of Hernia Repair 379
Bendavid, R. (Thornhill, Ont.)
Discussion following the Paper by Bendavid 394
Results of Open Tension-Free Mesh Patch Repair of Primary Inguinal Hernias 395
Shulman, A.G.; Amid, P.K.; Lichtenstein, I.L. (Los Angeles, Calif.)
Results after Stoppa Procedure 399
Stoppa, R.; Verhaeghe, P. (Amiens)
Discussion following the Papers by Shulman et al., and Stoppa and Verhaeghe 403
Recurrence and Complication Rate after Laparoscopic Herniorrhaphy  404
Filipi, C.J.; Fitzgibbons, R.J., Jr. (Omaha, Nebr.)
Recurrence Rates of Extraperitoneal Repair 408
Taylor, R.S. (London)
Inguinal hernia repair is the most common surgical procedure. Worldwide more than ten hernia repairs are performed every minute by numerous surgeons using thousands of different techniques. Since the standards set by Bassini in 1881, a continuous flow of 'technical innovations', retrospective analyses, case reports, and personal experiences fill the literature on hernia surgery. Only very few controlled prospective trials offer guidance through this jungle of personal emotions, subjective attitudes, and historical traditions.

Quality control, however, is of foremost importance in this field of everyday surgery. The outcome of hernia repair, like no other operation, can be followed up with ease during an average period of more than 20 years. Differences regarding higher recurrence rates, increased postoperative pain, extended loss of working time, and restricted physical activity may be of merely minor importance for the individual patient. Multiplied by the figure of about 15 million annual operations worldwide, however, even minor disadvantages have an astronomical impact on the socioeconomic costs of hernia repair. Therefore, standards for indication, classification, technique, follow-up and return to activity must be defined. The obvious need for standardization gains further momentum within the scope of the development of laparoscopic hernia surgery. The new methods have to be evaluated against the conventional procedures regarding costs, results and benefit for the patients. Subjective attitudes and emotional reactions do not offer
any help in this comparison of old versus new surgical techniques.  
The generation gap between the traditional surgeons and the `revolutionary youth' in hernia repair should be closed by objective analyses and academic discussions. The patients do not benefit from emotional arguments, they are only interested in the most atraumatic technique and the best long-term results.

The idea to find a path out of this jungle and to end the emotional discussion prompted the invitation of 32 renowned specialists in hernia surgery to a remote place in the Swiss Alps for a 4-day closed workshop. Neither press, nor company or audience were allowed to a family-type setting. The sole purpose of these `Swiss peace talks' was to find reliable truths and to define standards of inguinal hernia repair.

The results of this meeting were overwhelming for each of the participants. Gaps closed, knowledge increased, and emotions vanished. In the end, former combatants had become friends and hernia surgery had gotten a new start based on exact techniques, proven results, comparable classifications and well-defined indications. We all experienced the feeling that hernia repair is best prepared for the future by these measures.

We thank the Karger family and the staff of Karger publishers, particularly Dr. Angela Weber, for the production of this book with its scientific articles and lively discussions. We sincerely hope that this book may represent a little bit of that `Suvretta House spirit' which made this meeting so unique for all participants.

Volker Schumpelick
George E. Wantz