

Guidelines

World Guidelines for Groin Hernia Management

The HerniaSurge Group

Key Questions, Statements and Recommendations

(Key Statements for the Consensus vote in **yellow**)

Endorsed by:



Members of the HerniaSurge Group

Steering Committee:

| | |
|------------------|---|
| M.P. Simons | (coordinator) |
| M. Smietanski | (European Hernia Society) Treasurer. |
| H.J. Bonjer | (European Association for Endoscopic Surgery) |
| R. Bittner | (International Endo Hernia Society) |
| M. Miserez | (Editor Hernia) |
| Th.J. Aufenacker | (Statistical expert) |
| R.J. Fitzgibbons | (Americas Hernia Society) |
| P.K. Chowbey | (Asia Pacific Hernia Society) |
| H.M. Tran | (Australasian Hernia Society) |
| R. Sani | (Afro Middle East Hernia Society) |

Working Group

| | | |
|---------------------|-------------|-----------------|
| Th.J. Aufenacker | Arnhem | the Netherlands |
| F. Berrevoet | Ghent | Belgium |
| J. Bingener | Rochester | USA |
| T. Bisgaard | Copenhagen | Denmark |
| R. Bittner | Stuttgart | Germany |
| H.J. Bonjer | Amsterdam | the Netherlands |
| K. Bury | Gdansk | Poland |
| G. Campanelli | Milan | Italy |
| D.C. Chen | Los Angeles | USA |
| P.K. Chowbey | New Delhi | India |
| J. Conze | München | Germany |
| D. Cuccurullo | Naples | Italy |
| A.C. de Beaux | Edinburgh | United Kingdom |
| H.H. Eker | Amsterdam | the Netherlands |
| R.J. Fitzgibbons | Creighton | USA |
| R.H. Fortelny | Vienna | Austria |
| J.F. Gillion | Antony | France |
| B.J. van den Heuvel | Amsterdam | the Netherlands |
| W.W. Hope | Wilmington | USA |
| L.N. Jorgensen | Copenhagen | Denmark |
| U. Klinge | Aachen | Germany |
| F. Köckerling | Berlin | Germany |
| J.F. Kukleta | Zurich | Switzerland |
| I. Konate | Saint Louis | Senegal |
| A.L. Liem | Utrecht | the Netherlands |
| D. Lomanto | Singapore | Singapore |
| M.J.A. Loos | Veldhoven | the Netherlands |

| | | |
|---------------------|-------------|-----------------|
| M. Lopez-Cano | Barcelona | Spain |
| M. Miserez | Leuven | Belgium |
| M.C. Misra | New Delhi | India |
| A. Montgomery | Malmö | Sweden |
| S. Morales-Conde | Sevilla | Spain |
| F.E. Muysoms | Ghent | Belgium |
| H. Niebuhr | Hamburg | Germany |
| P. Nordin | Östersund | Sweden |
| M. Pawlak | Gdansk | Poland |
| G.H. van Ramshorst | Amsterdam | the Netherlands |
| W.M.J. Reinpold | Hamburg | Germany |
| D.L. Sanders | Barnstaple | United Kingdom |
| R. Sani | Niamey | Niger |
| N. Schouten | Utrecht | the Netherlands |
| S. Smedberg | Helsingborg | Sweden |
| M. Smietanski | Gdansk | Poland |
| M.P. Simons | Amsterdam | the Netherlands |
| R.K.J. Simmermacher | Utrecht | the Netherlands |
| H.M. Tran | Sydney | Australia |
| S. Tumtavitikul | Bangkok | Thailand |
| N. van Veenendaal | Amsterdam | the Netherlands |
| D. Weyhe | Oldenburg | Germany |
| A.R. Wijsmuller | Rotterdam | the Netherlands |

Corresponding address

M.P. Simons

m.p.simons@olvg.nl

OLVG Hospital, Oosterparkstraat 9, 1091 AC, Amsterdam, the Netherlands

The Guidelines development was sponsored by an educational and research grant from Johnson & Johnson and BARD companies.

The HerniaSurge Group is very grateful for the financial support provided by The European Hernia Society Board.

Abstract

Introduction

Worldwide, more than 20 million patients undergo groin hernia repair annually. The many different approaches, treatment indications and a significant array of techniques for groin hernia repair warrant guidelines to standardize care, minimize complications, and improve results.

The main goal of these guidelines is to improve patient outcomes, specifically to decrease recurrence rates and reduce chronic pain, the most frequent problems following groin hernia repair.

Methods

An expert group of international surgeons (the HerniaSurge Group) and one anesthesiologist pain expert was formed. The group consisted of members from all continents with specific experience in hernia-related research. Care was taken to include surgeons who perform all different types of repair and had preferably performed research on groin hernia surgery. During the Group's first meeting, Evidence-Based Medicine (EBM) training occurred and 166 key questions (KQ) were formulated. EBM rules were followed in complete literature searches (including a complete search by The Dutch Cochrane database) to January 1, 2015 and to July 1, 2015 for level 1 publications.

The articles were scored by teams of two or three according to Oxford, Sign and Grade methodologies. During five two-day meetings, results were discussed with the working group members leading to 125 statements and 86 recommendations. Statements graded as "strong" lead to recommendations. Those graded as "weak" lead to suggestions. In the Results and Summary section below, the term "should" refers to a recommendation.

Finally, consensus was sought by putting 50 "KEY" statements and recommendations to a vote by all HerniaSurge members. The AGREE II instrument was used to validate the guidelines. An external review was performed by three international experts.

Results and Summary

Inguinal hernia (IH) risk factors include: family history, previous contra-lateral hernia, gender, age, abnormal collagen metabolism, prostatectomy, and low body mass index. Perioperative risk factors for recurrence like: poor surgical technique, low surgical volume, and surgical inexperience should be considered when treating IH patients.

IH diagnosis can be confirmed by physical examination alone in the vast majority of patients with appropriate signs and symptoms. Rarely, ultrasound is necessary. Less commonly still, an MRI, CT scan or herniography may be needed.

The EHS classification system is suggested to stratify IH patients for tailored treatment, research and audit. Symptomatic groin hernias should be treated surgically. Asymptomatic or minimally symptomatic male IH patients may be managed with “watchful waiting” since their risk of hernia-related emergencies is low. The majority of these individuals will eventually require surgery; therefore, surgical risks and the watchful waiting strategy should be discussed with patients. Surgical treatment should be tailored to the surgeon’s expertise, patient- and hernia-related characteristics and local/national resources.

Mesh repair is recommended as first choice, either by an open procedure or a laparo-endoscopic repair technique. One standard repair technique for all groin hernias does not exist. It is recommended that surgeons/surgical services provide both anterior and posterior approach options. HerniaSurge suggests Lichtenstein or laparo-endoscopic repair as optimal techniques. Provided that resources and expertise are available, laparoscopic techniques have faster recovery times, lower chronic pain risk and are cost effective. There is discussion concerning laparo-endoscopic management of potential bilateral hernias (occult hernia issue). After patient consent, during TAPP, the contra-lateral side can be inspected. This is not suggested during unilateral TEP repair.

Day surgery is recommended for simple groin hernia repair provided aftercare is organized and suggested for selected other cases (e.g. after local anesthetic in ASA IIIa patients).

Surgeons should be aware of the intrinsic characteristics of the meshes they use. Use of so-called low-weight mesh may have short-term benefits like reduced postoperative pain and shorter convalescence, but are not associated with better longer-term outcomes like recurrence and chronic pain. Mesh selection on weight alone is not recommended. Migration and/or erosion incidence seems higher with plug versus flat mesh. It is suggested not to use plug repair techniques. In almost all cases, mesh fixation in TEP is unnecessary. In both TEP and TAPP it is recommended to fix mesh in M3 hernias (large medial) to reduce recurrence risk.

Antibiotic prophylaxis in average-risk patients in low-risk environments is not recommended. In laparo-endoscopic repair it is never recommended.

Local anesthesia in open repair has many advantages and its use is suggested (especially in patients with severe systemic disease) provided the surgeon is experienced in this technique. General anesthesia is suggested over regional as it allows for faster discharge with fewer complications like urinary retention, myocardial infarction, pneumonia and thromboembolism. Perioperative field blocks are recommended in all cases of open repair.

An early return to normal activities can be safely recommended.

Provided expertise is available, it is suggested that women with groin hernias undergo laparo-endoscopic repair in order to decrease chronic pain risk and avoid missing a femoral hernia. Watchful waiting is suggested in pregnant women as groin swelling most often consists of self-limited round ligament varicosities. Timely mesh repair by a laparo-endoscopic approach is suggested for femoral hernias provided expertise is available.

All complications of groin hernia management are discussed in an extensive chapter on the topic (chapter 18). Chronic postoperative inguinal pain (CPIP) is a serious complication affecting 10-12% of IH repair patients. It is defined as bothersome moderate pain impacting daily activities lasting at least 3 months postoperatively. CPIP risk factors include: young age, female gender, high preoperative pain, early high postoperative pain, recurrent hernia and open repair. Chapter 19 covers CPIP prevention and treatment. In short, the focus should be on nerve recognition in open surgery and, in selected cases, prophylactic pragmatic nerve resection (Planned resection is not suggested.). It is suggested that CPIP management be performed by multi-disciplinary teams. It is also suggested that CPIP be managed by a combination of pharmacological and interventional measures and, if this is unsuccessful, followed by, in selected cases, (triple) neurectomy and (in selected cases) mesh removal.

For recurrent hernia after anterior repair, posterior repair is recommended. If recurrence occurs after a posterior repair, an anterior repair is recommended. After a failed anterior and posterior approach, management by a hernia specialist surgeon is recommended.

Risk factors for hernia incarceration/strangulation include: female gender, femoral hernia presence and a history of hospitalization related to groin hernia. It is suggested that treatment of emergencies be tailored according to patient- and hernia-related factors, local expertise and resources.

Learning curves vary between different techniques. Probably about 100 supervised laparo-endoscopic repairs are needed to achieve the same results as open mesh surgery like Lichtenstein. It is suggested that case load per surgeon is more important than center volume. It is recommended that minimum requirements be developed to certify individuals as expert hernia surgeon. The same is true for the designation “Hernia Center.”

From a cost-effectiveness perspective, day-case laparoscopic IH repair with minimal use of disposables is recommended.

The development and implementation of national groin hernia registries in every country (or region, in the case of small country populations) is suggested. They should include patient follow-up data and account for local healthcare structures.

A dissemination and implementation plan of the guidelines will be developed by global (HerniaSurge), regional (international societies) and local (national chapters) initiatives through internet websites, social media and smartphone Apps. An overarching plan to improve access to safe IH surgery in low resource settings (LRSs) is needed. It is suggested that this plan contains simple guidelines and a sustainability strategy allowing implementation and maintainability, independent of international aid. It is suggested that in LRSs the focus be on performing high-volume Lichtenstein repair under local anesthesia using low-cost mesh.

Three chapters (29, 30, and 31) discuss future research, guidelines for general practitioners and guidelines for patients.

Conclusions

The HerniaSurge Group has developed these extensive and inclusive guidelines for the management of adult groin hernia patients. It is hoped that they will lead to better outcomes for groin hernia patients wherever they live! More knowledge, better training, national audit and specialization in groin hernia management will standardize care for these patients, lead to more effective and efficient healthcare and provide direction for future research.

DRAFT

Chapters

PART 1

Management of Inguinal Hernias in Adults

1. General introduction
2. Risk factors for the development of inguinal hernias in adults
3. Diagnostic testing modalities
4. Groin hernia classification
5. Indications – treatment options for symptomatic and asymptomatic patients
6. Surgical treatment of inguinal hernias
7. Individualization of treatment options
8. Occult hernias and bilateral repair
9. Day surgery
10. Meshes
11. Mesh fixation
12. Antibiotic prophylaxis
13. Anesthesia
14. Postoperative pain – prevention and management
15. Convalescence

PART 2

Specific Aspects of Groin Hernia Management

16. Groin hernias in women
17. Femoral hernia management
18. Complications – prevention and treatment
19. Pain – prevention and treatment
20. Recurrent inguinal hernias
21. Emergency groin hernia treatment

PART 3

Quality, Research and Global Management

Quality Aspects

22. Expertise and training
23. Specialized centers and hernia specialists
24. Costs
25. Registries
26. Outcomes and quality assessment
27. Dissemination and implementation

Global Groin Hernia Management

|

28. Inguinal hernia surgery in low resource settings

Research, General Practitioner and Patient Perspectives

29. Questions for research

30. Summary for general practitioners

31. Management of groin hernias from patients' perspectives

DRAFT

PART 1

Management of Inguinal Hernias in Adults

Chapter 1 HerniaSurge: The World Guidelines for Groin Hernia Management

no statements

Chapter 2 Risk Factors for the Development of Inguinal Hernias in Adults

KQ02.a What are the risk factors for the development of primary inguinal hernias in adults?

KQ02.b What are the acquired, demographic and perioperative risk factors for recurrence after treatment of IH in adults?

| | | | |
|-----------------------|--|---|---------------------|
| <i>Statement</i> | Important intrinsic risk factors for the development of primary inguinal hernias include: inheritance, a previous contralateral hernia, gender, age and abnormal collagen metabolism. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
| <i>Statement</i> | Important acquired risk factors for the development of primary inguinal hernias are prostatectomy and low body mass index. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
| <i>Statement</i> | Future studies on primary inguinal hernia formation should consider these inborn and acquired risk factors. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
| <i>Statement</i> | Several important intrinsic/demographic (anatomy, female gender, abnormal collagen metabolism), acquired (obesity), and perioperative risk factors (poor surgical technique, low surgical volume, surgical inexperience, and local anesthesia) for IH development exist. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
| <i>Recommendation</i> | Intrinsic, acquired, surgical and perioperative risk factors are recommended to be strongly considered since they are potentially modifiable and can influence the type of repair performed. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *upgraded |

Chapter 3 Diagnostic Testing Modalities

KQ03.a Which diagnostic modality is the most suitable for diagnosing groin hernias?

KQ03.b Which diagnostic modality is the most suitable for diagnosing patients with obscure pain or doubtful swelling?

KQ03.c Which diagnostic modality is the most suitable for diagnosing recurrent groin hernias?

KQ03.d Which diagnostic modality is the most suitable for diagnosing chronic pain after groin hernia surgery?

| | | | |
|-----------------------|--|--|---------------------|
| Recommendation | Clinical examination (CE) alone is recommended for confirming the diagnosis of an evident groin hernia. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *upgraded |
| Recommendation | CE and US combined is recommended as most suitable for diagnosing patients with vague groin swelling or possible occult groin hernias. Dynamic MRI or CT can be considered for further evaluation if US is negative or non-diagnostic. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | Strong *Upgraded |
| Recommendation | CE and US combined is suggested as most suitable for confirming the diagnosis of recurrent groin hernia. Dynamic MRI or CT can be considered for further evaluation if US is negative or non-diagnostic. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |
| Recommendation | The use of US-guided nerve blocks is suggested as most suitable for diagnosing the cause of chronic pain after inguinal hernia surgery. US, CT or MRI scans are helpful in identifying non-neuropathic causes of chronic groin pain (i.e. mesh-related pathologies, recurrent hernias, neuromas – occasionally). | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |

Chapter 4 Groin hernia classification

KQ04.a Is a groin hernia classification system necessary, and if so, which classification system is most appropriate?

| | | | |
|-----------------------|---|---|------|
| Recommendation | Use of the EHS classification system for inguinal hernias is suggested for the purposes of performing research, tailoring treatments and performing quality audits. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |
|-----------------------|---|---|------|

Chapter 5 Indications - Treatment Options for Symptomatic and Asymptomatic Patients

KQ05.a Is a management strategy of watchful waiting safe for men with symptomatic inguinal hernias?

KQ05.b What is the risk of a hernia complication (strangulation or bowel obstruction) in this population?

KQ05.c Is a management strategy of watchful waiting safe for men with asymptomatic inguinal hernias?

KQ05.d What is the risk of a hernia complication (strangulation or bowel obstruction) in this population?

KQ05.e Are emergent inguinal herniorrhaphies associated with higher morbidity and mortality?

KQ05.f What is the crossover rate from watchful waiting to surgery?

| | | | |
|-----------------------|---|---|----------------------------|
| <i>Statement</i> | There is a low complication risk (incarceration or strangulation) in asymptomatic or minimally symptomatic men with inguinal hernias. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | |
| <i>Statement</i> | Emergent repair of incarcerated or strangulated inguinal hernias in men is associated with higher morbidity and mortality compared with elective repair in men with symptomatic inguinal hernias. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | |
| <i>Statement</i> | The crossover rate to surgery in men with minimal symptomatic inguinal hernias is high due to the development to symptoms, mostly pain. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | |
| <i>Statement</i> | There is no evidence to support watchful waiting as a management strategy in men with symptomatic inguinal hernias. No data exist on the risk of incarceration or strangulation in this population. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
| <i>Statement</i> | Most men with minimally symptomatic or asymptomatic inguinal hernias will develop symptoms and require surgery. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | |
| <i>Recommendation</i> | Although most patients will develop symptoms and need surgery, watchful waiting for minimal or asymptomatic inguinal hernias is safe since the risk of hernia complications is low and can be recommended. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | Strong |
| <i>Recommendation</i> | Discussions with patients about timing of hernia repair are recommended to involve attention to social environment, occupation and overall health. The lower morbidity of elective surgery has to be weighed against the higher morbidity of emergency surgery. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *upgraded |

Chapter 6 Surgical Treatment of Inguinal Hernia

KQ06.a Which non mesh technique is the preferred repair method for inguinal hernias?

| | | | |
|-----------------------|---|--|---------------------|
| <i>Recommendation</i> | The Shouldice technique has lower recurrence rates than other suture repairs and is recommended in non-mesh inguinal hernia repair. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | Strong *upgraded |
|-----------------------|---|--|---------------------|

KQ06.b Which is the preferred repair method for inguinal hernias: Mesh or non-mesh?

| | | | |
|-----------------------|--|--|---------------------|
| <i>Recommendation</i> | A mesh-based repair technique is recommended for patients with symptomatic inguinal hernias. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | Strong *upgraded |
|-----------------------|--|--|---------------------|

| | | | |
|------------------|---|---|--|
| <i>Statement</i> | Whether a non-mesh technique is an alternative for mesh-based techniques in individual cases (e.g. young males with lateral hernia L1) is unknown and requires further study. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
|------------------|---|---|--|

| | | | |
|-----------------------|--|---|---------------------|
| <i>Recommendation</i> | The use open non-mesh repair in specific patients or types (e.g. young males with lateral hernia L1) of inguinal hernia to replace the Lichtenstein technique should only be performed in research settings. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *upgraded |
|-----------------------|--|---|---------------------|

KQ06.c Which is the preferred open mesh technique for inguinal hernias: Lichtenstein or other open flat mesh and gadgets via an anterior approach?

| | | | |
|------------------|---|---|--|
| <i>Statement</i> | The recurrence rate and postoperative chronic pain are comparable between plug-and-patch/ PHS and the Lichtenstein technique. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
|------------------|---|---|--|

| | | | |
|------------------|---|---|--|
| <i>Statement</i> | Self-gripping meshes do not provide any benefit in the short- and medium-term versus the Lichtenstein technique except a somewhat decreased operative time. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
|------------------|---|---|--|

| | | | |
|-----------------------|---|---|---------------------|
| <i>Recommendation</i> | Despite comparable results, the plug-and-patch and PHS are not recommended because of the excessive use of foreign material, the need to enter both the | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *upgraded |
|-----------------------|---|---|---------------------|

posterior and anterior plane and the additional cost.

Recommendation The use of other meshes or gadgets to replace the standard flat mesh in the Lichtenstein technique is currently not recommended. **Strong**
***upgraded**

KQ06.d Which is the preferred open mesh technique for inguinal hernias: Lichtenstein or any open pre-peritoneal technique?

Statement Open pre-peritoneal mesh repairs may, in the short term (one year), result in less postoperative and faster recovery. It must however be considered that some of these approaches use both anterior and posterior anatomical planes.

Statement Use of mesh devices results in increased costs and there are possible issues with the memory ring in some.

Statement In open surgery there is insufficient evidence to recommend a pre-peritoneal mesh repair over Lichtenstein repair.

Recommendation The use of open pre-peritoneal mesh techniques to replace the standard flat mesh in the Lichtenstein technique is suggested to only be performed in research settings. **Weak**

KQ06.e Is TEP or TAPP the preferred laparo-endoscopic technique?

Statement TAPP and TEP have similar operative times, overall complication risks, postoperative acute and chronic pain incidence and recurrence rates.

Statement Although very rare, there is a trend in TAPP for more visceral injuries.

Statement Although very rare, there is a trend in TEP for more vascular injuries

Statement Although very low, in TAPP the frequency of port-site hernias is higher.

| | | |
|-----------------------|---|--|
| <i>Statement</i> | Although very low, in TEP the conversion rate is higher. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> |
| <i>Statement</i> | Similar costs may be incurred in TAPP and TEP. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> |
| <i>Statement</i> | TEP has a longer learning curve than TAPP. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
| Recommendation | In laparo-endoscopic inguinal hernia repair, TAPP and TEP have comparable outcomes; hence it is recommended that the choice of the technique should be based on the surgeon's skills, education and experience. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> Strong |

KQ06.f When considering recurrence, pain, learning curve, postoperative recovery and costs which is preferred technique for inguinal hernias: Best open mesh (Lichtenstein) or a laparo-endoscopic (TEP and TAPP) technique?

| | | |
|------------------|---|--|
| <i>Statement</i> | When the surgeon has sufficient experience in the laparo-endoscopic techniques, comparable recurrence rates to Lichtenstein repair can be achieved. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> |
| <i>Statement</i> | When the surgeon has sufficient experience in the technique, laparo-endoscopic techniques do not take longer than Lichtenstein operations. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> |
| <i>Statement</i> | With sufficient experience, no significant differences are observed in the perioperative complications needing reoperation between the laparo-endoscopic and Lichtenstein techniques. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> |
| <i>Statement</i> | The direct operative costs for laparo-endoscopic inguinal hernia repair are higher. That difference decreases when the total community costs are taken into account and the surgeon has sufficient experience. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> |
| <i>Statement</i> | The learning curve for laparo-endoscopic techniques (especially TEP) is longer than for Lichtenstein. There are rare but severe complications mainly described early in the learning curve. Therefore, it is imperative that laparo-endoscopic techniques be learned in a properly supervised manner. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |

| | | | |
|-----------------------|--|------|-------------|
| <i>Recommendation</i> | <p>For male patients with primary unilateral inguinal hernia, a laparo-endoscopic technique is suggested because of a lower postoperative pain incidence and a reduction in chronic pain incidence, provided that a surgeon with specific expertise and sufficient resources is available. However, there are patient and hernia characteristics that warrant a Lichtenstein as first choice. (see chapter 7 on individualization)</p> | ☒☒☒☐ | Weak |
|-----------------------|--|------|-------------|

KQ06.g In males with unilateral primary inguinal hernias which is the preferred repair technique, laparo-endoscopic (TEP/TAPP) or open pre-peritoneal?

| | | |
|------------------|---|------|
| <i>Statement</i> | The outcome measures of morbidity, mortality, and recurrence rates do not seem not significantly different between laparoscopic and open pre-peritoneal repair. | ☒☐☐☐ |
|------------------|---|------|

| | | |
|------------------|--|------|
| <i>Statement</i> | With regards to visualization, laparoscopic pre-peritoneal repair is a safe and standardized operation with possible technical advantages over open. | ☒☐☐☐ |
|------------------|--|------|

| | | |
|------------------|--|------|
| <i>Statement</i> | Especially in lower resource settings, techniques utilizing open pre-peritoneal mesh placement may be become an acceptable alternative to laparoscopic pre-peritoneal mesh repair. | ☒☐☐☐ |
|------------------|--|------|

| | | |
|------------------|---|------|
| <i>Statement</i> | No recommendation to advocate laparoscopic pre-peritoneal mesh placement over open pre-peritoneal repairs can be made due to insufficient and heterogeneous data. | ☒☐☐☐ |
|------------------|---|------|

KQ06.h Which is the preferred technique in Bilateral hernia.

| | | | |
|-----------------------|--|------|----------------------------|
| <i>Recommendation</i> | From a socio-economic perspective, a laparo-endoscopic repair is recommended in bilateral hernia repair, provided expertise is available | ☒☐☐☐ | Strong *upgraded |
|-----------------------|--|------|----------------------------|

Chapter 7 Individualization of Treatment Options

KQ07.a In inguinal hernia repair, when should treatment be individualized?

| | | | |
|-----------------------|--|---|----------------------------|
| Recommendation | In patients with primary bilateral hernias a laparo-endoscopic approach is recommended provided expertise is available. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *Upgraded |
| Recommendation | In patients with pelvic pathology or scarring due to radiation or pelvic surgery, or for those on peritoneal dialysis, consider an anterior approach. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *Upgraded |
| Recommendation | It is recommended that surgeons tailor treatments based on expertise, local/national resources, and patient- and hernia-related factors. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *Upgraded |
| Recommendation | Since a generally accepted technique, suitable for all inguinal hernias, does not exist, it is recommended that surgeons/surgical services provide both an anterior and a posterior approach option. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *Upgraded |

Chapter 8 Occult Hernias and Bilateral Repair

KQ08.a In those with unilateral overt primary IHs, what is the likelihood they will also have a contralateral occult IH?

KQ08.b In those with unilateral overt primary IHs, what is the likelihood they will develop contralateral overt hernias over time?

KQ08.c In patients who have undergone a unilateral TEP and negative contralateral exploration, what is the risk of developing an overt hernia on the disease-free side?

KQ08.d In cases where an occult contralateral IH is seen during TAPP will it become symptomatic if not repaired?

KQ08.e In those with overt unilateral primary IHs without contraindications to bilateral TEP or TAPP repair, should bilateral repair be performed?

| | | |
|------------------|--|--|
| Statement | In patients with unilateral overt primary inguinal hernias, an occult contralateral inguinal hernia is seen at time of laparoscopic inguinal hernia surgery in up to 58% of cases. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
| Statement | In patients who have undergone a unilateral inguinal hernia repair, the chance of developing a contralateral inguinal hernia increases with time; however, the true incidence is | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |

| | | | |
|-----------------------|---|--|---------------------|
| | unknown. | | |
| <i>Statement</i> | There is a low risk for the development of a contralateral overt inguinal hernia following a previously negative TEP exploration. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
| <i>Statement</i> | The percentage of occult hernias noted at TAPP that become symptomatic will increase over time; however, the true incidence is unknown. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
| <i>Recommendation</i> | It is recommended that the contralateral groin be inspected at time of TAPP repair. If a contralateral inguinal hernia is found and prior informed consent was obtained, repair is recommended. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *Upgraded |
| <i>Recommendation</i> | In those with overt unilateral primary inguinal hernias without contralateral hernias, routine bilateral TAPP repair is not suggested. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |
| <i>Recommendation</i> | Routine exploration by TEP of the contralateral groin in an asymptomatic patient with no clinical hernia is not suggested. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |

Chapter 9 Day Surgery

KQ09.a Which inguinal hernias can be safely repaired in day surgery?

KQ09.b Can endoscopic and open herniorrhaphies be performed safely in day surgery?

KQ09.c Can patients with severe comorbidities (ASA III or higher) be safely treated in day surgery?

KQ09.d Can patients with complex inguinal hernias (e.g. scrotal hernias) be safely treated in day surgery?

| | | | |
|-----------------------|--|--|--------|
| <i>Recommendation</i> | Day surgery is recommended for the majority of groin hernia patients provided adequate aftercare is organized. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | Strong |
| <i>Recommendation</i> | Day surgery is suggested for all endoscopic repairs of simple inguinal hernias provided adequate aftercare is organized. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |

| | | | |
|-----------------------|--|---|------|
| <i>Recommendation</i> | Day surgery is suggested for selected older and ASA IIIa patients (open repair under local anesthesia) provided adequate aftercare is organized. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |
|-----------------------|--|---|------|

| | | | |
|-----------------------|---|--|------|
| <i>Recommendation</i> | Day surgery for patients with complex inguinal hernias is suggested only in selected cases. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |
|-----------------------|---|--|------|

Chapter 10 Meshes

KQ10.a Do mesh characteristics (i.e., flatness and pore size) have an impact on outcome?

| | | |
|------------------|---|---|
| <i>Statement</i> | Evidence supports the contention that mesh characteristics influence clinical outcomes. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |
|------------------|---|---|

| | | |
|------------------|--|--|
| <i>Statement</i> | The effect of pore size <u>alone</u> on clinical outcome has not been investigated in clinical trials; therefore, no recommendation can be made. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|--|--|

| | | | |
|-----------------------|---|---|---------------------|
| <i>Recommendation</i> | Hernia surgeons should be aware of the clinical characteristics of the meshes they use. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *upgraded |
|-----------------------|---|---|---------------------|

KQ10.b Do lightweight meshes have benefits in open or laparoscopic IH repair?

| | | |
|------------------|--|---|
| <i>Statement</i> | Use of so-called LWM in inguinal hernia surgery (open and laparo-endoscopic) may have some short-term benefits (reduced postoperative pain and shorter convalescence). | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|--|---|

| | | | |
|-----------------------|---|---|---------------------|
| <i>Recommendation</i> | Before a clear definition of LWM and HWM exists, the selection of mesh based solely on the terms “lightweight” or “heavyweight” is not recommended. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *upgraded |
|-----------------------|---|---|---------------------|

KQ10.c Are clinical outcomes influenced by mesh weight (evidence from meta-analyses)?

| | | |
|------------------|--|---|
| <i>Statement</i> | Recently published meta-analyses and RCTs do not support the contention that LWMs in groin hernia surgery are associated with better postoperative outcomes. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |
|------------------|--|---|

| | | |
|------------------|---|---|
| <i>Statement</i> | Subset analyses did not find higher recurrence rates with the use of LWMs in laparoscopic inguinal hernia repair. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |
|------------------|---|---|

| | | |
|------------------|--|---|
| <i>Statement</i> | There exists no clearly defined weight limit for LWMs and HWMs. Therefore, the effect of weight differences alone on surgical outcomes is unknown. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |
|------------------|--|---|

| | | | |
|-----------------------|--|---|--------|
| <i>Recommendation</i> | Mesh selection based on weight alone is not recommended nor supported by the available literature. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | Strong |
|-----------------------|--|---|--------|

KQ10.d Does chronic inflammation occur at mesh/tissue interfaces?

no statements

KQ10.e Is late-onset mesh migration unavoidable?

| | | |
|------------------|---|---|
| <i>Statement</i> | There is a lifetime risk for mesh migration which seems to be higher with plugs versus flat mesh. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|---|---|

| | | | |
|-----------------------|---|--|--------|
| <i>Recommendation</i> | There is a lifetime risk for mesh migration. Mesh-related complications—including erosion and migration— should be considered in the differential diagnosis in patients with relevant symptoms in the region of their mesh. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | Strong |
|-----------------------|---|--|--------|

KQ10.f Do mesh polymers elicit rejection reactions?

| | | |
|------------------|---|--|
| <i>Statement</i> | There is no evidence of true immunologically-based rejection of current synthetic mesh materials. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> |
|------------------|---|--|

KQ10.g Does mesh degradation occur?

no statements

KQ10.h Which mesh options—in structure and stability—should be considered?

No Statements

KQ10.i Is there a risk for carcinogenesis at meshes' interfaces?

no Statements

KQ10.j Is there an age-associated risk for mesh-related complications?

Statements

no statements

KQ10.k Does mesh shrinkage occur, and if so, to what extent?

| | | |
|------------------|--|---|
| <i>Statement</i> | Specific contraindications for flat meshes made from polymers are not known, even when adjusting for age. However, the risks of mesh-related complications increase with increasing implantation duration. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
| | Mesh shrinkage of at least 20% has to be accounted for depending on mesh structure and host tissue response. | |
| | There is no evidence of mesh-related carcinogenesis. | |

Chapter 11 Mesh Fixation

KQ11.a Which fixation methods are appropriate in primary open anterior mesh inguinal and femoral hernia repairs in those over 18 years of age?

| | | |
|------------------|--|--|
| <i>Statement</i> | In open anterior mesh groin hernia repairs there are no differences in recurrence, surgical site infection rates or length of stay between different fixation methods. Fixation with glue (fibrin sealant or cyanoacrylate) may reduce early postoperative and chronic pain. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|--|--|

| | | | |
|-----------------------|---|--|-------------|
| <i>Recommendation</i> | Atraumatic mesh fixation in open inguinal hernia repair techniques is suggested to reduce early postoperative pain. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |
|-----------------------|---|--|-------------|

KQ11.b Is mesh fixation necessary in endoscopic TEP inguinal/femoral hernia repair in adults?

KQ11.c Are there specific indications for mesh fixation in endoscopic TEP inguinal/femoral hernia repair in adults?

KQ11.d Is mesh fixation ever recommended in laparoscopic TAPP inguinal/femoral hernia repair in adults?

KQ11.e If using mesh fixation, what types should be used in TEP and TAPP inguinal/femoral hernia repairs?

| | | |
|------------------|--|---|
| <i>Statement</i> | In almost all cases, any type of mesh fixation in TEP repair is unnecessary. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|--|---|

| | | |
|------------------|---|---|
| <i>Statement</i> | Atraumatic mesh fixation techniques are favored to reduce early postoperative pain. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|---|---|

| | | | |
|-----------------------|--|--|---------------------|
| <i>Recommendation</i> | Traumatic mesh fixation (tackers) is recommended in patients with large direct hernias (M3-EHS classification) undergoing TAPP or TEP to reduce recurrence risk. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *Upgraded |
|-----------------------|--|--|---------------------|

Chapter 12 Antibiotic Prophylaxis

KQ12.a Are prophylactic antibiotics indicated in open mesh repair in an average-risk patient in a low-risk environment?

KQ12.b Are prophylactic antibiotics indicated in open mesh repair in a high-risk patient in a low-risk environment?

KQ12.c Are prophylactic antibiotics indicated in open mesh repair in any patient in a high-risk environment?

KQ12.d Are prophylactic antibiotics indicated in laparoscopic repair in any patient in any risk environment?

| | | | |
|-----------------------|--|---|--------|
| <i>Recommendation</i> | In open mesh repair, administration of antibiotic prophylaxis in average-risk patients in a low-risk environment is not recommended. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | Strong |
|-----------------------|--|---|--------|

| | | | |
|-----------------------|--|--|------|
| <i>Recommendation</i> | Administration of antibiotic prophylaxis in open mesh repair in high-risk patients in a low-risk environment is suggested. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |
|-----------------------|--|--|------|

| | | | |
|-----------------------|--|---|--------|
| <i>Recommendation</i> | Administration of antibiotic prophylaxis in open mesh repair in any patient in a high-risk environment is recommended. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | Strong |
|-----------------------|--|---|--------|

| | | | |
|-----------------------|--|---|---------------------|
| <i>Recommendation</i> | In laparo-endoscopic repair in any patient in any risk environment, antibiotic prophylaxis is not recommended. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *upgraded |
|-----------------------|--|---|---------------------|

Chapter 13 Anesthesia

KQ13.a Does local anesthesia influence outcomes after open repair of reducible inguinal hernia when compared with general or regional anesthesia?

| | | |
|------------------|---|------|
| <i>Statement</i> | When compared with general anesthesia, local anesthesia is associated with faster mobilization, earlier hospital discharge, lower hospital and total healthcare costs, and fewer complications such as urinary retention and early postoperative pain. However, when surgeons inexperienced in its use administer local anesthesia, more hernia recurrences might result. | ☒☒☒☒ |
|------------------|---|------|

| | | |
|------------------|---|------|
| <i>Statement</i> | When compared with regional anesthesia, local anesthesia is associated with earlier hospital discharge, lower hospital and total healthcare costs, and a lower incidence of urinary retention. However, when surgeons inexperienced in its use administer local anesthesia, more hernia recurrences might result. | ☒☒☒☒ |
|------------------|---|------|

| | | | |
|-----------------------|--|------|---------------|
| <i>Recommendation</i> | Local anesthesia is recommended for open repair of reducible inguinal hernias provided surgeons experienced in local anesthesia use administer the local anesthetic. | ☒☒☒☒ | strong |
|-----------------------|--|------|---------------|

| | | | |
|-----------------------|--|------|------|
| <i>Recommendation</i> | Correctly performed local anesthesia is suggested to be a good alternative to general or regional anesthesia in patients with severe systemic disease. | ☒☒☐☐ | weak |
|-----------------------|--|------|------|

KQ13.b Are outcomes different when open inguinal hernia repairs are performed with regional versus general anesthesia?

| | | |
|------------------|---|------|
| <i>Statement</i> | When compared with regional anesthesia, general anesthesia offers no clear advantages regarding the incidence of postoperative pain, postoperative nausea, cost, or patient satisfaction. Its use allows for faster patient discharge, which is of uncertain clinical significance. Some studies report a higher incidence of urinary retention with regional anesthesia. | ☒☒☒☒ |
|------------------|---|------|

| | | |
|------------------|---|------|
| <i>Statement</i> | When compared with general anesthesia, regional anesthesia in patients aged 65 and older might be associated with a higher incidence of medical complications like myocardial infarction, pneumonia and venous thromboembolism. | ☒☒☒☐ |
|------------------|---|------|

| | | | |
|-----------------------|---|---|------|
| <i>Recommendation</i> | General or local anesthesia is suggested over regional in patients aged 65 and older. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | weak |
|-----------------------|---|---|------|

KQ13.c Can surgical residents/registrars safely perform open inguinal hernia repair using local anesthesia?

| | | |
|------------------|---|--|
| <i>Statement</i> | Open inguinal hernia repair under local anesthesia can be safely performed by trainees under supervision of surgeons experienced in the administration of local anesthesia. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|---|--|

Chapter 14 Early Postoperative Pain Prevention and Management

KQ14.a Do preoperative or perioperative local anesthetic methods affect patients' pain experiences after open groin hernia repair?

KQ14.b Which is the most effective oral analgesic pain management regimen after open or endoscopic groin hernia repair?

| | | |
|------------------|--|---|
| <i>Statement</i> | When general or regional anesthesia is used, the addition of local anesthetic field blocks of the ilioinguinal and iliohypogastric nerves and/or subfascial and subcutaneous infiltration reduces early postoperative pain scores and the need for other analgesics. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |
|------------------|--|---|

| | | |
|------------------|---|---|
| <i>Statement</i> | Long-acting local anesthetics are preferable to short-acting local anesthetics but the timing of field blocks and/or infiltration—either preoperatively or at wound closure—has no proven effect on the occurrence of postoperative pain. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|---|---|

| | | |
|------------------|--|---|
| <i>Statement</i> | NSAID or selective COX-2 inhibitors reduce postoperative pain and when given with paracetamol reduce postoperative pain further. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |
|------------------|--|---|

| | | | |
|-----------------------|--|---|--------|
| <i>Recommendation</i> | Preoperative or perioperative local anesthetic measures like field blocks of the inguinal nerves and/or subfascial/subcutaneous infiltration are recommended in all open groin hernia repairs. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | strong |
|-----------------------|--|---|--------|

| | | | |
|-----------------------|--|---|--------|
| <i>Recommendation</i> | Use of a conventional NSAID or a selective COX-2 inhibitor <u>plus</u> paracetamol is recommended in open groin hernia repairs provided that there are no contraindications. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | strong |
|-----------------------|--|---|--------|

Chapter 15 Convalescence

KQ15.a What is the recommended duration of convalescence following uncomplicated inguinal hernia repair

| | | | |
|-----------------------|--|---|---------------------|
| <i>Statement</i> | Physical activity restrictions are unnecessary after uncomplicated inguinal hernia repair and do not effect recurrence rates. Patients should be encouraged to resume normal activities as soon as possible. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *Upgraded |
| <i>Recommendation</i> | An early return to normal activities can safely be recommended. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *Upgraded |

Chapter 16 Groin Hernias in Women

KQ16.a In women with a groin lump, what is the best diagnostic modality and is a preoperative diagnosis necessary?

KQ16.b What is the optimal treatment for women with groin hernias?

KQ16.c What is the risk of incarceration/strangulation in women with groin hernias? What is the incidence of emergent inguinal/femoral hernia repair in women? What are the outcomes?

| | | | |
|-----------------------|---|--|---------------------|
| <i>Statement</i> | No clinical or diagnostic tests can reliably distinguish inguinal from femoral hernias. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
| <i>Statement</i> | Femoral hernias occur more often in women. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | |
| <i>Statement</i> | Femoral hernias are more likely than inguinal hernias to incarcerate and strangulate. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | |
| <i>Recommendation</i> | Provided that expertise is available, women with groin hernias are recommended to undergo laparoscopic repair with preperitoneal mesh implantation. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | Strong *Upgraded |
| <i>Recommendation</i> | Timely hernia repair is recommended in women with groin hernias. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | Strong *Upgraded |
| <i>Recommendation</i> | Physicians should consider femoral hernia in the differential diagnosis of groin swelling in women. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | Strong |

KQ16.d How is a groin lump in a pregnant female diagnosed and treated?

Statement Groin hernia formation is uncommon during pregnancy.

Statement The most likely diagnosis in a woman with the onset of a groin lump during pregnancy is round ligament varicosity.

Recommendation Watchful waiting is suggested in pregnant females with groin swelling Weak

KQ16.e Should the round ligament be preserved in women who undergo groin hernia repair?

Statement Division of the genital branch of the genitofemoral nerve carries a small risk of deafferentation, hypersensitivity, and ipsilateral labial numbness.

Recommendation It is suggested to avoid division of the round ligament in open repair. If division of the round ligament is done in laparoscopic repair, it should preferentially be performed proximal to the genital branch meeting at the fusion with the peritoneum. Weak

Chapter 17 Femoral Hernias

KQ17.a Is there a recurrence rate difference between suture and mesh open femoral hernia repairs?

KQ17.b Following femoral hernia repair are there differences in recurrence rates, complications or the incidence of chronic pain between open anterior mesh repair and open posterior mesh repair?

KQ17.c Following open and endoscopic femoral hernia repairs are there differences in recurrence rates, postoperative pain and complications?

KQ17.d Should asymptomatic femoral hernias always be treated surgically?

Statement Preperitoneal mesh repair results in significantly fewer recurrences and less postoperative pain and foreign body sensation.

Statement Laparo-endoscopic repair of femoral hernias results in significantly fewer recurrences and less postoperative pain.

| | | |
|------------------|--|---|
| <i>Statement</i> | Laparo-endoscopic repair offers the opportunity to establish correct diagnoses in cases where preoperative diagnoses were incorrect. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|--|---|

| | | | |
|-----------------------|--|---|-----------------------------------|
| Recommendation | Mesh should be used in elective femoral hernia repairs. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *Upgraded |
|-----------------------|--|---|-----------------------------------|

| | | | |
|-----------------------|--|---|---------------------|
| <i>Recommendation</i> | Providing expertise is available, a laparo-endoscopic procedure is recommended for elective femoral hernia repair. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *Upgraded |
|-----------------------|--|---|---------------------|

| | | | |
|-----------------------|--|---|---------------------|
| <i>Recommendation</i> | Timely elective repair is recommended for all patients with femoral hernias. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *Upgraded |
|-----------------------|--|---|---------------------|

Chapter 18 Complications – Prevention and Treatment

KQ18.a Is early postoperative pain associated with increased urinary retention risk?

KQ18.b Is there an age-associated postoperative urinary retention risk?

KQ18.c Does intraoperative parenteral fluid restriction reduce urinary retention risk?

KQ18.d Is there an increased risk of postoperative urinary retention with open anterior repair?

KQ18.e When is prophylactic urinary bladder catheterization indicated before hernia operation?

KQ18.f Is there effective prophylactic medication to decrease urinary retention?

| | | |
|------------------|--|---|
| <i>Statement</i> | There is only indirect evidence that pain results in increased urinary retention rates based upon the experience with painful tack fixation vs non-fixation techniques. LOE = weak | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|--|---|

| | | |
|------------------|--|---|
| <i>Statement</i> | Urinary retention after inguinal hernia repair increases with age. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |
|------------------|--|---|

| | | |
|------------------|--|---|
| <i>Statement</i> | Minimizing the amount of parenteral fluids given to patients undergoing inguinal herniorrhaphy may result in a lower incidence of urinary retention. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|--|---|

| | | |
|------------------|---|---|
| <i>Statement</i> | Open anterior repair performed under local anesthesia has a decreased incidence of urinary retention compared to endoscopic repair. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |
|------------------|---|---|

Statement There is no difference in the incidence of urinary retention between open repair and endoscopic repair when performed under general anesthesia.

Statement There is no evidence that routine use of a urinary catheter is necessary for either conventional or laparoscopic inguinal herniorrhaphy. Therefore, its use should be discouraged in favor of immediate voiding prior to operation. A history of a prostatectomy or previous urinary emptying problems is a relative indication for urinary catheterization.

Statement Prazosin, phenoxybenzamine hydrochloride or tamsulosin may be effective in preventing urinary retention.

KQ18.g What defines “sexual dysfunction” after IH surgery?

KQ18.h What is the incidence of sexual dysfunction after IH surgery?

KQ18.i Are ischemic orchiditis causes known; and can this complication be prevented?

KQ18.j Does hernia repair with heavyweight mesh cause more testicular pain than hernia repair with lightweight mesh?

KQ18.k Are methods of repair or bilateral operation related to risks of impaired spermatogenesis and hormone production?

KQ18.l Can sexual dysfunction following hernia repair be treated surgically?

Statement The incidence of sexual dysfunction causing moderate-to-severe symptoms is around 5-7%. Impairment of testicular function and fertility occurs in less than 1%.

Statement There is a risk of damage to the spermatic artery and/or vein causing testicular ischemia and orchitis when dissecting the spermatic cord in both open and laparoscopic techniques.

Statement There is no significantly increased long-term risk of impaired spermatogenesis and hormone production related to methods of repair or bilateral surgical procedures.

Statement Painful conditions interfering with sexual function can be improved by operative techniques used for treatment of neuropathic pain, release of the spermatic cord and mesh removal.

KQ18.m Is hematoma formation related to hernia repair method or mesh use?

KQ18.n Are intraoperative bleeding and postoperative hematoma formation related to a surgeon's level of experience?

| | | | |
|------------------|---|--|--------|
| <i>Statement</i> | Hematoma incidence is reduced after endoscopic IH repair compared with open repair. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | Strong |
|------------------|---|--|--------|

| | | | |
|------------------|--|--|--|
| <i>Statement</i> | There is inadequate medical evidence to link hematoma formation risk to a surgeon's level of experience. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
|------------------|--|--|--|

KQ18.o Which patients undergoing anticoagulant or antiplatelet therapy are at risk of significant hematoma formation following hernia repair?

| | | | |
|------------------|--|--|--|
| <i>Statement</i> | Perioperative management of patients on anticoagulant or antiplatelet therapy should be governed by local or institutional protocol. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
|------------------|--|--|--|

| | | | |
|-----------------------|---|--|------|
| <i>Recommendation</i> | Endoscopically a highly cautious approach should be taken when operating on patients undergoing anticoagulant or antiplatelet therapy even after bridging with LMWH. The development of local protocols is suggested to guide management of these patients. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |
|-----------------------|---|--|------|

KQ18.p What are the risk factors for postoperative seroma formation?

KQ18.q Is there an association between open anterior repair method and postoperative seroma formation?

KQ18.r Do certain endoscopic or open preperitoneal techniques increase the risk of postoperative seroma formation?

KQ18.s Can the risk of postoperative seroma formation be reduced surgically?

KQ18.t Does drain usage reduce the risk of postoperative seroma formation?

KQ18.u Is there an association between hernia sac treatment modality and seroma/hematoma formation?

KQ18.v Does the use of abdominal binders or comparable wound compression devices prevent seroma/hematoma formation?

| | | | |
|------------------|---|--|--|
| <i>Statement</i> | The risk factors for postoperative seroma formation include: scrotal hernia, coagulopathy and congestive liver failure. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | |
|------------------|---|--|--|

| | | | |
|------------------|---|---|--|
| <i>Statement</i> | Inverting and fixing the lax <i>fascia transversalis</i> during | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
|------------------|---|---|--|

laparoscopic repair of large direct hernia sacs may reduce the risk of seroma and hematoma formation.

KQ18.w How common are serious complications during hernia surgery?

KQ18.x Are serious complications more common during endoscopic hernia surgery in patients with a history of previous abdominal surgery?

KQ18.y Is mesh migration—with the attendant risk of pain and severe complications—related to: mesh type, mesh shape, repair method, wound infection, or hernia type?

| | | |
|------------------|---|--|
| <i>Statement</i> | Serious complications—bowel, bladder and vascular injuries—rarely occur during hernia surgery although they are more common during laparo-endoscopic versus open hernia repair. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> |
|------------------|---|--|

| | | |
|------------------|--|--|
| <i>Statement</i> | Patients with a history of lower abdominal surgery have an increased risk of visceral damage during laparo-endoscopic hernia repair. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|--|--|

KQ18.z What is the 30-day mortality rate following groin hernia repair? What are the causes of this mortality?

| | | |
|------------------|--|--|
| <i>Statement</i> | Death in the 30 days following inguinal hernia repair is very rare and mainly associated with emergent repair. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> |
|------------------|--|--|

| | | |
|------------------|---|--|
| <i>Statement</i> | Femoral hernias are associated with an increased likelihood of emergent repair. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> |
|------------------|---|--|

| | | |
|------------------|---|--|
| <i>Statement</i> | Mortality in the 30 days following elective hernia repair is mainly related to medical comorbidities. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> |
|------------------|---|--|

Chapter 19 Pain – Prevention (P) and Treatment (T)

Pain prevention

KQ19P.a How is chronic pain defined? What is its prevalence after IH repair?

| | | |
|------------------|---|---|
| <i>Statement</i> | Ten to 12% of inguinal hernia repair patients experience at least a level of moderate pain that impacts daily activities. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |
|------------------|---|---|

| | | | |
|-----------------------|---|---|------|
| <i>Recommendation</i> | Chronic pain should be defined as \geq bothersome moderate pain impacting daily activities lasting \geq three months postoperatively. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |
|-----------------------|---|---|------|

KQ19P.b What are the risk factors for CPIP?

| | | | |
|------------------|--|--|--------|
| <i>Statement</i> | CPIP risk factors include: young age, female gender, high preoperative pain, early high postoperative pain, recurrent hernia and open hernia repair. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | Strong |
|------------------|--|--|--------|

KQ19P.d What are the most common variations in anterior inguinal nerve distribution patterns?

No Statement

KQ19P.e Does a “nerve-recognition” approach reduce the incidence of acute and chronic pain following open inguinal hernia repair?

| | | | |
|-----------------------|---|---|--------------------|
| <i>Recommendation</i> | Nerve anatomy awareness and recognition during surgery is recommended to reduce the incidence of chronic post-herniorrhaphy pain. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *upgrade |
|-----------------------|---|---|--------------------|

KQ19P.f Does prophylactic IIN resection reduce pain incidence?

KQ19P.g Does prophylactic IHN resection reduce pain incidence?

KQ19P.h Does prophylactic resection of the GB of the GFN reduce pain incidence?

| | | | |
|-----------------------|--|---|------|
| <i>Recommendation</i> | During open surgery, planned prophylactic IIN resection is not suggested since it does not reduce chronic pain incidence and it increases the incidence of postoperative sensory loss. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | weak |
|-----------------------|--|---|------|

| | | | |
|-----------------------|--|---|------|
| <i>Recommendation</i> | A planned prophylactic IHN resection is not suggested. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | weak |
|-----------------------|--|---|------|

| | | | |
|-----------------------|---|---|------|
| <i>Recommendation</i> | There is no evidence on the subject of planned neurectomy of the GB of the GFN. | <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | weak |
|-----------------------|---|---|------|

KQ19P.i Does pragmatic resection of inguinal nerves reduce pain incidence?

| | | | |
|-----------------------|--|---|------|
| <i>Recommendation</i> | Pragmatic resection of the IIN and/or the IHN is suggested if iatrogenic nerve injury occurs or if the nerve(s) interfere(s) with mesh position. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | weak |
|-----------------------|--|---|------|

KQ19P.j Does hernia sac resection and ligation increase the incidence of acute and/or chronic pain?

| | | | |
|------------------|--|--|--|
| <i>Statement</i> | In indirect hernia management, sac invagination, without | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | |
|------------------|--|--|--|

ligation, is associated with a reduction in the incidence of acute postoperative pain but an increased incidence of recurrence.

Statement A possible increase in pain incidence should be weighed against a possible increase in recurrence incidence when considering indirect hernia sac ligation.

KQ19P.k Does mesh fixation to the pubic bone increase the incidence of acute and/or chronic pain?

Recommendation Mesh fixation to the pubic bone is not recommended since this leads to an increased incidence of chronic pain. Strong
*upgraded

KQ19P.l What percentage of CPIP patients have orchialgia?

Recommendation Minimizing surgical trauma to the spermatic cord is recommended to reduce orchialgia incidence. Strong

KQ19P.m Can preoperative and perioperative topical and systemic medications reduce the incidence of chronic pain?

Statement Topical and/or oral medical therapy given preoperatively or intraoperatively has not been shown to reduce the incidence of chronic pain following hernia surgery. weak

KQ19P.n Can chronic postoperative pain be prevented or reduced by preoperative information and psychological preparation?

Pain treatment

Chronic postoperative pain treatment after inguinal hernia repair

KQ19T.a How should inguinal hernia repair patients with immediate, severe, postoperative pain be treated?

Recommendation Immediate severe/excruciating postoperative pain raises the possibility of vascular or nerve injury. Early re-operation is suggested to either exclude or manage these weak

complications.

KQ19T.b What should the initial approach be to IH repair patients with chronic postoperative pain (pain still present > three months after surgery)? (see treatment algorithm)

| | | | |
|-----------------------|---|---|------|
| | A multidisciplinary team is suggested to manage chronic pain patients. | | |
| Recommendation | Pharmacologic and interventional measures—including diagnostic and therapeutic nerve blocks—should continue for a minimum of three months (minimum of six months after hernia surgery). | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |

KQ19T.c Does non-pharmacological treatment work in CPIP?

| | | |
|------------------|--|---|
| Statement | No benefit has been shown for lidocaine and capsaicin patch treatment of CPIP. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|--|---|

KQ19T.d What is the effect of non-surgical interventional treatment on chronic pain after IH repair?

| | | |
|------------------|--|---|
| Statement | There is insufficient evidence of the diagnostic and therapeutic value of nerve blocks in chronic pain after inguinal hernia repair. In clinical practice however, nerve blocks can be useful in the diagnostic and therapeutic management of chronic pain after inguinal hernia repair. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|--|---|

| | | |
|------------------|--|--|
| Statement | Pulsed radio frequency ablation may be an effective treatment for chronic pain after inguinal hernia repair. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|--|--|

| | | |
|------------------|---|--|
| Statement | Early findings suggest that neuromodulation of the Dorsal Root Ganglia (DRG) may be an effective treatment for chronic neuropathic pain conditions in the groin region. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|---|--|

KQ19T.e Is mesh removal without intentional neurectomy an effective treatment for chronic pain after IH repair?

| | | |
|------------------|--|--|
| Statement | There is insufficient evidence to support mesh removal alone without neurectomy in patients with CPIP. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|--|--|

KQ19T.f What type of neurectomy should be performed in patients with chronic neuropathic pain (> 3 months) after IH repair?

| | | | |
|------------------|---|--|------|
| Statement | For chronic neuropathic pain after open hernia repair, both open neurectomy and endoscopic retroperitoneal neurectomy provide | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |
|------------------|---|--|------|

acceptable outcomes.

Recommendation A tailored approach to neurectomy with or without mesh removal is suggested depending on the original repair method and presentation. The decision about neurectomy type - selective or triple- is best left to the surgeon's discretion. Weak

Chapter 20 Recurrent Inguinal Hernias

KQ20.a Are recurrence rates still too high despite innovations like endoscopic repair, anterior preperitoneal repair and new mesh prosthetics?

Statement Recurrence rates worldwide are still too high despite numerous innovations in inguinal hernia surgery.

KQ20.b Is surgery necessary for all recurrence patients?

Statement There is no evidence to support a watchful waiting management strategy for those with recurrent inguinal hernias.

KQ20.c Which management strategy is best for recurrence after anterior repair?

Statement Open pre-peritoneal repair avoiding an approach through scar tissue can be an alternative surgical technique after failed anterior tissue repair or Lichtenstein repair. Weak

Recommendation Laparo-endoscopic recurrent inguinal hernia repair is recommended after failed anterior tissue or Lichtenstein repair. Strong

KQ20.d What is the best operation for a recurrence after TEP/TAPP?

Recommendation Anterior repair is recommended after a failed posterior repair. Strong

KQ20.e What is the optimal management strategy in the case of recurrent hernia after failed anterior and posterior (laparoscopic or anterior pre-peritoneal) repair?

| | | | |
|-----------------------|---|---|---------------------|
| <i>Recommendation</i> | An expert hernia surgeon should repair a recurrent IH after a failed anterior and posterior repair. The choice of technique depends on patient- and surgeon-specific factors. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong *Upgraded |
|-----------------------|---|---|---------------------|

| | | | |
|------------------|---|---|--|
| <i>Statement</i> | Increased morbidity and mortality are found amongst incarcerated/strangulated groin hernia patients with: age > 65 years, increased ASA classification, increased symptom duration, increased weight, necessity for bowel resection, presence of a recurrent hernia, femoral hernia presence, female gender, oral anticoagulant use, and presence of bowel obstruction. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
|------------------|---|---|--|

KQ20.f What are the options for a recurrence with post-herniorrhaphy chronic groin pain?

| | | | |
|-----------------------|--|--|------|
| <i>Recommendation</i> | There are no studies to guide decision making for recurrent hernia patients with post-herniorrhaphy chronic groin pain. It is suggested that patients with this condition be management by an expert hernia surgeon. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |
|-----------------------|--|--|------|

Chapter 21 Emergency Groin Hernia Treatment

KQ21.a Which groin hernias in adults are at increased risk for incarceration/strangulation?

| | | | |
|------------------|--|---|--|
| <i>Statement</i> | Risk factors for hernia incarceration/strangulation include: female gender, femoral hernia presence, and a history of hospitalizations related to groin hernias. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
|------------------|--|---|--|

KQ21.b Which risk factors increase morbidity and mortality in adults with incarcerated/strangulated groin hernias?

KQ 21.c Which diagnostic method is most suitable for the detection of incarcerated/strangulated groin hernias in adults?

| | | | |
|------------------|--|---|--|
| <i>Statement</i> | Clinical examination alone is sufficient for the diagnosis of incarcerated/strangulated groin hernias in almost all patients. Groin ultrasound and/or abdominopelvic CT can provide additional diagnostic information and aid decision making in selected cases. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | |
|------------------|--|---|--|

| | | | |
|-----------------------|---|---|-----------------------------------|
| <i>Recommendation</i> | Clinical examination of the groin is recommended in all patients presenting with signs and symptoms of bowel obstruction. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <i>Strong</i> <i>*upgraded</i> |
|-----------------------|---|---|-----------------------------------|

KQ21.d Should adults with acutely incarcerated/strangulated IHs undergo repair emergently?

| | | |
|------------------|---|---|
| <i>Statement</i> | Acutely incarcerated/strangulated groin hernias represent surgical emergencies mandating timely surgery, taking into account preoperative optimization and the capabilities of local surgical facilities. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|---|---|

KQ 21.e What is the optimal surgical approach (open anterior vs laparoscopic) for an acutely incarcerated/strangulated groin hernia?

KQ 21.f What is the optimal surgical approach (open posterior vs laparoscopic) for an acutely incarcerated/strangulated groin hernia?

KQ 21.g What is the optimal open surgical approach (anterior vs posterior) for an acutely incarcerated/strangulated groin hernia?

KQ 21.h What is the optimal laparoscopic surgical approach (TAPP vs TEP) for an acutely incarcerated/strangulated groin hernia?

| | | | |
|-----------------------|--|--|-------------|
| <i>Recommendation</i> | A tailored approach is suggested for adult patients with acutely incarcerated/strangulated groin hernias since there is no evidence supporting an optimal surgical approach. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <i>Weak</i> |
|-----------------------|--|--|-------------|

KQ21.i In patients with intestinal incarceration without signs of intestinal strangulation or concurrent bowel resection (i.e. a clean surgical field) is mesh-based repair recommended?

KQ21.j In patients with intestinal incarceration without signs of intestinal strangulation or concurrent bowel resection (i.e. a clean surgical field), which mesh is recommended?

| | | | |
|-----------------------|--|---|-------------|
| <i>Recommendation</i> | Similar to clean elective hernia surgery, mesh repair is suggested in clean emergent hernia surgery. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | <i>Weak</i> |
|-----------------------|--|---|-------------|

KQ21.k In patients with intestinal strangulation and/or concurrent bowel resection (clean-contaminated surgical field) is mesh-based repair recommended?

KQ21.l In patients with intestinal strangulation and/or concurrent bowel resection (clean-contaminated surgical field), which mesh is recommended?

| | | | |
|-----------------------|--|------|------|
| <i>Recommendation</i> | Mesh-based repair is suggested in emergent groin hernia surgery with a clean or clean-contaminated surgical field. | ☒☒□□ | Weak |
|-----------------------|--|------|------|

KQ21.m In stable patients with strangulated obstruction and peritonitis caused by a bowel perforation or an abscess due to necrosis of the omentum (contaminated-dirty surgical field) is mesh repair recommended?

KQ21.n In stable patients with strangulated obstruction and peritonitis caused by a bowel perforation or an abscess due to necrosis of the omentum (contaminated-dirty surgical field), which mesh is recommended?

| | | | |
|-----------------------|---|------|------|
| <i>Recommendation</i> | It is suggested not to use mesh during emergent groin hernia repair in a contaminated-dirty surgical field. | ☒☒□□ | Weak |
|-----------------------|---|------|------|

| | | | |
|------------------|---|------|--|
| <i>Statement</i> | Little evidence exists comparing the implantation of mesh of various types in non-clean surgical fields. Large-pore monofilament polypropylene, biological and biodegradable meshes have unknown effects on mesh-infection risks. | ☒□□□ | |
|------------------|---|------|--|

| | | | |
|-----------------------|---|------|------|
| <i>Recommendation</i> | As surgical field contamination status worsens it is recommended that mesh use be ever more conscientiously considered. If mesh is used, the risk/benefit ratio must be carefully contemplated. | ☒□□□ | Weak |
|-----------------------|---|------|------|

KQ21.o Should adult patients with acutely incarcerated/strangulated groin hernias receive antibiotic prophylaxis or treatment?

| | | | |
|-----------------------|---|------|---------------------|
| <i>Recommendation</i> | Prophylactic intravenous antibiotics are suggested during and following emergent hernia surgery. They should be continued as required depending on the contamination level of the surgical field. | ☒☒□□ | Strong *upgraded |
|-----------------------|---|------|---------------------|

KQ21.p In adults with acutely incarcerated/strangulated groin hernias, does hernia sac laparoscopy (hernioscopy) reduce morbidity and mortality in cases with spontaneous reduction of the hernia before viability assessment?

KQ21.q In adults with acutely incarcerated/strangulated groin hernias, is laparoscopy useful to check bowel viability even when an anterior approach is done?

Statement

If a surgeon has any concern about bowel viability, bowel visualization is recommended. Depending on surgical approach, expertise, and facilities, bowel visualization may be undertaken by groin exploration, hernia sac laparoscopy, formal laparoscopy or laparotomy.

Chapter 22 Training and the Learning Curve

KQ22.a What is the learning curve for open inguinal hernia repair, anterior approach?

KQ22.b What is the learning curve for open inguinal hernia repair, posterior approach?

KQ22.c What is the learning curve for laparoscopic inguinal hernia repair, TEP?

KQ22.d What is the learning curve for laparoscopic inguinal hernia repair, TAPP?

KQ22.e What are the best methods to teach open hernia repair?

KQ22.f What are the best methods to teach laparoscopic inguinal hernia repair?

Statement

Adequate evidence does not exist to assess the learning curve for the open posterior approach.

Statement

Open anterior mesh repair by unsupervised trainees with less than 60 cases or about 3 years' experience is on average associated with higher recurrence rate, longer operative times consistent with limited technical competency.

Statement

Complication rates do not differ between consultants and supervised trainees regardless of training year. However, involvement of trainees may slightly prolong operative times.

Statement

Although learning curves may vary, on average the learning curve for TAPP repair may be similar to the learning curve for TEP repair.

| | | | |
|-----------------------|---|--|---------------|
| Recommendation | A goal-directed curriculum including review of anatomy, procedure steps, intraoperative decision making and proficiency based, simulation enhanced technical skills training should be available to trainees whenever possible. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | Strong |
|-----------------------|---|--|---------------|

| | | | |
|-----------------------|---|--|---------------|
| Recommendation | Supervision of trainees should be provided until they have reached safe proficiency levels. This averages around 60 procedures for open and around 100 procedures for laparo-endoscopic hernia repair for novices, depending on individual aptitude and the training environment. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> | Strong |
|-----------------------|---|--|---------------|

Chapter 23 Specialized Centers and Hernia Specialists

KQ23.a Does a center’s volume affect IH surgery outcomes?

| | | |
|------------------|---|--|
| Statement | In order for centers and surgeons to be certified as either a hernia center or a hernia specialist, minimal requirements on numbers of operations, follow-up and quality control should be met. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|---|--|

KQ23.b Do surgical volumes affect the outcomes of IH surgeries?

| | | |
|------------------|--|---|
| Statement | A surgeon’s caseload appears to more important for IH surgery outcomes than a center’s caseload. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|--|---|

| | | |
|------------------|---|--|
| Statement | A surgeon’s case volume is inversely related to that surgeon’s recurrence rate. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> |
|------------------|---|--|

KQ23.c Does facility specialization affect IH surgery outcomes?

KQ23.d Does surgical specialization affect IH surgery outcomes?

| | | |
|------------------|--|--|
| Statement | Hernia specialists are surgeons with mastery/expert level hernia surgery skills who actively train, educate and perform research in their field. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|--|--|

Chapter 24 Costs

KQ24.a Is open or endoscopic inguinal hernia repair more cost effective?

Statement Direct institutional costs are lower for open mesh repair than for laparoscopic mesh repair.

Statement Indirect societal costs are lower for laparoscopic mesh versus open mesh repair.

Statement Laparoscopic inguinal hernia repair is overall more cost effective than open inguinal hernia repair.

KQ24.b What are the costs and cost differences between open and laparoscopic inguinal hernia repair?

Statement The higher institutional costs of laparoscopic inguinal hernia repair are mainly due to the use of expensive disposable equipment.

Recommendation From a cost-effectiveness perspective, day-case laparoscopic inguinal hernia repair with minimal use of disposables is recommended. Strong

KQ24.c Which surgeon-specific factors result in improved cost effectiveness?

Chapter 25 Groin Hernia Registries

KQ25.a When compared with RCTs, do well-validated IH quality registries, and the studies done on their databases, offer additional valuable evidence-based information to hernia surgeons?

Statement Hernia registries, with high coverage, allow monitoring of clinical practice and provide high external validity whereas RCTs define effects of a specific intervention with minimal bias and high internal validity.

Statement Rare events can be detected early in hernia registries highlighting potential problems soon after new techniques and products are introduced into clinical practice.

Statement Registry-based studies are important complements to RCTs, in guideline development.

Recommendation Countries or regions should develop and implement registries for groin hernia patients. weak

Chapter 26 Outcomes and Quality Assessment

KQ26.a What are the currently used methods for measuring surgeon-specific outcomes following groin hernia repair?

KQ26.b What are the currently used methods for measuring patient-based outcomes following groin hernia repair?

Statement There should be an internationally agreed upon set of parameters—with definitions—for groin hernia surgery. Strong

Recommendation The development of hernia registries that include patient follow-up data and account for local healthcare structures is recommended for research and audit purposes. Strong
*upgrade

Chapter 27 Dissemination and Implementation

KQ27.a What are the target groups for the guidelines?

KQ27.b What are the most important messages of the guidelines, both general and specific, for the targeted groups?

KQ27.c Which channels can be used for guidelines distribution?

KQ27.d How can the guidelines be supported by Internet tools, platforms, Apps and social media?

KQ27.e What is the evaluation strategy for the implementation process?

| | | | |
|-----------------------|---|--|---------------|
| Recommendation | HerniaSurge recommends that all countries or regions develop a guidelines dissemination and implementation strategy. HerniaSurge offers support for this process. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Strong |
|-----------------------|---|--|---------------|

Global Groin Hernia Management

Chapter 28 Inguinal Hernia Surgery in Low Resource Settings

KQ28.a What is the epidemiology of inguinal hernia in LRSs?

KQ28.b Which types of inguinal hernia repairs are currently performed in LRSs?

KQ28.c What is the recommended operation for inguinal hernias in low resource environments?

KQ28.d What are the logistical challenges for safe groin hernia repair in low resource environments?

KQ28.e Should any special precautions be taken?

KQ28.f What is the most suitable mesh?

KQ28.g What is the best way to educate surgeons in a sustainable manner in LRSs?

KQ28.h How can the internet and other technologies be used to teach physicians in LRSs?

| | | |
|------------------|--|--|
| <i>Statement</i> | Due to a substantial lack of access to surgery, inguinal hernia prevalence in LRSs is unacceptably high. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> |
|------------------|--|--|

| | | |
|------------------|---|--|
| <i>Statement</i> | In LRSs there is a lack of basic surgical training, expertise in inguinal hernia repair techniques, and resources to safely perform mesh repair. Mainly (modified) Bassini techniques are used. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> |
|------------------|---|--|

| | | | |
|-----------------------|---|---|-------------|
| Recommendation | LRSs should focus teaching the performance of high volume inguinal hernia repair by a standardized technique (Lichtenstein) under local anesthesia preferably using a low-cost mesh (e.g. mosquito mesh). | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |
|-----------------------|---|---|-------------|

| | | | |
|-----------------------|---|---|------|
| <i>Recommendation</i> | The use of low-cost mesh (with known chemical and physical characteristics, which are comparable to commercial prosthetics) is suggested. | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |
|-----------------------|---|---|------|

| | | | |
|-----------------------|---|--|------|
| <i>Recommendation</i> | When using a non-licensed low-cost mesh, outcome audits | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |
|-----------------------|---|--|------|

at a local level are suggested.

| | | | |
|-----------------------|--|--|------|
| <i>Recommendation</i> | It is suggested that at least one dose of an appropriate prophylactic antibiotic be administered prior to inguinal hernia repair in LRSs. Whether to administer antibiotics for 24 hours or more is unknown. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |
|-----------------------|--|--|------|

| | | | |
|-----------------------|--|--|------|
| <i>Recommendation</i> | An overarching plan to improve access to safe inguinal hernia surgery in LRSs is needed. It is suggested that this plan contain simple guidelines and a sustainability strategy which should allow implementation and maintainability, independent of international aid. | <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | Weak |
|-----------------------|--|--|------|

DRAFT