

Prevention and treatment of bile duct injuries during laparoscopic cholecystectomy: the clinical practice guidelines of the European Association for Endoscopic Surgery (EAES)

M. Eikermann · R. Siegel · I. Broeders · C. Dziri · A. Fingerhut ·
C. Gutt · T. Jaschinski · A. Nassar · A. M. Paganini · D. Pieper · E. Targarona ·
M. Schrewe · A. Shamiyeh · M. Strik · E. A. M. Neugebauer

Received: 22 July 2012 / Accepted: 29 July 2012
© Springer Science+Business Media, LLC 2012

Abstract

Background Laparoscopic cholecystectomy is one of the most common surgical procedures in Europe (and the world) and has become the standard procedure for the management of symptomatic cholelithiasis or acute cholecystitis in patients without specific contraindications. Bile duct injuries (BDI) are rare but serious complications that can occur during a laparoscopic cholecystectomy. Prevention and management of BDI has given rise to a host of publications but very few recommendations, especially in Europe.

Methods A systematic research of the literature was performed. An international expert panel was invited to appraise the current literature and to develop evidence-based recommendations. Statements and recommendations were drafted after a consensus development conference in May 2011, followed by presentation and discussion at the annual congress of the EAES held in Torino in June 2011. Finally, full guidelines were consented and adopted by the expert panel via e-mail and web conference.

Results A total of 1,765 publications were identified through the systematic literature search and additional

M. Eikermann · T. Jaschinski · D. Pieper ·
E. A. M. Neugebauer (✉)
Institute for Research in Operative Medicine (IFOM), Faculty
of Health, Witten/Herdecke University, Campus Cologne-
Merheim, Ostmerheimer Straße 200, 51109 Cologne, Germany
e-mail: edmund.neugebauer@uni-wh.de

R. Siegel
Department of Visceral, Vascular, and Transplantation Surgery,
Faculty of Health, Witten/Herdecke University, Campus
Cologne-Merheim, Cologne, Germany

I. Broeders
Meander Medisch Centrum, Afdeling Chirurgie, Amersfoort,
The Netherlands

C. Dziri
Department B of General Surgery, Hôpital Charles Nicolle,
University of Tunis El Manar, Boulevard du 9 avril 1938,
Tunis 1006, Tunisia

A. Fingerhut
First Department of Propaedeutic Surgery, Hippokraton
Hospital, Athens Medical School Greece, 115 27 Athens, Greece

C. Gutt
Allgemein-, Viszeral-, Thorax- und Gefäßchirurgie,
Klinikum Memmingen, Memmingen, Germany

A. Nassar
BMI Ross Hall Hospital, Glasgow, UK

A. M. Paganini
Clinica Chirurgica e Tecnologie Avanzate, Dipartimento
di Chirurgia Generale, Specialità Chirurgiche e Trapianti
d'Organo "Paride Stefanini", Azienda Policlinico Umberto I,
"Sapienza" Università di Roma, Rome, Italy

E. Targarona
Service of Surgery, Hospital de Santpau, Autonomous
University Autonomous of Barcelona, Barcelona, Spain

M. Schrewe
GRB-Consulting Company for Risk-Management,
Klingenbergstraße 4, 32758 Detmold, Germany

A. Shamiyeh
Ludwig Boltzmann Institute for Operative Laparoscopy,
2nd Surgical Department, Academic Teaching Hospital,
AKH Linz, Linz, Austria

M. Strik
Klinik für Allgemein-, Viszeral- und Onkologische Chirurgie,
HELIOS Klinikum Berlin-Buch, Berlin, Germany

submission by panellists; 671 publications were selected as potentially relevant. Only 46 publications fulfilled minimal methodological criteria to support Clinical Practice Guidelines recommendations. Because the level of evidence was low for most of the studies, most statements or recommendations had to be based on consensus of opinion among the panel members. A total of 15 statements and recommendations were developed covering the following topics: classification of injuries, epidemiology, prevention, diagnosis, and management of BDI.

Conclusions Because BDI is a rare event, it is difficult to generate evidence for prevention, diagnosis, or the management of BDI from clinical studies. Nevertheless, the panel has formulated recommendations. Due to the currently limited evidence, a European registry should be considered to collect and analyze more valid data on BDI upon which recommendations can be based.

Keywords Guidelines · Laparoscopy · Bile duct injury · Cholecystectomy

Laparoscopic cholecystectomy is one of the most common surgical procedures in Europe (and worldwide). It has become the standard procedure for the management of symptomatic cholelithiasis or acute cholecystitis in patients without specific contraindications.

Bile duct injuries (BDI) are rare but serious complications that can occur during a laparoscopic cholecystectomy. BDI are associated with high postoperative morbidity and mortality as well as with reduced quality of life, especially when they are unrecognized.

Prevention, diagnosis, and management of BDI have given rise to a host of publications but very few recommendations, especially in Europe. For these reasons, the European Association for Endoscopic Surgery (EAES) decided to develop statements and recommendations regarding the prevention, diagnosis, and management of BDI. Clinical Practice Guidelines (CPG) are statements that include recommendations intended to optimize patient care that are informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options [1].

Materials and methods

The EAES scientific committee commissioned a methodological expert team (EN, ME, DP, TJ) to analyze the current evidence and coordinate the guideline development process with the intention to develop recommendations. An international expert panel consisting of surgeons and research scientists was constituted. Experts were selected

according to their scientific and clinical expertise as well as their geographical localization.

The methodological expert team was responsible for the literature search, the critical appraisal of literature, the data extraction, the moderation of the consensus conference, and writing of guidelines. Furthermore, the methodological experts designated the selection of topics and key questions. Based on their clinical knowledge and experience, the clinical experts' contribution involved further selection of topics and key questions, a complementary literature review, the submission of additional relevant evidence, the discussion and formulation of the recommendations, the presentation and discussion of the recommendations, and the review and comments on the draft version of the guidelines before consenting to the final version, presented herein.

Selection of topics and research questions

The list of key clinical issues derived according to a formal consultation process was presented to the expert panel. A set of 15 key questions was developed and consented by the panel members. Where appropriate, the key questions were refined once the evidence had been searched or additional questions were generated.

Systematic literature search

An initial scoping search for published guidelines, systematic reviews, and health technology assessments was performed to identify current relevant guidelines and to identify relevant words and terms for the search strategy in the following databases as well as on websites: Guidelines International Network (GIN), National Guidelines Clearinghouse (NGC), Cochrane Database of Systematic Reviews (CDSR), Health Technology Assessment Database (HTA), and MEDLINE.

A systematic literature search was conducted in the electronic databases: MEDLINE (via PubMed) and Cochrane Library. No restrictions regarding the publication date were applied to the search. The initial search was conducted on February 18, 2011, an updated search on June 21, 2011. Further details of the search strategy are provided in "Appendix 1" section.

Literature selection

Publications (primary studies and secondary literature) identified during the literature searches were reviewed to exclude duplicates and identify the most appropriate data to address the key questions.

The remaining publications were selected for inclusion in the guideline adopting the following inclusion criteria:

1. Population: adult patients with BDI during laparoscopic cholecystectomy
2. Population (for single-arm cohort studies): less than 20 % of the patients had an open procedure and a subgroup analysis was done for the laparoscopic group
3. Language: English or German
4. Publication type: systematic review, randomized controlled trial, controlled clinical trial, cohort study, case control studies, case series ≥ 6 patients
5. Full text of the publication is available

The selection process was performed in a two-step procedure. First, the titles and abstracts of the retrieved citations were scanned to exclude all publications that were clearly not relevant to the guideline topic or the key questions. The remaining abstracts were checked against the inclusion criteria. Next, full versions of the potential eligible studies were acquired for assessment and checked against the inclusion criteria. Two reviewers performed the selection process independently. Any discrepancies regarding the inclusion were resolved in a discussion. In the case of insolvable inconsistency, a third reviewer was involved in the discussion.

Critical appraisal of literature

The study quality of relevant publications was assessed using the study-type-specific methodology checklists for primary studies by NICE [2] and the AMSTAR-instrument for systematic reviews [3, 4]. Two reviewers independently assessed the studies. Any disagreements were resolved in a discussion. In the case of insolvable inconsistency, a third reviewer was involved in the discussion. Based on the assessment of study quality, the levels of evidence (LoE) were determined by using the Oxford Centre for Evidence-based Medicine (CEBM) LoE-table (Version 2009).

Formulating recommendations and consensus process

All recommendations were graded according to the quality and quantity of the underlying scientific evidence, the risk-benefit balance, and the values expressed by the panelists. The grades of recommendations ranged from A to D:

- A Consistent level 1 studies
- B Consistent level 2 or 3 studies or extrapolations from level 1 studies
- C Level 4 studies or extrapolations from level 2 or 3 studies
- D Level 5 evidence or inconsistent or inconclusive studies of any level

In case of limited or lacking data to support a recommendation, the panel decided that the grade of

recommendation could be higher than the evidence would ordinarily allow for. Furthermore, for some recommendations, there was a need to modulate and weigh the evidence locally according to value judgments, priorities, and local conditions.

Based on the identified studies and the assessment of study quality, the expert panel formulated statements and draft recommendations. The statements and recommendations were discussed and consented in a consensus conference (May 20–21, 2011) and thereafter presented by members of the panel at the annual congress of the EAES in Torino, June 16, 2011 in a 90-min plenary session. Comments were taken from the audience after discussion and considered in the further process.

The strength of consensus was classified according to the percentage of agreement (Table 1). After drafting the final consensus of the statements and recommendations, the full guideline was consented and adopted by the expert panel via e-mail and web conference.

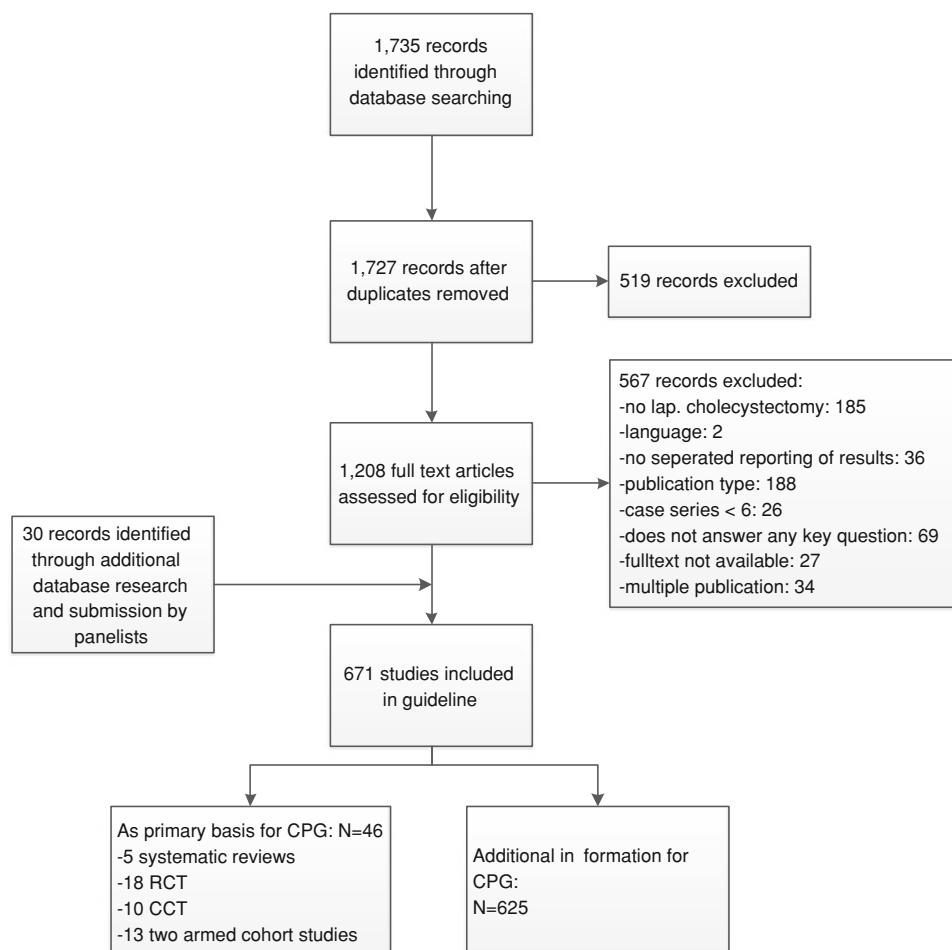
Results

A total of 1,735 publications were identified through the systematic literature search, 30 further publications were identified through an additional database research and the submission by panelists. After exclusion of duplicates and screening of titles, abstracts, and full texts 671 publications were selected as potentially relevant. Most of these trials were observational studies without control group. Only 46 publications fulfilled minimal methodological criteria to support Clinical Practice Guidelines recommendations: 5 systematic reviews [5–9]; 18 randomized controlled trials (RCT) [10–27]; 10 nonrandomized, controlled, clinical trials (CCT) [28–37]; and 13 two-armed cohort studies [38–50]. Furthermore, 625 studies (mostly single-arm cohort studies and case series) were analyzed for additional information for guideline development (see “Appendix 2” section). A detailed flow chart of the systematic literature search and the selection process is given in Fig. 1.

As a result of the systematic literature search and the appraisal of the literature, we concluded that there is only limited evidence from clinical studies to support CPG recommendations. Most of the publications had

Table 1 Classification of consensus

Strength of consensus	Percentage of agreement
Strong consensus	>95 % of participants
Consensus	75–95 % of participants
Majority	50–75 % of participants
No consensus	<50 % of participants

Fig. 1 Flow chart: literature search and selection process

shortcomings regarding the methodological quality. For a number of key questions, no single publication could be identified. As in other areas of low or absent evidence, this led to rely heavily on expert opinion in formulating the recommendations.

Recommendations and statements

Classification of injuries

Various classification schemes have been used to classify BDI. They reflect anatomical type, type of division, vascular involvement, detection (intraoperative, postoperative leak, stricture), and etiopathogeneses to different degrees. All of the classifications have strong positive points but also weaknesses. Therefore, the panel decided to formulate a new comprehensive classification scheme, based on the existing classifications.

According to the EAES-classification BDI are graded on the basis of the following criteria:

(1) Anatomical location on biliary tree (1 to 6)

Type 1: main bile duct injury ≥ 2 cm distal to inferior border of superior hepatic confluence

Type 2: main bile duct injury < 2 cm distal to inferior border of superior hepatic confluence

Type 3: main bile duct injury involving superior hepatic confluence but communication left right preserved

Type 4: main bile duct injury involving superior hepatic confluence but communication left right interrupted

Type 5: left or right hepatic duct without lesion of the superior confluence

Type 6: non-main bile duct injury including hepatic bed, aberrant, accessory ducts

(2) Type of division: complete (C), major (M) ($> 25\%$ of diameter) vs. partial (P) (minor (m) $< 25\%$ of diameter)

(3) According to whether a concomitant vascular lesion occurred (V +, V -)

(4) According to whether loss of substance (length) occurred LS +, LS -

Table 2 Comparison of BDI classification schemes

	Anatomical type	Type of division (C, M, P, LS)	Vascular	Detection (intraoperative postoperative leak, stricture)	Pathogenesis
Bismuth	+	-	-	-	-
McMahon	±	+	-	-	-
Strasberg	+	+	-	-	-
AMA (Bergman)	+	+	-	-	-
Neuhaus	+	+	-	±	-
Csendes	+	±	-	±	+
Stewart-Way	+	+	+	+	+
Lau	+	+	+	-	-
EAES	+	+	+	+	+

- (5) According to time of detection: during operation (Ey), early postoperative bile leak (E), late (S = stricture)
- (6) According to etiopathogenesis: mechanical division (e.g., scissors) (M), energy driven (e.g., electric (E), ischemic (whether secondary to vascular injury or energy-related) (I)
- (7) According to whether occlusion (O) (ligation, clip) or leak (L)

In Table 3, a matrix for the classification of bile duct injuries according to the EAES scheme is shown. Table 2 summarizes the classification criteria of the most common classification schemes compared with the new EAES classification.

Epidemiology

Key question 1.1 What is the event rate for BDI during laparoscopic cholecystectomy (LC) (compared with an open approach)?

The risk of BDI in LC has drawn wide attention from the beginning of the laparoscopic era.

In the present systematic literature search, the authors identified only two small, randomized, controlled trials [14, 19] with data on BDI. Furthermore, a number of case series and—mostly retrospective—cohort studies were identified.

Due to the study design and/or small populations, the information on event rates of BDI of these studies was not considered valid.

A systematic review consisting of 45 studies with 2,626 patients identified a BDI rate of 0.72 % for single incision laparoscopic cholecystectomy performed in the absence of acute cholecystitis (90.6 %) [51].

In addition, data from registries are available. In Germany, the Institute for Applied Quality Improvement and Research in Health Care GmbH (AQUA) is commissioned by the Federal Joint Committee to collect and analyze data for quality assurance and publishes the “German Hospital Quality Report” annually [52]. In 2010, 172,368 cholecystectomies were reported for reasons other than malignant diseases of the gallbladder or bile ducts, approximately 90 % of all cases were performed laparoscopically. Overall (laparoscopic and open approach) an “Occlusion or transection of the CHD” was registered in 177 operations (0.1 %), the reintervention rate for all reasons (including BDI) was 0.9 %. The rate of at least one intervention-specific complication requiring treatment after laparoscopically initiated surgery in 2010 was 2.4 %.

According to data from the Danish Cholecystectomy Database in Denmark, 28,379 patients underwent a cholecystectomy between 2006 and 2009, with complete registration data in 24,240 patients [53, 54]. A laparoscopic

Table 3 EAES classification matrix for bile duct injuries

Anatomical type	Type of division				Vascular		Detection			Pathogenesis			Type of injury	
	C	M	P (m)	LS	Yes	No	D	Ey	S	M	En	I	O	L
1														
2														
3														
4														
5														
6														

procedure was started in 23,672 patients (97.7 %). In 21,626 patients the procedure was completed laparoscopically (92.6 %). A reconstructive bile duct surgery within 30 days had to be conducted in 0.1 % (2007) to 0.25 % (2008), another bile duct surgery within 30 days had to be conducted in 0.11 % (2009) to 0.19 % (2007).

In a large retrospectively analyzed Finnish cohort [55], 75 BDI were encountered in a total of 8,349 cholecystectomies (1,616 open and 6,733 laparoscopic cholecystectomies), which means an overall BDI incidence of 0.9 %. Twenty BDI occurred in open cholecystectomy (incidence rate: 1.24 %) and 55 in laparoscopic cholecystectomies (incidence rate 0.82 %). For the open approach, most injuries were minor (15/20); during laparoscopic cholecystectomies 26 of 55 injuries were classified as minor, and 29 of 55 as major BDI (14 of them with complete transection or excision of common bile duct). In conclusion, OC was associated with a higher number of BDI but mostly classified as a minor BDI. LC was associated with less but more severe BDI [55].

In a recent publication medical record from Kaiser Permanente Northern California (KPNC), data from 83,449 patients who underwent laparoscopic cholecystectomy (LC) between 1995 and 2008 were analyzed retrospectively. The incidence rates were contrasted with the results from the Nationwide Inpatient Sample (NIS). In the KPNC patient sample, a cumulative BDI rate of 0.04 % was found, for the NIS a cumulative BDI rate of 0.11 %. For the KPNC sample, types of injuries were analyzed. The authors found a trend toward more major injuries approaching the hilum and fewer distal or minor injuries but no significant differences [56].

Today, the laparoscopic approach has become the standard procedure and the open approach more often is used for difficult patients.

Statement 1.1 Following the introduction of laparoscopic cholecystectomy, the literature pointed out to an increase in the incidence of BDI.

(Strong consensus)

Key question 1.2 What is the event rate for BDI during conventional laparoscopic cholecystectomy compared to alternative endoscopic techniques?

Recently developed techniques in laparoscopic surgery as “Single Incision Laparoscopic Surgery” (SILS) or “Natural Orifice Transluminal Endoscopic Surgery” (NOTES) are performed in selected patients. In particular, NOTES is an endoscopic surgical technique for which only limited evidence from clinical studies [9, 22] or small registries [57] regarding the event rates of BDI is available until now. Therefore, no conclusions could be made regarding this question.

Statement 1.2 Because there is currently no high-quality clinical evidence, the EAES cannot conclude that the incidence of BDI in alternative endoscopic techniques is less or greater than conventional laparoscopic cholecystectomy.

(Strong consensus)

Key question 1.3 Do alternative endoscopic techniques increase the risk for BDI?

As stated in the key question, no data from high-quality clinical studies for alternative endoscopic techniques are available. In the German Hospital Quality Report 2010, it is stated: “The risks of more recent procedures wherein surgical access is gained by natural orifice transluminal endoscopic surgery (NOTES), for instance, through the vagina, cannot yet be estimated with certainty” [9].

There is some evidence for needlescopic, miniport, or 3-port laparoscopic cholecystectomy compared with 4-port technique [8, 20, 27], but the study populations and therefore the rates of BDI were too small to answer the key question under consideration.

Statement 1.3 Because there is currently no high-quality clinical evidence, the EAES cannot conclude that the incidence of BDI in NOTES and single-port cholecystectomy is less or greater than conventional laparoscopic cholecystectomy.

(Strong consensus)

Prevention

Key question 2.1 What are the patient risk factors for BDI?

Key question 2.2 Which factors (related to surgical technique) can decrease the risk for BDI?

Key question 2.3 What are the indications for the conversion to an open approach to avoid BDI?

Studies differ for the reported patient or local risk factors for BDI. Age, sex, acute cholecystitis, impacted gallstone within the Hartman pouch or a short or inexistent cystic duct, anatomical variations of biliary or vascular system, thickened gallbladder wall and dilated common bile duct, severe chronic scarring of the gallbladder, bleeding in the Calot triangle obscuring the operative field, previous (upper) abdominal surgery and adhesions, and duration of the operative procedure have been mentioned as risk factors for BDI. Nevertheless, due to the small number of cases, it is not possible to provide clear data for the relevance of these factors for BDI. Data from the registry of the Swiss Association of Laparoscopic and Thoracoscopic Surgery

(SALTS) showed no significant difference in risk of BDI for acute versus chronic inflammation. An increased risk was found in male compared with female patients. However, the participation in the study was voluntary and only 65 % of surgeons contributed [58].

Although there is only limited evidence from clinical studies to back this technique, the panel recommends performing the critical view of safety as follows [59–61]:

- The critical view of safety can be achieved with the 0°, 30°, or 45° optics. However, the common bile duct (CBD) is more difficult to see with the 0° telescope, because it lies parallel to the scope and it is partly hidden behind the duodenal bulb. Moreover, 360° rotation of the 30° or 45° scope provides different angles of visualization of the surgical field and offers the surgeon more information for safe dissection throughout the procedure. Therefore, the use of an angled forward oblique viewing telescope is recommended.
- Firm cephalic traction on the fundus of the gallbladder toward the patient's right shoulder to reduce redundancy in the infundibulum of the gallbladder.
- Lateral and caudal traction on Hartmann's pouch to place the cystic duct perpendicular to the CBD.
- Visual identification of the supraduodenal CBD without dissection. Dissection starts with an incision on the peritoneum of the infundibulum of the gallbladder, *not directly on what is presumed to be the cystic duct*, either on the lateral or more commonly on the medial aspect of the infundibulum near its reflection on the liver parenchyma.
- Dissection then proceeds alternately on the lateral and medial aspects of the gallbladder toward the cystic duct, with an alternate movement exerted on Hartmann's pouch by the grasper holding it on either side (flag technique).
- Dissection may be accomplished by any instrument according to surgeon's preference (hook, scissors, dissector, ultrasonic dissection).
- To avoid thermal damage, monopolar electrocautery should be used sparingly, and with short bursts (1–2 s).
- Attention is warranted not to place the active blade of alternative energy sources, such as ultrasonic dissection, in contact with the bile duct structures, again to avoid thermal damage.
- Dissection continues until the infundibulum is completely lifted off the liver bed.
- The next step is to clear the triangle of Calot of fat, small vessels, and lymphatics, bridging the gap between the cystic duct and artery. Achievement of the CRITICAL VIEW of SAFETY is completed when only two tubular structures—the cystic duct and

artery—are identified joining the gallbladder. Cloquet's node may be used as a landmark for the cystic artery.

- The surgeon should always be aware of the possible existence of a variety of ductal and vascular aberrations.

If at this step of the surgical procedure the surgeon does not achieve the critical view of safety, it is advisable:

1. To reevaluate the anatomical landmarks
2. To proceed with further dissection of the gallbladder body off the liver bed
3. To reexplore Calot's triangle closer to the infundibulum in an attempt to achieve the critical view
4. Intraoperative cholangiography or laparoscopic ultrasonography both provide valuable anatomic information. They should be employed liberally whenever the surgeon has any doubt about the anatomy and to provide permanent documentation
5. Consider fundus-first dissection
6. Consider subtotal cholecystectomy, in cases with an important scarring and difficult dissection
7. Consider conversion.

The surgeon should proceed with ligation only when the cystic duct and artery are clearly identified and encircled. The use of metal clips, absorbable clips, or ties is up to the individual preference of the surgeon. Once the artery and cystic duct are divided, the surgeon should rule out the presence of further tubular structures before proceeding with the separation of the gallbladder from the liver bed. During dissection of the gallbladder from the liver bed, the surgeon should carefully look for accessory (Luschka) ducts. These ducts should be ligated and not just divided with electrocautery to avoid postoperative bile leakage. Any open subvesicular duct should be treated with sutures. Any thin continuous tubular structure running on the liver bed should be opened. If it bleeds, it can be diathermed. If it is of biliary origin (Luschka duct), it should be ligated.

Statement 2.1 Surgeons should be aware that anatomical biliary tract and vascular variations are frequent. Such variations are considered risk factors if they cannot be properly identified and dealt with.

Pathological risk factors include the impacted Hartmann's pouch stone, impacted cystic duct stones, the Mirizzi syndrome or inflammatory changes that make identification of the anatomy difficult.

(Strong consensus)

Recommendation 2.2 Optimal exposure to reach the critical view of safety is highly recommended. GoR A

(Strong consensus)

Recommendation 2.3 Inability to reach the critical view of safety and/or to identify the source and safely control bleeding are indications for conversion. GoR A

(Strong consensus)

Key question 2.4 Is the surgeon's experience a risk factor for BDI?

Key question 2.5 Can structured training reduce the rate of BDI?

Shortly after the introduction of laparoscopic cholecystectomy, the rate of BDI were more commonly reported early in each surgeon's experience [62]. Studies have been performed to evaluate the effect of training programs to the complication rate in laparoscopic cholecystectomy, especially BDI [37, 63]. Since this time, the laparoscopic approach has become the standard procedure, and young surgeons become familiar with this approach from the beginning of their education. The rate of BDI seems to have decreased and remains apparently constant. The authors could not identify more current clinical studies dealing with the influence of surgeon's experience on the complication rate or the impact of training programs. Therefore, no current evidence exists for the role of surgeons experience or the impact of training programs. Data from the registry of the Swiss Association of Laparoscopic and Thoracoscopic Surgery (SALTS) showed no significant difference in risk of BDI according to surgeon's laparoscopic experience [58].

Statement 2.4 Although BDI can occur even in the hands of expert surgeons, inadequate experience is a risk factor.

(Strong consensus)

Recommendation 2.5 EAES recommends supervised structured training starting with skills courses. GoR B

(Majority)

Key question 2.6 Can intraoperative cholangiography prevent BDI?

IOC allows efficient clarification of bile duct anatomy.

For the patients analyzed for the registry of the Swiss Association of Laparoscopic and Thoracoscopic Surgery (SALTS), IOC was performed in 36.6 % of the patients. The frequency of IOC decreased from 37.1 % (1995) to 30.1 % (2005), whereas IOC was less commonly used in the group of surgeons with an intermediate level of experience. There was no significant difference in incidence of BDI in the groups with or without the use of IOC [58]. A systematic review consisting of eight RCT did not demonstrate any benefit in preventing BDI by using IOC [64]. In contrast, another systematic review based on five trials

showed a protective effect of IOC on BDI during cholecystectomy [65].

Recommendation 2.6 The use of routine IOC in the prevention of BDI is controversial; therefore, the panel cannot recommend routine IOC based on the current literature. However, the panel strongly agreed that IOC allows early identification of BDI as long as it is correctly interpreted. GoR B

(Consensus for the first, strongly for the second)

Key question 2.7 Can intraoperative laparoscopic ultrasound prevent BDI?

The effect of intraoperative laparoscopic ultrasound (IOUS) on the rate of BDI was evaluated in several studies [38, 66–70]. Due to limitations in study design and/or only a small event rate the evidence is not sufficient to base any recommendations on it. Therefore, the panel only formulated a statement.

Statement 2.7 Laparoscopic ultrasound can be helpful in clarifying bile duct anatomy.

(Strong Consensus)

Diagnosis

Patients with BDI can present with the injury intraoperatively, soon after the cholecystectomy or delayed, weeks to months after the injury.

Key question 3.1 Which diagnostic investigations are indicated to confirm a suspected BDI intraoperatively?

No evidence was identified from clinical studies regarding the diagnostic value or the diagnostic or therapeutic impact of different diagnostic procedures.

The panel recommends suspecting a BDI whenever bile is observed in the operative field.

Recommendation 3.1 In case of suspected BDI, whether or not there is a bile leakage, IOC must be performed.

If an IOC cannot be accomplished safely, a subhepatic drain must be inserted and the patient must be referred to an expert of a hepatobiliary unit.

GoR A

(Strong Consensus)

Key question 3.2 How is suspected BDI after surgery handled?

Key question 3.3 Which diagnostic investigations/interventions are indicated postoperatively in case of suspected BDI?

Symptoms that are associated with leakage of bile into the abdominal cavity are: persistent pain, fever or hypothermia, nausea, vomiting, rigidity, or abnormal liver function (jaundice, laboratory parameters) after laparoscopic cholecystectomy. Patients who continue to complain about symptoms that do not improve should be suspected to have BDI. Standard laboratory parameters of cholestasis can be elevated in both partial or total occlusion of the bile duct. They remain elevated in case of total occlusion (>10 days) but can decrease to normal ranges after 10 days in case of partial occlusion of the bile duct.

Ultrasonography or computed tomography is the primary investigation method to detect intra-abdominal fluid in case of BDI. Both methods can be combined with guided drainage. Endoscopic retrograde cholangiography (ERC) should be performed as an emergency procedure to evaluate the biliary tree. ERC offers the possibility of simultaneous therapy, such as stenting or dilation, and can be the definitive therapy in more than half of the cases. In the case of complete obstruction, the proximal part of the biliary tree may be visualized by percutaneous transhepatic cholangiography (PTC). MRCP can give valuable information on intrahepatic biliary tree, not visible by ERC or PTC. Adequate mapping is essential before any therapeutic action.

Recommendation 3.2 Any deviation from an uneventful postoperative course, even after discharge or after 30 days postoperative must be investigated.

GoR A

(Strong Consensus)

Recommendation 3.3 Primary investigation methods are ultrasound and contrast enhanced computerized tomography to detect intra-abdominal fluid.

Whenever found, intra-abdominal collections should be drained immediately and analyzed.

If bile contents are found, ERCP should be done as an emergency procedure to evaluate the biliary tree. Simultaneous therapy, such as stenting or dilatation, is feasible and could possibly be the definitive therapy in half of the cases. Sphincterotomy should not be performed.

If complete obstruction is found, the proximal part of the biliary tree may be visualized by percutaneous transhepatic cholangiography or magnetic resonance cholangiography.

GoR A

(Strong Consensus)

Management

Key question 4.1 What are the indications for conversion to an open approach in case of BDI?

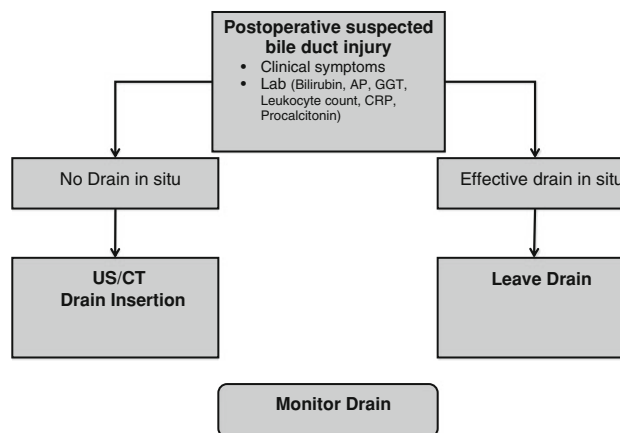


Fig. 2 Algorithm 1 suspected BDI

No high-quality evidence dealing with this question was identified from clinical studies.

Recommendation 4.1 BDI may be an indication for conversion. However, it is strongly recommended that this must only be done by a surgeon with experience in reconstructive hepatobiliary surgery, once the BDI has been confirmed and the indication for open reconstructive surgery established. Otherwise, in all other cases the panel strongly recommends not to convert; insert a subhepatic drain and refer to a unit with experience in this type of injuries.

GoR A

(Strong Consensus)

Key question 4.2 What is the recommended management for minor/major BDI (early/late detection)?

No high-quality evidence dealing with this question was identified from clinical studies. The management of BDI should be performed by surgeons who are experienced in

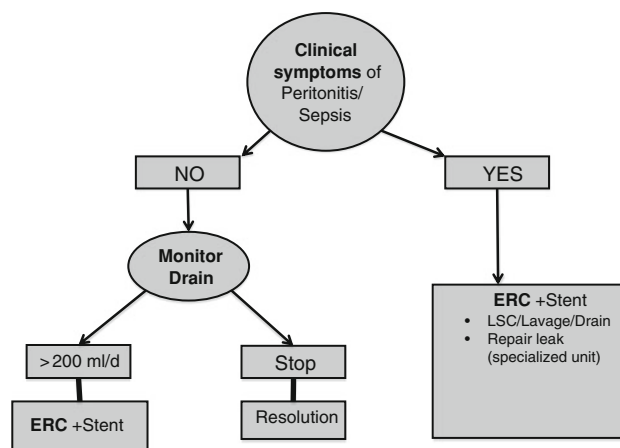


Fig. 3 Algorithm 2 suspected BDI

this field. The algorithms for the management of BDI are presented in Figs. 2 and 3.

Recommendation 4.2 The specific management of BDI must be left to units with experience in this type of injuries.

Apart from confirmed leakage from cystic ducts or subvesicular ducts (liver bed leakage) that can be treated endoscopically, all other injuries must be referred to specialized unit or experts.

GoR A

(Strong Consensus)

Conclusions

BDI is a rare but serious complication of cholecystectomy. In the beginning of laparoscopic cholecystectomy, the event rates increased. Nowadays, it seems that the event rates have decreased and are stabilized.

Because it is a rare event, it is difficult to generate evidence for prevention, diagnosis, or management of BDI from clinical studies. We identified nearly 700 clinical studies dealing with BDI, but only little information can be used as an evidence base for recommendations. Even though a systematic literature search and an appraisal of the literature were performed, most statements or recommendations had to be based on consensus of opinion between the panel members with only limited information from clinical studies.

Nevertheless, the panel has formulated recommendations for the prevention, diagnosis, and management of BDI. Due to the currently limited evidence, a European registry should be considered to collect and analyze more valid data on BDI upon which recommendations can be based.

Acknowledgments The supportive work of Sunya-Lee Antoine, Monika Becker, Christoph Mosch, and Maren Walgenbach Institute for Research in Operative Medicine (IFOM, Witten/Herdecke University) is highly appreciated.

Disclosures The authors have no conflicts of interest or financial ties to disclose.

Appendix 1: search strategy

Search strategy Medline via Pubmed

(((((Laparoscop* OR Celioscop* OR Coelioscop* OR Abdominoscop* OR Peritoneoscop* OR lap) AND (cholecystectom* OR colecystecto* OR chole) OR “Cholecystectomy, Laparoscopic” [Mesh]) AND (((injur* OR

bile leak* OR biliary leak* OR transection* OR occlusion* OR stricture* OR stenosis* OR obstruct* OR laceration* OR damage*) OR (harm* OR convers* OR “Peritonitis”[MeSH] OR peritonitis OR “Cholestasis”[Mesh] OR Cholestas*) OR (peritone* AND inflamma*) OR ((biliary OR bile) AND stas*)) AND (bile duct* OR biliary tract*)) OR “Biliary Tract/injuries”[Mesh])) AND (German [LA] OR English [LA])) NOT (animals [MeSH] NOT (humans [MeSH] AND animals [MeSH]))

Search strategy Cochrane Central Register of Controlled Trials (Central; Clinical Trials) via Cochrane Library

(((((Laparoscop* OR Celioscop* OR Coelioscop* OR Abdominoscop* OR Peritoneoscop* OR lap) AND (cholecystectom* OR colecystecto* OR chole) OR “Cholecystectomy, Laparoscopic”[Mesh])) AND ((injur* OR bile leak* OR biliary leak* OR transection* OR occlusion* OR stricture* OR stenosis* OR obstruct* OR laceration* OR damage* OR harm* OR convers* OR “Peritonitis”[MeSH] OR peritonitis OR “Cholestasis”[Mesh] OR Cholestas* OR (peritone* AND inflamma*) OR ((biliary OR bile) AND stas*)) AND ((bile duct* OR biliary tract*) OR “Biliary Tract”[Mesh]))

Appendix 2: additional information for guideline development

1. Absil B, Mendes da Costa P (1994) Cholecystectomies: from laparotomy to laparoscopy. *Acta Chir Belg* 94:180–184
2. Adams DB, Borowicz MR, Wootton FT 3rd, Cunningham JT (1993) Bile duct complications after laparoscopic cholecystectomy. *Surg Endosc* 7:79–83
3. Adamsen S, Hansen OH, Funch-Jensen P, Schulze S, Stage JG, Wara P (1997) Bile duct injury during laparoscopic cholecystectomy: a prospective nationwide series. *J Am Coll Surg* 184:571–578
4. Aduna M, Larena JA, Martin D, Martinez-Guerenu B, Aguirre I, Astigarraga E (2005) Bile duct leaks after laparoscopic cholecystectomy: value of contrast-enhanced MRCP. *Abdom Imaging* 30:480–487
5. Airan M, Appel M, Berci G, Coburg AJ, Cohen M, Cuschieri A, Dent T, Duppler D, Easter D, Greene F et al. (1992) Retrospective and prospective multi-institutional laparoscopic cholecystectomy study organized by the Society of American Gastrointestinal Endoscopic Surgeons. *Surg Endosc* 6:169–176; discussion 177–168
6. Akoglu M, Ercan M, Bostanci EB, Teke Z, Parlak E (2010) Surgical outcomes of laparoscopic cholecystectomy in

- scleroatrophic gallbladders. *Turk J Gastroenterol* 21:156–162
7. Akolekar D, Nixon SJ, Parks RW (2009) Intraoperative cholangiography in modern surgical practice. *Dig Surg* 26:130–134
 8. Al-Akeely MH, Alam MK, Bismar HA, Khalid K, Al-Teimi I, Al-Dossary NF (2005) Mirizzi syndrome: ten years experience from a teaching hospital in Riyadh. *World J Surg* 29:1687–1692
 9. Alhamdani A, Mahmud S, Jameel M, Baker A (2008) Primary closure of choledochotomy after emergency laparoscopic common bile duct exploration. *Surg Endosc* 22:2190–2195
 10. Al-Kubati WR (2010) Bile duct injuries following laparoscopic cholecystectomy: A clinical study. *Saudi J Gastroenterol* 16:100–104
 11. Allen NL, Leeth RR, Finan KR, Tishler DS, Vickers SM, Wilcox CM, Hawn MT (2006) Outcomes of cholecystectomy after endoscopic sphincterotomy for choledocholithiasis. *J Gastrointest Surg* 10:292–296
 12. Al-Mulhim AS, Al-Mulhim AA (2009) Laparoscopic cholecystectomy in 427 adults with sickle cell disease: a single-center experience. *Surg Endosc* 23:1599–1602
 13. Al-Sebayel MI (2003) High bile duct injury following laparoscopic cholecystectomy. *Saudi Med J* 24:971–973
 14. Alves A, Farges O, Nicolet J, Watrin T, Sauvanet A, Belghiti J (2003) Incidence and consequence of an hepatic artery injury in patients with postcholecystectomy bile duct strictures. *Ann Surg* 238:93–96
 15. Ammori BJ, Davides D, Vezakis A, Larvin M, McMahon MJ (2003) Laparoscopic cholecystectomy: are patients with biliary pancreatitis at increased operative risk? *Surg Endosc* 17:777–780
 16. Ammori BJ, Vezakis A, Davides D, Martin IG, Larvin M, McMahon MJ (2001) Laparoscopic cholecystectomy in morbidly obese patients. *Surg Endosc* 15:1336–1339
 17. Andersson R, Eriksson K, Blind PJ, Tingstedt B (2008) Iatrogenic bile duct injury—a cost analysis. *HPB (Oxford)* 10:416–419
 18. Angrisani L, Lorenzo M, Corcione F, Vincenti R (1997) Gallstones in cirrhotics revisited by a laparoscopic view. *J Laparoendosc Adv Surg Tech A* 7:213–220
 19. Antonopoulos C, Voulimeneas I, Ioannides P, Kotsifas T, Kavallieratos N, Vagianos C (2009) Bile leaks after cholecystectomy: the significance of patient selection. *Surg Laparosc Endosc Percutan Tech* 19:379–383
 20. Aru GM, Davis CR Jr, Elliott NL, Morris SJ (1997) Endoscopic retrograde cholangiopancreatography in the treatment of bile leaks and bile duct strictures after laparoscopic cholecystectomy. *South Med J* 90:705–708
 21. Arvidsson D, Berggren U, Haglund U (1998) Laparoscopic common bile duct exploration. *Eur J Surg* 164:369–375
 22. Asbun HJ, Rossi RL, Lowell JA, Munson JL (1993) Bile duct injury during laparoscopic cholecystectomy: mechanism of injury, prevention, and management. *World J Surg* 17:547–551; 551–542
 23. Ascher SM, Evans SR, Zeman RK (1993) Laparoscopic cholecystectomy: intraoperative ultrasound of the extrahepatic biliary tree and the natural history of postoperative transabdominal ultrasound findings. *Semin Ultrasound CT MR* 14:331–337
 24. Assaff Y, Matter I, Sabo E, Mogilner JG, Nash E, Abrahamson J, Eldar S (1998) Laparoscopic cholecystectomy for acute cholecystitis and the consequences of gallbladder perforation, bile spillage, and “loss” of stones. *Eur J Surg* 164:425–431
 25. Atabek U, Spence RK, Pello MJ, Alexander JB, Villanueva D, Camishion RC (1993) Safety of teaching laparoscopic cholecystectomy to surgical residents. *J Laparoendosc Surg* 3:23–26
 26. Ausch C, Hochwarter G, Taher M, Holzer B, Rosen HR, Urban M, Sebesta C, Hrubby W, Schiessel R (2005) Improving the safety of laparoscopic cholecystectomy: the routine use of preoperative magnetic resonance cholangiography. *Surg Endosc* 19:574–580
 27. Avgerinos C, Kelgiorgi D, Touloumis Z, Baltatzi L, Dervenis C (2009) One thousand laparoscopic cholecystectomies in a single surgical unit using the “critical view of safety” technique. *J Gastrointest Surg* 13:498–503
 28. Bachellier P, Nakano H, Weber JC, Lemarque P, Oussoultzoglou E, Candau C, Wolf P, Jaeck D (2001) Surgical repair after bile duct and vascular injuries during laparoscopic cholecystectomy: when and how? *World J Surg* 25:1335–1345
 29. Bagia JS, North L, Hunt DR (2001) Mirizzi syndrome: an extra hazard for laparoscopic surgery. *ANZ J Surg* 71:394–397
 30. Bagnato VJ, McGee GE, Hatten LE, Varner JE, Culpepper JP, 3rd (1991) Justification for routine cholangiography during laparoscopic cholecystectomy. *Surg Laparosc Endosc* 1:89–93
 31. Bailey RW, Zucker KA, Flowers JL, Scovill WA, Graham SM, Imbembo AL (1991) Laparoscopic cholecystectomy. Experience with 375 consecutive patients. *Ann Surg* 214:531–540; discussion 540–531
 32. Baird DR, Wilson JP, Mason EM, Duncan TD, Evans JS, Luke JP, Ruben DM, Lucas GW (1992) An early review of 800 laparoscopic cholecystectomies at a

- university-affiliated community teaching hospital. *Am Surg* 58:206–210
33. Bakr AA (1997) A new modified layout for laparoscopic cholecystectomy. *JLS* 1:281–283
 34. Balakrishnan S, Samdani T, Singhal T, Hussain A, Grandy-Smith S, Nicholls J, El-Hasani S (2008) Patient experience with gallstone disease in a national health service district hospital. *JLS* 12:389–394
 35. Balakrishnan VB, Kumar R, Dhanpathi H, Nadig M, Mohapatra T, Bal CS, Malhotra A (2008) Hepatobiliary scintigraphy in detecting lesser sac bile leak in postcholecystectomy patients: the need to recognize as a separate entity. *Clin Nucl Med* 33:161–167
 36. Barkun JS, Fried GM, Barkun AN, Sigman HH, Hinchey EJ, Garzon J, Wexler MJ, Meakins JL (1993) Cholecystectomy without operative cholangiography. Implications for common bile duct injury and retained common bile duct stones. *Ann Surg* 218:371–377; discussion 377–379
 37. Barrow PJ, Siriwardena AK (2007) Outcome of hepaticojejunostomy without access loop for repair of iatrogenic bile duct injury at laparoscopic cholecystectomy. *J Hepatobiliary Pancreat Surg* 14:374–376
 38. Barton JR, Russell RC, Hatfield AR (1995) Management of bile leaks after laparoscopic cholecystectomy. *Br J Surg* 82:980–984
 39. Bauer TW, Morris JB, Lowenstein A, Wolferth C, Rosato FE, Rosato EF (1998) The consequences of a major bile duct injury during laparoscopic cholecystectomy. *J Gastrointest Surg* 2:61–66
 40. Bektas H, Schrem H, Winny M, Klempnauer J (2007) Surgical treatment and outcome of iatrogenic bile duct lesions after cholecystectomy and the impact of different clinical classification systems. *Br J Surg* 94:1119–1127
 41. Bektas H, Winny M, Schrem H, Becker T, Klempnauer J (2007) [Late stage stenoses of bile ducts after iatrogenic bile duct injuries following cholecystectomy]. *Zentralbl Chir* 132:523–528
 42. Beldi G, Glattli A (2003) Laparoscopic subtotal cholecystectomy for severe cholecystitis. *Surg Endosc* 17:1437–1439
 43. Belz J, Schwacha H, Hagenmuller F (1997) [Nasobiliary tube in management of postoperative bile fistulas]. *Chirurg* 68:68–71
 44. Ben Baruch D, Mobel M, Antebi E (1996) The role of nuclear scintigraphy of suspected bile duct injury following laparoscopic cholecystectomy. *Isr J Med Sci* 32:1306–1308
 45. Bentzon N, Adamsen S (1995) Impact of laparoscopic technique on the quality of cholecystectomy. *J Laparoendosc Surg* 5:279–287
 46. Berci G (1992) Biliary ductal anatomy and anomalies. The role of intraoperative cholangiography during laparoscopic cholecystectomy. *Surg Clin North Am* 72:1069–1075
 47. Berger M, Junemann K, Schramm H (2001) [Danger of monopolar current in laparoscopic gallbladder surgery]. *Zentralbl Chir* 126:591–595
 48. Berggren P, Farago I, Gabrielsson N, Thor K (1997) Intravenous cholangiography before 1000 consecutive laparoscopic cholecystectomies. *Br J Surg* 84:472–476
 49. Bergman JJ, van den Brink GR, Rauws EA, de Wit L, Obertop H, Huijbregtse K, Tytgat GN, Gouma DJ (1996) Treatment of bile duct lesions after laparoscopic cholecystectomy. *Gut* 38:141–147
 50. Bernard HR, Hartman TW (1993) Complications after laparoscopic cholecystectomy. *Am J Surg* 165:533–535
 51. Berthou J, Dron B, Charbonneau P, Moussalier K, Pellissier L (2007) Evaluation of laparoscopic treatment of common bile duct stones in a prospective series of 505 patients: indications and results. *Surg Endosc* 21:1970–1974
 52. Bezzi M, Silecchia G, Orsi F, Materia A, Salvatori FM, Fiocca F, Fantini A, Basso N, Rossi P (1995) Complications after laparoscopic cholecystectomy. Coordinated radiologic, endoscopic, and surgical treatment. *Surg Endosc* 9:29–36
 53. Bingener J, Richards ML, Schwesinger WH, Strodel WE, Sirinek KR (2003) Laparoscopic cholecystectomy for elderly patients: gold standard for golden years? *Arch Surg* 138:531–535; discussion 535–536
 54. Bingener-Casey J, Richards ML, Strodel WE, Schwesinger WH, Sirinek KR (2002) Reasons for conversion from laparoscopic to open cholecystectomy: a 10-year review. *J Gastrointest Surg* 6:800–805
 55. Bingham J, McKie LD, McLoughlin J, Diamond T (2000) Biliary complications associated with laparoscopic cholecystectomy—an analysis of common misconceptions. *Ulster Med J* 69:106–111
 56. Birdi I, Hunt TM, Veitch PS, Armon M, Jervis P, Barr C (1994) Laparoscopic cholecystectomy in Leicester: an audit of 555 patients. *Ann R Coll Surg Engl* 76:390–395
 57. Bismuth H (2003) Surgical management of bile duct stricture following laparoscopic cholecystectomy. *Acta Chir Belg* 103:140–142
 58. Bockler D, Geoghegan J, Klein M, Weissmann Q, Turan M, Meyer L, Scheele J (1999) Implications of laparoscopic cholecystectomy for surgical residency training. *JLS* 3:19–22
 59. Bonatsos G, Leandros E, Dourakis N, Birbas C, Delibaltadakis G, Golematis B (1995) Laparoscopic

- cholecystectomy. Intraoperative findings and postoperative complications. *Surg Endosc* 9:889–893
60. Bonatsos G, Leandros E, Polydorou A, Romanos A, Dourakis N, Birbas C, Golematis B (1996) ERCP in association with laparoscopic cholecystectomy. A strategy to minimize the number of unnecessary ERCPs. *Surg Endosc* 10:37–40
 61. Borjeson J, Liu SK, Jones S, Matolo NM (2000) Selective intraoperative cholangiography during laparoscopic cholecystectomy: how selective? *Am Surg* 66:616–618
 62. Born P, Bruhl K, Rosch T, Ungeheuer A, Neuhaus H, Classen M (1996) Long-term follow-up of endoscopic therapy in patients with post-surgical biliary leakage. *Hepatogastroenterology* 43:477–482
 63. Borowicz MR, Adams DB, Simpson JP, Cunningham JT (1995) Management of biliary strictures due to laparoscopic cholecystectomy. *J Surg Res* 58:86–89
 64. Borzellino G, de Manzoni G, Ricci F, Castaldini G, Guglielmi A, Cordiano C (1999) Emergency cholecystostomy and subsequent cholecystectomy for acute gallstone cholecystitis in the elderly. *Br J Surg* 86:1521–1525
 65. Branum G, Schmitt C, Baillie J, Suhocki P, Baker M, Davidoff A, Branch S, Chari R, Cucchiario G, Murray E et al. (1993) Management of major biliary complications after laparoscopic cholecystectomy. *Ann Surg* 217:532–540; discussion 540–531
 66. Bresadola V, Intini S, Terrosu G, Baccarani U, Marcellino MG, Sistu M, Scanavacca F, Bresadola F (2001) Intraoperative cholangiography in laparoscopic cholecystectomy during residency in general surgery. *Surg Endosc* 15:812–815
 67. Brooks DC, Becker JM, Connors PJ, Carr-Locke DL (1993) Management of bile leaks following laparoscopic cholecystectomy. *Surg Endosc* 7:292–295
 68. Brugge WR, Rosenberg DJ, Alavi A (1994) Diagnosis of postoperative bile leaks. *Am J Gastroenterol* 89:2178–2183
 69. Brune IB, Schonleben K, Omran S (1994) Complications after laparoscopic and conventional cholecystectomy: a comparative study. *HPB Surg* 8:19–25
 70. Brunt LM, Quasebarth MA, Dunnegan DL, Soper NJ (2001) Outcomes analysis of laparoscopic cholecystectomy in the extremely elderly. *Surg Endosc* 15:700–705
 71. Bryant TL (1992) Bipolar electrocautery in laparoscopic cholecystectomy. *J Laparoendosc Surg* 2:155–158
 72. Cala Z, Velnic D, Cvitanovic B, Rasic Z, Perko Z (1996) Laparoscopic cholecystectomy: results after 1000 procedures. *Acta Med Croatica* 50:147–149
 73. Calvete J, Sabater L, Camps B, Verdu A, Gomez-Portilla A, Martin J, Torrico MA, Flor B, Cassinello N, Lledo S (2000) Bile duct injury during laparoscopic cholecystectomy: myth or reality of the learning curve? *Surg Endosc* 14:608–611
 74. Caratozzolo E, Massani M, Recordare A, Bonariol L, Antoniutti M, Jelmoni A, Bassi N (2004) Usefulness of both operative cholangiography and conversion to decrease major bile duct injuries during laparoscopic cholecystectomy. *J Hepatobiliary Pancreat Surg* 11:171–175
 75. Carr A, Bhavaraju A, Goza J, Wilson R (2010) Initial experience with single-incision laparoscopic cholecystectomy. *Am Surg* 76:703–707
 76. Carroll BJ, Friedman RL, Liberman MA, Phillips EH (1996) Routine cholangiography reduces sequelae of common bile duct injuries. *Surg Endosc* 10:1194–1197
 77. Carvalho GL, Silva FW, Silva JS, de Albuquerque PP, Coelho Rde M, Vilaca TG, Lacerda CM (2009) Needlescopic clipless cholecystectomy as an efficient, safe, and cost-effective alternative with diminutive scars: the first 1000 cases. *Surg Laparosc Endosc Percutan Tech* 19:368–372
 78. Cates JA, Tompkins RK, Zinner MJ, Busuttil RW, Kallman C, Roslyn JJ (1993) Biliary complications of laparoscopic cholecystectomy. *Am Surg* 59:243–247
 79. Chan AC, Chung SC, Lau JW, Brockwell J, Li MK, Tate JJ, Au KT, Li AK (1994) Laparoscopic cholecystectomy: results of first 300 cases in Hong Kong. *J R Coll Surg Edinb* 39:26–30
 80. Chander J, Vindal A, Lal P, Gupta N, Ramteke VK (2011) Laparoscopic management of CBD stones: an Indian experience. *Surg Endosc* 25:172–181
 81. Chandio A, Timmons S, Majeed A, Twomey A, Aftab F (2009) Factors influencing the successful completion of laparoscopic cholecystectomy. *JSLs* 13:581–586
 82. Chandler JG, Voyles CR, Floore TL, Bartholomew LA (1997) Litigious consequences of open and laparoscopic biliary surgical mishaps. *J Gastrointest Surg* 1:138–145; discussion 145
 83. Chau CH, Siu WT, Tang CN, Ha PY, Kwok SY, Yau KK, Li AC, Li MK (2006) Laparoscopic cholecystectomy for acute cholecystitis: the evolving trend in an institution. *Asian J Surg* 29:120–124
 84. Chaudhary A, Negi SS, Puri SK, Narang P (2002) Comparison of magnetic resonance cholangiography and percutaneous transhepatic cholangiography in the evaluation of bile duct strictures after cholecystectomy. *Br J Surg* 89:433–436
 85. Cheema S, Brannigan AE, Johnson S, Delaney PV, Grace PA (2003) Timing of laparoscopic cholecystectomy in acute cholecystitis. *Ir J Med Sci* 172:128–131

86. Chen X, Luo D, Li S, Mao J, Zhou Z, Yu S, Duan Z (1996) Experience in prevention of serious complications of laparoscopic cholecystectomy. *Chin Med J (Engl)* 109:223–227
87. Chen X, Mao J, Wang S, Ru S, Qin X, Luo D, Li S, Duan Z, Wei S, Zhou C (1995) A two-year experience with laparoscopic cholecystectomy—a report of 1475 cases from Kunming, China. *Ann Acad Med Singapore* 24:312–315
88. Cheung MT, Yuen CH, Tse CW, Chia NH, Chiu WY (1999) Audit of laparoscopic cholecystectomy in a single center. *Surg Laparosc Endosc Percutan Tech* 9:181–183
89. Chng HC, Chia KH, Ng FC (1993) Experience with laparoscopic cholecystectomy at the Toa Payoh Hospital. *Singapore Med J* 34:205–207
90. Choi JY, Kim MJ, Park MS, Kim JH, Lim JS, Oh YT, Kim KW (2006) Imaging findings of biliary and nonbiliary complications following laparoscopic surgery. *Eur Radiol* 16:1906–1914
91. Chow A, Purkayastha S, Aziz O, Pefanis D, Paraskeva P (2010) Single-incision laparoscopic surgery for cholecystectomy: a retrospective comparison with 4-port laparoscopic cholecystectomy. *Arch Surg* 145:1187–1191
92. Christoforidis E, Goulimaris I, Tsalis K, Kanellos I, Demetriades H, Betsis D (2002) The endoscopic management of persistent bile leakage after laparoscopic cholecystectomy. *Surg Endosc* 16:843–846
93. Christoforidis E, Vasiliadis K, Goulimaris I, Tsalis K, Kanellos I, Papachilea T, Tsorlini E, Betsis D (2007) A single center experience in minimally invasive treatment of postcholecystectomy bile leak, complicated with biloma formation. *J Surg Res* 141:171–175
94. Chuang KI, Corley D, Postlethwaite DA, Merchant M, Harris HW (2012) Does increased experience with laparoscopic cholecystectomy yield more complex bile duct injuries? *Am J Surg* 203:480–487
95. Clair DG, Carr-Locke DL, Becker JM, Brooks DC (1993) Routine cholangiography is not warranted during laparoscopic cholecystectomy. *Arch Surg* 128:551–554; discussion 554–555
96. Cohen MM, Young W, Theriault ME, Hernandez R (1996) Has laparoscopic cholecystectomy changed patterns of practice and patient outcome in Ontario? *CMAJ* 154:491–500
97. Collet D (1997) Laparoscopic cholecystectomy in 1994. Results of a prospective survey conducted by SFCERO on 4,624 cases. *Societe Francaise de Chirurgie Endoscopique et Radiologie Operatoire. Surg Endosc* 11:56–63
98. Collet D, Edye M, Perissat J (1993) Conversions and complications of laparoscopic cholecystectomy. Results of a survey conducted by the French Society of Endoscopic Surgery and Interventional Radiology. *Surg Endosc* 7:334–338
99. Contractor QQ, Dubian MK, Boujemla M, Contractor TQ (2001) Endoscopic therapy after laparoscopic cholecystectomy. *J Clin Gastroenterol* 33:218–221
100. Conzo G, Amato G, Angrisani L, Bardi U, Belli G, Brancaccio U, Calise F, Celsi S, Corcione F, Cuccurullo D, De Falco G, De Werra C, De Sena G, Docimo G, Esposito MG, Fantini C, Giardiello C, Livrea A, Lorenzo M, Molino C, Musella M, Muto C, Palazzo A, Porcelli A, Rea R, Rendano F, Santangelo M, Santaniello W, Santini L, Sperlongano P, Stanzione F, Tartaglia A, Tricarico A, Vincenti R, Delrio P (2007) Hepaticojejunostomy in the treatment of iatrogenic biliary lesions following laparoscopic cholecystectomy. A retrospective study on 51 cases. *Hepatogastroenterology* 54: 2328–2332
101. Corbitt JD Jr, Cantwell DV (1991) Laparoscopic cholecystectomy with operative cholangiogram. *Surg Laparosc Endosc* 1:229–232
102. Corbitt JD Jr, Leonetti LA (1997) One thousand and six consecutive laparoscopic intraoperative cholangiograms. *JLS* 1:13–16
103. Cox MR, Wilson TG, Jeans PL, Padbury RT, Touli J (1994) Minimizing the risk of bile duct injury at laparoscopic cholecystectomy. *World J Surg* 18: 422–426; discussion 426–427
104. Croce E, Azzola M, Golia M, Russo R, Pompa C (1994) Laparocholecystectomy. 6,865 cases from Italian institutions. *Surg Endosc* 8:1088–1091
105. Csendes A, Navarrete C, Burdiles P, Yarmuch J (2001) Treatment of common bile duct injuries during laparoscopic cholecystectomy: endoscopic and surgical management. *World J Surg* 25: 1346–1351
106. Csikesz N, Ricciardi R, Tseng JF, Shah SA (2008) Current status of surgical management of acute cholecystitis in the United States. *World J Surg* 32: 2230–2236
107. Csikesz NG, Singla A, Murphy MM, Tseng JF, Shah SA (2010) Surgeon volume metrics in laparoscopic cholecystectomy. *Dig Dis Sci* 55:2398–2405
108. Cuschieri A, Dubois F, Mouiel J, Mouret P, Becker H, Buess G, Trede M, Troidl H (1991) The European experience with laparoscopic cholecystectomy. *Am J Surg* 161:385–387
109. Daradkeh S (2005) Laparoscopic cholecystectomy: analytical study of 1208 cases. *Hepatogastroenterology* 52:1011–1014
110. Dashow L, Friedman I, Kempner R, Rudick J, McSherry C (1992) Initial experience with

- laparoscopic cholecystectomy at the Beth Israel Medical Center. *Surg Gynecol Obstet* 175:25–30
111. Davidoff AM, Pappas TN, Murray EA, Hilleren DJ, Johnson RD, Baker ME, Newman GE, Cotton PB, Meyers WC (1992) Mechanisms of major biliary injury during laparoscopic cholecystectomy. *Ann Surg* 215:196–202
 112. Davids PH, Ringers J, Rauws EA, de Wit LT, Huibregtse K, van der Heyde MN, Tytgat GN (1993) Bile duct injury after laparoscopic cholecystectomy: the value of endoscopic retrograde cholangiopancreatography. *Gut* 34:1250–1254
 113. Davis CJ, Arregui ME, Nagan RF, Shaar C (1992) Laparoscopic cholecystectomy: the St. Vincent experience. *Surg Laparosc Endosc* 2:64–68
 114. De Palma GD, Galloro G, Iuliano G, Puzziello A, Persico F, Masone S, Persico G (2002) Leaks from laparoscopic cholecystectomy. *Hepatogastroenterology* 49:924–925
 115. De Palma GD, Galloro G, Romano G, Sottile R, Puzziello A, Persico F, Masone S, Labianca O, Persico G (2003) Long-term follow-up after endoscopic biliary stent placement for bile duct strictures from laparoscopic cholecystectomy. *Hepatogastroenterology* 50:1229–1231
 116. de Reuver PR, Busch OR, Rauws EA, Lameris JS, van Gulik TM, Gouma DJ (2007) Long-term results of a primary end-to-end anastomosis in peroperative detected bile duct injury. *J Gastrointest Surg* 11:296–302
 117. de Reuver PR, Grossmann I, Busch OR, Obertop H, van Gulik TM, Gouma DJ (2007) Referral pattern and timing of repair are risk factors for complications after reconstructive surgery for bile duct injury. *Ann Surg* 245:763–770
 118. de Reuver PR, Rauws EA, Bruno MJ, Lameris JS, Busch OR, van Gulik TM, Gouma DJ (2007) Survival in bile duct injury patients after laparoscopic cholecystectomy: a multidisciplinary approach of gastroenterologists, radiologists, and surgeons. *Surgery* 142:1–9
 119. De Wit LT, Rauws EA, Gouma DJ (1999) Surgical management of iatrogenic bile duct injury. *Scand J Gastroenterol Suppl* 230:89–94
 120. Debru E, Dawson A, Leibman S, Richardson M, Glen L, Hollinshead J, Falk GL (2005) Does routine intraoperative cholangiography prevent bile duct transection? *Surg Endosc* 19:589–593
 121. Dexter SP, Martin IG, Marton J, McMahon MJ (1997) Long operation and the risk of complications from laparoscopic cholecystectomy. *Br J Surg* 84:464–466
 122. Deziel DJ, Millikan KW, Economou SG, Doolas A, Ko ST, Airan MC (1993) Complications of laparoscopic cholecystectomy: a national survey of 4,292 hospitals and an analysis of 77,604 cases. *Am J Surg* 165:9–14
 123. Diamantis T, Tsigris C, Kiriakopoulos A, Papanambros E, Bramis J, Michail P, Felekouras E, Griniatsos J, Rosenberg T, Kalahanis N, Giannopoulos A, Bakoyiannis C, Bastounis E (2005) Bile duct injuries associated with laparoscopic and open cholecystectomy: an 11-year experience in one institute. *Surg Today* 35:841–845
 124. Dion YM, Morin J (1990) Laparoscopic cholecystectomy: a report of 60 cases. *Can J Surg* 33:483–486
 125. Doctor N, Dooley JS, Dick R, Watkinson A, Rolles K, Davidson BR (1998) Multidisciplinary approach to biliary complications of laparoscopic cholecystectomy. *Br J Surg* 85:627–632
 126. Doganay M, Kama NA, Reis E, Kologlu M, Atli M, Gozalan U (2002) Management of main bile duct injuries that occur during laparoscopic cholecystectomy. *Surg Endosc* 16:216
 127. Dolan JP, Diggs BS, Sheppard BC, Hunter JG (2005) Ten-year trend in the national volume of bile duct injuries requiring operative repair. *Surg Endosc* 19:967–973
 128. Dolan S, Khan Z, McNally D, Calvert CH, Moorehead RJ (1999) Laparoscopic cholecystectomy: experience with 303 patients over the initial four years. *Ulster Med J* 68:64–67
 129. Dominguez EP, Giammar D, Baumert J, Ruiz O (2006) A prospective study of bile leaks after laparoscopic cholecystectomy for acute cholecystitis. *Am Surg* 72:265–268
 130. Donohue JH, Farnell MB, Grant CS, van Heerden JA, Wahlstrom HE, Sarr MG, Weaver AL, Ilstrup DM (1992) Laparoscopic cholecystectomy: early Mayo Clinic experience. *Mayo Clin Proc* 67:449–455
 131. Dorazio RA (1995) Selective operative cholangiography in laparoscopic cholecystectomy. *Am Surg* 61:911–913
 132. Dubois F, Berthelot G, Levard H (1995) Coelioscopic cholecystectomy: experience with 2006 cases. *World J Surg* 19:748–752
 133. Duff WM (2006) Avoiding misidentification injuries in laparoscopic cholecystectomy: use of cystic duct marking technique in intraoperative cholangiography. *J Am Coll Surg* 203:257–261
 134. Dunn D, Nair R, Fowler S, McCloy R (1994) Laparoscopic cholecystectomy in England and Wales: results of an audit by the Royal College of Surgeons of England. *Ann R Coll Surg Engl* 76:269–275

135. Edwards C, Bradshaw A, Ahearne P, Dematos P, Humble T, Johnson R, Mauterer D, Soosaar P (2010) Single-incision laparoscopic cholecystectomy is feasible: initial experience with 80 cases. *Surg Endosc* 24:2241–2247
136. Eldar S, Sabo E, Nash E, Abrahamson J, Matter I (1997) Laparoscopic cholecystectomy for acute cholecystitis: prospective trial. *World J Surg* 21:540–545
137. Elsey JK, Feliciano DV (2010) Initial experience with single-incision laparoscopic cholecystectomy. *J Am Coll Surg* 210:620–624, 624–626
138. Emous M, Westerterp M, Wind J, Eerenberg JP, van Geloven AA (2010) Registering the critical view of safety: photo or video? *Surg Endosc* 24:2527–2530
139. Erben Y, Benavente-Chenhalls LA, Donohue JM, Que FG, Kendrick ML, Reid-Lombardo KM, Farnell MB, Nagorney DM (2011) Diagnosis and Treatment of Mirizzi Syndrome: 23-Year Mayo Clinic Experience. *J Am Coll Surg*
140. Ercan M, Bostanci EB, Teke Z, Karaman K, Dalgic T, Ulas M, Ozer I, Ozogul YB, Atalay F, Akoglu M (2010) Predictive factors for conversion to open surgery in patients undergoing elective laparoscopic cholecystectomy. *J Laparoendosc Adv Surg Tech A* 20:427–434
141. Ercan M, Bostanci EB, Ulas M, Ozer I, Ozogul Y, Seven C, Atalay F, Akoglu M (2009) Effects of previous abdominal surgery incision type on complications and conversion rate in laparoscopic cholecystectomy. *Surg Laparosc Endosc Percutan Tech* 19:373–378
142. Farha GJ, Mullins JR, Beamer RL (1992) Laparoscopic cholecystectomy in a private community setting. *J Laparoendosc Surg* 2:75–80
143. Fathy O, Zeid MA, Abdallah T, Fouad A, Eleinien AA, el-Hak NG, Eleibiedy G, el-Wahab MA, Sultan A, Anwar N, Ezzat F (2003) Laparoscopic cholecystectomy: a report on 2000 cases. *Hepatogastroenterology* 50:967–971
144. Fatima J, Barton JG, Grotz TE, Geng Z, Harmsen WS, Huebner M, Baron TH, Kendrick ML, Donohue JH, Que FG, Nagorney DM, Farnell MB (2010) Is there a role for endoscopic therapy as a definitive treatment for post-laparoscopic bile duct injuries? *J Am Coll Surg* 211:495–502
145. Ferguson CM (1992) Electrosurgical laparoscopic cholecystectomy. *Am Surg* 58:96–99
146. Ferguson CM, Rattner DW, Warshaw AL (1992) Bile duct injury in laparoscopic cholecystectomy. *Surg Laparosc Endosc* 2:1–7
147. Ferzli G, Kloss DA (1991) Laparoscopic cholecystectomy: 111 consecutive cases. *Am J Gastroenterol* 86:1176–1178
148. Ferzli G, Massaad A, Piperno B, Fiorillo M, Kiel T (1996) Changing experiences with 1848 cholecystectomies at a single institution. *J Laparoendosc Surg* 6:1–11
149. Ferzli GS, Fiorillo MA, Hayek NE, Sabido F (1997) Chief resident experience with laparoscopic cholecystectomy. *J Laparoendosc Adv Surg Tech A* 7: 147–150
150. Feussner H, Ungeheuer A, Lehr L, Siewert JR (1991) [Technique of laparoscopic cholecystectomy]. *Langenbecks Arch Chir* 376:367–374
151. Fiallo VM, O'Connor FX, Reed WP (1994) Preceptored introduction of laparoscopic techniques for cholecystectomy into a large university-affiliated medical center. *Surg Endosc* 8:1063–1066
152. Flowers JL, Zucker KA, Graham SM, Scovill WA, Imbembo AL, Bailey RW (1992) Laparoscopic cholangiography. Results and indications. *Ann Surg* 215:209–216
153. Flum DR, Dellinger EP, Cheadle A, Chan L, Koepsell T (2003) Intraoperative cholangiography and risk of common bile duct injury during cholecystectomy. *JAMA* 289:1639–1644
154. Flum DR, Koepsell T, Heagerty P, Sinanan M, Dellinger EP (2001) Common bile duct injury during laparoscopic cholecystectomy and the use of intraoperative cholangiography: adverse outcome or preventable error? *Arch Surg* 136:1287–1292
155. Foutch PG, Harlan JR, Hoefer M (1993) Endoscopic therapy for patients with a post-operative biliary leak. *Gastrointest Endosc* 39:416–421
156. Fox AD, Baigrie RJ, Cobb RA, Dowling BL (1996) Peroperative cholangiography through the gallbladder (cholecystocholangiography) during laparoscopic cholecystectomy. *Surg Laparosc Endosc* 6: 22–25
157. Frilling A, Li J, Weber F, Fruhauf NR, Engel J, Beckebaum S, Paul A, Zopf T, Malago M, Broelsch CE (2004) Major bile duct injuries after laparoscopic cholecystectomy: a tertiary center experience. *J Gastrointest Surg* 8:679–685
158. Frimberger E (1999) Laparoscopic cholecystotomy. *Baillieres Best Pract Res Clin Gastroenterol* 13: 199–205
159. Fronza JS, Linn JG, Nagle AP, Soper NJ (2010) A single institution's experience with single incision cholecystectomy compared to standard laparoscopic cholecystectomy. *Surgery* 148:731–734; discussion 734–736
160. Fullarton GM, Bell G (1994) Prospective audit of the introduction of laparoscopic cholecystectomy in the west of Scotland. *West of Scotland Laparoscopic Cholecystectomy Audit Group. Gut* 35:1121–1126

161. Gadacz TR (1993) U.S. experience with laparoscopic cholecystectomy. *Am J Surg* 165:450–454
162. Gai H, Thiele H (1992) [Ultrasound selection criteria for laparoscopic cholecystectomy]. *Chirurg* 63:426–431
163. Gartner U, Schwenke E (1998) [Endoscopic therapy of postoperative complications of the bile ducts]. *Zentralbl Chir* 123 Suppl 2:106–109
164. Gazzaniga GM, Filauro M, Mori L (2001) Surgical treatment of iatrogenic lesions of the proximal common bile duct. *World J Surg* 25:1254–1259
165. Gentileschi P, Di Paola M, Catarci M, Santoro E, Montemurro L, Carlini M, Nanni E, Alessandrini L, Angeloni R, Benini B, Cristini F, Dalla Torre A, De Stefano C, Gatto A, Gossetti F, Manfroni S, Mascagni P, Masoni L, Montalto G, Polito D, Puce E, Silecchia G, Terenzi A, Valle M, Vita S, Zanarini T (2004) Bile duct injuries during laparoscopic cholecystectomy: a 1994–2001 audit on 13,718 operations in the area of Rome. *Surg Endosc* 18:232–236
166. Georgiades CP, Mavromatis TN, Kourlaba GC, Kapiris SA, Bairamides EG, Spyrou AM, Kokkinos CN, Spyratou CS, Ieronymou MI, Diamantopoulos GI (2008) Is inflammation a significant predictor of bile duct injury during laparoscopic cholecystectomy? *Surg Endosc* 22:1959–1964
167. Gharaibeh KI, Qasaimeh GR, Al-Heiss H, Ammari F, Bani-Hani K, Al-Jaberi TM, Al-Natour S (2002) Effect of timing of surgery, type of inflammation, and sex on outcome of laparoscopic cholecystectomy for acute cholecystitis. *J Laparoendosc Adv Surg Tech A* 12:193–198
168. Ghazal AH, Sorour MA, El-Riwini M, El-Bahrawy H (2009) Single-step treatment of gall bladder and bile duct stones: a combined endoscopic-laparoscopic technique. *Int J Surg* 7:338–346
169. Ghnnam W, Malek J, Shebl E, Elbeshry T, Ibrahim A (2010) Rate of conversion and complications of laparoscopic cholecystectomy in a tertiary care center in Saudi Arabia. *Ann Saudi Med* 30:145–148
170. Giger U, Ouaisi M, Schmitz SF, Krahenbuhl S, Krahenbuhl L (2011) Bile duct injury and use of cholangiography during laparoscopic cholecystectomy. *Br J Surg* 98:391–396
171. Giger UF, Michel JM, Opitz I, Th Inderbitzin D, Kocher T, Krahenbuhl L (2006) Risk factors for perioperative complications in patients undergoing laparoscopic cholecystectomy: analysis of 22,953 consecutive cases from the Swiss Association of Laparoscopic and Thoracoscopic Surgery database. *J Am Coll Surg* 203:723–728
172. Gigot J, Etienne J, Aerts R, Wibin E, Dallemagne B, Deweer F, Fortunati D, Legrand M, Vereecken L, Doumont J, Van Reepinghe P, Beguin C (1997) The dramatic reality of biliary tract injury during laparoscopic cholecystectomy. An anonymous multicenter Belgian survey of 65 patients. *Surg Endosc* 11:1171–1178
173. Glatzli A, Klaiber C, Metzger A (1994) [Laparoscopic cholecystectomy: current status]. *Schweiz Med Wochenschr* 124:502–508
174. Golub R, Brodsky N, Cantu R Jr, Kuan J, Palmadessa D (2000) Same-session endoscopic retrograde cholangiopancreatography and cholecystectomy. *Surg Laparosc Endosc Percutan Tech* 10:272–274
175. Goodman GR, Hunter JG (1991) Results of laparoscopic cholecystectomy in a university hospital. *Am J Surg* 162:576–579
176. Gourgiotis S, Dimopoulos N, Germanos S, Vougas V, Alfaras P, Hadjiyannakis E (2007) Laparoscopic cholecystectomy: a safe approach for management of acute cholecystitis. *JSLs* 11:219–224
177. Graber JN, Schultz LS, Pietrafitta JJ, Hickok DF (1992) Complications of laparoscopic cholecystectomy: a prospective review of an initial 100 consecutive cases. *Lasers Surg Med* 12:92–97
178. Grace PA, Qureshi A, Burke P, Leahy A, Brindley N, Osborne H, Lane B, Broe P, Bouchier-Hayes D (1993) Selective cholangiography in laparoscopic cholecystectomy. *Br J Surg* 80:244–246
179. Grau-Talens EJ, Garcia-Olives F, Ruperez-Arribas MP (1998) Transcylindrical cholecystectomy: new technique for minimally invasive cholecystectomy. *World J Surg* 22:453–458
180. Grau-Talens EJ, Giner M (2010) Transcylindrical gas-free cholecystectomy for the treatment of cholelithiasis, cholecystitis, and choledocholithiasis. *Surg Endosc* 24:2099–2104
181. Griniatsos J, Karvounis E, Isla AM (2005) Limitations of fluoroscopic intraoperative cholangiography in cases suggestive of choledocholithiasis. *J Laparoendosc Adv Surg Tech A* 15:312–317
182. Gronroos JM, Hamalainen MT, Karvonen J, Gullichsen R, Laine S (2003) Is male gender a risk factor for bile duct injury during laparoscopic cholecystectomy? *Langenbecks Arch Surg* 388: 261–264
183. Hakamada K, Narumi S, Toyoki Y, Nara M, Oohashi M, Miura T, Jin H, Yoshihara S, Sugai M, Sasaki M (2008) Intraoperative ultrasound as an educational guide for laparoscopic biliary surgery. *World J Gastroenterol* 14:2370–2376
184. Hallenscheidt T, Dietz C, Fuhrmann C, Kramling HJ (2000) [Intraoperative cholangiography in laparoscopic cholecystectomy for acute cholecystitis]. *Zentralbl Chir* 125:183–185

185. Hallfeldt KK, Puhmann M, Neelamekam TK, Hay DJ (1994) [Laparoscopic cholecystectomy-experiences in a British district general hospital]. *Zentralbl Chir* 119:378–382
186. Hamad MA, Nada AA, Abdel-Atty MY, Kawashti AS (2011) Major biliary complications in 2,714 cases of laparoscopic cholecystectomy without intraoperative cholangiography: a multicenter retrospective study. *Surg Endosc*
187. Hamazaki K, Kurose M (2000) Laparoscopic cholecystectomy: experience with 150 consecutive patients in Kurashiki. *Hiroshima J Med Sci* 49:1–6
188. Han HJ, Choi SB, Kim WB, Choi SY (2011) Single-incision multiport laparoscopic cholecystectomy: things to overcome. *Arch Surg* 146:68–73
189. Harboe KM, Bardram L (2011) The quality of cholecystectomy in Denmark: outcome and risk factors for 20,307 patients from the national database. *Surg Endosc* 25:1630–1641
190. Hardy KJ, Miller H, Fletcher DR, Jones RM, Shulkes A, McNeil JJ (1994) An evaluation of laparoscopic versus open cholecystectomy. *Med J Aust* 160:58–62
191. Harris BC (1993) Retrospective comparison of outcome of 100 consecutive open cholecystectomies and 100 consecutive laparoscopic cholecystectomies. *South Med J* 86:993–996
192. Harrison VL, Dolan JP, Pham TH, Diggs BS, Greenstein AJ, Sheppard BC, Hunter JG (2011) Bile duct injury after laparoscopic cholecystectomy in hospitals with and without surgical residency programs: is there a difference? *Surg Endosc* 25:1969–1974
193. Hashimoto M, Matsuda M, Watanabe G (2010) Intraoperative ultrasonography for reducing bile duct injury during laparoscopic cholecystectomy. *Hepatogastroenterology* 57:706–709
194. Hasl DM, Ruiz OR, Baumert J, Gerace C, Matyas JA, Taylor PH, Kennedy GM (2001) A prospective study of bile leaks after laparoscopic cholecystectomy. *Surg Endosc* 15:1299–1300
195. Hawasli A (1993) Does routine cystic duct cholangiogram during laparoscopic cholecystectomy prevent common bile duct injury? *Surg Laparosc Endosc* 3:290–295
196. Haynes JH, Guha SC, Taylor SG (2004) Laparoscopic cholecystectomy in a rural family practice: the Vivian, LA, experience. *J Fam Pract* 53:205–208; discussion 209–212
197. Hazzan D, Geron N, Golijanin D, Reissman P, Shiloni E (2003) Laparoscopic cholecystectomy in octogenarians. *Surg Endosc* 17:773–776
198. Heise M, Schmidt SC, Adler A, Hintze RE, Langrehr JM, Neuhaus P (2003) [Management of bile duct injuries following laparoscopic cholecystectomy]. *Zentralbl Chir* 128:944–951
199. Hellinger A, Lange R, Peitgen K, Stephan V, Krause U, Erhard J (1997) [Bile duct lesions in laparoscopic cholecystectomy-methods of reconstruction and results]. *Zentralbl Chir* 122:1092–1098
200. Helmy MA (2008) Iatrogenic bile duct injuries: management of ten patients. *J Egypt Soc Parasitol* 38:873–882
201. Hernandez J, Ross S, Morton C, McFarlin K, Dahal S, Golkar F, Albrink M, Rosemurgy A (2010) The learning curve of laparoendoscopic single-site (LESS) cholecystectomy: definable, short, and safe. *J Am Coll Surg* 211:652–657
202. Hershman MJ, Rosin RD (1992) Laparoscopic laser cholecystectomy: our first 200 patients. *Ann R Coll Surg Engl* 74:242–247
203. Herve J, Simoens C, Smets D, Ngongang C, Mendes da Costa P (2007) Laparoscopic cholecystectomy; a retrospective 10-year study. *Hepatogastroenterology* 54:1326–1330
204. Herzog U, Kocher T, Ackermann C, Schuppisser JP, Looser C, Tondelli P (1992) [Laparoscopic cholecystectomy-experiences and results with a new surgical technique]. *Schweiz Med Wochenschr* 122:659–662
205. Himal HS (1996) The role of ERCP in laparoscopic cholecystectomy-related cystic duct stump leaks. *Surg Endosc* 10:653–655
206. Hjelmqvist B (2000) Complications of laparoscopic cholecystectomy as recorded in the Swedish laparoscopy registry. *Eur J Surg Suppl*:18–21
207. Hobbs MS, Mai Q, Knuiman MW, Fletcher DR, Ridout SC (2006) Surgeon experience and trends in intraoperative complications in laparoscopic cholecystectomy. *Br J Surg* 93:844–853
208. Hoferlin A, Roder W, Hohle KD (1995) [Does the “Bergetrokar” decrease the rate of intraoperative complications in laparoscopic cholecystectomy?]. *Chirurg* 66:990–993
209. Hoffmann W, Neuhaus H (1993) [The role of endoscopic retrograde cholangiopancreatography in complications after laparoscopic cholecystectomy]. *Bildgebung* 60(Suppl 1):57–60
210. Holbling N, Pilz E, Feil W, Schiessel R (1995) [Laparoscopic cholecystectomy-a meta-analysis of 23,700 cases and status of a personal patient sample]. *Wien Klin Wochenschr* 107:158–162
211. Holte K, Bardram L, Wettergren A, Rasmussen A (2010) Reconstruction of major bile duct injuries

- after laparoscopic cholecystectomy. *Dan Med Bull* 57:A4135
212. Holzinger J, Mayer F, Heinerman PM, Sungler P, Waclawiczek HW, Boeckl O (1997) [Treatment of postoperative bile fistulas after laparoscopic cholecystectomy by ERCP, EPT and bile duct drainage]. *Zentralbl Chir* 122:1088–1091
 213. Holzman MD, Sharp K, Holcomb GW, Frexes-Steed M, Richards WO (1994) An alternative technique for laparoscopic cholangiography. *Surg Endosc* 8:927–930
 214. Hosch SB, Zornig C, Izbicki JR, Prenzel KL, Thonke F, Broelsch CE (1996) [Surgical correction of bile duct injuries after laparoscopic cholecystectomy]. *Zentralbl Chir* 121:290–293
 215. Huang CS, Lein HH, Tai FC, Wu CH (2003) Long-term results of major bile duct injury associated with laparoscopic cholecystectomy. *Surg Endosc* 17:1362–1367
 216. Huang CS, Tai FC, Shi MY, Chen DF, Wang NY (1992) Complications of laparoscopic cholecystectomy: an analysis of 200 cases. *J Formos Med Assoc* 91:785–792
 217. Huang SM, Wu CW, Hong HT, Ming L, King KL, Lui WY (1993) Bile duct injury and bile leakage in laparoscopic cholecystectomy. *Br J Surg* 80:1590–1592
 218. Huang X, Feng Y, Huang Z (1997) Complications of laparoscopic cholecystectomy in China: an analysis of 39,238 cases. *Chin Med J (Engl)* 110:704–706
 219. Hubert C, Annet L, van Beers BE, Gigot JF (2010) The “inside approach of the gallbladder” is an alternative to the classic Calot’s triangle dissection for a safe operation in severe cholecystitis. *Surg Endosc* 24:2626–2632
 220. Hugh TB, Chen FC, Hugh TJ, Li B (1992) Laparoscopic cholecystectomy. A prospective study of outcome in 100 unselected patients. *Med J Aust* 156:318–320
 221. Hunter JG (1991) Avoidance of bile duct injury during laparoscopic cholecystectomy. *Am J Surg* 162:71–76
 222. Hussain MI, Khan AF (2006) Outcome of laparoscopic cholecystectomy in acute and chronic cholecystitis. *Saudi Med J* 27:657–660
 223. Ibrahim S, Tay KH, Lim SH, Ravintharan T, Tan NC (2008) Analysis of a structured training programme in laparoscopic cholecystectomy. *Langenbecks Arch Surg* 393:943–948
 224. Ichihara T, Suzuki N, Horisawa M, Kataoka M, Uchida Y, Sekiya M, Matsui T, Chen H, Sakamoto J, Nakao A, Koide A (1996) The importance of the real-time fluoroscopic intraoperative direct cholangiogram in the laparoscopic cholecystectomy using a new instrument. *Hepatogastroenterology* 43:1296–1304
 225. Ichihara T, Takada M, Ajiki T, Fukumoto S, Urakawa T, Nagahata Y, Kuroda Y (2004) Tape ligation of cystic duct and fundus-down approach for safety laparoscopic cholecystectomy: outcome of 500 patients. *Hepatogastroenterology* 51:362–364
 226. Ichiya T, Maguchi H, Takahashi K, Katanuma A, Osanai M, Kin T (2011) Endoscopic management of laparoscopic cholecystectomy-associated bile duct injuries. *J Hepatobiliary Pancreat Sci* 18:81–86
 227. Ido K, Isoda N, Kawamoto C, Suzuki T, Ioka T, Nagamine N, Taniguchi Y, Kumagai M, Kimura K (1996) Confirmation of a “safety zone” by intraoperative cholangiography during laparoscopic cholecystectomy. *Surg Endosc* 10:798–800
 228. Ihasz M, Hung CM, Regoly-Merei J, Fazekas T, Batorfi J, Balint A, Zaborszky A, Posfai G (1997) Complications of laparoscopic cholecystectomy in Hungary: a multicentre study of 13,833 patients. *Eur J Surg* 163:267–274
 229. Ikeda T, Yonemura Y, Ueda N, Kabashima A, Mashino K, Yamashita K, Fujii K, Tashiro H, Sakata H (2011) Intraoperative cholangiography using an endoscopic nasobiliary tube during a laparoscopic cholecystectomy. *Surg Today* 41:667–673
 230. Inui H, Kwon AH, Kamiyama Y (1998) Managing bile duct injury during and after laparoscopic cholecystectomy. *J Hepatobiliary Pancreat Surg* 5:445–449
 231. Ishizaki Y, Miwa K, Yoshimoto J, Sugo H, Kawasaki S (2006) Conversion of elective laparoscopic to open cholecystectomy between 1993 and 2004. *Br J Surg* 93:987–991
 232. Ishizawa T, Bandai Y, Ijichi M, Kaneko J, Hasegawa K, Kokudo N (2010) Fluorescent cholangiography illuminating the biliary tree during laparoscopic cholecystectomy. *Br J Surg* 97:1369–1377
 233. Ji W, Li LT, Li JS (2006) Role of laparoscopic subtotal cholecystectomy in the treatment of complicated cholecystitis. *Hepatobiliary Pancreat Dis Int* 5:584–589
 234. Johnson LW, Sehon JK, Lee WC, Zibari GB, McDonald JC (2001) Mirizzi’s syndrome: experience from a multi-institutional review. *Am Surg* 67:11–14
 235. Johnson SR, Koehler A, Pennington LK, Hanto DW (2000) Long-term results of surgical repair of bile duct injuries following laparoscopic cholecystectomy. *Surgery* 128:668–677
 236. Johnston SM, Kidney S, Sweeney KJ, Zaki A, Tanner WA, Keane FV (2003) Changing trends in

- the management of gallstone disease. *Surg Endosc* 17:781–786
237. Jones DB, Dunnegan DL, Soper NJ (1995) Results of a change to routine fluorocholangiography during laparoscopic cholecystectomy. *Surgery* 118:693–701; discussion 701–692
 238. Jones-Monahan K, Gruenberg JC (1998) Bile duct injuries during laparoscopic cholecystectomy: a community's experience. *Am Surg* 64:638–642
 239. Jorgensen JO, Norman SL, Hunt DR (1996) A prospective audit of selective cholangiography for laparoscopic cholecystectomy. *Aust N Z J Surg* 66:441–444
 240. Kaffes AJ, Hourigan L, De Luca N, Byth K, Williams SJ, Bourke MJ (2005) Impact of endoscopic intervention in 100 patients with suspected postcholecystectomy bile leak. *Gastrointest Endosc* 61:269–275
 241. Kahler G, Muller C, al-Sibaie A, Scheele J (1998) [Diagnosis and therapy of biliary complications after laparoscopic cholecystectomy by ERCP]. *Zentralbl Chir* 123 Suppl 2:96–97
 242. Kakizoe S, Kakizoe Y, Guntani A, Kabashima A, Kakizoe H, Sadamatsu K, Kakizoe T, Kakizoe K (2004) Personal experience of laparoscopic cholecystectomy. *Hepatogastroenterology* 51:934–936
 243. Kama NA, Doganay M, Dolapci M, Reis E, Atli M, Kologlu M (2001) Risk factors resulting in conversion of laparoscopic cholecystectomy to open surgery. *Surg Endosc* 15:965–968
 244. Kaman L, Behera A, Singh R, Katariya RN (2004) Management of major bile duct injuries after laparoscopic cholecystectomy. *Surg Endosc* 18:1196–1199
 245. Kaman L, Sanyal S, Behera A, Singh R, Katariya RN (2006) Comparison of major bile duct injuries following laparoscopic cholecystectomy and open cholecystectomy. *ANZ J Surg* 76:788–791
 246. Kano N, Yamakawa T, Ishikawa Y, Sakai S, Honda H, Kasugai H, Tachibana A (1994) Laparoscopic cholecystectomy: a report of 409 consecutive cases and its future outlook. *Surg Today* 24:399–402
 247. Karvonen J, Gullichsen R, Laine S, Salminen P, Gronroos JM (2007) Bile duct injuries during laparoscopic cholecystectomy: primary and long-term results from a single institution. *Surg Endosc* 21:1069–1073
 248. Karvonen J, Salminen P, Gronroos JM (2011) Bile duct injuries during open and laparoscopic cholecystectomy in the laparoscopic era: alarming trends. *Surg Endosc*
 249. Kato K, Matsuda M, Onodera K, Kobayashi T, Kasai S, Mito M (1994) Laparoscopic cholecystectomy from fundus downward. *Surg Laparosc Endosc* 4:373–374
 250. Katsinelos P, Kountouras J, Paroutoglou G, Beltsis A, Zavos C, Chatzimavroudis G, Vasiliadis I, Papaziogas B (2006) The role of endoscopic treatment in postoperative bile leaks. *Hepatogastroenterology* 53:166–170
 251. Kaushik R, Sharma R, Batra R, Yadav TD, Attri AK, Kaushik SP (2002) Laparoscopic cholecystectomy: an Indian experience of 1233 cases. *J Laparoendosc Adv Surg Tech A* 12:21–25
 252. Kelly MD (2009) Laparoscopic retrograde (fundus first) cholecystectomy. *BMC Surg* 9:19
 253. Kent AL, Cox MR, Wilson TG, Padbury RT, Toulli J (1994) Endoscopic retrograde cholangiopancreatography following laparoscopic cholecystectomy. *Aust N Z J Surg* 64:407–412
 254. Keulemans YC, Bergman JJ, de Wit LT, Rauws EA, Huibregtse K, Tytgat GN, Gouma DJ (1998) Improvement in the management of bile duct injuries? *J Am Coll Surg* 187:246–254
 255. Khan M, Qadri SJ, Nazir SS (2010) Use of rigid nephroscope for laparoscopic common bile duct exploration—a single-center experience. *World J Surg* 34:784–790
 256. Khan MH, Howard TJ, Fogel EL, Sherman S, McHenry L, Watkins JL, Canal DF, Lehman GA (2007) Frequency of biliary complications after laparoscopic cholecystectomy detected by ERCP: experience at a large tertiary referral center. *Gastrointest Endosc* 65:247–252
 257. Khan MN, Nordon I, Ghauri AS, Ranaboldo C, Carty N (2009) Urgent cholecystectomy for acute cholecystitis in a district general hospital—is it feasible? *Ann R Coll Surg Engl* 91:30–34
 258. Kholdebarin R, Boetto J, Harnish JL, Urbach DR (2008) Risk factors for bile duct injury during laparoscopic cholecystectomy: a case–control study. *Surg Innov* 15:114–119
 259. Kim JH, Kim JW, Jeong IH, Choi TY, Yoo BM, Kim MW, Kim WH (2008) Surgical outcomes of laparoscopic cholecystectomy for severe acute cholecystitis. *J Gastrointest Surg* 12:829–835
 260. Kim JH, Kim WH, Yoo BM, Kim MW (2010) Management of patients who return to the hospital with a bile leak after laparoscopic cholecystectomy. *J Laparoendosc Adv Surg Tech A* 20:317–322
 261. Kimura K, Ido K, Taniguchi Y, Kawamoto C, Satoh S, Isoda N, Ohtani M, Kumagai M, Horikawa S (1992) Prospective study of laparoscopic cholecystectomy in two hundred and fifty patients. *Endoscopy* 24:740–744

262. Kimura T, Kimura K, Suzuki K, Sakai S, Ohtomo Y, Sakuramachi S, Yamashita Y, Ido K, Kitano S, Yazaki Y (1993) Laparoscopic cholecystectomy: the Japanese experience. *Surg Laparosc Endosc* 3: 194–198
263. Kimura T, Suzuki K, Umehara Y, Kawabe A, Wada H (2005) Features and management of bile leaks after laparoscopic cholecystectomy. *J Hepatobiliary Pancreat Surg* 12:61–64
264. Klima S, Schyra B (1999) [Results of routine intraoperative cholangiography]. *Zentralbl Chir* 124:1054–1058
265. Knight JS, Mercer SJ, Somers SS, Walters AM, Sadek SA, Toh SK (2004) Timing of urgent laparoscopic cholecystectomy does not influence conversion rate. *Br J Surg* 91:601–604
266. Knorr C, Kastl S, Hohenberger W (2006) [The “inspection jejunostomy” after complex reconstructions of the central bile ducts]. *Rozhl Chir* 85: 624–630
267. Ko ST, Airan MC (1991) Review of 300 consecutive laparoscopic cholecystectomies: development, evolution, and results. *Surg Endosc* 5:103–108
268. Kocher M, Cerna M, Havlik R, Kral V, Gryga A, Duda M (2007) Percutaneous treatment of benign bile duct strictures. *Eur J Radiol* 62:170–174
269. Koffron A, Ferrario M, Parsons W, Nemcek A, Saker M, Abecassis M (2001) Failed primary management of iatrogenic biliary injury: incidence and significance of concomitant hepatic arterial disruption. *Surgery* 130:722–728; discussion 728–731
270. Kok KY, Mathew VV, Tan KK, Yapp SK (1998) A prospective review of laparoscopic cholecystectomy in Brunei. *Surg Laparosc Endosc* 8:120–122
271. Konstadoulakis MM, Antonakis PT, Karatzikos G, Alexakis N, Leandros E (2004) Intraoperative findings and postoperative complications in laparoscopic cholecystectomy: the Greek experience with 5,539 patients in a single center. *J Laparoendosc Adv Surg Tech A* 14:31–36
272. Koo KP, Thirlby RC (1996) Laparoscopic cholecystectomy in acute cholecystitis. What is the optimal timing for operation? *Arch Surg* 131: 540–544; discussion 544–545
273. Koperna T, Kisser M, Schulz F (1999) Laparoscopic versus open treatment of patients with acute cholecystitis. *Hepatogastroenterology* 46:753–757
274. Korman J, Cosgrove J, Furman M, Nathan I, Cohen J (1996) The role of endoscopic retrograde cholangiopancreatography and cholangiography in the laparoscopic era. *Ann Surg* 223:212–216
275. Korner T, Brennenstuhl M, Kristahl H, Graf S (1998) [Endoscopic interventions of the biliary tract in postoperative complications after cholecystectomy for preventing relaparotomy]. *Zentralbl Chir* 123 Suppl 2:98–101
276. Koulas SG, Tsimoyiannis J, Koutsourelakis I, Zikos N, Pappas-Gogos G, Siakas P, Tsimoyiannis EC (2006) Laparoscopic cholecystectomy performed by surgical trainees. *JLS* 10:484–487
277. Kozarek R, Gannan R, Baerg R, Wagonfeld J, Ball T (1992) Bile leak after laparoscopic cholecystectomy. Diagnostic and therapeutic application of endoscopic retrograde cholangiopancreatography. *Arch Intern Med* 152:1040–1043
278. Kozarek RA, Ball TJ, Patterson DJ, Brandabur JJ, Raltz S, Traverso LW (1994) Endoscopic treatment of biliary injury in the era of laparoscopic cholecystectomy. *Gastrointest Endosc* 40:10–16
279. Krahenbuhl L, Sclabas G, Wente MN, Schafer M, Schlumpf R, Buchler MW (2001) Incidence, risk factors, and prevention of biliary tract injuries during laparoscopic cholecystectomy in Switzerland. *World J Surg* 25:1325–1330
280. Kruis W, Roehrig H, Hardt M, Pohl C, Schlosser D (1997) A prospective evaluation of the diagnostic work-up before laparoscopic cholecystectomy. *Endoscopy* 29:602–608
281. Kulber DA, Berci G, Paz-Partlow M, Ashok G, Hiatt JR (1994) Value of early cholescintigraphy in detection of biliary complications after laparoscopic cholecystectomy. *Am Surg* 60:190–193
282. Kullman E, Borch K, Lindstrom E, Svanvik J, Anderberg B (1996) Value of routine intraoperative cholangiography in detecting aberrant bile ducts and bile duct injuries during laparoscopic cholecystectomy. *Br J Surg* 83:171–175
283. Kum CK, Eypasch E, Lefering R, Paul A, Neugebauer E, Troidl H (1996) Laparoscopic cholecystectomy for acute cholecystitis: is it really safe? *World J Surg* 20:43–48; discussion 48–49
284. Kumar A, Thombare MM, Sikora SS, Saxena R, Kapoor VK, Kaushik SP (1996) Morbidity and mortality of laparoscopic cholecystectomy in an institutional setup. *J Laparoendosc Surg* 6:393–397
285. Kupferschmidt H, Havelka J, Schwery S, Bernardi M, Buhler H (1996) [Endoscopic therapy of bile leakage following laparoscopic cholecystectomy]. *Schweiz Med Wochenschr Suppl* 79:89S–93S
286. Kurauchi N, Kamii N, Kazui K, Saji Y, Uchino J (1998) Laparoscopic cholecystectomy: a report on the community hospital experience in Hokkaido. *Surg Today* 28:714–718
287. Kuroki T, Tajima Y, Tsuneoka N, Kitasato A, Adachi T, Mishima T, Kanematsu T (2007) Biliary navigation surgery using endoscopic nasobiliary

- drainage tube for the prevention of bile duct injury in laparoscopic cholecystectomy. *Hepatogastroenterology* 54:1018–1019
288. Kurose M, Hamazaki K, Takai K, Hayashi N, Kaneshige T, Yerdel MA, Sakagami K, Mimura H, Orita K (1992) Laparoscopic cholecystectomy report of 30 cases. *Hiroshima J Med Sci* 41:43–47
 289. Kurumi Y, Tani T, Hanasawa K, Kodama M (2000) The prevention of bile duct injury during laparoscopic cholecystectomy from the point of view of anatomic variation. *Surg Laparosc Endosc Percutan Tech* 10:192–199
 290. Kuster GG, Gilroy S, Graefen M (1993) Intraoperative cholangiography for laparoscopic cholecystectomy. *Surg Gynecol Obstet* 176:411–417
 291. Kuster GG, Gilroy SB (1995) Intraoperative transgallbladder cholangiography intended to delineate bile duct anatomy. *J Laparoendosc Surg* 5:377–384
 292. Kuzela L, Oltman M, Sutka J, Hrecka R, Novotna T, Vavrecka A (2005) Prospective follow-up of patients with bile duct strictures secondary to laparoscopic cholecystectomy, treated endoscopically with multiple stents. *Hepatogastroenterology* 52:1357–1361
 293. Kwon AH, Inui H, Imamura A, Uetsuji S, Kamiyama Y (1998) Preoperative assessment for laparoscopic cholecystectomy: feasibility of using spiral computed tomography. *Ann Surg* 227:351–356
 294. Kwon AH, Matsui Y, Uemura Y (2004) Surgical procedures and histopathologic findings for patients with xanthogranulomatous cholecystitis. *J Am Coll Surg* 199:204–210
 295. Kwon AH, Uetsuji S, Ogura T, Kamiyama Y (1997) Spiral computed tomography scanning after intravenous infusion cholangiography for biliary duct anomalies. *Am J Surg* 174:396–401; discussion 401–392
 296. Ladocsi LT, Benitez LD, Filippone DR, Nance FC (1997) Intraoperative cholangiography in laparoscopic cholecystectomy: a review of 734 consecutive cases. *Am Surg* 63:150–156
 297. Lai EC, Fok M, Chan AS (2003) Needleoscopic cholecystectomy: prospective study of 150 patients. *Hong Kong Med J* 9:238–242
 298. Lal P, Agarwal PN, Malik VK, Chakravarti AL (2002) A difficult laparoscopic cholecystectomy that requires conversion to open procedure can be predicted by preoperative ultrasonography. *JLS* 6:59–63
 299. Larson GM, Vitale GC, Casey J, Evans JS, Gilliam G, Heuser L, McGee G, Rao M, Scherm MJ, Voyles CR (1992) Multipractice analysis of laparoscopic cholecystectomy in 1,983 patients. *Am J Surg* 163:221–226
 300. Lee KT, Shan YS, Wang ST, Lin PW (2005) Verres needle decompression of distended gallbladder to facilitate laparoscopic cholecystectomy in acute cholecystitis: a prospective study. *Hepatogastroenterology* 52:1388–1392
 301. Lee PC, Lai IR, Yu SC (2004) Minilaparoscopic (needleoscopic) cholecystectomy: a study of 1,011 cases. *Surg Endosc* 18:1480–1484
 302. Lehmann KS, Ritz JP, Wibmer A, Gellert K, Zornig C, Burghardt J, Busing M, Runkel N, Kohlhaw K, Albrecht R, Kirchner TG, Arlt G, Mall JW, Butters M, Bulian DR, Bretschneider J, Holmer C, Buhr HJ (2010) The German registry for natural orifice transluminal endoscopic surgery: report of the first 551 patients. *Ann Surg* 252:263–270
 303. Leitman IM, Fisher ML, McKinley MJ, Rothman R, Ward RJ, Reiner DS, Tortolani AJ (1993) The evaluation and management of known or suspected stones of the common bile duct in the era of minimal access surgery. *Surg Gynecol Obstet* 176:527–533
 304. Lekawa M, Shapiro SJ, Gordon LA, Rothbart J, Hiatt JR (1995) The laparoscopic learning curve. *Surg Laparosc Endosc* 5:455–458
 305. Lepner U, Grunthal V (2005) Intraoperative cholangiography can be safely omitted during laparoscopic cholecystectomy: a prospective study of 413 consecutive patients. *Scand J Surg* 94:197–200
 306. Leung KL, Kwong KH, Lau WY, Chung SC, Li AK (1996) Absorbable clips for cystic duct ligation in laparoscopic cholecystectomy. *Surg Endosc* 10:49–51
 307. Lezoche E, Paganini AM (2000) Technical considerations and laparoscopic bile duct exploration: transcystic and choledochotomy. *Semin Laparosc Surg* 7:262–278
 308. Li J, Frilling A, Nadalin S, Paul A, Malago M, Broelsch CE (2008) Management of concomitant hepatic artery injury in patients with iatrogenic major bile duct injury after laparoscopic cholecystectomy. *Br J Surg* 95:460–465
 309. Li LB, Cai XJ, Mou YP, Wei Q, Wang XF (2005) Factors influencing the results of treatment of bile duct injuries during laparoscopic cholecystectomy. *Hepatobiliary Pancreat Dis Int* 4:113–116
 310. Lichten JB, Reid JJ, Zahalsky MP, Friedman RL (2001) Laparoscopic cholecystectomy in the new millennium. *Surg Endosc* 15:867–872
 311. Lichtenstein S, Moorman DW, Malatesta JQ, Martin MF (2000) The role of hepatic resection in the management of bile duct injuries following laparoscopic cholecystectomy. *Am Surg* 66:372–376; discussion 377
 312. Lien HH, Huang CS, Shi MY, Chen DF, Wang NY, Tai FC, Chen SH, Lai CY (2004) Management of bile

- leakage after laparoscopic cholecystectomy based on etiological classification. *Surg Today* 34:326–330
313. Lillemoe KD, Martin SA, Cameron JL, Yeo CJ, Talamini MA, Kaushal S, Coleman J, Venbrux AC, Savader SJ, Osterman FA, Pitt HA (1997) Major bile duct injuries during laparoscopic cholecystectomy. Follow-up after combined surgical and radiologic management. *Ann Surg* 225:459–468; discussion 468–471
 314. Lim CC, Law NM, Cheng J, Ng HS (1994) Role of ERCP in the management of bile duct lesions post bile duct surgery. *Singapore Med J* 35:571–574
 315. Lim KR, Ibrahim S, Tan NC, Lim SH, Tay KH (2007) Risk factors for conversion to open surgery in patients with acute cholecystitis undergoing interval laparoscopic cholecystectomy. *Ann Acad Med Singapore* 36:631–635
 316. Lim SH, Salleh I, Poh BK, Tay KH (2005) Laparoscopic cholecystectomy: an audit of our training programme. *ANZ J Surg* 75:231–233
 317. Lirici MM, Califano A (2010) Management of complicated gallstones: results of an alternative approach to difficult cholecystectomies. *Minim Invasive Ther Allied Technol* 19:304–315
 318. Litwin DE, Girotti MJ, Poulin EC, Mamazza J, Nagy AG (1992) Laparoscopic cholecystectomy: trans-Canada experience with 2201 cases. *Can J Surg* 35:291–296
 319. Liu CL, Lo CM, Fan ST (1997) Acute biliary pancreatitis: diagnosis and management. *World J Surg* 21:149–154
 320. Liyanage CA, Sadakari Y, Kitada H, Ienaga J, Tanabe R, Takahata S, Nabae T, Tanaka M (2009) Prevention of iatrogenic bile duct injuries in difficult laparoscopic cholecystectomies: is the naso-biliary drain the answer? *J Hepatobiliary Pancreat Surg* 16:458–462
 321. Lo CM, Lai EC, Fan ST, Liu CL, Wong J (1996) Laparoscopic cholecystectomy for acute cholecystitis in the elderly. *World J Surg* 20:983–986; discussion 987
 322. Lorimer JW, Fairfull-Smith RJ (1995) Intraoperative cholangiography is not essential to avoid duct injuries during laparoscopic cholecystectomy. *Am J Surg* 169:344–347
 323. Lotz GW, Stahlschmidt M, Moergel K (1993) [Obligatory intraoperative cholangiography in laparoscopic cholecystectomy]. *Chirurg* 64:412–415
 324. Low JK, Barrow P, Owera A, Ammori BJ (2007) Timing of laparoscopic cholecystectomy for acute cholecystitis: evidence to support a proposal for an early interval surgery. *Am Surg* 73:1188–1192
 325. Lubikowski J, Post M, Bialek A, Kordowski J, Milkiewicz P, Wojcicki M (2011) Surgical management and outcome of bile duct injuries following cholecystectomy: a single-center experience. *Langenbecks Arch Surg* 396:699–707
 326. Ludwig K, Bernhardt J, Lorenz D (2002) Value and consequences of routine intraoperative cholangiography during cholecystectomy. *Surg Laparosc Endosc Percutan Tech* 12:154–159
 327. Lujan JA, Parrilla P, Robles R, Torralba JA, Garcia Ayllon J, Liron R, Sanchez-Bueno F (1995) Laparoscopic cholecystectomy in the treatment of acute cholecystitis. *J Am Coll Surg* 181:75–77
 328. Luo D, Chen XR, Li SH, Mao JX, Yu SM (2002) Non-image diagnosis of bile duct injury during laparoscopic cholecystectomy. *Hepatobiliary Pancreat Dis Int* 1:106–110
 329. MacFadyen BV Jr, Vecchio R, Ricardo AE, Mathis CR (1998) Bile duct injury after laparoscopic cholecystectomy. The United States experience. *Surg Endosc* 12:315–321
 330. Machi J, Johnson JO, Deziel DJ, Soper NJ, Berber E, Siperstein A, Hata M, Patel A, Singh K, Arregui ME (2009) The routine use of laparoscopic ultrasound decreases bile duct injury: a multicenter study. *Surg Endosc* 23:384–388
 331. Machi J, Oishi AJ, Tajiri T, Murayama KM, Furumoto NL, Oishi RH (2007) Routine laparoscopic ultrasound can significantly reduce the need for selective intraoperative cholangiography during cholecystectomy. *Surg Endosc* 21:270–274
 332. Madanur MA, Battula N, Sethi H, Deshpande R, Heaton N, Rela M (2007) Pseudoaneurysm following laparoscopic cholecystectomy. *Hepatobiliary Pancreat Dis Int* 6:294–298
 333. Madariaga JR, Dodson SF, Selby R, Todo S, Iwatsuki S, Starzl TE (1994) Corrective treatment and anatomic considerations for laparoscopic cholecystectomy injuries. *J Am Coll Surg* 179:321–325
 334. Madhavan KK, Macintyre IM, Wilson RG, Saunders JH, Nixon SJ, Hamer-Hodges DW (1995) Role of intraoperative cholangiography in laparoscopic cholecystectomy. *Br J Surg* 82:249–252
 335. Magnanini F, Peralta C, Pardo R, Curras A, Zalar A, Olmos M (1994) Endoscopic retrograde cholangiopancreatography: before and after laparoscopic cholecystectomy. *Acta Gastroenterol Latinoam* 24:213–217
 336. Magnuson TH, Ratner LE, Zenilman ME, Bender JS (1997) Laparoscopic cholecystectomy: applicability in the geriatric population. *Am Surg* 63:91–96
 337. Mahatharadol V (2004) Bile duct injuries during laparoscopic cholecystectomy: an audit of 1522 cases. *Hepatogastroenterology* 51:12–14
 338. Malik AM, Laghari AA, Talpur AH, Khan A (2008) Iatrogenic biliary injuries during laparoscopic

- cholecystectomy. A continuing threat. *Int J Surg* 6: 392–395
339. Manoukian AV, Schmalz MJ, Geenen JE, Hogan WJ, Venu RP, Johnson GK (1993) Endoscopic treatment of problems encountered after laparoscopic cholecystectomy [corrected]. *Gastrointest Endosc* 39:9–14
 340. Manouras A, Pararas N, Antonakis P, Lagoudianakis EE, Papageorgiou G, Dalianoudis IG, Konstadoulakis MM (2009) Management of major bile duct injury after laparoscopic cholecystectomy: a case report. *J Med Case Reports* 3:44
 341. Marakis GN, Pavlidis TE, Ballas K, Aimoniotou E, Psarras K, Karvounaris D, Rafailidis S, Demertzidis H, Sakantamis AK (2007) Major complications during laparoscopic cholecystectomy. *Int Surg* 92: 142–146
 342. Marti W, Herzog U, Kocher T, Schuppisser JP, Ackermann C, Tondelli P (1994) [Cholecystectomy today. A prospective study]. *Schweiz Med Wochenschr* 124:763–767
 343. Martin IG, Holdsworth PJ, Asker J, Baltas B, Glinatsis MT, Sue-Ling H, Gibson J, Johnston D, McMahon MJ (1992) Laparoscopic cholecystectomy as a routine procedure for gallstones: results of an ‘all-comers’ policy. *Br J Surg* 79:807–810
 344. Martin MB, Earle KR (2010) Does a surgeon as first assistant reduce the incidence of common bile duct injuries during laparoscopic cholecystectomy? *Am Surg* 76:287–291
 345. Mathisen O, Soreide O, Bergan A (2002) Laparoscopic cholecystectomy: bile duct and vascular injuries: management and outcome. *Scand J Gastroenterol* 37:476–481
 346. Matthews BD, Williams GB (1999) Laparoscopic cholecystectomy in an academic hospital: evaluation of changes in perioperative outcomes. *JLS* 3:9–17
 347. Mazer LM, Tapper EB, Sarmiento JM (2011) Non-operative management of right posterior sectoral duct injury following laparoscopic cholecystectomy. *J Gastrointest Surg* 15:1237–1242
 348. McGee JM, Malnar KF, Bellefeuille CE, Berry BL, Katsis SB, Clingan FA (1997) Longitudinal cholecystectomy study: patterns of care in a total community experience. *J Laparoendosc Adv Surg Tech A* 7:99–109
 349. McLindon JP, England RE, Martin DF (1998) Causes, clinical features and non-operative management of bile leaks. *Eur Radiol* 8:1602–1607
 350. Melton GB, Lillemoen KD, Cameron JL, Sauter PA, Coleman J, Yeo CJ (2002) Major bile duct injuries associated with laparoscopic cholecystectomy: effect of surgical repair on quality of life. *Ann Surg* 235:888–895
 351. Mercado MA, Chan C, Salgado-Nesme N, Lopez-Rosales F (2008) Intrahepatic repair of bile duct injuries. A comparative study. *J Gastrointest Surg* 12:364–368
 352. Merrie AE, Booth MW, Shah A, Pettigrew RA, McCall JL (1997) Bile duct imaging and injury: a regional audit of laparoscopic cholecystectomy. *Aust N Z J Surg* 67:706–711
 353. Meshikhes AW, al-Dhurai S, Bhatia D, al-Khatir N (1995) Laparoscopic cholecystectomy: the Dammam Central Hospital experience. *Int Surg* 80: 102–104
 354. Messmer P, Rothenbuhler JM, Vogelbach P, Harder F (1996) [laparoscopic cholecystectomy and acute cholecystitis-feasibility and morbidity]. *Swiss Surg*:127–130
 355. Metzger J, Berbig R, Muller C (1993) [Preoperative ERCP and laparoscopic cholecystectomy for treatment of choledocholithiasis]. *Helv Chir Acta* 59:643–648
 356. Millat B, Deleuze A, de Saxce B, de Seguin C, Fingerhut A (1997) Routine intraoperative cholangiography is feasible and efficient during laparoscopic cholecystectomy. *Hepatogastroenterology* 44:22–27
 357. Miller RE, Kimmelstiel FM (1992) Surgical laparoscopic experience during the first year on a teaching service. *Surg Gynecol Obstet* 175:523–527
 358. Mir IS, Mohsin M, Kirmani O, Majid T, Wani K, Hassan MU, Naqshbandi J, Maqbool M (2007) Is intra-operative cholangiography necessary during laparoscopic cholecystectomy? A multicentre rural experience from a developing world country. *World J Gastroenterol* 13:4493–4497
 359. Miroshnik M, Saafan A, Koh S, Farlow J, Neophyton J, Lizzio J, Yee F, Ethell T, Bean A, Fenton-Lee D (2002) Biliary tract injury in laparoscopic cholecystectomy: results of a single unit. *ANZ J Surg* 72:867–870
 360. Mirza DF, Narsimhan KL, Ferraz Neto BH, Mayer AD, McMaster P, Buckels JA (1997) Bile duct injury following laparoscopic cholecystectomy: referral pattern and management. *Br J Surg* 84: 786–790
 361. Misawa T, Saito R, Shiba H, Son K, Futagawa Y, Nojiri T, Kitajima K, Uwagawa T, Ishida Y, Ishii Y, Yanaga K (2006) Analysis of bile duct injuries (Stewart-Way classification) during laparoscopic cholecystectomy. *J Hepatobiliary Pancreat Surg* 13: 427–434

362. Misra M, Schiff J, Rendon G, Rothschild J, Schwaitzberg S (2005) Laparoscopic cholecystectomy after the learning curve: what should we expect? *Surg Endosc* 19:1266–1271
363. Misra S, Melton GB, Geschwind JF, Venbrux AC, Cameron JL, Lillemoe KD (2004) Percutaneous management of bile duct strictures and injuries associated with laparoscopic cholecystectomy: a decade of experience. *J Am Coll Surg* 198:218–226
364. Mo LR, Yau MP, Hwang MH, Lin RC, Kuo JY, Tsai CC (1993) The role of ERCP and therapeutic biliary endoscopy in laparoscopic cholecystectomy. *J Laparoendosc Surg* 3:19–22
365. Moore DE, Feurer ID, Holzman MD, Wudel LJ, Strickland C, Gorden DL, Chari R, Wright JK, Pinson CW (2004) Long-term detrimental effect of bile duct injury on health-related quality of life. *Arch Surg* 139:476–481; discussion 481–472
366. Moore MJ, Bennett CL (1995) The learning curve for laparoscopic cholecystectomy. *The Southern Surgeons Club. Am J Surg* 170:55–59
367. Moran J, Del Grosso E, Wills JS, Hagy JA, Baker R (1994) Laparoscopic cholecystectomy: imaging of complications and normal postoperative CT appearance. *Abdom Imaging* 19:143–146
368. Morgenstern L, McGrath MF, Carroll BJ, Paz-Partlow M, Berci G (1995) Continuing hazards of the learning curve in laparoscopic cholecystectomy. *Am Surg* 61:914–918
369. Morlang T, Umscheid T, Stelter WJ (1995) [Laparoscopic cholecystectomy: a prospective study of 1,775 unselected patients]. *Zentralbl Chir* 120:353–359
370. Morris JB, Margolis R, Rosato EF (1993) Safe laparoscopic cholecystectomy without intraoperative cholangiography. *Surg Laparosc Endosc* 3:17–20
371. Mucio M, Felemovicus J, De la Concha F, Cabello R, Zamora A (1994) The Mexican experience with laparoscopic cholecystectomy and common bile duct exploration. A multicentric trial. *Surg Endosc* 8:306–309
372. Mufti TS, Ahmad S, Naveed D, Akbar M, Zafar A (2007) Laparoscopic cholecystectomy: an early experience at Ayub Teaching Hospital Abbottabad. *J Ayub Med Coll Abbottabad* 19:42–44
373. Nader M, D'Agostino HB, Veja R, Ariza Mde G, Zibari G, Manas K, Jordan P, Shi R (2009) Biliary spills and collections: causes, diagnosis, and multidisciplinary management. *J La State Med Soc* 161:46–52; quiz 53–44
374. Nair RG, Dunn DC, Fowler S, McCloy RF (1997) Progress with cholecystectomy: improving results in England and Wales. *Br J Surg* 84:1396–1398
375. Nakajima J, Sasaki A, Obuchi T, Baba S, Nitta H, Wakabayashi G (2009) Laparoscopic subtotal cholecystectomy for severe cholecystitis. *Surg Today* 39:870–875
376. Navez B, Mutter D, Russier Y, Vix M, Jamali F, Lipski D, Cambier E, Guiot P, Leroy J, Marescaux J (2001) Safety of laparoscopic approach for acute cholecystitis: retrospective study of 609 cases. *World J Surg* 25:1352–1356
377. Nealon WH, Urrutia F (1996) Long-term follow-up after bilioenteric anastomosis for benign bile duct stricture. *Ann Surg* 223:639–645; discussion 645–638
378. Neidich R, Soper N, Edmundowicz S, Chokshi H, Aliperti G (1996) Endoscopic management of bile duct leaks after attempted laparoscopic cholecystectomy. *Surg Laparosc Endosc* 6:348–354
379. Nenner RP, Imperato PJ, Alcorn CM (1992) Serious complications of laparoscopic cholecystectomy in New York State. *N Y State J Med* 92:179–181
380. Neri V, Ambrosi A, Di Lauro G, Fersini A, Valentino TP (2003) Difficult cholecystectomies: validity of the laparoscopic approach. *JLS* 7:329–333
381. Neuhaus P, Schmidt SC, Hintze RE, Adler A, Veltzke W, Raakow R, Langrehr JM, Bechstein WO (2000) [Classification and treatment of bile duct injuries after laparoscopic cholecystectomy]. *Chirurg* 71:166–173
382. Newman CL, Wilson RA, Newman L, 3rd, Eubanks S, Duncan TD, Mason EM, Wilson JP, Lucas GW (1995) 1525 laparoscopic cholecystectomies without biliary injury: a single institution's experience. *Am Surg* 61:226–228
383. Nordin A, Halme L, Makisalo H, Isoniemi H, Hockerstedt K (2002) Management and outcome of major bile duct injuries after laparoscopic cholecystectomy: from therapeutic endoscopy to liver transplantation. *Liver Transpl* 8:1036–1043
384. Nuzzo G, Giuliante F, Giovannini I, Ardito F, D'Acapito F, Vellone M, Murazio M, Capelli G (2005) Bile duct injury during laparoscopic cholecystectomy: results of an Italian national survey on 56 591 cholecystectomies. *Arch Surg* 140:986–992
385. Nuzzo G, Giuliante F, Giovannini I, Murazio M, D'Acapito F, Ardito F, Vellone M, Gauzolino R, Costamagna G, Di Stasi C (2008) Advantages of multidisciplinary management of bile duct injuries occurring during cholecystectomy. *Am J Surg* 195:763–769
386. Olsen D (1997) Bile duct injuries during laparoscopic cholecystectomy. *Surg Endosc* 11:133–138
387. Onders RP, Hallowell PT (2005) The era of ultrasonography during laparoscopic cholecystectomy. *Am J Surg* 189:348–351

388. Ooi LL, Goh YC, Chew SP, Tay KH, Foo E, Low CH, Ch'ng HC, Chan ST, Soo KC (1999) Bile duct injuries during laparoscopic cholecystectomy: a collective experience of four teaching hospitals and results of repair. *Aust N Z J Surg* 69:844–846
389. Orlando R, 3rd, Russell JC, Lynch J, Mattie A (1993) Laparoscopic cholecystectomy. A statewide experience. The Connecticut Laparoscopic Cholecystectomy Registry. *Arch Surg* 128:494–498; discussion 498–499
390. O'Rourke NA, Askew AR, Cowen AE, Roberts R, Fielding GA (1993) The role of ERCP and endoscopic sphincterotomy in the era of laparoscopic cholecystectomy. *Aust N Z J Surg* 63:3–7
391. Ou ZB, Li SW, Liu CA, Tu B, Wu CX, Ding X, Liu ZJ, Sun K, Feng HY, Gong JP (2009) Prevention of common bile duct injury during laparoscopic cholecystectomy. *Hepatobiliary Pancreat Dis Int* 8:414–417
392. Ovaska J, Airo I, Haglund C, Kivilaakso E, Kiviluoto T, Palm J, Paakkonen M, Ristkari S, Smitten KV (1996) Laparoscopic cholecystectomy: the Finnish experience. *Ann Chir Gynaecol* 85:208–211
393. Ozturk E, Can MF, Yagci G, Ersoz N, Ozerhan IH, Harlak A, Sahin M, Cetiner S, Tufan T (2009) Management and mid- to long-term results of early referred bile duct injuries during laparoscopic cholecystectomy. *Hepatogastroenterology* 56:17–25
394. Paczynski A, Koziarski T, Stanowski E, Krupa J (2002) Extrahepatic bile duct injury during laparoscopic cholecystectomy – own material. *Med Sci Monit* 8:CR438–440
395. Paganini AM, Feliciotti F, Guerrieri M, Tamburini A, Campagnacci R, Lezoche E (2002) Laparoscopic cholecystectomy and common bile duct exploration are safe for older patients. *Surg Endosc* 16:1302–1308
396. Paganini AM, Guerrieri M, Sarnari J, De Sanctis A, D'Ambrosio G, Lezoche G, Perretta S, Lezoche E (2007) Thirteen years' experience with laparoscopic transcystic common bile duct exploration for stones. Effectiveness and long-term results. *Surg Endosc* 21:34–40
397. Panpimanmas S, Kanyaprasit K (2004) Complications of laparoscopic cholecystectomy and their management. *Hepatogastroenterology* 51:9–11
398. Park MS, Kim KW, Yu JS, Kim MJ, Lim JS, Cho ES, Yoon DS, Kim TK, Lee SI, Lee JD, Lee WJ, Ha HK, Lee JT, Yoo HS (2004) Early biliary complications of laparoscopic cholecystectomy: evaluation on T2-weighted MR cholangiography in conjunction with mangafodipir trisodium-enhanced 3D T1-weighted MR cholangiography. *AJR Am J Roentgenol* 183:1559–1566
399. Pasmans HL, Go PM, Gouma DJ, Heidendal GA, van Engelshoven JM, van Kroonenburgh MJ (1992) Scintigraphic diagnosis of bile leakage after laparoscopic cholecystectomy. A prospective study. *Clin Nucl Med* 17:697–700
400. Patel AG, Murgatroyd B, Carswell K, Belgaumkar A (2011) Fundus-first transumbilical single-incision laparoscopic cholecystectomy with a cholangiogram: a feasibility study. *Surg Endosc* 25:954–957
401. Patterson EJ, McLoughlin RF, Mathieson JR, Cooperberg PL, MacFarlane JK (1996) An alternative approach to acute cholecystitis. Percutaneous cholecystostomy and interval laparoscopic cholecystectomy. *Surg Endosc* 10:1185–1188
402. Pavlidis TE, Marakis GN, Ballas K, Symeonidis N, Psarras K, Rafailidis S, Karvounaris D, Sakantamis AK (2007) Risk factors influencing conversion of laparoscopic to open cholecystectomy. *J Laparoendosc Adv Surg Tech A* 17:414–418
403. Pavlidis TE, Marakis GN, Symeonidis N, Psarras K, Ballas K, Rafailidis S, Sakantamis AK (2008) Considerations concerning laparoscopic cholecystectomy in the extremely elderly. *J Laparoendosc Adv Surg Tech A* 18:56–60
404. Pencev D, Brady PG, Pinkas H, Boulay J (1994) The role of ERCP in patients after laparoscopic cholecystectomy. *Am J Gastroenterol* 89:1523–1527
405. Peng WK, Sheikh Z, Nixon SJ, Paterson-Brown S (2005) Role of laparoscopic cholecystectomy in the early management of acute gallbladder disease. *Br J Surg* 92:586–591
406. Perera MT, Monaco A, Silva MA, Bramhall SR, Mayer AD, Buckels JA, Mirza DF (2011) Laparoscopic posterior sectoral bile duct injury: the emerging role of nonoperative management with improved long-term results after delayed diagnosis. *Surg Endosc*
407. Perera MT, Silva MA, Hegab B, Muralidharan V, Bramhall SR, Mayer AD, Buckels JA, Mirza DF (2011) Specialist early and immediate repair of post-laparoscopic cholecystectomy bile duct injuries is associated with an improved long-term outcome. *Ann Surg* 253:553–560
408. Perez Lara FJ, de Luna Diaz R, Moreno Ruiz J, Suescun Garcia R, del Rey Moreno A, Hernandez Carmona J, Oliva Munoz H (2006) Laparoscopic cholecystectomy in patients over 70 years of age: review of 176 cases. *Rev Esp Enferm Dig* 98:42–48
409. Perini RF, Uflacker R, Cunningham JT, Selby JB, Adams D (2005) Isolated right segmental hepatic duct injury following laparoscopic cholecystectomy. *Cardiovasc Intervent Radiol* 28:185–195
410. Perissat J, Collet D, Edye M, Magne E, Belliard R, Desplantez J (1992) Laparoscopic cholecystectomy:

- an analysis of 777 cases. *Baillieres Clin Gastroenterol* 6:727–742
411. Peterli R, Herzog U, Schuppisser JP, Ackermann C, Tondelli P (2000) The learning curve of laparoscopic cholecystectomy and changes in indications: one institutions's experience with 2,650 cholecystectomies. *J Laparoendosc Adv Surg Tech A* 10: 13–19
 412. Peters JH, Ellison EC, Innes JT, Liss JL, Nichols KE, Lomano JM, Roby SR, Front ME, Carey LC (1991) Safety and efficacy of laparoscopic cholecystectomy. A prospective analysis of 100 initial patients. *Ann Surg* 213:3–12
 413. Peters JH, Gibbons GD, Innes JT, Nichols KE, Front ME, Roby SR, Ellison EC (1991) Complications of laparoscopic cholecystectomy. *Surgery* 110:769–777; discussion 777–768
 414. Peters JH, Krailadsiri W, Incarbone R, Bremner CG, Froes E, Ireland AP, Crookes P, Ortega AE, Anthone GA, Stain SA (1994) Reasons for conversion from laparoscopic to open cholecystectomy in an urban teaching hospital. *Am J Surg* 168:555–558; discussion 558–559
 415. Peters JH, Ollila D, Nichols KE, Gibbons GD, Davanzo MA, Miller J, Front ME, Innes JT, Ellison EC (1994) Diagnosis and management of bile leaks following laparoscopic cholecystectomy. *Surg Laparosc Endosc* 4:163–170
 416. Pfluke JM, Bowers SP (2011) Laparoscopic Intraoperative Biliary Ultrasonography: Findings During Laparoscopic Cholecystectomy for Acute Disease. *J Laparoendosc Adv Surg Tech A*
 417. Philipp SR, Miedema BW, Thaler K (2009) Single-incision laparoscopic cholecystectomy using conventional instruments: early experience in comparison with the gold standard. *J Am Coll Surg* 209: 632–637
 418. Philips JA, Lawes DA, Cook AJ, Arulampalam TH, Zaborsky A, Menzies D, Motson RW (2008) The use of laparoscopic subtotal cholecystectomy for complicated cholelithiasis. *Surg Endosc* 22:1697–1700
 419. Pier A, Thevissen P, Ablassmaier B (1991) [Technique in laparoscopic cholecystectomy. Experiences and results in 200 interventions]. *Chirurg* 62: 323–331
 420. Pietra N, Sarli L, Maccarini PU, Sabadini G, Costi R, Gobbi S (2000) Five-year prospective audit of routine intravenous cholangiography and selective endoscopic retrograde cholangiography with or without intraoperative cholangiography in patients undergoing laparoscopic cholecystectomy. *World J Surg* 24:345–352
 421. Pietrabissa A, Di Candio G, Giulianotti PC, Shimi SM, Cuschieri A, Mosca F (1995) Comparative evaluation of contact ultrasonography and transcystic cholangiography during laparoscopic cholecystectomy: a prospective study. *Arch Surg* 130: 1110–1114
 422. Pietrafitta JJ, Schultz LS, Graber JN, Josephs LG, Hickok DF (1991) Cholecystcholangiography during laparoscopic cholecystectomy: cholecystcholangiography or cystic duct cholangiography. *J Laparoendosc Surg* 1:197–206
 423. Pinkas H, Brady PG (2008) Biliary leaks after laparoscopic cholecystectomy: time to stent or time to drain. *Hepatobiliary Pancreat Dis Int* 7:628–632
 424. Pisanu A, Altana ML, Piu S, Uccheddu A (2003) Bile leak from the accessory biliary duct following laparoscopic cholecystectomy. *G Chir* 24:115–118
 425. Plummer JM, Duncan ND, Mitchell DI, McDonald AH, Reid M, Arthurs M (2006) Laparoscopic cholecystectomy for chronic cholecystitis in Jamaican patients with sickle cell disease: preliminary experience. *West Indian Med J* 55:22–24
 426. Plummer JM, Mitchell DI, Duncan ND, McDonald AH, Arthurs M (2006) Bile duct injuries in the laparoscopic era: the University Hospital of the West Indies experience. *West Indian Med J* 55:228–231
 427. Poole G, Waldron B, Shimi SM, Cuschieri A (1997) Laparoscopic common bile duct exploration after failed endoscopic stone extraction. *Endoscopy* 29: 609–613
 428. Poole GH, Yellapu S (2000) Acute laparoscopic cholecystectomy. A case controlled study. *Surg Endosc* 14:106–109
 429. Porte RJ, De Vries BC (1996) Laparoscopic versus open cholecystectomy: a prospective matched-cohort study. *HPB Surg* 9:71–75
 430. Power C, Maguire D, McAnena OJ, Calleary J (2000) Use of the ultrasonic dissecting scalpel in laparoscopic cholecystectomy. *Surg Endosc* 14: 1070–1073
 431. Prakash K, Jacob G, Lekha V, Venugopal A, Venugopal B, Ramesh H (2002) Laparoscopic cholecystectomy in acute cholecystitis. *Surg Endosc* 16:180–183
 432. Prat F, Pelletier G, Ponchon T, Fritsch J, Meduri B, Boyer J, Person B, Bretagne JF (1997) What role can endoscopy play in the management of biliary complications after laparoscopic cholecystectomy? *Endoscopy* 29:341–348
 433. Priego P, Ramiro C, Molina JM, Rodriguez Velasco G, Lobo E, Galindo J, Fresneda V (2009) Results of laparoscopic cholecystectomy in a third-level

- university hospital after 17 years of experience. *Rev Esp Enferm Dig* 101:20–30
434. Quinn SF, Sangster W, Standage B, Schuman E, Gross G (1992) Biliary complications related to laparoscopic cholecystectomies: radiologic diagnosis and management. *Surg Laparosc Endosc* 2:279–286
435. Raakow R, Schmidt S, Knoop M, Neuhaus P (1998) [Surgical interventional endoscopic treatment concept of bile duct lesions after laparoscopic cholecystectomy]. *Langenbecks Arch Chir Suppl Kongressbd* 115:1541–1543
436. Ragozzino A, De Ritis R, Mosca A, Iaccarino V, Imbriaco M (2004) Value of MR cholangiography in patients with iatrogenic bile duct injury after cholecystectomy. *AJR Am J Roentgenol* 183:1567–1572
437. Rajzman I, Catalano MF, Hirsch GS, MacFadyen B, Broughan TA, Chung RS, Sivak MV, Jr. (1994) Endoscopic treatment of biliary leakage after laparoscopic cholecystectomy. *Endoscopy* 26:741–744
438. Raj PK, Castillo G, Urban L (2001) Laparoscopic cholecystectomy: fundus-down approach. *J Laparosc Adv Surg Tech A* 11:95–100
439. Rakos G, Markus B, Szell K (1997) Cholecystectomy through a mini laparotomy alongside laparoscopic technique. *Acta Chir Hung* 36:286–288
440. Rantis PC Jr, Greenlee HB, Pickleman J, Prinz RA (1993) Laparoscopic cholecystectomy bile duct injuries: more than meets the eye. *Am Surg* 59:533–540
441. Raute M, Podlech P, Jaschke W, Manegold BC, Trede M, Chir B (1993) Management of bile duct injuries and strictures following cholecystectomy. *World J Surg* 17:553–562
442. Reardon PR, Kamelgard JI, Applebaum B, Rossman L, Brunnicardi FC (1999) Feasibility of laparoscopic cholecystectomy with miniaturized instrumentation in 50 consecutive cases. *World J Surg* 23:128–131; discussion 131–122
443. Rees BI, Williams HR (1992) Laparoscopic cholecystectomy: the first 155 patients. *Ann R Coll Surg Engl* 74:233–236
444. Ress AM, Sarr MG, Nagorney DM, Farnell MB, Donohue JH, McIlrath DC (1993) Spectrum and management of major complications of laparoscopic cholecystectomy. *Am J Surg* 165:655–662
445. Rice DC, Memon MA, Jamison RL, Agnessi T, Ilstrup D, Bannon MB, Farnell MB, Grant CS, Sarr MG, Thompson GB, van Heerden JA, Zietlow SP, Donohue JH (1997) Long-term consequences of intraoperative spillage of bile and gallstones during laparoscopic cholecystectomy. *J Gastrointest Surg* 1:85–90; discussion 90–81
446. Richardson AJ, Brancatisano R, Avramovic J, Roney W, Little JM (1993) Injuries to the bile duct resulting from laparoscopic cholecystectomy. *Aust N Z J Surg* 63:684–689
447. Richardson MC, Bell G, Fullarton GM (1996) Incidence and nature of bile duct injuries following laparoscopic cholecystectomy: an audit of 5913 cases. West of Scotland Laparoscopic Cholecystectomy Audit Group. *Br J Surg* 83:1356–1360
448. Ricciardi R, Islam S, Canete JJ, Arcand PL, Stoker ME (2003) Effectiveness and long-term results of laparoscopic common bile duct exploration. *Surg Endosc* 17:19–22
449. Robinson BL, Donohue JH, Gunes S, Thompson GB, Grant CS, Sarr MG, Farnell MB, van Heerden JA (1995) Selective operative cholangiography. Appropriate management for laparoscopic cholecystectomy. *Arch Surg* 130:625–630; discussion 630–621
450. Robinson TN, Stiegmann GV, Durham JD, Johnson SI, Wachs ME, Serra AD, Kumpe DA (2001) Management of major bile duct injury associated with laparoscopic cholecystectomy. *Surg Endosc* 15:1381–1385
451. Rojas-Ortega S, Arizpe-Bravo D, Marin Lopez ER, Cesin-Sanchez R, Roman GR, Gomez C (2003) Transcystic common bile duct exploration in the management of patients with choledocholithiasis. *J Gastrointest Surg* 7:492–496
452. Rossi M, Salvatori FM, Giglio L, Fanelli F, Cantisani V, Rossi P, David V (2002) Interventional radiology techniques in the treatment of complications due to videolaparoscopic cholecystectomy. *Radiol Med* 103:384–395
453. Rossi RL, Schirmer WJ, Braasch JW, Sanders LB, Munson JL (1992) Laparoscopic bile duct injuries. Risk factors, recognition, and repair. *Arch Surg* 127:596–601; discussion 601–592
454. Roviario GC, Maciocco M, Rebuffat C, Varoli F, Vergani V, Rabughino G, Scarduelli A (1997) Complications following cholecystectomy. *J R Coll Surg Edinb* 42:324–328
455. Roy AF, Passi RB, Lapointe RW, McAlister VC, Dagenais MH, Wall WJ (1993) Bile duct injury during laparoscopic cholecystectomy. *Can J Surg* 36:509–516
456. Rubio PA (1993) Laparoscopic cholecystectomy: experience in 500 consecutive cases. *Int Surg* 78:277–279
457. Russell JC, Walsh SJ, Mattie AS, Lynch JT (1996) Bile duct injuries, 1989–1993. A statewide experience.

- Connecticut Laparoscopic Cholecystectomy Registry. *Arch Surg* 131:382–388
458. Ryan ME, Geenen JE, Lehman GA, Aliperti G, Freeman ML, Silverman WB, Mayeux GP, Frakes JT, Parker HW, Yakshe PN, Goff JS (1998) Endoscopic intervention for biliary leaks after laparoscopic cholecystectomy: a multicenter review. *Gastrointest Endosc* 47:261–266
459. Ryan SM, Milsom P, Yang J, Snyman G (2009) Travelling surgeons—a clinical audit of laparoscopic cholecystectomy procedures in Northland, New Zealand. *N Z Med J* 122:34–40
460. Sackier JM, Berci G, Phillips E, Carroll B, Shapiro S, Paz-Partlow M (1991) The role of cholangiography in laparoscopic cholecystectomy. *Arch Surg* 126:1021–1025; discussion 1025–1026
461. Sahajpal AK, Chow SC, Dixon E, Greig PD, Gallinger S, Wei AC (2010) Bile duct injuries associated with laparoscopic cholecystectomy: timing of repair and long-term outcomes. *Arch Surg* 145:757–763
462. Salky B, Bauer J (1994) Intravenous cholangiography, ERCP, and selective operative cholangiography in the performance of laparoscopic cholecystectomy. *Surg Endosc* 8:289–291
463. Samardzic J, Latic F, Kraljik D, Pitlovic V, Mrkovic H, Miskic D, Latic A, Delibegovic S (2010) Treatment of common bile duct stones—is the role of ERCP changed in era of minimally invasive surgery? *Med Arh* 64:187–188
464. Sanabria JR, Gallinger S, Croxford R, Strasberg SM (1994) Risk factors in elective laparoscopic cholecystectomy for conversion to open cholecystectomy. *J Am Coll Surg* 179:696–704
465. Sanchez A, Rodriguez O, Bellorin O, Sanchez R, Benitez G (2010) Laparoscopic common bile duct exploration in patients with gallstones and choledocholithiasis. *JSLs* 14:246–250
466. Sandha GS, Bourke MJ, Haber GB, Kortan PP (2004) Endoscopic therapy for bile leak based on a new classification: results in 207 patients. *Gastrointest Endosc* 60:567–574
467. Sandoval BA, Goettler CE, Robinson AV, O'Donnell JK, Adler LP, Stellato TA (1997) Cholescintigraphy in the diagnosis of bile leak after laparoscopic cholecystectomy. *Am Surg* 63:611–616
468. Sanjay P, Fulke JL, Exon DJ (2010) 'Critical view of safety' as an alternative to routine intraoperative cholangiography during laparoscopic cholecystectomy for acute biliary pathology. *J Gastrointest Surg* 14:1280–1284
469. Santambrogio R, Bianchi P, Opocher E, Mantovani A, Schubert L, Ghelma F, Panzera M, Verga M, Spina GP (1996) Intraoperative ultrasonography (IOUS) during laparoscopic cholecystectomy. *Surg Endosc* 10:622–627
470. Saraswat VA, Choudhuri G, Sharma BC, Agarwal DK, Gupta R, Baijal SS, Sikora SS, Saxena R, Kapoor VK (1996) Endoscopic management of postoperative bile leak. *J Gastroenterol Hepatol* 11:148–151
471. Sari YS, Tunali V, Tomaoglu K, Karagoz B, Guneyi A, Karagoz I (2005) Can bile duct injuries be prevented? "A new technique in laparoscopic cholecystectomy". *BMC Surg* 5:14
472. Sarli L, Iusco D, Sgobba G, Roncoroni L (2002) Gallstone cholangitis: a 10-year experience of combined endoscopic and laparoscopic treatment. *Surg Endosc* 16:975–980
473. Sarli L, Iusco DR, Roncoroni L (2003) Preoperative endoscopic sphincterotomy and laparoscopic cholecystectomy for the management of cholecystocholedocholithiasis: 10-year experience. *World J Surg* 27:180–186
474. Sarli L, Pietra N, Costi R, Grattarola M (1999) Gallbladder perforation during laparoscopic cholecystectomy. *World J Surg* 23:1186–1190
475. Sarli L, Pietra N, Franze A, Colla G, Costi R, Gobbi S, Trivelli M (1999) Routine intravenous cholangiography, selective ERCP, and endoscopic treatment of bile duct stones before laparoscopic cholecystectomy. *Gastrointest Endosc* 50:200–208
476. Sarmiento JM, Farnell MB, Nagorney DM, Hodge DO, Harrington JR (2004) Quality-of-life assessment of surgical reconstruction after laparoscopic cholecystectomy-induced bile duct injuries: what happens at 5 years and beyond? *Arch Surg* 139:483–488; discussion 488–489
477. Sasaki A, Nakajima J, Nitta H, Obuchi T, Baba S, Wakabayashi G (2008) Laparoscopic cholecystectomy in patients with a history of gastrectomy. *Surg Today* 38:790–794
478. Savar A, Carmody I, Hiatt JR, Busuttil RW (2004) Laparoscopic bile duct injuries: management at a tertiary liver center. *Am Surg* 70:906–909
479. Savassi-Rocha PR, Almeida SR, Sanches MD, Andrade MA, Frerreira JT, Diniz MT, Rocha AL (2003) Iatrogenic bile duct injuries. *Surg Endosc* 17:1356–1361
480. Savassi-Rocha PR, Ferreira JT, Diniz MT, Sanches SR (1997) Laparoscopic cholecystectomy in Brazil: analysis of 33,563 cases. *Int Surg* 82:208–213
481. Schafer M, Schneider R, Krahenbuhl L (2003) Incidence and management of Mirizzi syndrome during laparoscopic cholecystectomy. *Surg Endosc* 17:1186–1190; discussion 1191–1182

482. Schiphorst AH, Besselink MG, Boerma D, Timmer R, Wiezer MJ, van Erpecum KJ, Broeders IA, van Ramshorst B (2008) Timing of cholecystectomy after endoscopic sphincterotomy for common bile duct stones. *Surg Endosc* 22:2046–2050
483. Schlumpf R, Klotz HP, Wehrli H, Herzog U (1994) A nation's experience in laparoscopic cholecystectomy. Prospective multicenter analysis of 3722 cases. *Surg Endosc* 8:35–41
484. Schmidt SC, Langrehr JM, Hintze RE, Neuhaus P (2005) Long-term results and risk factors influencing outcome of major bile duct injuries following cholecystectomy. *Br J Surg* 92:76–82
485. Schmiederer R, Kubitzky M, Razek P, Pinnisch K, Prochaska M, Tuchmann A (1995) [Minimally invasive surgery-choledocholithiasis: therapeutic splitting]. *Wien Klin Wochenschr* 107:54–56
486. Schmitt CM, Baillie J, Cotton PB (1995) ERCP following laparoscopic cholecystectomy: a safe and effective way to manage CBD stones and complications. *HPB Surg* 8:187–192
487. Schnarkowski P, Decker D, Decker P, Kreft B, Hirner A, Reiser MF (1995) [Radiological diagnosis before and after laparoscopic cholecystectomies]. *Rofo* 162:497–501
488. Schol FP, Go PM, Gouma DJ (1994) Risk factors for bile duct injury in laparoscopic cholecystectomy: analysis of 49 cases. *Br J Surg* 81:1786–1788
489. Schwery S, Havelka J, Zaugg PY, Buhler H (1994) [The value of ERCP in the diagnosis and therapy of complications of laparoscopic cholecystectomy]. *Schweiz Med Wochenschr* 124:771–775
490. Seeliger H, Furst A, Zulke C, Jauch KW (2002) Surgical management of bile duct injuries following laparoscopic cholecystectomy: analysis and follow-up of 28 cases. *Langenbecks Arch Surg* 387:286–293
491. Sefr R, Ochmann J, Kozumplik L, Vrstayak J, Penka I (1995) The role of relaparoscopy in the management of bile leaks after laparoscopic cholecystectomy. *Int Surg* 80:356–357
492. Sekido H, Matsuo K, Morioka D, Kunihiro O, Tanaka K, Endo I, Togo S, Shimada H (2004) Surgical strategy for the management of biliary injury in laparoscopic cholecystectomy. *Hepatogastroenterology* 51:357–361
493. Sequeira R, Weinbaum F, Satterfield J, Chassin J, Mock L (1994) Credentialing physicians for new technology: the physician's learning curve must not harm the patient. *Am Surg* 60:821–823
494. Shaikh IA, Thomas H, Joga K, Amin AI, Daniel T (2009) Post-cholecystectomy cystic duct stump leak: a preventable morbidity. *J Dig Dis* 10:207–212
495. Sicklick JK, Camp MS, Lillemoe KD, Melton GB, Yeo CJ, Campbell KA, Talamini MA, Pitt HA, Coleman J, Sauter PA, Cameron JL (2005) Surgical management of bile duct injuries sustained during laparoscopic cholecystectomy: perioperative results in 200 patients. *Ann Surg* 241:786–792; discussion 793–785
496. Sikora SS, Kumar A, Das NR, Sarkari A, Saxena R, Kapoor VK (2001) Laparoscopic bile duct injuries: spectrum at a tertiary-care center. *J Laparoendosc Adv Surg Tech A* 11:63–68
497. Silva MA, Coldham C, Mayer AD, Bramhall SR, Buckels JA, Mirza DF (2008) Specialist outreach service for on-table repair of iatrogenic bile duct injuries—new kind of 'travelling surgeon'. *Ann R Coll Surg Engl* 90:243–246
498. Singh B, Moodley J, Haffejee AA, Naidu AG, Rajaruthnam P (1998) Laparoscopic cholecystectomy—an audit from Durban. *S Afr J Surg* 36:17–21
499. Singhal T, Balakrishnan S, Grandy-Smith S, Hunt J, Asante M, El-Hasani S (2006) Gallstones: best served hot. *JSL* 10:332–335
500. Siperstein A, Pearl J, Macho J, Hansen P, Gitomirsky A, Rogers S (1999) Comparison of laparoscopic ultrasonography and fluorocholangiography in 300 patients undergoing laparoscopic cholecystectomy. *Surg Endosc* 13:113–117
501. Sjer AE, Boland DM, van Rijn PJ, Mohamad S (2010) A decade of washing out common bile duct stones with papillary balloon dilatation as a one-stage procedure during laparoscopic cholecystectomy. *Surg Endosc* 24:2226–2230
502. Slim K, Pezet D, Stencl J Jr, Lechner C, Le Roux S, Lointier P, Chipponi J (1995) Laparoscopic cholecystectomy: an original three-trocar technique. *World J Surg* 19:394–397
503. Smith EB (1992) Complications of laparoscopic cholecystectomy. *J Natl Med Assoc* 84:880–882
504. Smith JF, Boysen D, Tschirhart J, Williams T (1991) Risks and benefits of laparoscopic cholecystectomy in the community hospital setting. *J Laparoendosc Surg* 1:325–332
505. Smith JF, Boysen D, Tschirhart J, Williams T, Vasilenko P (1992) Comparison of laparoscopic cholecystectomy versus elective open cholecystectomy. *J Laparoendosc Surg* 2:311–317
506. Smith R, Kolyn D, Pymar H, Sauerbrei E, Pace RF (1992) Ultrasonographic and radiologic evaluation of patients after laparoscopic cholecystectomy. *Can J Surg* 35:55–58
507. Snow LL, Weinstein LS, Hannon JK, Lane DR (2001) Evaluation of operative cholangiography in 2043 patients undergoing laparoscopic cholecystectomy: a

- case for the selective operative cholangiogram. *Surg Endosc* 15:14–20
508. Soderlund C, Frozanpor F, Linder S (2005) Bile duct injuries at laparoscopic cholecystectomy: a single-institution prospective study. Acute cholecystitis indicates an increased risk. *World J Surg* 29:987–993
 509. Soper NJ, Dunnegan DL (1991) Does intraoperative gallbladder perforation influence the early outcome of laparoscopic cholecystectomy? *Surg Laparosc Endosc* 1:156–161
 510. Soper NJ, Dunnegan DL (1993) Laparoscopic cholecystectomy: experience of a single surgeon. *World J Surg* 17:16–20
 511. Soper NJ, Flye MW, Brunt LM, Stockmann PT, Sicard GA, Picus D, Edmundowicz SA, Aliperti G (1993) Diagnosis and management of biliary complications of laparoscopic cholecystectomy. *Am J Surg* 165:663–669
 512. Soper NJ, Stockmann PT, Dunnegan DL, Ashley SW (1992) Laparoscopic cholecystectomy. The new ‘gold standard’? *Arch Surg* 127:917–921; discussion 921–913
 513. Sportelli G, Crovaro M, Mercuri M, Carrara A, Giri S, Fiocca F (2000) Conservative approach in the treatment of the biliary tract’s iatrogenic lesions. *Eur Rev Med Pharmacol Sci* 4:123–126
 514. Stair JM, DeLoach JM Jr, Woodward LA, Ludwig FR (1991) Laparoscopic laser cholecystectomy. Results of 100 successful operations. *J Ark Med Soc* 88:83–85
 515. Steele RJ, Marshall K, Lang M, Doran J (1995) Introduction of laparoscopic cholecystectomy in a large teaching hospital: independent audit of the first 3 years. *Br J Surg* 82:968–971
 516. Stewart L, Hunter JG, Wetter A, Chin B, Way LW (2010) Operative reports: form and function. *Arch Surg* 145:865–871
 517. Stewart L, Robinson TN, Lee CM, Liu K, Whang K, Way LW (2004) Right hepatic artery injury associated with laparoscopic bile duct injury: incidence, mechanism, and consequences. *J Gastrointest Surg* 8:523–530; discussion 530–521
 518. Stewart L, Way LW (1995) Bile duct injuries during laparoscopic cholecystectomy. Factors that influence the results of treatment. *Arch Surg* 130: 1123–1128; discussion 1129
 519. Stoker ME, Vose J, O’Mara P, Maini BS (1992) Laparoscopic cholecystectomy. A clinical and financial analysis of 280 operations. *Arch Surg* 127: 589–594; discussion 594–585
 520. Strasberg SM, Eagon CJ, Drebin JA (2000) The “hidden cystic duct” syndrome and the infundibular technique of laparoscopic cholecystectomy—the danger of the false infundibulum. *J Am Coll Surg* 191:661–667
 521. Strasberg SM, Hertl M, Soper NJ (1995) An analysis of the problem of biliary injury during laparoscopic cholecystectomy. *J Am Coll Surg* 180:101–125
 522. Stuart SA, Simpson TI, Alvord LA, Williams MD (1998) Routine intraoperative laparoscopic cholangiography. *Am J Surg* 176:632–637
 523. Suhocki PV, Meyers WC (1999) Injury to aberrant bile ducts during cholecystectomy: a common cause of diagnostic error and treatment delay. *AJR Am J Roentgenol* 172:955–959
 524. Sulkowski U, Brockmann J, Dinse P (1996) [Injuries of the extrahepatic bile ducts. Clinical aspects, diagnosis and therapy]. *Langenbecks Arch Chir* 381:246–250
 525. Sungler P, Mayer F, Waclawiczek HW, Boeckl O (1998) [Surgical ultrasound-indications for “therapeutic splitting” in complicated gallstones]. *Langenbecks Arch Chir Suppl Kongressbd* 115:1133–1135
 526. Suter M, Meyer A (2001) A 10-year experience with the use of laparoscopic cholecystectomy for acute cholecystitis: is it safe? *Surg Endosc* 15:1187–1192
 527. Syrakos T, Antonitsis P, Zacharakis E, Takis A, Manousari A, Bakogiannis K, Efthimiopoulos G, Achoulias I, Trikoupi A, Kiskinis D (2004) Small-incision (mini-laparotomy) versus laparoscopic cholecystectomy: a retrospective study in a university hospital. *Langenbecks Arch Surg* 389:172–177
 528. Tagaya N, Shimoda M, Kato M, Nakagawa A, Abe A, Iwasaki Y, Oishi H, Shirohani N, Kubota K (2010) Intraoperative exploration of biliary anatomy using fluorescence imaging of indocyanine green in experimental and clinical cholecystectomies. *J Hepatobiliary Pancreat Sci* 17:595–600
 529. Talebpour M, Panahi M (2007) New aspects in laparoscopic cholecystectomy. *J Laparoendosc Adv Surg Tech A* 17:290–295
 530. Talpur KA, Laghari AA, Yousfani SA, Malik AM, Memon AI, Khan SA (2010) Anatomical variations and congenital anomalies of extra hepatic biliary system encountered during laparoscopic cholecystectomy. *J Pak Med Assoc* 60:89–93
 531. Tambyraja AL, Kumar S, Nixon SJ (2004) Outcome of laparoscopic cholecystectomy in patients 80 years and older. *World J Surg* 28:745–748
 532. Tan JT, Suyapto DR, Neo EL, Leong PS (2006) Prospective audit of laparoscopic cholecystectomy experience at a secondary referral centre in South Australia. *ANZ J Surg* 76:335–338
 533. Tan KY, Chng HC, Chen CY, Tan SM, Poh BK, Hoe MN (2004) Mirizzi syndrome: noteworthy

- aspects of a retrospective study in one centre. *ANZ J Surg* 74:833–837
534. Tang E, Stain SC, Tang G, Froes E, Berne TV (1995) Timing of laparoscopic surgery in gallstone pancreatitis. *Arch Surg* 130:496–499; discussion 499–500
 535. Taniguchi Y, Ido K, Kimura K, Yoshida Y, Ohtani M, Kawamoto C, Isoda N, Suzuki T, Kumagai M (1993) Introduction of a “safety zone” for the safety of laparoscopic cholecystectomy. *Am J Gastroenterol* 88:1258–1261
 536. Tantia O, Jain M, Khanna S, Sen B (2008) Iatrogenic biliary injury: 13,305 cholecystectomies experienced by a single surgical team over more than 13 years. *Surg Endosc* 22:1077–1086
 537. Targarona EM, Marco C, Balague C, Rodriguez J, Cugat E, Hoyuela C, Veloso E, Trias M (1998) How, when, and why bile duct injury occurs. A comparison between open and laparoscopic cholecystectomy. *Surg Endosc* 12:322–326
 538. Taylor EW, Dunham RH, Bloch JH (1994) Laparoscopic management of gallstone pancreatitis. *J Laparoendosc Surg* 4:121–125
 539. Taylor OM, Sedman PC, Jones BM, Royston CM, Arulampalam T, Wellwood J (1997) Laparoscopic cholecystectomy without operative cholangiogram: 2038 cases over a 5-year period in two district general hospitals. *Ann R Coll Surg Engl* 79:376–380
 540. Tebala GD (2006) Three-port laparoscopic cholecystectomy by harmonic dissection without cystic duct and artery clipping. *Am J Surg* 191:718–720
 541. Tekin A, Ogetman Z, Altunel E (2008) Laparoendoscopic “rendezvous” versus laparoscopic antegrade sphincterotomy for choledocholithiasis. *Surgery* 144:442–447
 542. The Southern Surgeons Club (1991) A prospective analysis of 1518 laparoscopic cholecystectomies. *N Engl J Med* 324:1073–1078
 543. Thiele H, Lang RD (1994) [Complications after 1,000 laparoscopic cholecystectomies]. *Chirurg* 65:795–800
 544. Thompson MH, Tranter SE (2002) All-comers policy for laparoscopic exploration of the common bile duct. *Br J Surg* 89:1608–1612
 545. Thomson BN, Cullinan MJ, Banting SW, Collier NA (2003) Recognition and management of biliary complications after laparoscopic cholecystectomy. *ANZ J Surg* 73:183–188
 546. Thumbe VK, Dorricott NJ (1999) Investigation of bile ducts before laparoscopic cholecystectomy. *JLS* 3:23–25
 547. Tian Y, Wu SD, Su Y, Kong J, Yu H, Fan Y (2009) Laparoscopic subtotal cholecystectomy as an alternative procedure designed to prevent bile duct injury: experience of a hospital in northern China. *Surg Today* 39:510–513
 548. Tomonaga T, Filipi CJ, Lowham A, Martinez T (1999) Laparoscopic intracorporeal ultrasound cystic duct length measurement: a new technique to prevent common bile duct injuries. *Surg Endosc* 13:183–185
 549. Topal B, Aerts R, Penninckx F (1999) The outcome of major biliary tract injury with leakage in laparoscopic cholecystectomy. *Surg Endosc* 13:53–56
 550. Traverso LW, Kozarek RA, Ball TJ, Brandabur JJ, Hunter JA, Jolly PC, Patterson DJ, Ryan JA, Thirlby RC, Wechter DG (1993) Endoscopic retrograde cholangiopancreatography after laparoscopic cholecystectomy. *Am J Surg* 165:581–586
 551. Trerotola SO, Savader SJ, Lund GB, Venbrux AC, Sostre S, Lillemoe KD, Cameron JL, Osterman FA, Jr. (1992) Biliary tract complications following laparoscopic cholecystectomy: imaging and intervention. *Radiology* 184:195–200
 552. Triantafyllidis I, Nikoloudis N, Sapidis N, Chrissidou M, Kalaitidou I, Chrissidis T (2009) Complications of laparoscopic cholecystectomy: our experience in a district general hospital. *Surg Laparosc Endosc Percutan Tech* 19:449–458
 553. Tripathi M, Chandrashekar N, Kumar R, Thomas EJ, Agarwal S, Bal CS, Malhotra A (2004) Hepatobiliary scintigraphy. An effective tool in the management of bile leak following laparoscopic cholecystectomy. *Clin Imaging* 28:40–43
 554. Trold H, Spangenberger W, Langen R, al-Jaziri A, Eypasch E, Neugebauer E, Dietrich J (1992) Laparoscopic cholecystectomy: technical performance, safety and patient’s benefit. *Endoscopy* 24:252–261
 555. Tsai CC, Chiu KC, Mo LR, Lin RC, Chang KK, Kuo CY, Lin YW, Yang TM, Ting J (2009) Restenotic hepaticojejunostomy secondary to laparoscopic cholecystectomy bile duct injury treated with self-modified Gianturco-Rosh stents. *Hepato-gastroenterology* 56:1592–1595
 556. Tsalis K, Zacharakis E, Vasiliadis K, Kalfadis S, Vergos O, Christoforidis E, Betsis D (2005) Bile duct injuries during laparoscopic cholecystectomy: management and outcome. *Am Surg* 71:1060–1065
 557. Tsang SM, Caluda MJ, 3rd, Steinberg SM, McSwain NE, Flint LM, Ferrara JJ (1994) Laparoscopic cholecystectomy: what’s so special? *South Med J* 87:1076–1082
 558. Tumer AR, Yuksek YN, Yasti AC, Gozalan U, Kama NA (2005) Dropped gallstones during laparoscopic cholecystectomy: the consequences. *World J Surg* 29:437–440

559. Turfah F, Nazzal M, Ali MA, Lakra Y (1994) Laparoscopic cholecystectomy: analysis of the complications at a community hospital. *Surg Laparosc Endosc* 4:264–267
560. Tuveri M, Calo PG, Medas F, Tuveri A, Nicolosi A (2008) Limits and advantages of fundus-first laparoscopic cholecystectomy: lessons learned. *J Laparoendosc Adv Surg Tech A* 18:69–75
561. Tuveri M, Tuveri A (2007) Laparoscopic cholecystectomy: complications and conversions with the 3-trocar technique: a 10-year review. *Surg Laparosc Endosc Percutan Tech* 17:380–384
562. Tuveri M, Tuveri A (2009) Body-first laparoscopic cholecystectomy: a three-trocar technique for difficult gallbladders. *J Laparoendosc Adv Surg Tech A* 19:415–418
563. Uccheddu A, Pisanu A, Cois A, Cillara N (2005) Can intraoperative cholangiography be avoided during laparoscopic cholecystectomy? *Chir Ital* 57: 571–577
564. Uchiyama K, Tani M, Kawai M, Ueno M, Hama T, Yamaue H (2006) Preoperative evaluation of the extrahepatic bile duct structure for laparoscopic cholecystectomy. *Surg Endosc* 20:1119–1123
565. Uecker J, Adams M, Skipper K, Dunn E (2001) Cholecystitis in the octogenarian: is laparoscopic cholecystectomy the best approach? *Am Surg* 67: 637–640
566. Urban M, Holzer B, Sebesta C, Schmid L, Schiessel R, Hruba W, Rosen HR (2002) Efficacy of diagnosis of mechanical cholestasis by magnetic resonance cholangiography. *World J Surg* 26:353–358
567. Uyama I, Iida S, Ogiwara H, Takahara T, Kato Y, Furuta T, Kikuchi K (1995) Laparoscopic retrograde cholecystectomy (from fundus downward) facilitated by lifting the liver bed up to the diaphragm for inflammatory gallbladder. *Surg Laparosc Endosc* 5:431–436
568. Van Campenhout I, Prosmann O, Gagner M, Pomp A, Deslandres E, Levesque HP (1993) Routine operative cholangiography during laparoscopic cholecystectomy: feasibility and value in 107 patients. *AJR Am J Roentgenol* 160:1209–1211
569. Van de Sande S, Bossens M, Parmentier Y, Gigot JF (2003) National survey on cholecystectomy related bile duct injury—public health and financial aspects in Belgian hospitals—1997. *Acta Chir Belg* 103:168–180
570. Vanek VW, Rhodes R, Dallis DJ (1995) Results of laparoscopic versus open cholecystectomy in a community hospital. *South Med J* 88:555–566
571. vanSonnenberg E, D’Agostino HB, Easter DW, Sanchez RB, Christensen RA, Kerlan RK Jr, Moossa AR (1993) Complications of laparoscopic cholecystectomy: coordinated radiologic and surgical management in 21 patients. *Radiology* 188: 399–404
572. vanSonnenberg E, D’Agostino HB, Sanchez RL, Goodacre BB, Esch OG, Easter DE, Gosink BB (1992) Percutaneous intraluminal US in the gallbladder and bile ducts. *Radiology* 182:693–696
573. Veen EJ, Bik M, Janssen-Heijnen ML, De Jongh M, Roukema AJ (2008) Outcome measurement in laparoscopic cholecystectomy by using a prospective complication registry: results of an audit. *Int J Qual Health Care* 20:144–151
574. Velanovich V, Morton JM, McDonald M, Orlando R, 3rd, Maupin G, Traverso LW (2006) Analysis of the SAGES outcomes initiative cholecystectomy registry. *Surg Endosc* 20:43–50
575. Verma GR, Bose SM, Singh R, Singh G (2002) Biliary mishaps in laparoscopic cholecystectomy. *Trop Gastroenterol* 23:38–40
576. Vezakis A, Davides D, Ammori BJ, Martin IG, Larvin M, McMahan MJ (2000) Intraoperative cholangiography during laparoscopic cholecystectomy. *Surg Endosc* 14:1118–1122
577. Victorzon M, Tolonen P, Vuorialho T (2007) Day-case laparoscopic cholecystectomy: treatment of choice for selected patients? *Surg Endosc* 21:70–73
578. Vitale GC, Tran TC, Davis BR, Vitale M, Vitale D, Larson G (2008) Endoscopic management of post-cholecystectomy bile duct strictures. *J Am Coll Surg* 206:918–923; discussion 924–915
579. Vogelbach P, Bogdan B, Rosenthal R, Pfefferkorn U, Triponez F (2002) [Laparoscopic and conventional cholecystectomy. Didactic concept for training and introduction of laparoscopic cholecystectomy and preventing complications]. *Swiss Surg* 8:250–254
580. Voyles CR, Petro AB, Meena AL, Haick AJ, Koury AM (1991) A practical approach to laparoscopic cholecystectomy. *Am J Surg* 161:365–370
581. Voyles CR, Sanders DL, Hogan R (1994) Common bile duct evaluation in the era of laparoscopic cholecystectomy. 1050 cases later. *Ann Surg* 219: 744–750; discussion 750–742
582. Walker AT, Brooks DC, Tumeh SS, Braver JM (1993) Bile duct disruption after laparoscopic cholecystectomy. *Semin Ultrasound CT MR* 14: 346–355
583. Wallace DH, O’Dwyer PJ (1997) Effect of a non-conversion policy on patient outcome following laparoscopic cholecystectomy. *Br J Surg* 84: 1680–1682
584. Walsh RM, Henderson JM, Vogt DP, Brown N (2007) Long-term outcome of biliary reconstruction

- for bile duct injuries from laparoscopic cholecystectomies. *Surgery* 142:450–456; discussion 456–457
585. Wang YC, Yang HR, Chung PK, Jeng LB, Chen RJ (2006) Urgent laparoscopic cholecystectomy in the management of acute cholecystitis: timing does not influence conversion rate. *Surg Endosc* 20:806–808
586. Ward EM, LeRoy AJ, Bender CE, Donohue JH, Hughes RW (1993) Imaging of complications of laparoscopic cholecystectomy. *Abdom Imaging* 18: 150–155
587. Watkin DS, Haworth JM, Leaper DJ, Thompson MH (1994) Assessment of the common bile duct before cholecystectomy using ultrasound and biochemical measurements: validation based on follow-up. *Ann R Coll Surg Engl* 76:317–319
588. Watson DI, Mathew G, Williams JA (1995) Impact of laparoscopic cholecystectomy in a major teaching hospital: clinical and hospital outcomes. *Med J Aust* 163:527–530
589. Way LW, Stewart L, Gantert W, Liu K, Lee CM, Whang K, Hunter JG (2003) Causes and prevention of laparoscopic bile duct injuries: analysis of 252 cases from a human factors and cognitive psychology perspective. *Ann Surg* 237:460–469
590. Weber A, Feussner H, Winkelmann F, Siewert JR, Schmid RM, Prinz C (2009) Long-term outcome of endoscopic therapy in patients with bile duct injury after cholecystectomy. *J Gastroenterol Hepatol* 24: 762–769
591. Wei Q, Wang JG, Li LB, Li JD (2003) Management of choledocholithiasis: comparison between laparoscopic common bile duct exploration and intraoperative endoscopic sphincterotomy. *World J Gastroenterol* 9:2856–2858
592. Wenner DE, Whitwam P, Turner D, Chadha A, Degani J (2006) Laparoscopic cholecystectomy and management of biliary tract stones in a freestanding ambulatory surgery center. *JSL* 10:47–51
593. Wherry DC, Marohn MR, Malanoski MP, Hetz SP, Rich NM (1996) An external audit of laparoscopic cholecystectomy in the steady state performed in medical treatment facilities of the Department of Defense. *Ann Surg* 224:145–154
594. Williams LF Jr, Chapman WC, Bonau RA, McGee EC Jr, Boyd RW, Jacobs JK (1993) Comparison of laparoscopic cholecystectomy with open cholecystectomy in a single center. *Am J Surg* 165:459–465
595. Wills VL, Jorgensen JO, Hunt DR (2000) Role of relaparoscopy in the management of minor bile leakage after laparoscopic cholecystectomy. *Br J Surg* 87:176–180
596. Wolf AS, Nijssen BA, Sokal SM, Chang Y, Berger DL (2009) Surgical outcomes of open cholecystectomy in the laparoscopic era. *Am J Surg* 197: 781–784
597. Wolfe BM, Gardiner BN, Leary BF, Frey CF (1991) Endoscopic cholecystectomy. An analysis of complications. *Arch Surg* 126:1192–1196; discussion 1196–1198
598. Wolnerhanssen BK, Ackermann C, Guenin MO, Kern B, Tondelli P, von Flue M, Peterli R (2005) [Twelve years of laparoscopic cholecystectomy]. *Chirurg* 76:263–269
599. Woods MS, Shellito JL, Santoscoy GS, Hagan RC, Kilgore WR, Traverso LW, Kozarek RA, Brandabur JJ (1994) Cystic duct leaks in laparoscopic cholecystectomy. *Am J Surg* 168:560–563; discussion 563–565
600. Woods MS, Traverso LW, Kozarek RA, Donohue JH, Fletcher DR, Hunter JG, Oddsdottir M, Rossi RL, Tsao J, Windsor J (1995) Biliary tract complications of laparoscopic cholecystectomy are detected more frequently with routine intraoperative cholangiography. *Surg Endosc* 9:1076–1080
601. Woods MS, Traverso LW, Kozarek RA, Tsao J, Rossi RL, Gough D, Donohue JH (1994) Characteristics of biliary tract complications during laparoscopic cholecystectomy: a multi-institutional study. *Am J Surg* 167:27–33; discussion 33–24
602. Wootton FT, Hoffman BJ, Marsh WH, Cunningham JT (1992) Biliary complications following laparoscopic cholecystectomy. *Gastrointest Endosc* 38: 183–185
603. Wright KD, Wellwood JM (1998) Bile duct injury during laparoscopic cholecystectomy without operative cholangiography. *Br J Surg* 85:191–194
604. Wu JS, Peng C, Mao XH, Lv P (2007) Bile duct injuries associated with laparoscopic and open cholecystectomy: sixteen-year experience. *World J Gastroenterol* 13:2374–2378
605. Wudel LJ Jr, Wright JK, Pinson CW, Herline A, Debelak J, Seidel S, Revis K, Chapman WC (2001) Bile duct injury following laparoscopic cholecystectomy: a cause for continued concern. *Am Surg* 67:557–563; discussion 563–554
606. Wullstein C, Woeste G, Barkhausen S, Gross E, Hopt UT (2002) Do complications related to laparoscopic cholecystectomy influence the prognosis of gallbladder cancer? *Surg Endosc* 16:828–832
607. Yaghoobian A, Kaji AH, Ishaque B, Park J, Rosing DK, Lee S, Stabile BE, de Virgilio C (2010) Acute care surgery performed by sleep deprived residents: are outcomes affected? *J Surg Res* 163:192–196

608. Yaghoobian A, Saltmarsh G, Rosing DK, Lewis RJ, Stabile BE, de Virgilio C (2008) Decreased bile duct injury rate during laparoscopic cholecystectomy in the era of the 80-hour resident workweek. *Arch Surg* 143:847–851; discussion 851
609. Yamakawa T, Kano N, Sakai S, Ishikawa Y (1992) Preliminary experience using an ultrasonic aspirator for laparoscopic cholecystectomy. *Endoscopy* 24: 721–723
610. Yan JQ, Peng CH, Ding JZ, Yang WP, Zhou GW, Chen YJ, Tao ZY, Li HW (2007) Surgical management in biliary restructure after Roux-en-Y hepaticojejunostomy for bile duct injury. *World J Gastroenterol* 13:6598–6602
611. Yau MP, Tsai CC, Mo LR, Lin RC, Kuo JY, Lin YW, Hwang MH (1993) Diagnostic and therapeutic interventions in post-laparoscopic cholecystectomy biliary complications. *Hepatogastroenterology* 40: 139–144
612. Yegiyants S, Collins JC (2008) Operative strategy can reduce the incidence of major bile duct injury in laparoscopic cholecystectomy. *Am Surg* 74:985–987
613. Yeh CN, Jan YY, Chen MF (2003) Laparoscopic treatment for Mirizzi syndrome. *Surg Endosc* 17: 1573–1578
614. Yeh CN, Jan YY, Liu NJ, Yeh TS, Chen MF (2004) Endo-GIA for ligation of dilated cystic duct during laparoscopic cholecystectomy: an alternative, novel, and easy method. *J Laparoendosc Adv Surg Tech A* 14:153–157
615. Yeh TS, Jan YY, Wang CS, Jeng LB, Hwang TL, Chen MF (1998) A multidisciplinary approach to major bile duct injury following laparoscopic cholecystectomy. *JLS* 2:147–151
616. Ying F, Shuodong W, Hong Y, Yang S, Jing K, Yu T, Amos SE (2010) Lessons learnt after 12 years experience in laparoscopic cholecystectomy at a single center. *Hepatogastroenterology* 57:202–206
617. Young C, Moont M (1998) Routine cholecystocholangiography: a viable alternative during laparoscopic cholecystectomy. *Aust N Z J Surg* 68: 425–427
618. Yuksel O, Salman B, Yilmaz U, Akyurek N, Tatlicioglu E (2006) Timing of laparoscopic cholecystectomy for subacute calculous cholecystitis: early or interval—a prospective study. *J Hepatobiliary Pancreat Surg* 13:421–426
619. Yun SS, Hwang DW, Kim SW, Park SH, Park SJ, Lee DS, Kim HJ (2010) Better treatment strategies for patients with acute cholecystitis and American Society of Anesthesiologists classification 3 or greater. *Yonsei Med J* 51:540–545
620. Yvergneaux JP, Kint M, Kuppens E (1994) Pitfalls in laparoscopic cholecystectomy. *Acta Chir Belg* 94:123–128
621. Zacharakis E, Angelopoulos S, Kanellos D, Pramateftakis MG, Sapidis N, Stamatopoulos H, Kanellos I, Tsalis K, Betsis D (2007) Laparoscopic cholecystectomy without intraoperative cholangiography. *J Laparoendosc Adv Surg Tech A* 17:620–625
622. Zargar-Shoshtari K, Short H, Poole GH, Hill AG (2008) Acute laparoscopic cholecystectomy: preferred treatment for acute biliary disease. *ANZ J Surg* 78:771–774
623. Zerem E, Omerovic S (2009) Minimally invasive management of biliary complications after laparoscopic cholecystectomy. *Eur J Intern Med* 20: 686–689
624. Z'Graggen K, Wehrli H, Metzger A, Buehler M, Frei E, Klaiber C (1998) Complications of laparoscopic cholecystectomy in Switzerland. A prospective 3-year study of 10,174 patients. *Swiss Association of Laparoscopic and Thoracoscopic Surgery. Surg Endosc* 12:1303–1310
625. Zucker KA, Bailey RW, Gadacz TR, Imbembo AL (1991) Laparoscopic guided cholecystectomy. *Am J Surg* 161:36–42; discussion 42–34

References

- Guidelines CoSfDTCP, Medicine Io (2011) Clinical practice guidelines we can trust. The National Academies Press, Washington
- National Institute for Health and Clinical Excellence (NICE) (2009) The guidelines manual
- Shea BJ, Grimshaw J, Wells G, Boers M, Andersson N, Hamel C, Porter A, Tugwell P, Moher D, Bouter LM (2007) Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews. *BMC Med Res Method* 7:10
- Shea BJ, Hamel C, Wells G, Bouter LM, Kristjansson E, Grimshaw J, Henry D, Boers M (2009) AMSTAR is a reliable and valid measurement tool to assess the methodological quality of systematic reviews. *J Clin Epidemiol* 62:1013–1020
- Gurusamy K, Samraj K, Gluud C, Wilson E, Davidson BR (2010) Meta-analysis of randomized controlled trials on the safety and effectiveness of early versus delayed laparoscopic cholecystectomy for acute cholecystitis. *Br J Surg* 97:141–150
- Gurusamy KS, Bong JJ, Fusai G, Davidson BR (2010) Methods of cystic duct occlusion during laparoscopic cholecystectomy. *Cochrane Database Syst Rev* CD006807
- Gurusamy KS, Samraj K, Fusai G, Davidson BR (2008) Early versus delayed laparoscopic cholecystectomy for biliary colic. *Cochrane Database Syst Rev* CD007196
- Gurusamy KS, Samraj K, Ramamoorthy R, Farouk M, Fusai G, Davidson BR (2010) Miniport versus standard ports for laparoscopic cholecystectomy. *Cochrane Database Syst Rev*. doi: 10.1002/14651858.CD006804.pub2

9. Keus F, Gooszen HG, van Laarhoven CJ (2010) Open, small-incision, or laparoscopic cholecystectomy for patients with symptomatic cholelithiasis. An overview of Cochrane Hepato-Biliary Group reviews. *Cochrane Database Syst Rev* CD008318
10. Bahram M, Gaballa G (2010) The value of pre-operative magnetic resonance cholangiopancreatography (MRCP) in management of patients with gall stones. *Int J Surg* 8:342–345
11. Bessa SS, Al-Fayoumi TA, Katri KM, Awad AT (2008) Clipless laparoscopic cholecystectomy by ultrasonic dissection. *J Laparoendosc Adv Surg Tech A* 18:593–598
12. Calik A, Topaloglu S, Topcu S, Turkyilmaz S, Kucuktulu U, Piskin B (2007) Routine intraoperative aspiration of gallbladder during laparoscopic cholecystectomy. *Surg Endosc* 21:1578–1581
13. Gupta A, Agarwal PN, Kant R, Malik V (2004) Evaluation of fundus-first laparoscopic cholecystectomy. *JLS* 8:255–258
14. Harju J, Kokki H, Paakkonen M, Karjalainen K, Eskelinen M (2010) Feasibility of minilaparotomy versus laparoscopic cholecystectomy for day surgery: a prospective randomised study. *Scand J Surg* 99:132–136
15. Jarhult J (2005) Is preoperative evaluation of the biliary tree necessary in uncomplicated gallstone disease? Results of a randomized trial. *Scand J Surg* 94:31–33
16. Kato K, Kasai S, Matsuda M, Onodera K, Kato J, Imai M, Mito M, Saito T (1996) A new technique for laparoscopic cholecystectomy—retrograde laparoscopic cholecystectomy: an analysis of 81 cases. *Endoscopy* 28:356–359
17. Katsinelos P, Kountouras J, Paroutoglou G, Chatzimavroudis G, Germanidis G, Zavos C, Pilpilidis I, Paikos D, Papaziogas B (2008) A comparative study of 10-Fr vs. 7-Fr straight plastic stents in the treatment of postcholecystectomy bile leak. *Surg Endosc* 22:101–106
18. Khan OA, Balaji S, Branagan G, Bennett DH, Davies N (2011) Randomized clinical trial of routine on-table cholangiography during laparoscopic cholecystectomy. *Br J Surg* 98:362–367
19. Kiviluoto T, Siren J, Luukkonen P, Kivilaakso E (1998) Randomised trial of laparoscopic versus open cholecystectomy for acute and gangrenous cholecystitis. *Lancet* 351:321–325
20. Kumar M, Agrawal CS, Gupta RK (2007) Three-port versus standard four-port laparoscopic cholecystectomy: a randomized controlled clinical trial in a community-based teaching hospital in eastern Nepal. *JLS* 11:358–362
21. Leida Z, Ping B, Shuguang W, Yu H (2008) A randomized comparison of primary closure and T-tube drainage of the common bile duct after laparoscopic choledochotomy. *Surg Endosc* 22:1595–1600
22. Marks J, Tacchino R, Roberts K, Onders R, Denoto G, Paraskeva P, Rivas H, Soper N, Rosemurgy A, Shah S (2011) Prospective randomized controlled trial of traditional laparoscopic cholecystectomy versus single-incision laparoscopic cholecystectomy: report of preliminary data. *Am J Surg* 201:369–372 discussion 372–373
23. Mavrogiannis C, Liatsos C, Papanikolaou IS, Karagiannis S, Galanis P, Romanos A (2006) Biliary stenting alone versus biliary stenting plus sphincterotomy for the treatment of post-laparoscopic cholecystectomy biliary leaks: a prospective randomized study. *Eur J Gastroenterol Hepatol* 18:405–409
24. Ros A, Gustafsson L, Krook H, Nordgren CE, Thorell A, Wallin G, Nilsson E (2001) Laparoscopic cholecystectomy versus minilaparotomy cholecystectomy: a prospective, randomized, single-blind study. *Ann Surg* 234:741–749
25. Sabharwal AJ, Minford EJ, Marson LP, Muir IM, Hill D, Auld CD (1998) Laparoscopic cholangiography: a prospective study. *Br J Surg* 85:624–626
26. Talwar N, Pusuluri R, Arora MP, Pawar M (2006) Randomized controlled trial of conventional carbon dioxide pneumoperitoneum versus gasless technique for laparoscopic cholecystectomy. *JK Sci* 8:73–78
27. Trichak S (2003) Three-port vs standard four-port laparoscopic cholecystectomy. *Surg Endosc* 17:1434–1436
28. Alkhaffaf B, Parkin E, Flook D (2011) Endoscopic retrograde cholangiopancreatography prior to laparoscopic cholecystectomy: a common and potentially hazardous technique that can be avoided. *Arch Surg* 146:329–333
29. Amott D, Webb A, Tulloh B (2005) Prospective comparison of routine and selective operative cholangiography. *ANZ J Surg* 75:378–382
30. Glattli A, Metzger A, Klaiber C, Seiler C, Maddern GJ, Baer HU (1994) Cholecystocholangiography vs cystic duct cholangiography during laparoscopic cholecystectomy. A prospective controlled trial. *Surg Endosc* 8:299–301
31. Huang SM, Hsiao KM, Pan H, Yao CC, Lai TJ, Chen LY, Wu CW, Lui WY (2011) Overcoming the difficulties in laparoscopic management of contracted gallbladders with gallstones: possible role of fundus-down approach. *Surg Endosc* 25:284–291
32. Huscher CG, Lirici MM, Di Paola M, Crafa F, Napolitano C, Mereu A, Recher A, Corradi A, Amini M (2003) Laparoscopic cholecystectomy by ultrasonic dissection without cystic duct and artery ligation. *Surg Endosc* 17:442–451
33. Hussain A, Mahmood HK, Dulku K (2008) Laparoscopic cholecystectomy can be safely performed in a resource-limited setting: the first 49 laparoscopic cholecystectomies in Yemen. *JLS* 12:71–76
34. Kavlakoglu B, Pekcici R, Oral S (2010) Verification of clipless closure of cystic duct by harmonic scalpel. *J Laparoendosc Adv Surg Tech A* 20:591–595
35. Kelley JE, Burrus RG, Burns RP, Graham LD, Chandler KE (1993) Safety, efficacy, cost, and morbidity of laparoscopic versus open cholecystectomy: a prospective analysis of 228 consecutive patients. *Am Surg* 59:23–27
36. Xu F, Xu CG, Xu DZ (2004) A new method of preventing bile duct injury in laparoscopic cholecystectomy. *World J Gastroenterol* 10:2916–2918
37. Yamashita Y, Kurohiji T, Kakegawa T (1994) Evaluation of two training programs for laparoscopic cholecystectomy: incidence of major complications. *World J Surg* 18:279–285 discussion 285
38. Biffl WL, Moore EE, Offner PJ, Franciose RJ, Burch JM (2001) Routine intraoperative laparoscopic ultrasonography with selective cholangiography reduces bile duct complications during laparoscopic cholecystectomy. *J Am Coll Surg* 193:272–280
39. Buanes T, Mjaland O, Waage A, Langeeggen H, Holmboe J (1998) A population-based survey of biliary surgery in Norway. Relationship between patient volume and quality of surgical treatment. *Surg Endosc* 12:852–855
40. Buanes T, Waage A, Mjaland O, Solheim K (1996) Bile leak after cholecystectomy significance and treatment: results from the National Norwegian Cholecystectomy Registry. *Int Surg* 81:276–279
41. Cagir B, Rangraj M, Maffucci L, Ostrander LE, Herz BL (1994) A retrospective analysis of laparoscopic and open cholecystectomies. *J Laparoendosc Surg* 4:89–100
42. Carlson MA, Ludwig KA, Frantzides CT, Cattet RP, Henry LG, Walker AP, Schulte WJ, Wilson SD (1993) Routine or selective intraoperative cholangiography in laparoscopic cholecystectomy. *J Laparoendosc Surg* 3:27–33
43. Chau CH, Tang CN, Siu WT, Ha JP, Li MK (2002) Laparoscopic cholecystectomy versus open cholecystectomy in elderly patients with acute cholecystitis: retrospective study. *Hong Kong Med J* 8:394–399
44. Costi R, Mazzeo A, Tartamella F, Manceau C, Vacher B, Valverde A (2010) Cholecystocholedocholithiasis: a case-control study comparing the short- and long-term outcomes for a

- “laparoscopy-first” attitude with the outcome for sequential treatment (systematic endoscopic sphincterotomy followed by laparoscopic cholecystectomy). *Surg Endosc* 24:51–62
45. de Vries A, Donkervoort SC, van Geloven AA, Pierik EG (2005) Conversion rate of laparoscopic cholecystectomy after endoscopic retrograde cholangiography in the treatment of choledocholithiasis: does the time interval matter? *Surg Endosc* 19:996–1001
 46. Fletcher DR, Hobbs MS, Tan P, Valinsky LJ, Hockey RL, Pikora TJ, Knuiman MW, Sheiner HJ, Edis A (1999) Complications of cholecystectomy: risks of the laparoscopic approach and protective effects of operative cholangiography: a population-based study. *Ann Surg* 229:449–457
 47. Gelmini R, Franzoni C, Zona S, Andreotti A, Saviano M (2010) Laparoscopic cholecystectomy with Harmonic scalpel. *JLS* 14:14–19
 48. Hanif F, Ahmed Z, Samie MA, Nassar AH (2010) Laparoscopic transcystic bile duct exploration: the treatment of first choice for common bile duct stones. *Surg Endosc* 24:1552–1556
 49. Nickkholgh A, Soltanyekta S, Kalbasi H (2006) Routine versus selective intraoperative cholangiography during laparoscopic cholecystectomy: a survey of 2,130 patients undergoing laparoscopic cholecystectomy. *Surg Endosc* 20:868–874
 50. Wu SD, Han JY, Tian Y (2011) Single-incision laparoscopic cholecystectomy versus conventional laparoscopic cholecystectomy: a retrospective comparative study. *J Laparoendosc Adv Surg Tech A* 21:25–28
 51. Joseph M, Phillips MR, Farrell TM, Rupp CC (2012) Single incision laparoscopic cholecystectomy is associated with a higher bile duct injury rate: a review and a word of caution. *Ann Surg* 256:1–6
 52. AQUA (2011) Institute for Applied Quality Improvement and Research in Health Care GmbH. German Hospital Quality Report 2010
 53. Harboe KM, Bardram L (2011) The quality of cholecystectomy in Denmark: outcome and risk factors for 20,307 patients from the national database. *Surg Endosc* 25:1630–1641
 54. Harboe KM, Bardram L (2011) Nationwide quality improvement of cholecystectomy: results from a national database. *Int J Qual Health Care* 23:565–573
 55. Karvonen J, Salminen P, Gronroos JM (2011) Bile duct injuries during open and laparoscopic cholecystectomy in the laparoscopic era: alarming trends. *Surg Endosc* 25:2906–2910
 56. Chuang KI, Corley D, Postlethwaite DA, Merchant M, Harris HW (2012) Does increased experience with laparoscopic cholecystectomy yield more complex bile duct injuries? *Am J Surg* 203:480–487
 57. Lehmann KS, Ritz JP, Wibmer A, Gellert K, Zornig C, Burghardt J, Busing M, Runkel N, Kohlhaw K, Albrecht R, Kirchner TG, Arlt G, Mall JW, Butters M, Bulian DR, Bretschneider J, Holmer C, Buhr HJ (2010) The German registry for natural orifice transluminal endoscopic surgery: report of the first 551 patients. *Ann Surg* 252:263–270
 58. Giger U, Ouaisi M, Schmitz SF, Krahenbuhl S, Krahenbuhl L (2011) Bile duct injury and use of cholangiography during laparoscopic cholecystectomy. *Br J Surg* 98:391–396
 59. Cuschieri A, Dubois F, Mouiel J, Mouret P, Becker H, Buess G, Trede M, Troidl H (1991) The European experience with laparoscopic cholecystectomy. *Am J Surg* 161:385–387
 60. Hunter JG (1994) Laparoscopic cholecystectomy and the common bile duct. *Surg Endosc* 8:285–286
 61. Strasberg SM (2005) Biliary injury in laparoscopic surgery: part 2. Changing the culture of cholecystectomy. *J Am Coll Surg* 201:604–611
 62. Archer SB, Brown DW, Smith CD, Branum GD, Hunter JG (2001) Bile duct injury during laparoscopic cholecystectomy: results of a national survey. *Ann Surg* 234:549–558 discussion 558–549
 63. Lekawa M, Shapiro SJ, Gordon LA, Rothbart J, Hiatt JR (1995) The laparoscopic learning curve. *Surg Laparosc Endosc* 5:455–458
 64. Ford JA, Soop M, Du J, Loveday BP, Rodgers M (2012) Systematic review of intraoperative cholangiography in cholecystectomy. *Br J Surg* 99:160–167
 65. Buddingh KT, Nieuwenhuijs VB, van Buuren L, Hulscher JB, de Jong JS, van Dam GM (2011) Intraoperative assessment of biliary anatomy for prevention of bile duct injury: a review of current and future patient safety interventions. *Surg Endosc* 25:2449–2461
 66. Pfluke JM, Bowers SP (2011) Laparoscopic intraoperative biliary ultrasonography: findings during laparoscopic cholecystectomy for acute disease. *J Laparoendosc Adv Surg Tech A* 21:505–509
 67. Hashimoto M, Matsuda M, Watanabe G (2010) Intraoperative ultrasonography for reducing bile duct injury during laparoscopic cholecystectomy. *Hepatogastroenterology* 57:706–709
 68. Hublet A, Dili A, Lemaire J, Mansvelt B, Molle G, Bertrand C (2009) Laparoscopic ultrasonography as a good alternative to intraoperative cholangiography (IOC) during laparoscopic cholecystectomy: results of prospective study. *Acta Chir Belg* 109:312–316
 69. Machi J, Tateishi T, Oishi AJ, Furumoto NL, Oishi RH, Uchida S, Sigel B (1999) Laparoscopic ultrasonography versus operative cholangiography during laparoscopic cholecystectomy: review of the literature and a comparison with open intraoperative ultrasonography. *J Am Coll Surg* 188:360–367
 70. Santambrogio R, Bianchi P, Opocher E, Mantovani A, Schubert L, Ghelma F, Panzera M, Verga M, Spina GP (1996) Intraoperative ultrasonography (IOUS) during laparoscopic cholecystectomy. *Surg Endosc* 10:622–627