Le complicanze della colecistectomia laparoscopica: i dati della letteratura

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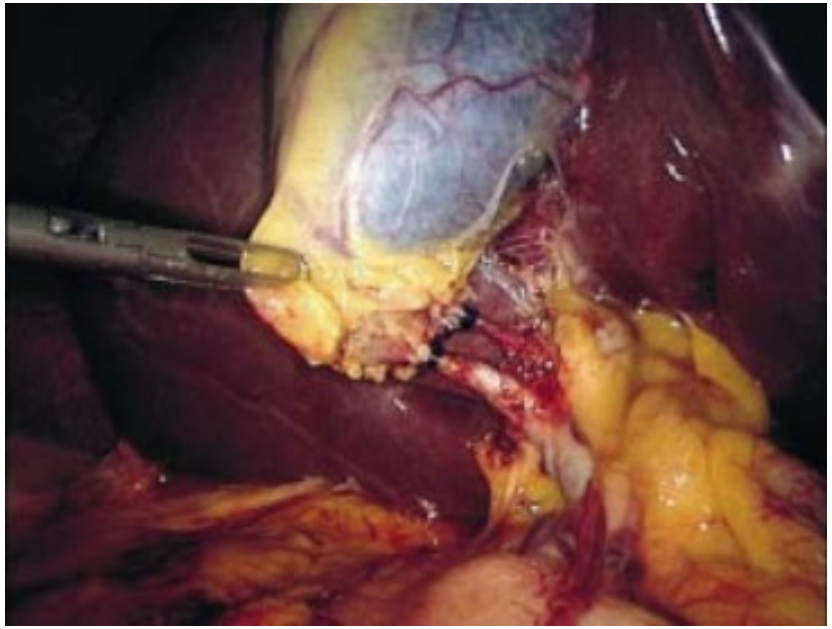
Colecistectomia laparoscopica

- La Colecistectomia Laparoscopica (VLC) è una delle operazioni chirurgiche più diffusa al mondo.
- Negli Stati Uniti circa 750.000 e in Europa circa 900.000 colecistectomie sono eseguite annualmente

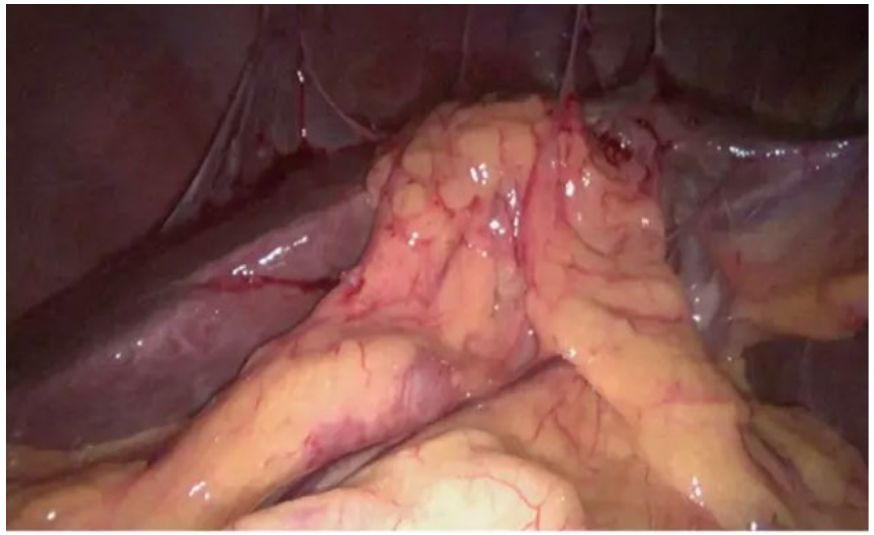
On March 17, 1987, Philippe Mouret performed the first laparoscopic cholecystectomy, in Lyon, France. This date represents a profound epistemological leap: "before that, there was nothing, after that there was laparoscopic surgery."[16] Patients have deserted the waiting rooms of conventional surgeons and crowd into those of the laparoscopic surgeons. Moreover, laparoscopic surgery now forms a fundamental part of all standard surgeons' training courses.[1]

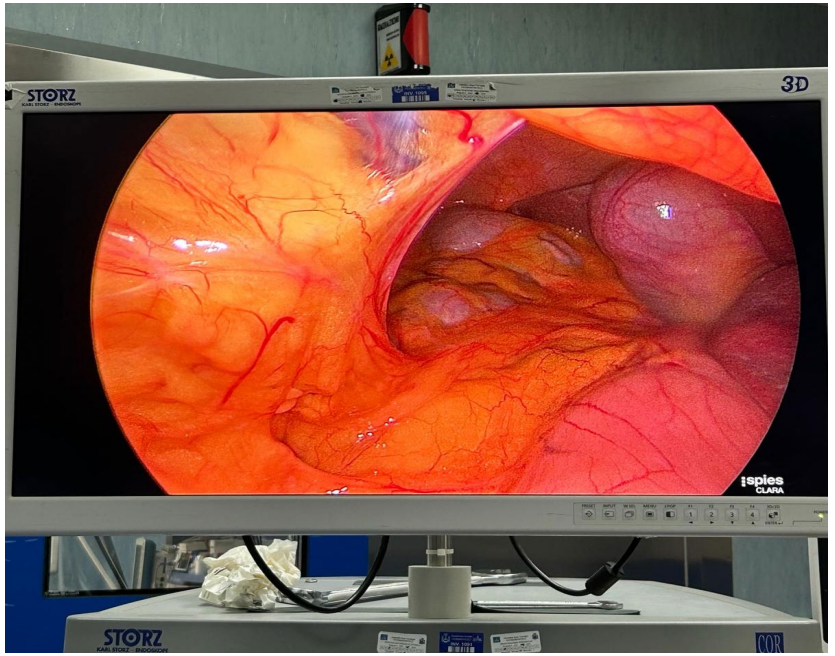


Abdallah, BMC Surg. 2025

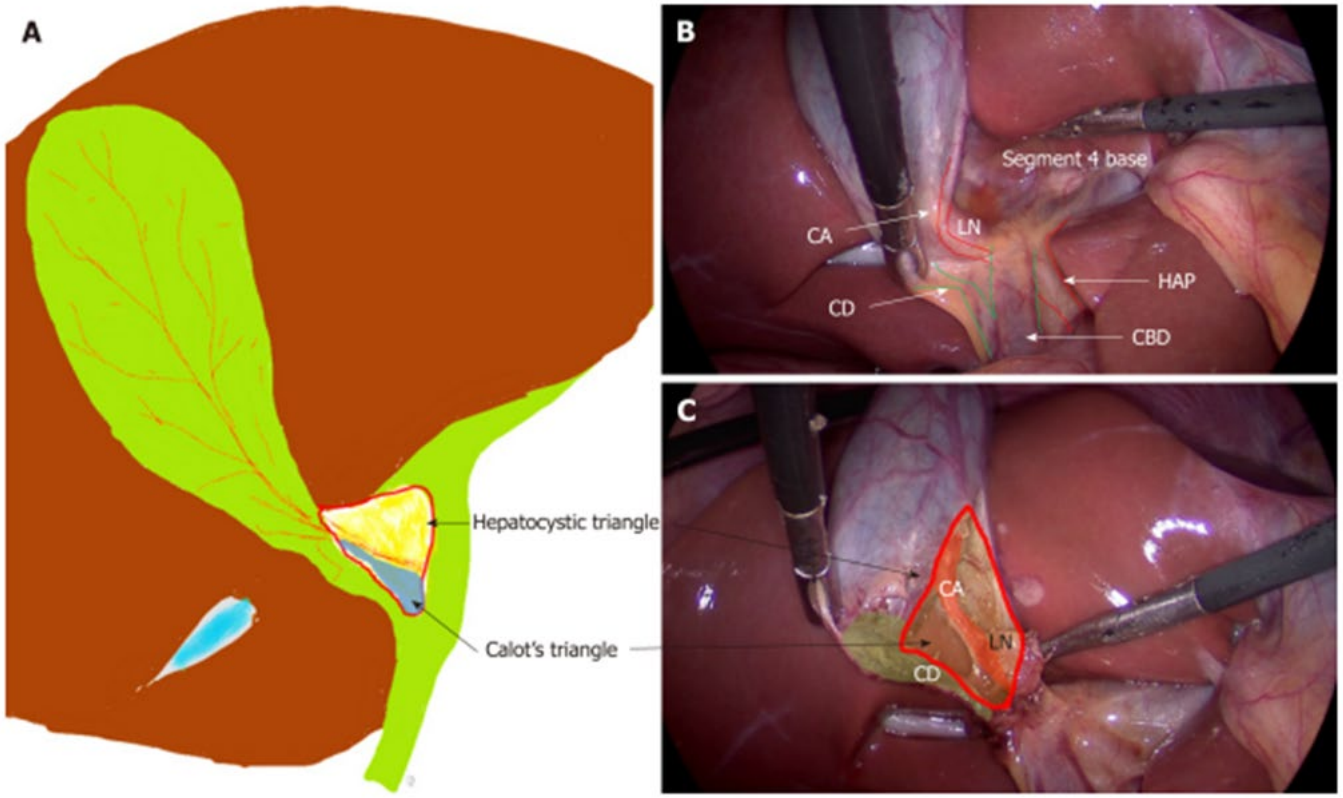
Colecistectomia laparoscopica

- La VLC può presentare un ampio spettro di difficoltà tecniche. Nella sua forma più semplice, si tratta di una procedura rapida e standardizzata; tuttavia, nella sua forma più complessa, può presentare notevoli difficoltà chirurgiche.





Anatomia chirurgica



Triangolo Epatocistico

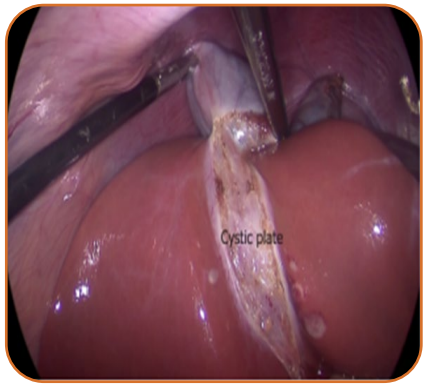
- Area della dissezione per raggiungere la **Critical View of Safety**
- Contiene l'arteria cistica, una porzione variabile dell'arteria epatica destra, il linfonodo cistico e tessuto adiposo

Triangolo di Calot

- Triangolo della colecistectomia
- Sede degli elementi del peduncolo cistico

Gupta, World J Gastrointest Surg. 2019

Anatomia chirurgica



Piano Cistico

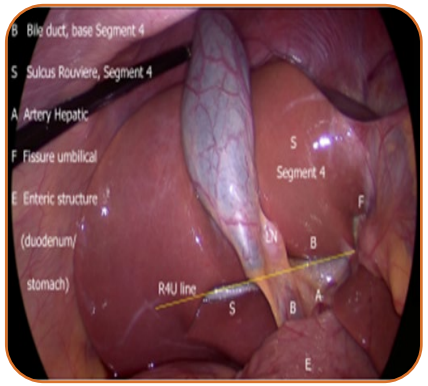
Sottile guaina fibrosa situata nel letto della colecisti e in continuità con la lamina ilare e la guaina glissoniana

del peduncolo portale destro.

Dovrebbe rimanere intatta, apparendo come una struttura biancastra o grigiastra nel

letto della colecisti.

Una sua lesione può determinare sanguinamenti importanti in particolare se i tributari terminali della vena epatica media sono danneggiati



Solco di Rouviere

Solco di 2-3 cm sulla superficie inferiore del lobo destro del fegato, a destra dell'ilo epatico, anteriormente al processo caudato, descritto per la prima volta da Henri Rouviere nel 1924.

Identificabile nell'82% dei soggetti, tipicamente contiene la triade portale destra o i suoi rami

Importante punto di riferimento anatomico fisso che aiuta a orientare il chirurgo durante la LC.

Gupta, World J Gastrointest Surg. 2019

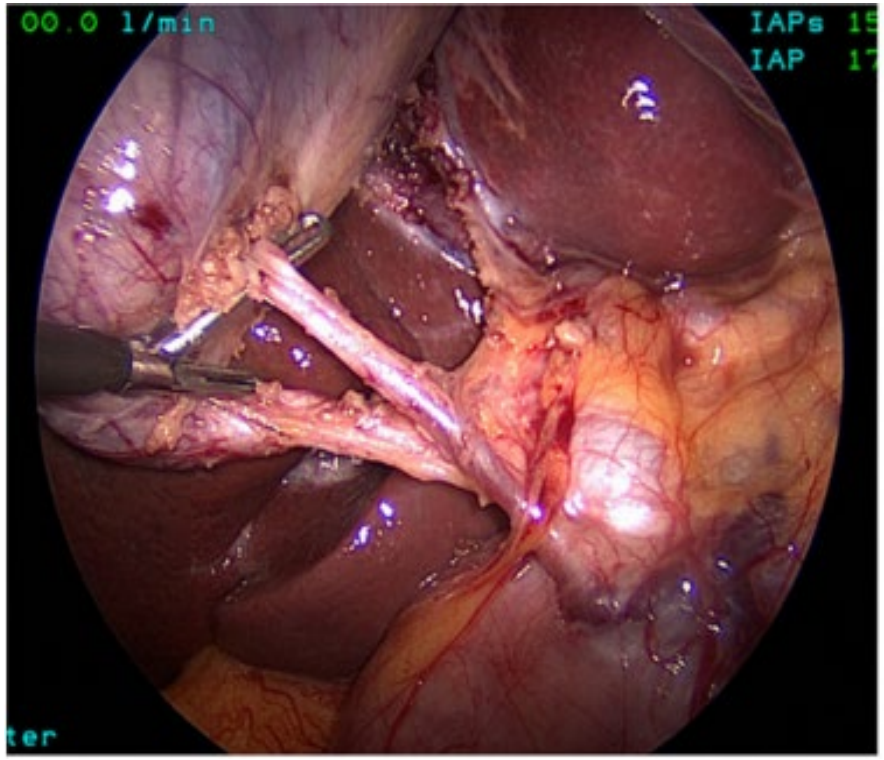
Critical View of Safety

Review > J Am Coll Surg. 1995 Jan;180(1):101-25.

An analysis of the problem of biliary injury during laparoscopic cholecystectomy

S M Strasberg [1], M Hertl, N J Soper

1. Il triangolo di Calot deve essere aperto e deve essere rimosso il tessuto adiposo
2. Dissezione della parte inferiore della colecisti dal cystic plate
3. Solo due strutture entrano nella colecisti (Dotto Cistico e Arteria Cistica)



Sanford, J Am Coll Surg. 2014

Colecistectomia Laparoscopica: complicanze

COMPLICANZE

- Lesioni delle vie biliari
- Emorragie
- Lesioni viscerali

Lesioni delle vie biliari

- La complicanza più temuta è la lesione della via biliare principale (VBP)

L'incidenza delle lesioni maggiori è 0,1% nelle VLC elettive e 0,3% in quelle d'urgenza

Considerate tutti i tipi di lesioni, l'incidenza sale allo 0,4% per le VLC elettive e allo 0,8% per gli interventi in urgenza

Table 1 Summary of proposed classifications of bile duct injuries

Reference Year	Bismuth[40] 1982	Strasberg *et al.*[41] 1995	Stewart *et al.*[38] 2004	Keulemans *et al.*[27] 1998	Csendes *et al.*[81] 2001	Schmidt *et al.*[42] 2004
Bile Leak						
Cystic duct or terminal biliary radical leak		A		A		$A_{1,2}$
Bile leak from CBD/CHD without tissue loss		D	I	B1	I,II	$C_{1,2}$
Bile leak with tissue loss from CHD/CBD			II	B1	III	D_2
Bile leak from right hepatic duct (posterior sector)		C	IV*	B2		
Transection or occlusion of CBD or CHD			III	D	III	$B_{1,2}$ or $D_{1,2}$
Strictures						
CBD stricture						$E_{1,2}$
CHD > 2 cm	I	E1	III	C	III,IV	E_3
CHD < 2 cm	II	E2	III	C	III,IV	E_3
Hilar stricture but confluence intact	III	E3	III	C	III,IV	E_3
Hilar stricture with disruption of confluence	IV	E4	III	C	III,IV	E_3
Obstructed right posterior hepatic duct with or without CBD/CHD stricture	V	B/E5	IV*	C		E_4

*Includes the recognition of right hepatic artery injury. CBD, common bile duct; CHD, common hepatic duct.

Lesioni delle vie biliari

Nel passato il rischio di complicanze biliari era maggiore nella chirurgia laparoscopica rispetto alla chirurgia open ma la tendenza si è invertita con il progredire delle conoscenze sulle tecniche mininvasive

Review

ANNALS OF SURGERY OPEN

OPEN

Bile Duct Injury and Litigation in Laparoscopic Cholecystectomy

A Global Review of Current and Future Preventative Initiatives

Danielle Angeline Hoang,BVisSc,* Yicong Liang,BMed, MD,† Odette Pheiffer,DipPEC, MBChB,‡ Devesh Kaushal,MBBS, MS, FRACS,* and Robert Beaumont Wilson, MBBS, BSc, FRACS, FACS§

LC Learning Curve

The early learning curve suggested a doubling of all complications compared with OC following the 1991 introduction of LC.[11] Complications included bowel or vascular injuries, hemorrhage, BDIs, and bile leaks requiring intervention.[11] BDI incidence peaked at 0.35% in 1994 and subsequently declined; however, rates of other injuries (0.41%) and bile leaks requiring intervention (0.57%) stabilized. BDI risk was greatest for surgeons performing 1 to 50 LC [odds ratio (OR) = 2.40; 95% confidence interval (CI), 1.09–5.29; P = 0.029] compared with surgeons performing >300 LCs in the preceding 5 years.[11] Surgical complexity and inexperience were significant independent risk factors for intraoperative complications.[11]

Lesioni delle vie biliari

La complessità chirurgica è data nella maggior parte dei casi dalla presenza di infiammazione o anomalie anatomiche

La colecistectomia «difficile» è associata ad un aumento di:

- Tempo operatorio
- Perdite ematiche
- Ospedalizzazione
- Tassi di conversione
- Rischio di complicanze
- Costi
- Mortalità

Definizione non universalmente accettata

Frequenza di circa 26% in alcune serie

Colecisti necrotica, gangrenosa o perforata, associata alla Sindrome di Mirizzi, con tenaci aderenze che distorcono la normale anatomia

Colecistectomia laparoscopica "difficile"

J Hepatobiliary Pancreat Sci (2018) 25:41–54
DOI: 10.1002/jhbp.515

GUIDELINE

Tokyo Guidelines 2018: diagnostic criteria and severity grading of acute cholecystitis (with videos)

Table 2 Relationship between severity and 30-day overall mortality[a]

	Severity grading			
	Grade I $n = 1,339$	Grade II $n = 1,702$	Grade III $n = 680$	*P*-value
30-day mortality	15 (1.1%)	13 (0.8%)	37 (5.4%)	<0.001

Table 5 Complications (morbidities)

References	Year	*n*	Grade I	Grade II	Grade III	*P*-value
Cheng [44]	2014	103	3/31 (9.7%)	7/25 (28.0%)	9/20 (45.0%)	<0.05
Wright [10]	2015	445	4/137 (2.9%)	6/191 (3.1%)	13/117 (11.1%)	0.003
Ambe [13]	2015	138	7/79 (8.9%)	5/33 (15.2%)	12/26 (46.2%)	0.01

Table 1 TG18/TG13 severity grading for acute cholecystitis [8]

Grade III (Severe)	Associated with dysfunction of any of the following organs/ systems: 1. Cardiovascular dysfunction (hypotension requiring treatment with dopamine 5 μg/kg per min or any dose of norepinephrine) 2. Neurological dysfunction (decreased level of consciousness) 3. Respiratory dysfunction (Pa02/Fi02 ratio 300) 4. Renal dysfunction (oliguria, creatinine 2.0 mg/dl) 5. Hepatic dysfunction (PT-INR 1.5) 6. Hematological dysfunction (platelet count 100,000/mm^3)
Grade II (Moderate)	Associated with any one of the following conditions: 1. Elevated white blood cell count (18,000/mm^3) 2. Palpable tender mass in the right upper abdominal quadrant 3. Duration of complaints 72 h 4. Marked local inflammation (gangrenous cholecystitis, pericholecystic abscess, hepatic abscess, biliary peritonitis, emphysematous cholecystitis)
Grade I (Mild)	Does not meet the criteria of grade II or grade III acute cholecystitis Can also be defined as acute cholecystitis in a healthy patient with no organ dysfunction and mild inflammatory changes in the GB

TG Tokyo guidelines, Pa02 partial pressure of Oxygen in arterial blood, Fi02 Fraction of inspired Oxygen, PT-INR Prothrombin time/International normalized ration, GB gallbladder

Lesioni delle vie biliari: fattori di rischio

Principali FR

- Marcata infiammazione del peduncolo o del triangolo epatocistico
- Errata esposizione della colecisti
- Sanguinamenti nel campo operatorio
- Alterazioni anatomiche
- Interpretazione errata dell'anatomia

Table 2 Predictors of difficult gallbladder [12]

History
Male
Age > 65 year)
Prior AC,
Interval between onset and presentation > 72–96 h in AC
Previous multiple attacks of biliary pain (> 10)
History of AC
Upper abdominal surgery
Prior attempt at cholecystectomy (including cholecystostomy)
Physical examination
Fever
Higher ASA score
Morbid obesity
Laboratory tests
Raised WBC count (> 18000/mm3)
Raised CRP
Imaging (USG/CT/MRCP)
Thick walled GB (> 4–5 mm)
Small contracted GB
Distended GB with a stone impacted in neck
Gangrenous/perforated GB
Mirizzi syndrome/Cholecystoenteric fistula
Cirrhosis/portal cavernoma with portal hypertension
Intraoperative
Small shrunken GB not visualized on initial exploration
Liver edge puckering near fundus
Fatty or cirrhotic liver (difficulty in retraction)

Lesioni delle vie biliari: fattori di rischio

Surgical Endoscopy
https://doi.org/10.1007/s00464-024-10727-9

Acute cholecystitis, obesity, and steatohepatitis constitute the lethal triad for bile duct injury (BDI) during laparoscopic cholecystectomy

Joseph V. Gutierrez[1] · Daniel G. Chen[1] · Christopher G. Yheulon[1,2] · Christopher W. Mangieri[1]

In uno studio pubblicato ad inizio 2024 Gutierrez e colleghi hanno evidenziato una relazione statisticamente significativa tra le lesioni biliari e una triade patologica

- **COLECISTITE ACUTA**
- **OBESITA' SEVERA (BMI >30)**
- **STEATOSI EPATICA**

Table 3 Unadjusted multivariate analysis BDI

	Odds ratio	95%CI	*P* value
Acute cholecystitis†	1.219	1.064–1.396	0.004
BMI ≥ 30†	2.305	2.015–2.637	0.001
Steatohepatitis	0.938	0.820–1.072	0.063
Lethal triad†	16.345	14.227–18.778	< 0.0001
Sex	1.071	0.927–1.237	0.341
Race†	0.672	0.581–0.776	0.001
Age	1.001	0.998–1.005	0.811
Functional status	1.272	0.832–1.943	0.062
ASA class	1.109	0.963–1.277	0.343
Morbid obesity[a]	0.910	0.736–1.124	0.204
Diabetic	0.951	0.774–1.167	0.357
Smoker†	1.477	1.262–1.730	0.001
Disposition status†	1.219	1.064–1.396	0.004
IOC performed	1.074	0.918–1.257	0.492
Pre-Op WBC	1.000	0.998–1.001	0.474
Pre-Op AST/ALT	0.999	0.998–1.001	0.283
Pre-Op alk phos	1.000	0.999–1.001	0.331
Pre-Op bilirubin	0.998	0.997–1.001	0.623
Pre-Op albumin	0.999	0.998–1.001	0.233

Table 6 BDI incidence for adjusted multivariate analysis

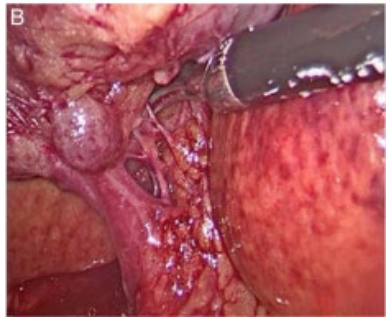
	Lethal triad	Control	*P* value
BDI rate†	1.65%	0.04%	< 0.001

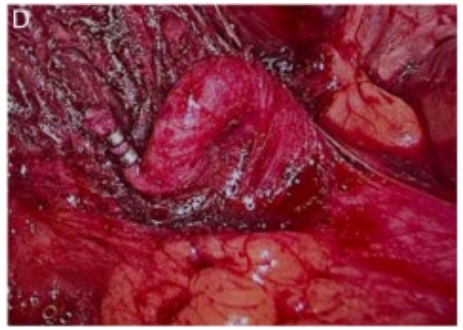
†Statistically significant

Lesioni delle vie biliari: fattori di rischio

Anatomical variations of cystic artery, cystic duct, and gall bladder and their associated intraoperative and postoperative complications: an observational study

Rohit Gupta, MBBS, MS[a], Anil Kumar, MS[b*], Chinniahnapalaya P. Hariprasad, MS[b], Manoj Kumar, MS[a]





Associazione statisticamente significativa tra complicanze bilio-vascolari e anomalie anatomiche

Table 4

Subgroup analysis of intraoperative and postoperative complications among gall bladder, cystic duct, and cystic artery anomalies.

Variables	Normal ($n=203$)	Cystic artery ($n=46$)	Cystic duct ($n=32$)	Gall bladder ($n=12$)	Mutiple ($n=5$)	*P*
Hemorrhage ($n=20$)	4	14	2	0	0	<0.001
Bile leak ($n=28$)	13	1	8	5	1	<0.001
Drain ($n=31$)	6	13	5	4	3	<0.001
Conversion to open ($n=3$)	0	2	1	0	0	0.04
VAS at 6 hours	4.4 ± 1.3	5.0 ± 1.2	4.9 ± 1.2	4.5 ± 1.2	5.8 ± 1.3	0.02
VAS at 24 h	2.6 ± 1.3	3.09 ± 1.1	3.03 ± 1.1	2.9 ± 1.3	4.0 ± 1.5	0.01
VAS at 48 h	1.18 ± 0.9	1.4 ± 0.9	1.5 ± 1.08	0.67 ± 0.8	1.7 ± 0.9	0.1
Length of stay	1.8 ± 0.7	2.02 ± 0.88	2.0 ± 0.9	2.0 ± 0.8	1.6 ± 0.5	0.5
Port site infection	25	6	5	1	1	0.9

Colecistectomia laparoscopica "difficile"

Nel corso degli anni, sono stati sviluppati diversi sistemi di punteggio per prevedere la difficoltà della LC.
Questi sistemi valutano diversi fattori clinici, radiologici, biochimici e operatori

Nassar Scale

- Valuta colecisti, peduncolo cistico e aderenze, utilizzando un punteggio da 1 a 4.
- Gradi Nassar >5 associati a un aumentato rischio di complicanze

Nassar grades [11]	Gallbladder	Cystic pedicle	Adhesions
1	Lax, no adhesions	Clear and thin	Simple, at the neck and Hartmann's pouch
2	Mucocele, stone-filled	With fatty appendages	Simple, up to the gallbladder body
3	Deep gallbladder fossa, acute cholecystitis, fibrotic Hartmann's or obscured cystic duct pouch with adhesions to the bile duct or stone impaction	Normal anatomy, short, dilated, or obscured cystic duct	Dense, reaching the gallbladder fundus involving hepatic flexure or duodenum
4	Completely obscured, empyema/gangrene tumor	Impossible to identify	Dense, fibrous, involving the gallbladder, duodenum, or hepatic flexure, difficult to separate

TABLE 5: Nassar Scale

Nassar, Surg Endosc. 2020

Colecistectomia laparoscopica "difficile"

de'Angelis *et al. World Journal of Emergency Surgery* (2021) 16:30
https://doi.org/10.1186/s13017-021-00369-w

World Journal of Emergency Surgery

REVIEW Open Access

2020 WSES guidelines for the detection and management of bile duct injury during cholecystectomy

1.1. The use of the CVS during LC (achieving all 3 components) is the recommended approach to minimize the risk of BDIs.

Strong recommendation, low quality of evidence (GRADE 1C)

1.2. If the CVS is not achievable during a difficult LC, a bailout procedure, such as STC, should be considered.

Strong recommendation, moderate quality of evidence (GRADE 1B)

1.3. Conversion to open surgery may be considered during a difficult LC whenever the operating surgeon cannot manage the procedure laparoscopically. However, there is insufficient evidence to support conversion to open surgery as a strategy to avoid or reduce the risk of BDI in difficult LCs.

Weak recommendation, moderate quality of evidence (GRADE 2B)

1.5. Intraoperative ICG-C is a promising noninvasive tool to recognize bile duct anatomy and vascular structures, but routine use to reduce the BDI rate is not yet recommended.

Weak recommendation, low quality of evidence (GRADE 2C).

1.6. In patients presenting with AC, the optimal timing for cholecystectomy is within 48 h, and no more than 10 days from symptom appearance.

Strong recommendation, good quality of evidence (*GRADE 1A*)

Colecistite

Surg Endosc (2016) 30:1172–1182
DOI 10.1007/s00464-015-4325-4

Early laparoscopic cholecystectomy is superior to delayed acute cholecystitis: a meta-analysis of case–control studies

Amy M. Cao[1] · Guy D. Eslick[1] · Michael R. Cox[1]

Table 2 Outcomes and subgroup analysis

Outcome (odds ratio)	Early versus delayed	Subgroups			
		<72 h versus >4 weeks	<72 h versus >72 h	<7 days versus >4 weeks	<7 days versus <4 weeks
Mortality	0.46 (95 % CI 0.33–0.62, $p < 0.001$)	0.66 (95 % CI 0.18–2.34, $p = 0.51$)	0.31 (95 % CI 0.17–0.55, $p < 0.001$)	0.54 (95 % CI 0.37–0.80, $p < 0.001$)	0.31 (95 % CI 0.18–0.54, $p < 0.001$)
Complications	0.59 (95 % CI 0.50–0.69, $p < 0.001$)	0.82 (95 % CI 0.50–1.37, $p = 0.45$)	0.61 (95 % CI 0.45–0.82, $p < 0.001$)	0.85 (95 % CI 0.60–1.19, $p = 0.35$)	0.52 (95 % CI 0.44–0.62, $p < 0.001$)
Bile duct injuries	0.49 (95 % CI 0.33–0.73, $p < 0.001$)	0.58 (95 % CI 0.12–2.94, $p = 0.51$)	0.44 (95 % CI 0.17–1.10, $p = 0.06$)	0.48 (95 % CI 0.31–0.75, $p < 0.001$)	0.46 (95 % CI 0.20–1.06, $p = 0.07$)
Bile leaks	0.51 (95 % CI 0.32–0.82 $p = 0.01$)	0.50 (95 % CI 0.13–1.96, $p = 0.32$)	0.38 (95 % CI 0.20–0.72, $p < 0.001$)	0.79 (95 % CI 0.36–1.74, $p = 0.56$)	0.40 (95 % CI 0.23–0.71, $p < 0.001$)
Wound infections	0.52 (95 % CI 0.35–0.78, $p < 0.001$)	1.33 (95 % CI 0.32–5.46, $p = 0.69$)	0.42 (95 % CI 0.25–0.71, $p < 0.001$)	1.11 (95 % CI 0.49–2.53, $p = 0.80$)	0.40 (95 % CI 0.26–0.63, $p < 0.001$)
Conversions	0.66 (95 % CI 0.53–0.81, $p < 0.001$)	1.00 (95 % CI 0.66–1.52, $p = 0.99$)	0.44 (95 % CI 0.32–0.64, $p < 0.001$)	0.84 (95 % CI 0.77–0.92, $p < 0.001$)	0.40 (95 % CI 0.29–0.55, $p < 0.001$)

Bailout Procedures

Bailout procedures

Whenever a CVS cannot be achieved and the biliary anatomy cannot be clearly defined, alternative techniques such as the "fundus-first (top-down)" approach or subtotal cholecystectomy (STC) should be considered [5, 48]. Several studies have shown how the "fundus-first" technique is associated with reduced rates conversion rate and iatrogenic complications (including BDIs) during difficult operations, such as in cases of severe AC [49–52], although the risk of vascular and biliary injuries cannot be completely eliminated [10, 53]. It is essential to recognize approaching areas of danger during LC and, in response

Bailout Technique	Cholecystitis Group	Non-Cholecystitis Group	p-Value
Subtotal cholecystectomy	6 (3.2%)	1 (0.6%)	0.133◊
Abandonment of surgery	5 (2.6%)	1 (0.6%)	0.147◊
Conversion to open cholecystectomy	0	0	-
Cholecystostomy drain	0	0	-
Overall bailout rate	11 (5.8%)	2 (1.2%)	0.039◊
Mortality	0	0	-

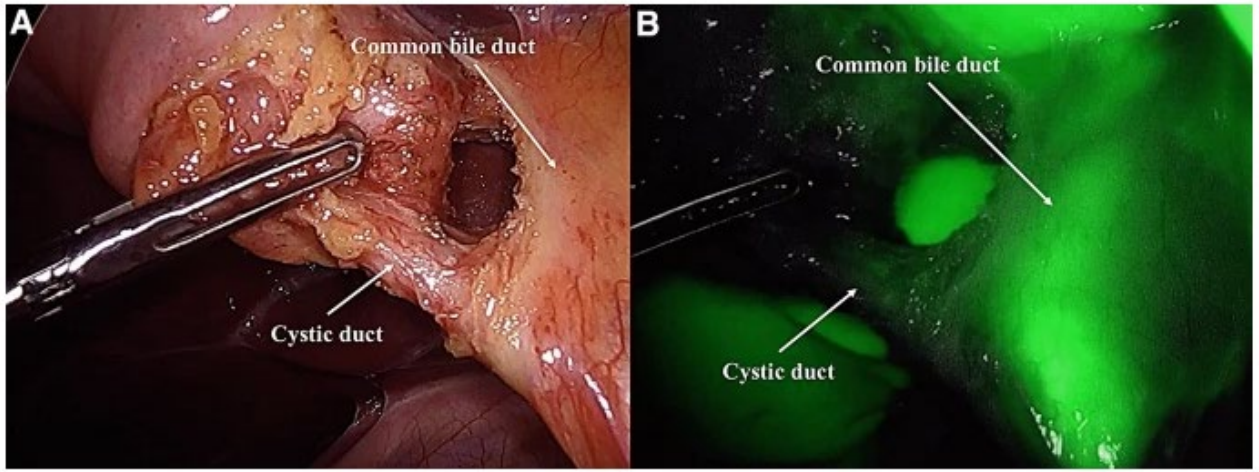
TABLE 5: Comparative outcomes of bailout procedures between the two groups

◊Pearson's chi-square test. A p-value of <0.05 indicates a statistically significant difference between variables.

Colangiografia a fluorescenza con ICG

Review › Exp Ther Med. 2022 Feb;23(2):187. doi: 10.3892/etm.2021.11110. Epub 2021 Dec 30.

Systematic review of the role of indocyanine green near-infrared fluorescence in safe laparoscopic cholecystectomy (Review)



› Surg Endosc. 2021 Oct;35(10):5729-5739. doi: 10.1007/s00464-020-08045-x. Epub 2020 Oct 14.

Fluorescent cholangiography significantly improves patient outcomes for laparoscopic cholecystectomy

Table 2 Patient outcomes

	ICG ($n=400$)	Non-ICG ($n=989$)	p-value	95% CI
Op time* (min)	72.53 ($n=373$)	99.0 ($n=930$)	<0.0001	21.09–31.84
Op time, BMI ≥ 30* (min)	75.57 ($n=114$)	104.9 ($n=407$)	<0.0001	19.43–39.30
Conversion to open	6 (1.5%)	84 (8.5%)	<0.0001	–
Conversion to open BMI ≥ 30	2 (1.57%) ($n=127$)	32 (7.42%) ($n=431$)	0.0113	–
EBL (ml)	15.58	27.30	0.0007	4.948–18.48
Drain placement (n)	18 (4.5%)	109 (11.0%)	<0.0001	–
LOS (days)	0.69	1.54	<0.0001	0.6029–1.101
Overall 30-day morbidity (n)	33 (8.25%)	79 (7.99%)	0.9134	–
Major morbidity	2 (0.5%)	6 (0.61%)	1.0	–
Procedural morbidity	7 (1.75%)	23 (2.33%)	0.6837	–
Minor morbidity	26 (6.5%)	54 (5.46%)	0.4475	–
CBDI	0	1 (0.1%)	1.0	–
Bile leak	2 (0.5%)	9 (0.91%)	0.7387	–
Mortality	0	2 (0.2%)	1.0	–
Readmission	15 (3.75%)	39 (3.94%)	1.0	–
ED visit	46 (11.5%)	128 (12.94%)	0.531	–

Major morbidity: unanticipated return to OR, cardiac event, death

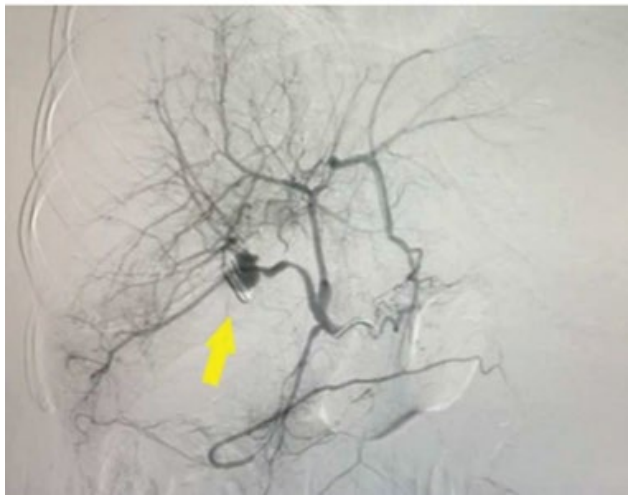
Procedural morbidity: major morbidity + patients requiring IR percutaneous drain, EGD + ERCP/stenting

Minor morbidity: conservative management, i.e., antibiotics, Foley placement, superficial bedside drainage, supportive care

*Cases involving concomitant procedures excluded from operative time analysis

Lesioni vascolari

- Meno studiate delle lesioni biliari, si presentano isolate nello 0.8 % dei casi e in contemporanea alle lesioni della VBP nel 25% dei pazienti
- La più frequente manifestazione è l'emorragia intraoperatoria da lesione dell'arteria cistica (60% dei casi) o dell'arteria epatica destra.
- Raro è il coinvolgimento di rami portali.
- Causa meno frequente è la rottura di un aneurisma dell'arteria epatica destra che può verificarsi anche a distanza di settimane dall'intervento chirurgico



Lesioni dell'Arteria Cistica

- Variazioni nel numero e nel decorso
- Incorretta visualizzazione per fenomeni di fibrosi o aderenze
- Pericolosa per le lesioni in corso di tentativo di emostasi

Lesioni dell'Arteria Epatica

- Emorragie massive che richiedono la conversione immediata
- Chiusura erronea dell'arteria epatica destra spesso indolenti

Emorragia dal letto della colecisti o dal parenchima epatico

- Frequente soprattutto nei casi di infiammazione della colecisti
- Di più difficile gestione nei pazienti cirrotici

Sinha, JSLS. 2023

Learning Curve

La prevenzione delle complicanze biliari rimane l'aspetto più importante nella learning curve del chirurgo. Essa si raggiunge attraverso la conoscenza dei meccanismi che possono sostenere il danno, della CVS e attraverso una giusta selezione dei pazienti.

FEATURE

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Causes and Prevention of Laparoscopic Bile Duct Injuries

Analysis of 252 Cases From a Human Factors and Cognitive Psychology Perspective

Table 1. MECHANISM OF INJURY

Class I	CBD mistaken for cystic duct, but recognized
	Cholangiogram incision in cystic duct extended into CBD
Class II	Lateral damage to the CHD from cautery or clips placed on duct
	Associated bleeding, poor visibility
Class III	CBD mistaken for cystic duct, not recognized
	CBD, CHD, R, L hepatic ducts transected and/or resected
Class IV	RHD mistaken for cystic duct, RHA mistaken for cystic artery, RHD and RHA transected
	Lateral damage to the RHD from cautery or clips placed on duct

Conclusions

These data show that errors leading to laparoscopic bile duct injuries stem principally from misperception, not errors of skill, knowledge, or judgment. The misperception was so compelling that in most cases the surgeon did not recognize a problem. Even when irregularities were identified, corrective feedback did not occur, which is characteristic of human thinking under firmly held assumptions. These findings illustrate the complexity of human error in surgery while simultaneously providing insights. They demonstrate that automatically attributing technical complications to behavioral factors that rely on the assumption of control is likely to be wrong. Finally, this study shows that there are only a few points within laparoscopic cholecystectomy where the complication-causing errors occur, which suggests that focused training to heighten vigilance might be able to decrease the incidence of bile duct injury.

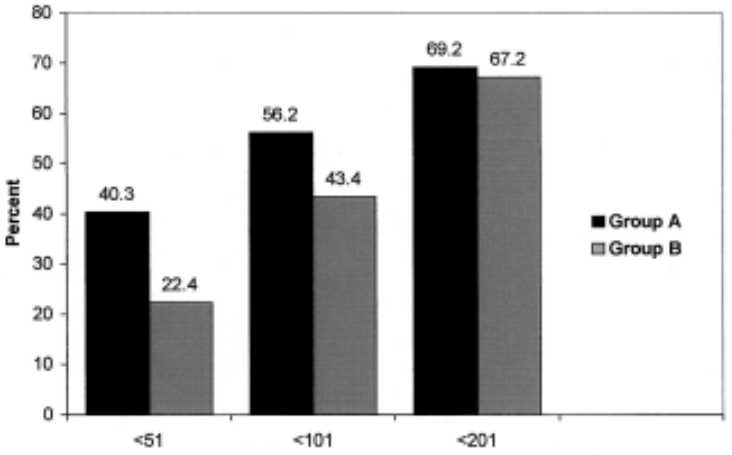

Figure 3. Number of laparoscopic cholecystectomies completed at the time of first reported bile duct injury, combining response categories of surgeons reporting at least one injury. More surgeons in group A than group B reported injuries within the first 50 cases completed. This observation was also true when calculating the number of surgeons reporting their first injury in the first 100 cases. The percentage of surgeons reporting their first injury within 200 cases, however, was similar between groups.

Archer, Ann Surg. 2001

Conclusioni

- Nonostante la standardizzazione, la colecistectomia laparoscopica richiede un approccio cauto e giudizioso.
- Le complicanze in corso di Colecistectomia Laparoscopica sono associate ad elevata morbilità.
- Fattori di rischio sono molteplici e i più importanti sono l'alterata anatomia, la presenza di infiammazione ed errori di giudizio e di tecnica.
- Durante l'intervento ottenere sempre la critical view of safety per una più sicura procedura.
- L'identificazione dei fattori predisponenti e la corretta gestione dell'intervento chirurgico, prendendo in considerazione anche «bailout procedures» nei casi più al alto rischio, consentono una riduzione del rischio perioperatorio.

Grazie per l'attenzione