XVII CONGRESSO NAZIONALE

PRESIDENTI: F.AGRESTA – G.ANANIA

EVIDENZA E LINGUAGGIO IN CHIRURGIA LAPAROSCOPICA

FERRARA 24-25 SETTEMBRE 2015

Workgroup for the update of the guidelines of the laparoscopic approach to acute abdomen

S.I.C.E.
Società Italiana di Chirurgia
Endoscopica e nuove tecnologie

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Associazione Chirurghi
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Società Italiana
di Chirurgia
nell'Ospedalità Privata

WSES

SICE 2015

Introduction
WHY UPDATE

Ferdinando Agresta

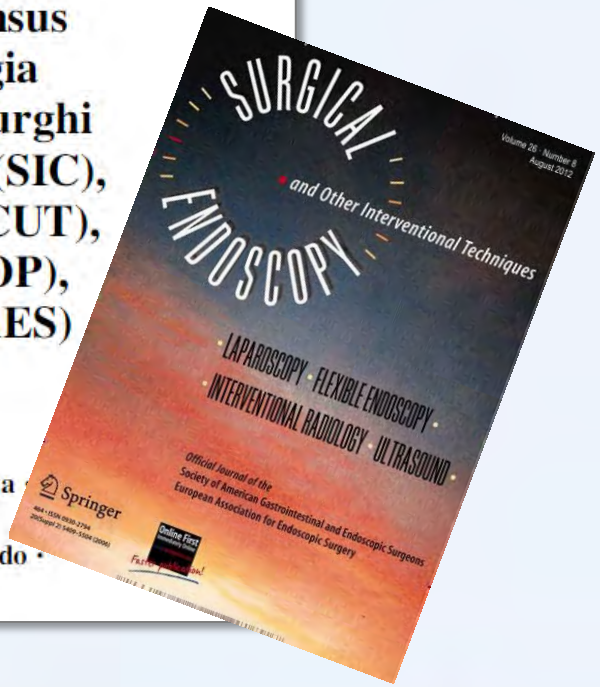
Workgroup for the update of the guidelines of the laparoscopic approach to acute abdomen

Surg Endosc (2012) 26:2134–2164
DOI 10.1007/s00464-012-2331-3

CONSENSUS STATEMENT

Laparoscopic approach to acute abdomen from the Consensus Development Conference of the Società Italiana di Chirurgia Endoscopica e nuove tecnologie (SICE), Associazione Chirurghi Ospedalieri Italiani (ACOI), Società Italiana di Chirurgia (SIC), Società Italiana di Chirurgia d'Urgenza e del Trauma (SICUT), Società Italiana di Chirurgia nell'Ospedalità Privata (SICOP), and the European Association for Endoscopic Surgery (EAES)

Ferdinando Agresta · Luca Ansaloni · Gian Luca Baiocchi · Carlo Bergamini · Fabio Cesare Campanile · Michele Carlucci · Giafranco Cocorullo · Alessio Corradi · Boris Franzato · Massimo Lupo · Vincenzo Mandalà · Antonino Mirabella · Graziano Pernazza · Micaela Piccoli · Carlo Staudacher · Nereo Vettoretto · Mauro Zago · Emanuele Lettieri · Anna Levati · Domenico Pietrini · Mariano Scaglione · Salvatore De Masi · Giuseppe De Placido · Marsilio Francucci · Monica Rasi · Abe Fingerhut · Selman Uranüs · Silvio Garattini



Introduction
Ferdinando Agresta

SICE 2015

«…As doctor and surgeons our mission is to treat patients to the best of our knowledge and expertise. **The exponential knowledge eruption and the nearly daily skill-related technology advances in minimal invasive surgery make it more than ever mandatory** that we, surgeons and doctors, humbly examine, analyze and objectively audit our own practice…we have to recognise and discard our acquired biases, and base our diagnostic procedures and surgical therapy on "hard" evidence…»

Fingerhut A. Do we need consensus conferences?
Surg Endosc 2002; 16:1149-1450

Vernooij *et al. Implementation Science* 2014, **9**:3
http://www.implementationscience.com/content/9/1/3

IMPLEMENTATION SCIENCE

SYSTEMATIC REVIEW Open Access

Guidance for updating clinical practice guidelines: a systematic review of methodological handbooks

Robin WM Vernooij[1,2], Andrea Juliana Sanabria[1], Ivan Solà[1], Pablo Alonso-Coello[1*] and Laura Martínez García[1]

…Updating clinical practice guidelines (CPGs) is a crucial process for maintaining the validity of Recommendations….Guidance for updating CPGs is poorly described in methodological handbooks. This guidance should be more rigorous and explicit. This could lead to a more optimal updating process, and, ultimately to valid trustworthy guidelines…

Education and debate

When should clinical guidelines be updated?

Paul Shekelle, Martin P Eccles, Jeremy M Grimshaw, Steven H Wolf

Summary points

Changes in evidence, the values placed on evidence, the resources available for health care, and improvements in current performance are all possible reasons for updating clinical guidelines

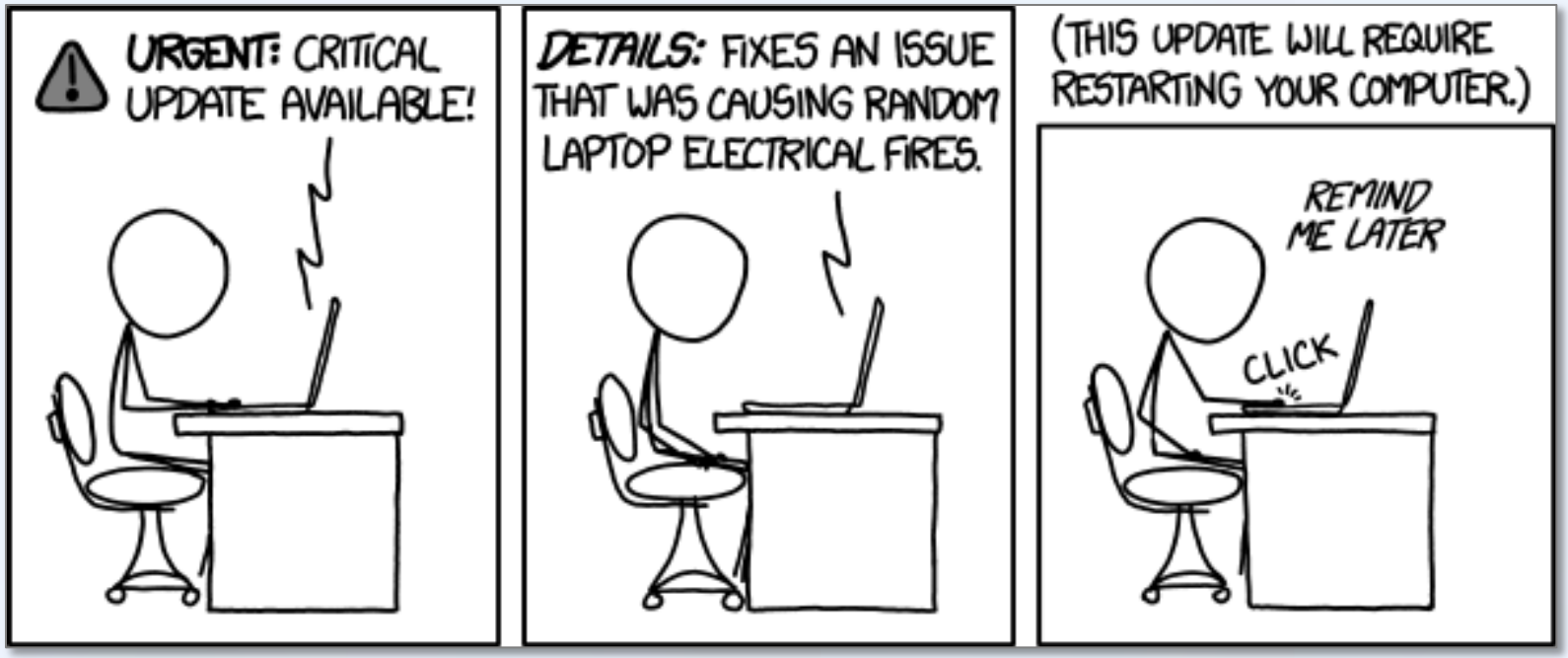
The need for an efficient mechanism for identifying when guidelines require updating is urgent

A possible model for assessing validity of guidelines is based on a combination of multidisciplinary expert opinion and limited literature searches

BMJ

VOLUME 323 21 JULY 2001
bmj.com

Workgroup for the update of the guidelines of the laparoscopic approach to acute abdomen



Introduction

Ferdinando Agresta

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Methodology

SOCIETIES	COORDINATORS	PANELISTS
Selection of Topic		
Selection of Panel		
	Key Questions	
	Evidence search	Clinical answers
		Consensus
		Draft version
	Revision of text	
Publication		

On Pubmed:

Limits Activated: **Humans, Clinical Trial, Meta-Analysis, Practice Guideline, Randomized Controlled Trial, Review, English, All Adult: 19+ years, published in the last 5 years.**

Search details: **[(("laparoscopy"[MeSH Terms] OR "laparoscopic"[All Fields]) AND ("*condition-specific key word*"[MeSH Terms] OR "*condition-specific key word*"[All Fields])) AND ("humans"[MeSH Terms] AND (Clinical Trial[ptyp] OR Meta-Analysis[ptyp] OR Practice Guideline[ptyp] OR Randomized Controlled Trial[ptyp] OR Review[ptyp]) AND English[lang] AND "adult"[MeSH Terms] AND "1995/1/1"[PDat]: "2015/05/31"[PDat])].**

Cross-link control was performed with Google Scholar and Cochrane library databases.

OCEBM Levels of Evidence Working Group*: "The Oxford 2011 Levels of Evidence".

Oxford Centre for Evidence-Based Medicine. http://www.cebm.net/index.aspx?o=5653

** Jeremy Howick, Iain Chalmers (James Lind Library), Paul Glasziou, Trish Greenhalgh, Carl Heneghan, Alessandro Liberati, Ivan Moschetti, Bob Phillips, Hazel Thornton, Olive Goddard and Mary Hodgkinson*

Question	Step 1 (Level 1*)	Step 2 (Level 2*)	Step 3 (Level 3*)	Step 4 (Level 4*)	Step 5 (Level 5)
How common is the problem?	Local and current random sample surveys (or censuses)	Systematic review of surveys that allow matching to local circumstances**	Local non-random sample**	Case-series**	n/a
Is this diagnostic or monitoring test accurate? (Diagnosis)	Systematic review of cross sectional studies with consistently applied reference standard and blinding	Individual cross sectional studies with consistently applied reference standard and blinding	Non-consecutive studies, or studies without consistently applied reference standards**	Case-control studies, or "poor or non-independent reference standard**	Mechanism-based reasoning
What will happen if we do not add a therapy? (Prognosis)	Systematic review of inception cohort studies	Inception cohort studies	Cohort study or control arm of randomized trial*	Case-series or case-control studies, or poor quality prognostic cohort study**	n/a
Does this intervention help? (Treatment Benefits)	Systematic review of randomized trials or *n*-of-1 trials	Randomized trial or observational study with dramatic effect	Non-randomized controlled cohort/follow-up study**	Case-series, case-control studies, or historically controlled studies**	Mechanism-based reasoning
What are the COMMON harms? (Treatment Harms)	Systematic review of randomized trials, systematic review of nested case-control studies, *n*-of-1 trial with the patient you are raising the question about, or observational study with dramatic effect	Individual randomized trial or (exceptionally) observational study with dramatic effect	Non-randomized controlled cohort/follow-up study (post-marketing surveillance) provided there are sufficient numbers to rule out a common harm. (For long-term harms the duration of follow-up must be sufficient.)**	Case-series, case-control, or historically controlled studies**	Mechanism-based reasoning
What are the RARE harms? (Treatment Harms)	Systematic review of randomized trials or *n*-of-1 trial	Randomized trial or (exceptionally) observational study with dramatic effect			
Is this (early detection) test worthwhile? (Screening)	Systematic review of randomized trials	Randomized trial	Non -randomized controlled cohort/follow-up study**	Case-series, case-control, or historically controlled studies**	Mechanism-based reasoning

Introduction

Ferdinando Agresta

Categories of recommendations

Although the degree of confidence is a continuum, we suggest using two categories: strong and weak.

GRADE

- **Strong recommendation:** the panel is confident that the desirable effects of adherence to a recommendation outweigh the undesirable effects.
- **Weak recommendation:** the panel concludes that the desirable effects of adherence to a recommendation probably outweigh the undesirable effects, but is not confident.

Recommend

↑↑ ↓↓

Suggest

↑ ↓

Workgroup for the update of the guidelines of the laparoscopic approach to acute abdomen

Effectivenes of laparoscopic surgery	2006 Consensus	2011 Consensus	2015 update
Perforated gastroduodenal ulcer	+++	++	
Acute cholecystitis	+++	+++	
Acute pancreatitis	+	++	
Acute appendicitis	+++	+++	
Acute diverticulitis	-?	+	**Specific guideline**
Colon diseases			**New**
Small bowel obstruction	+?	+	
Incarcerated Hernias	+?	+	
Ventral hernias		+	
Mesenteric Ischemia	-?	-	
Gynecologic disorders	+++	+++	
Non-Specific Abdominal Pain	+++	+++	
Abdominal trauma	+?/-?	+	

EAES 2006 Guidelines "evidence" of effectivenes of laparoscopy in acute abdomen and 2011 Consensus ones
(+: effectiveness from strongest +++ to weakest +; -: no effectiveness; ?: doubtful effectiveness)

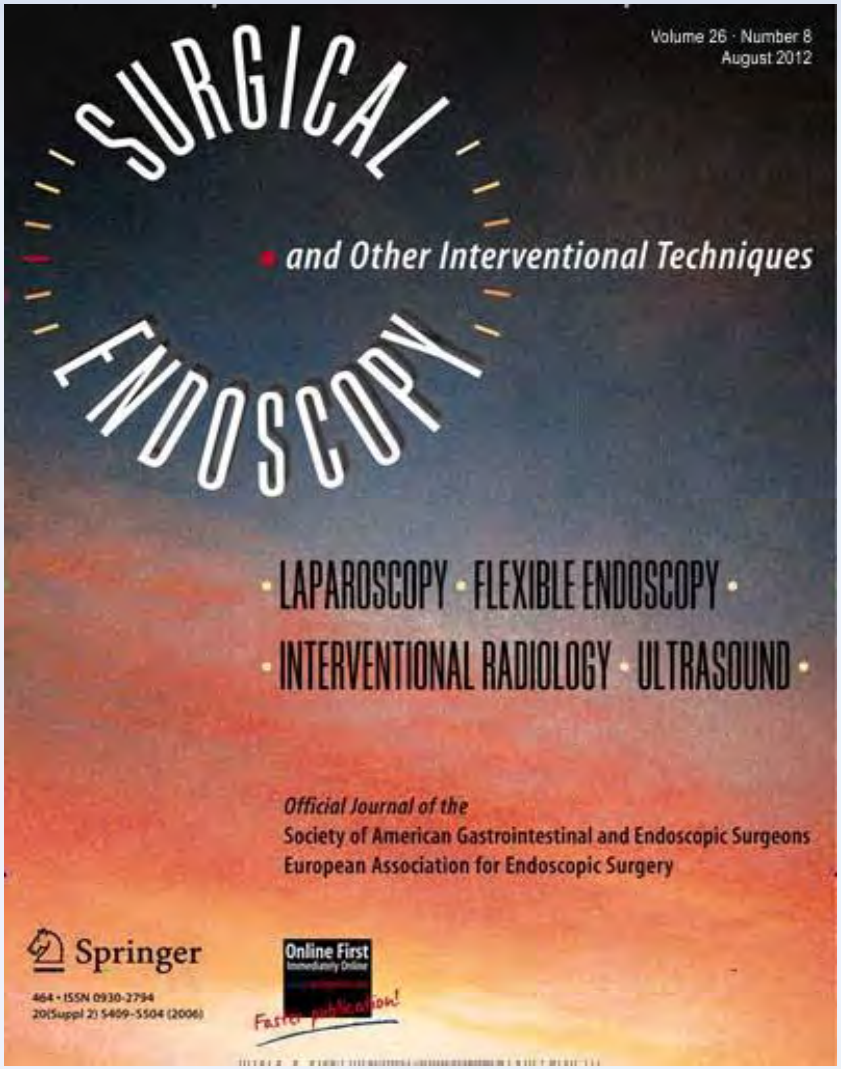
Topics

- Acute Cholecystitis – *F.C. Campanile*
- Acute Pancreatitis – *M. Campli*
- Acute Appendicitis – *N. Vettoretto*
- Gynecologic Disorders – *L. Ansaloni*
- Non-Specific Abdominal Pain – *M.Carlucci*
- Perforated Gastroduodenal Ulcer – *A. Mirabella*
- Colonic urgencies – *A. Arezzo*
- Small Bowel Obstruction – *M. Zago*
- Incarcerated Hernias – *C. Bergamini*
- Ventral Hernias – *M. Piccoli*
- Abdominal Trauma – *S. Di Saverio*
- Mesenteric Ischemia – *G. Cocorullo*

Acute Cholecystitis

Fabio Cesare Campanile

Workgroup for the update of the guidelines of the laparoscopic approach to acute abdomen



Acute Cholecystitis

Fabio Cesare Campanile

SICE 2015

Indication

Patients with acute cholecystitis should be treated by laparoscopic cholecystectomy (GoR A).
Severe (gangrenous, empyemic) cholecystitis and advanced age do not preclude the indication for laparoscopic cholecystectomy (GoR B).
Surgery should be performed as soon as possible after the onset of symptoms (GoR A). Early laparoscopic surgery should be offered also to elderly patients (GoR B).
In patients with severe comorbidities, conservative treatment or percutaneous cholecystostomy, followed or not by early or delayed surgery, may be alternatives in order to reduce surgical or anesthetic risks (GoR C)

Indication

Patients with
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Surgery should be
symptoms (GoR
also to elderly pati
In patients with
percutaneous chol
surgery, may be a
risks (GoR C)

Original bibliography according Oxford CEBM 2009

Original bibliography according Oxford CEBM 2011

Kiviluoto T, Siren J, Luukkonen P, Kivilaakso E (1998) **(LoE 1b)**
Randomised trial of laparoscopic versus open cholecystectomy for acute and gangrenous cholecystitis. **(LoE 2)**
Lancet 351:321–325

(LoE 1b)

Johansson M, Thune A, Nelvin L, Stiernstam M, Westman B, Lundell L (2005)
Randomized clinical trial of open versus laparoscopic cholecystectomy in the treatment of acute cholecystitis. **(LoE 2)**
Br J Surg 92:44–49

Csikesz N, Ricciardi R, Tseng JF, Shah SA (2008) **(LoE 2c)**
Current status of surgical management of acute cholecystitis in the United States.
World J Surg 32(10):2230–2236 **(LoE 3)**

Boo YJ, Kim WB, Kim J, Song TJ, Choi SY, Kim YC, Suh SO (2007) **(LoE 1b)**
Systemic immune response after open versus laparoscopic cholecystectomy in acute cholecystitis: a prospective randomized study. **(LoE 2)**
Scand J Clin Lab Invest 67(2):207–214

Indication: what is new?

Hepatogastroenterology. 2013 Oct;60(127):1552-6.

The ACTIVE (Acute Cholecystitis Trial Invasive Versus Endoscopic) Study: multicenter randomized, double-blind, controlled trial of laparoscopic versus open surgery for acute cholecystitis.

Catena F, Ansaloni L, Bianchi E, Di Saverio S, Coccolini F, Vallicelli C, Lazzareschi D, Sartelli M, Amaduzzi A, Amaduzz A, Pinna AD.

(LoE 2)

Indication: what is new?

Original research

Open versus laparoscopic cholecystectomy in acute cholecystitis. Systematic review and meta-analysis

(LoE 1)

Federico Coccolini [a,*], Fausto Catena [b], Michele Pisano [a], Federico Gheza [c], Stefano Fagiuoli [d], Salomone Di Saverio [e], Gioacchino Leandro [f], Giulia Montori [a], Marco Ceresoli [a], Davide Corbella [a], Massimo Sartelli [g], Michael Sugrue [h,i], Luca Ansaloni [a]

[a] General Surgery Dept., Papa Giovanni XXIII Hospital, P.zza OMS 1, 24128 Bergamo, Italy

Indication: what is new?

Study or Subgroup	Laparoscopy Events	Total	Open Events	Total	Weight	Odds Ratio M-H, Fixed, 95% CI	Year
1.15.1 Randomized							
Kiviluoto 1998	1	32	13	31	9.2%	0.04 [0.01, 0.37]	1998
Johansson 2005	2	35	3	35	2.0%	0.65 [0.10, 4.13]	2005
Boo 2007	0	15	2	18	1.6%	0.21 [0.01, 4.80]	2007
Catena 2012	24	72	25	72	12.0%	0.94 [0.47, 1.87]	2012
Subtotal (95% CI)		**154**		**156**	**24.8%**	**0.54 [0.31, 0.94]**	
Total events	27		43				
Heterogeneity: Chi² = 8.22, df = 3 (P = 0.04); I² = 63%							
Test for overall effect: Z = 2.19 (P = 0.03)							
1.15.2 Not randomized							
Unger 1993	18	100	33	100	19.4%	0.45 [0.23, 0.86]	1993
Eldar 1997	24	146	25	97	18.0%	0.57 [0.30, 1.07]	1997
Araujo-Texeira 1999	10	100	32	100	20.7%	0.24 [0.11, 0.51]	1999
Pessaux 2001	9	50	19	89	8.0%	0.81 [0.33, 1.95]	2001
Chau 2002	4	31	17	42	9.0%	0.22 [0.06, 0.74]	2002
Subtotal (95% CI)		**427**		**428**	**75.2%**	**0.43 [0.31, 0.60]**	
Total events	65		126				
Heterogeneity: Chi² = 6.21, df = 4 (P = 0.18); I² = 36%							
Test for overall effect: Z = 4.89 (P < 0.00001)							
Total (95% CI)		**581**		**584**	**100.0%**	**0.46 [0.34, 0.61]**	
Total events	92		169				
Heterogeneity: Chi² = 15.49, df = 8 (P = 0.05); I² = 48%							
Test for overall effect: Z = 5.32 (P < 0.00001)							
Test for subgroup differences: Chi² = 0.46, df = 1 (P = 0.50), I² = 0%							

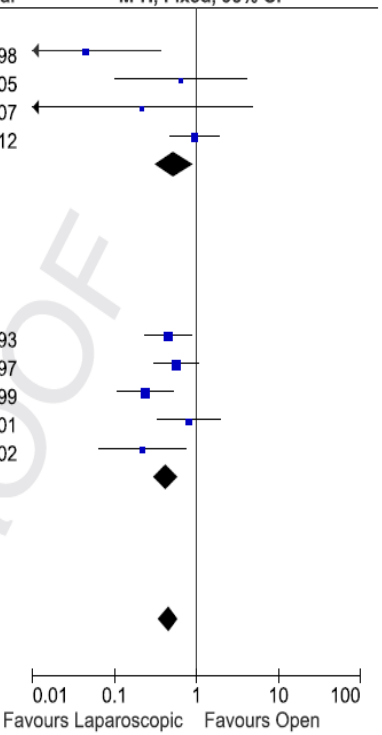

Fig. 2. Morbidity.

Original research

Open versus laparoscopic

Systematic review and m

Federico Coccolini [a,*], Fausto
Stefano Fagiuoli [d], Salomone
Marco Ceresoli [a], Davide Co

[a] General Surgery Dept., Papa Giovanni XXIII

Acute Cholecystitis

Fabio Cesare Campanile

Timing

Patients with acute cholecystitis should be treated by laparoscopic cholecystectomy (GoR A).
Severe (gangrenous, empyemic) cholecystitis and advanced age do not preclude the indication for laparoscopic cholecystectomy (GoR B).
Surgery should be performed as soon as possible after the onset of symptoms (GoR A). Early laparoscopic surgery should be offered also to elderly patients (GoR B).
In patients with severe comorbidities, conservative treatment or percutaneous cholecystostomy, followed or not by early or delayed surgery, may be alternatives in order to reduce surgical or anesthetic risks (GoR C)

Timing

Meta-analyses (LoE 1a according OCEBM 2009)
Meta-analyses (LoE 2 according OCEBM 2011)

Papi C,et al (2004) Timing of cholecystectomy for acute calculous cholecystitis: a meta-analysis. Am J Gastroenterol 99:147–155

*Shikata S, et a*l (2005) Early versus delayed cholecystectomy for acutecholecystitis: a meta-analysis of randomized controlled trials. Surg Today 35:553–560

Lau H, et al (2006) Early versus delayed interval laparoscopic cholecystectomy for acute cholecystitis: a metaanalysis. Surg Endosc 20:82–87

Gurusamy KS, Samraj K (2006) Early versus delayed laparoscopic cholecystectomy for acute cholecystitis. Cochrane Database Syst Rev (4):CD005440

Siddiqui T, et al (2008) Early versus delayed laparoscopic cholecystectomy for acute cholecystitis: a meta-analysis of randomized clinical trials. Am J Surg 195(1):40–47

Gurusamy K,et al (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(2): 141–150

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Timing

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Randomized Controlled Trials (LoE 1b according OCEBM 2009)

Randomized Controlled Trials (LoE 2 according OCEBM 2011)

Lai PBS, et al (1998) Randomized trial of early versus delayed laparoscopic cholecystectomy for acute cholecystitis. *Br J Surg 85(6):764–767*

Lo C, et al (1998) Prospective randomized study of early versus delayed laparoscopic cholecystectomy for acute cholecystitis. Ann Surg 227(4):461–467

D'Avila D, et al (1999) Experience in the treatment (early vs delayed) of acute cholecystitis via laparoscopy. *Cir Esp 66(suppl 1):233*

Chandler CF, et al (2000) Prospective evaluation of early versus delayed laparoscopic cholecystectomy for treatment of acute cholecystitis. *Am Surg 66:896–900*

Johansson M, et al (2003) Management of acute cholecystitis in the laparoscopic era: results of a prospective, randomized clinical trial. *J Gastrointest Surg 7:642–645*

Serralta AS, et al (2003) Prospective evaluation of emergency versus delayed laparoscopic cholecystectomy for early cholecystitis. *Surg Laparosc Endosc Percutan Tech 13:71–75*

Kolla SB, et al (2004) Early versus delayed laparoscopic cholecystectomy for acute cholecystitis: a prospective randomized
trial. *Surg Endosc 18:1323–1327*

Yadav RP, et al (2009) A comparative study of early vs. delayed laparoscopic cholecystectomy in acute cholecystitis *Kathmandu Univ Med J (KUMJ) 7(25):16–20*

Timing: what is new?

Randomized Controlled Trials (LoE 2 according OCEBM 2011)

Mare LD, et al (2012) Delayed versus early laparoscopic cholecystectomy for acute cholecystitis: A prospective randomized study. Hpb 14: 130

Gutt CN,et al (2013) Acute cholecystitis: early versus delayed cholecystectomy, a multicenter randomized trial (ACDC study, NCT00447304). Ann Surg 258:385–393.

Ozkardeş AB, et al (2014) Early versus delayed laparoscopic cholecystectomy for acute cholecystitis: a prospective, randomized study. *Int Surg 99:56–61. doi: 10.9738/INTSURG-D-13-00068.1*

Croo A, et al (2014) Laparoscopic cholecystectomy in acute cholecystitis: support for an early interval surgery. Acta Gastroenterol Belg 77:306–3111.

Metaanalysis (LoE 1 according OCEBM 2011)

Zhou M-W, et al (2014) Comparison of clinical safety and outcomes of early versus delayed laparoscopic cholecystectomy for acute cholecystitis: a meta-analysis. ScientificWorldJournal 2014:274516. doi: 10.1155/2014/274516

Gurusamy KS, et al (2013) Early versus delayed laparoscopic cholecystectomy for people with acute cholecystitis. Cochrane Database Syst Rev 6:CD005440. doi: 10.1002/14651858.CD005440.pub3.

Large trial
(618 pts)

Immediate (24 hrs)
vs
Delayed (7-45 days)

Morbidity
11.8 vs 34.4%

Lower costs

Elderly

Patients with acute cholecystitis should be treated by laparoscopic cholecystectomy (GoR A).

Severe (gangrenous, empyemic) cholecystitis and advanced age do not preclude the indication for laparoscopic cholecystectomy (GoR B).

Surgery should be performed as soon as possible after the onset of symptoms (GoR A). **Early laparoscopic surgery should be offered also to elderly patients (GoR B).**

In patients with severe comorbidities, conservative treatment or percutaneous cholecystostomy, followed or not by early or delayed surgery, may be alternatives in order to reduce surgical or anesthetic risks (GoR C)

Elderly

Patients with acute cholecystitis should be treated by laparoscopic cholecystectomy (GoR A).

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Surgery should be symptoms (GoR A) **also to elderly pati**

In patients with s percutaneous chole surgery, may be alt risks (GoR C)

Original bibliography according Oxford CEBM 2009

(LoE 2b)

Original bibliography according Oxford CEBM 2011

Sanchez Beorlegui J, Lagunas Lostao E, Lamata Hernandez F, Monsalve Laguna EC (2009) *Treatment of acute cholecystitis in the elderly: urgent surgery versus medical therapy and surgery delay. Rev Gastroenterol Peru 29(4):332–340* **(LoE 2)**

Riall TS, et al (2010)
Failure to perform cholecystectomy for acute cholecystitis in elderly patients is associated with increased morbidity, mortality, and cost. J Am Coll Surg 210(5):668–679 **(LoE 3)**

Elderly: what is new

Patients with acute cholecystitis should be treated by laparoscopic cholecystectomy (GoR A).

Severe (gangrenous, empyemic) cholecystitis and advanced age do not preclude the indication for laparoscopic cholecystectomy (GoR B).

Surgery should be performed as soon as possible after the onset of symptoms (GoR A). **Early laparoscopic surgery should be offered**

conservative treatment or
or not by early or delayed
reduce surgical or anesthetic

Cohort study (LoE 3)

Nielsen LB et al
Cholecystectomy for the elderly: no hesitation for otherwise healthy patients
Surg Endosc. 201428(1):171-7

[mortality ASA 1-2 OR (age >80 vs. 65-79 vs. 50-64) 30.86 vs. 5.51 vs.1]

High-risk patients

Patients with acute cholecystitis should be treated by laparoscopic cholecystectomy (GoR A).

Severe (gangrenous, empyemic) cholecystitis and advanced age do not preclude the indication for laparoscopic cholecystectomy (GoR B).

Surgery should be performed as soon as possible after the onset of symptoms (GoR A). Early laparoscopic surgery should be offered also to elderly patients (GoR B).

In patients with severe comorbidities, conservative treatment or percutaneous cholecystostomy, followed or not by early or delayed surgery, may be alternatives in order to reduce surgical or anesthetic risks (GoR C)

High-risk patients

Original bibliography according Oxford CEBM 2009 **(LoE 2a)**

Original bibliography according Oxford CEBM 2011 **(LoE 3)**

Winbladh A, et al (2009)
Systematic review of cholecystostomy as a treatment option in acute cholecystitis. HPB (Oxford) 11(3):183–193

uld be treated by laparoscopic

ecystitis and advanced age do
oscopic cholecystectomy (GoR

Surgery should be performed as soon as possible after the onset of symptoms (GoR A). Early laparoscopic surgery should be offered also to elderly patients (GoR B).

In patients with severe comorbidities, conservative treatment or percutaneous cholecystostomy, followed or not by early or delayed surgery, may be alternatives in order to reduce surgical or anesthetic risks (GoR C)

High-risk patients: what is new?

Observational studies (LoE 4)

More than 30 observational studies:
poor quality
conclusions largely not homogeneous

One ongoing trial (LoE 2)

Kortram K,et al (2012)
Acute cholecystitis in high risk surgical patients: percutaneous cholecystostomy versus laparoscopic cholecystectomy (CHOCOLATE trial): study protocol for a randomized controlled trial.
Trials 13:7. doi: 10.1186/1745-6215-13-

reated by laparoscopic

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cholecystectomy (GoR

sible after the onset of
gery should be offered

servative treatment or percutaneous cholecystostomy, followed or not by early or delayed surgery, may be alternatives in order to reduce surgical or anesthetic risks (GoR C)

Statements

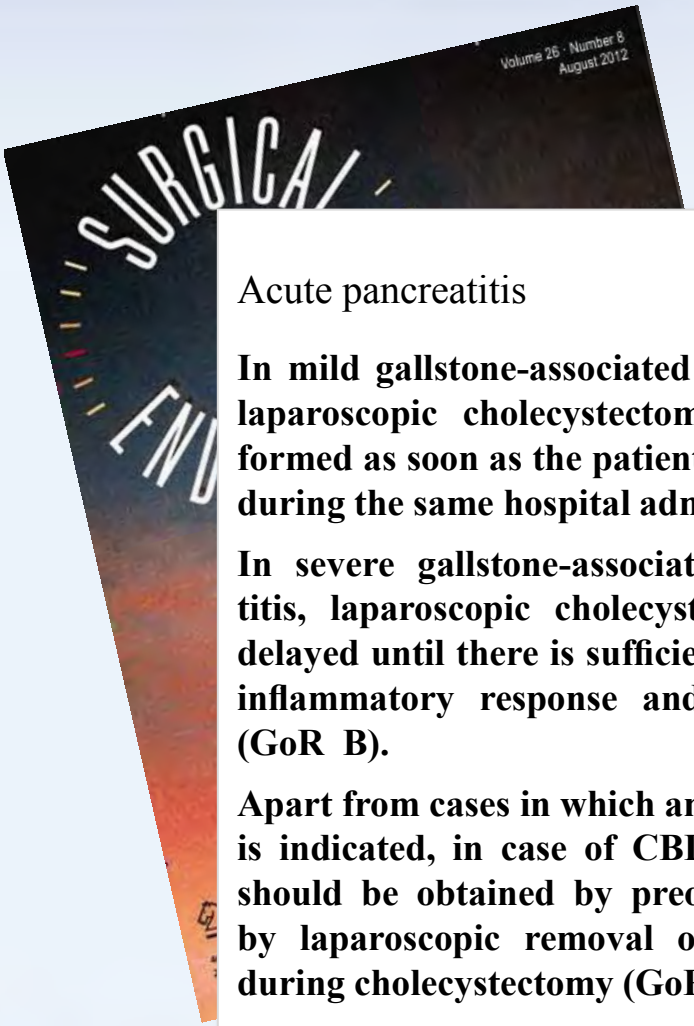
Patients with acute cholecystitis should be treated by laparoscopic cholecystectomy. Severe (gangrenous, empyemic) cholecystitis and advanced age do not preclude the indication for laparoscopic cholecystectomy (Strong recommendation).

Surgery should be performed as soon as possible after the onset of symptoms (Strong recommendation) and up to 10 days from the onset of symptoms. Afterwards, delayed surgery is suggested, unless emergency surgery is needed for worsening sepsis (Weak recommendation).

Based on the currently available evidence, it is not possible to determine the optimal treatment for elderly and high-risk patients.

Acute Pancreatitis

Mario Campli



Acute pancreatitis

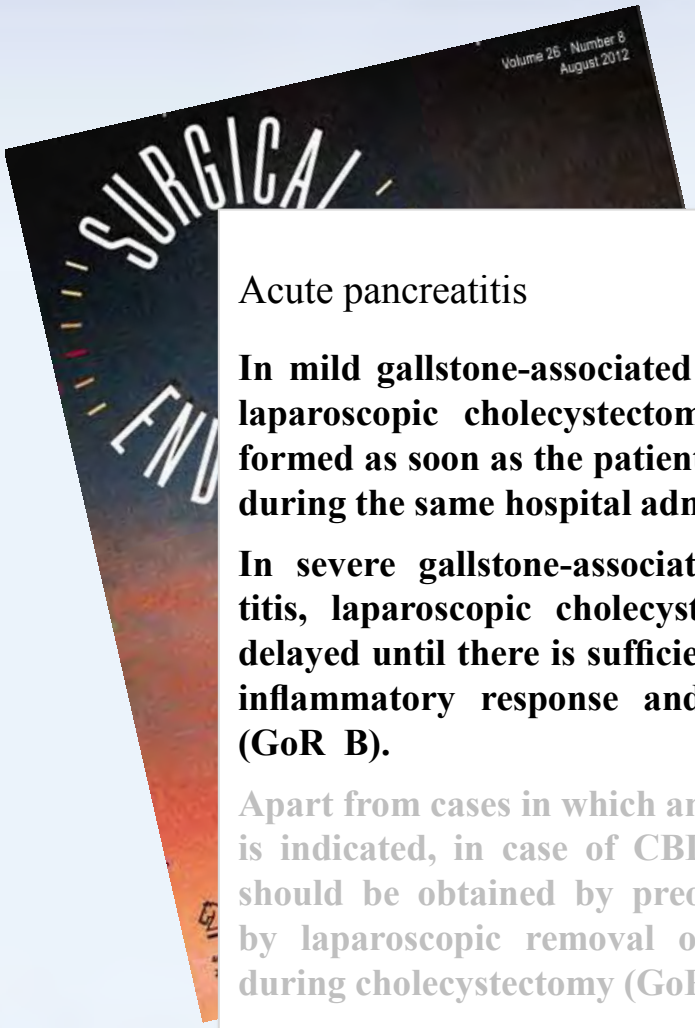
In mild gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be performed as soon as the patient has recovered and during the same hospital admission (GoR B).

In severe gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be delayed until there is sufficient resolution of the inflammatory response and clinical recovery (GoR B).

Apart from cases in which an emergency ERCP is indicated, in case of CBD stones, clearance should be obtained by preoperative ERCP or by laparoscopic removal of bile duct stones during cholecystectomy (GoR A).

When pancreatic necrosis requires treatment for clinical signs of sepsis or multiorgan failure that does not improve despite optimal therapy, a step-up approach consisting of percutaneous drainage, followed, if necessary, by minimally invasive retroperitoneal debridement should be undertaken. Open surgery should be reserved to patients not responding to minimally invasive treatment (GoR B).

The abdominal compartment syndrome should be managed by prompt laparostomy or fasciotomy; laparoscopy is formally contraindicated in these cases (GoR C).



Acute pancreatitis

In mild gallstone-associated a
laparoscopic cholecystectomy
formed as soon as the patient h
during the same hospital admi

In severe gallstone-associated
titis, laparoscopic cholecyste
delayed until there is sufficient
inflammatory response and
(GoR B).

Apart from cases in which an e
is indicated, in case of CBD
should be obtained by preop
by laparoscopic removal of
during cholecystectomy (GoR

Original bibliography according Oxford CEBM 2009

Original bibliography according Oxford CEBM 2011

Statement 2.1, 2.2 **(LoE 2b)**

Aboulian A, Chan T, Yaghoubian A et al. **(LoE 2)**
Early cholecystectomy safely decreases hospital stay in patients with mild gallstone pancreatitis: a randomized prospective study.
Ann Surg. 2010 Apr;251(4):615-9

Uhl W, Warshaw A, Imrie C, Bassi C, et al. **(LoE 2)**
IAP Guidelines for the Surgical Management of Acute Pancreatitis.
Pancreatology. 2002;2(6):565-73

Kimura Y, Takada T, Kawarada Y et al. **(LoE 2)**
JPN Guidelines for the management of acute pancreatitis: treatment of gallstone-induced acute pancreatitis.
J Hepatobiliary Pancreat Surg. 2006;13(1):56-60.

Nebiker CA, Frey DM, Hamel CT et al. **(LoE 3)**
Early versus delayed cholecystectomy in patients with biliary acute pancreatitis.
Surgery. 2009 Mar;145(3):260-4

Sinha R. **(LoE 3)**
Early laparoscopic cholecystectomy in acute biliary pancreatitis: the optimal choice?
HPB (Oxford). 2008;10(5):332-5

Taylor E, Wong C. **(LoE 3)**
The optimal timing of laparoscopic cholecystectomy in mild gallstone pancreatitis.
Am Surg. 2004 Nov;70(11):971-5

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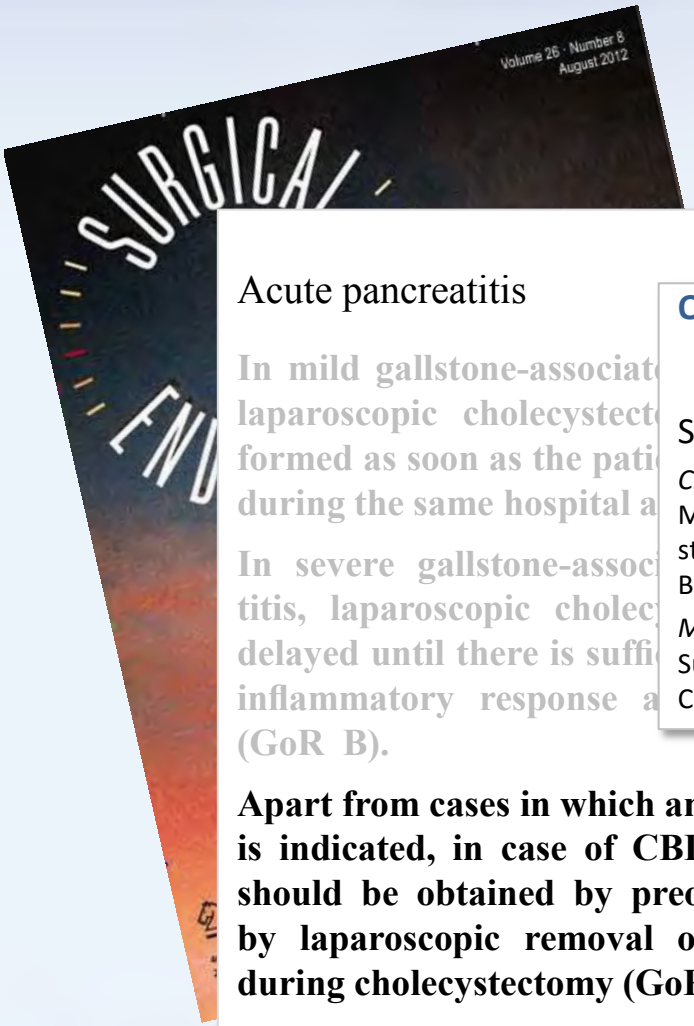
Delayed cholecystectomy for gallstone pancreatitis: re-admissions and outcomes.
Ann R Coll Surg Engl. 2004 Sep;86(5):358-62



Acute pancreatitis

In mild gallstone-associat… laparoscopic cholecystect… formed as soon as the pati… during the same hospital a…

In severe gallstone-assoc… titis, laparoscopic cholec… delayed until there is suffi… inflammatory response a… (GoR B).

Apart from cases in which an emergency ERCP is indicated, in case of CBD stones, clearance should be obtained by preoperative ERCP or by laparoscopic removal of bile duct stones during cholecystectomy (GoR A).

Original bibliography according Oxford CEBM 2009

Original bibliography according Oxford CEBM 2011

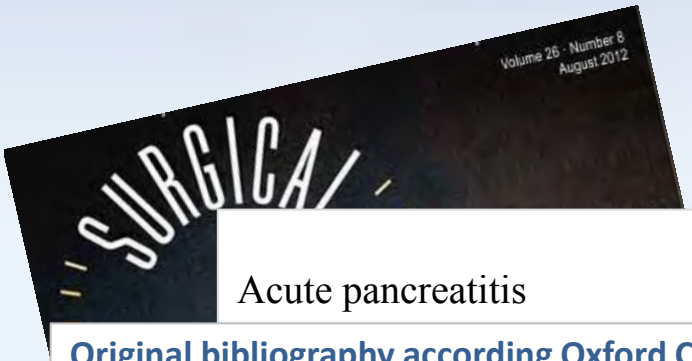
Statement 2.3 **(LoE 1b)**

Clayton ES, Connor S, Alexakis N, Leandros E. **(LoE 1)**
Meta-analysis of endoscopy and surgery versus surgery alone for common bile duct stones with the gallbladder in situ.
Br J Surg. 2006 Oct;93(10):1185-91

Martin DJ, Vernon DR, Toouli J. **(LoE 1)**
Surgical versus endoscopic treatment of bile duct stones.
Cochrane Database Syst Rev. 2006 Apr 19;(2):CD003327

…atment …failure …herapy, …aneous …himally …uld be …served …nvasive …treatment (GoR B).

The abdominal compartment syndrome should be managed by prompt laparostomy or fasciotomy; laparoscopy is formally contra-indicated in these cases (GoR C).



Acute pancreatitis

Original bibliography according Oxford CEBM 2009

Original bibliography according Oxford CEBM 2011

Statement 2.4 **(LoE 1b)**

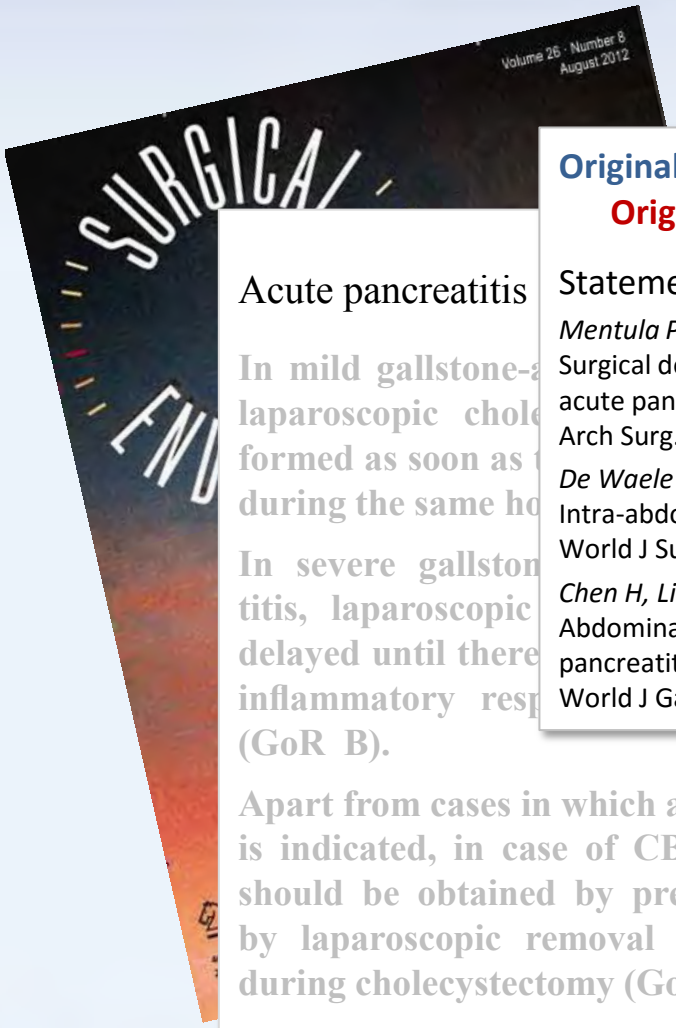
Horvath K, Freeny P, Escallon J et al. **(LoE 2)**
Safety and efficacy of video-assisted retroperitoneal debridement for infected pancreatic collections: a multicenter, prospective, single-arm phase 2 study.
Arch Surg. 2010 Sep;145(9):817-25

van Santvoort HC, Besselink MG, Bakker OJ et al. **(LoE 2)**
A step-up approach or open necrosectomy for necrotizing pancreatitis.
N Engl J Med. 2010 Apr 22;362(16):1491-502

When pancreatic necrosis requires treatment for clinical signs of sepsis or multiorgan failure that does not improve despite optimal therapy, a step-up approach consisting of percutaneous drainage, followed, if necessary, by minimally invasive retroperitoneal debridement should be undertaken. Open surgery should be reserved to patients not responding to minimally invasive treatment (GoR B).

Apart from cases in which an emergency ERCP is indicated, in case of CBD stones, clearance should be obtained by preoperative ERCP or by laparoscopic removal of bile duct stones during cholecystectomy (GoR A).

The abdominal compartment syndrome should be managed by prompt laparostomy or fasciotomy; laparoscopy is formally contra-indicated in these cases (GoR C).



Acute pancreatitis

In mild gallstone-a… laparoscopic chole… formed as soon as t… during the same ho…

In severe gallston… titis, laparoscopic … delayed until there… inflammatory resp… (GoR B).

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…sis requires treatment …is or multiorgan failure …espite optimal therapy, …sisting of percutaneous …ecessary, by minimally …debridement should be …ery should be reserved …g to minimally invasive …

The abdominal compartment syndrome should be managed by prompt laparostomy or fasciotomy; laparoscopy is formally contra-indicated in these cases (GoR C).

Original bibliography according Oxford CEBM 2009

Original bibliography according Oxford CEBM 2011

Statement 2.5 **(LoE 4)**

Mentula P, Hienonen P, Kemppainen E et al. **(LoE 4)**
Surgical decompression for abdominal compartment syndrome in severe acute pancreatitis.
Arch Surg. 2010 Aug;145(8):764-9

De Waele JJ, Leppäniemi AK. **(LoE 4)**
Intra-abdominal hypertension in acute pancreatitis.
World J Surg. 2009 Jun;33(6):1128-33

Chen H, Li F, Sun JB, Jia JG. **(LoE 3)**
Abdominal compartment syndrome in patients with severe acute pancreatitis in early stage.
World J Gastroenterol. 2008 Jun 14;14(22):3541-8

Workgroup for the update of the guidelines of the laparoscopic approach to acute abdomen

Acute Pancreatitis

Mario Campli

SICE 2015

Acute Pancreatitis

Mario Campli

AJG The American Journal of GASTROENTEROLOGY

1400 PRACTICE GUIDELINES

nature publishing group

CME

American College of Gastroenterology Guideline: Management of Acute Pancreatitis

Scott Tenner, MD, MPH, FACG[1], John Baillie, MB, ChB, FRCP, FACG[2], John DeWitt, MD, FACG[3] and Santhi Swaroop Vege, MD, FACG[4]

This guideline presents recommendations for the management of patients with acute pancreatitis (AP). During the past decade, there have been new understandings and developments in the diagnosis, etiology, and early and late management of the disease.

Am J Gastroenterol 2013; 108:1400–1415; doi:10.1038/ajg.2013.218; published online 30 July 2013

Acute Pancreatitis

Mario Campli

Pancreatology 13 (2013) e1–e15

Contents lists available at SciVerse ScienceDirect

Pancreatology

journal homepage: www.elsevier.com/locate/pan

Original article

IAP/APA evidence-based guidelines for the management of acute pancreatitis☆

Working Group IAP/APA Acute Pancreatitis Guidelines[a,b,*,1]

[a] International Association of Pancreatology, UNSW Clinical School Locked Bag 7103, Liverpool, BC NSW 1871, Australia
[b] American Pancreatic Association, PO Box 14906, Minneapolis, MN 55414, USA

ARTICLE INFO

Article history:
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Accepted 5 July 2013

ABSTRACT

Background: There have been substantial improvements in the management of acute pancreatitis since the publication of the International Association of Pancreatology (IAP) treatment guidelines in 2002. A collaboration of the IAP and the American Pancreatic Association (APA) was undertaken to revise these guidelines using an evidence-based approach.

G Model
YDLD-2860; No. of Pages 12

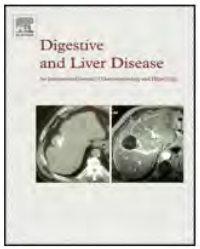
ARTICLE IN PRESS

Digestive and Liver Disease xxx (2015) xxx–xxx

Contents lists available at ScienceDirect

Digestive and Liver Disease

journal homepage: www.elsevier.com/locate/dld



Position Paper

Consensus guidelines on severe acute pancreatitis

The Italian Association for the Study of the Pancreas (AISP)

ARTICLE INFO

Article history:
Received 2 February 2015
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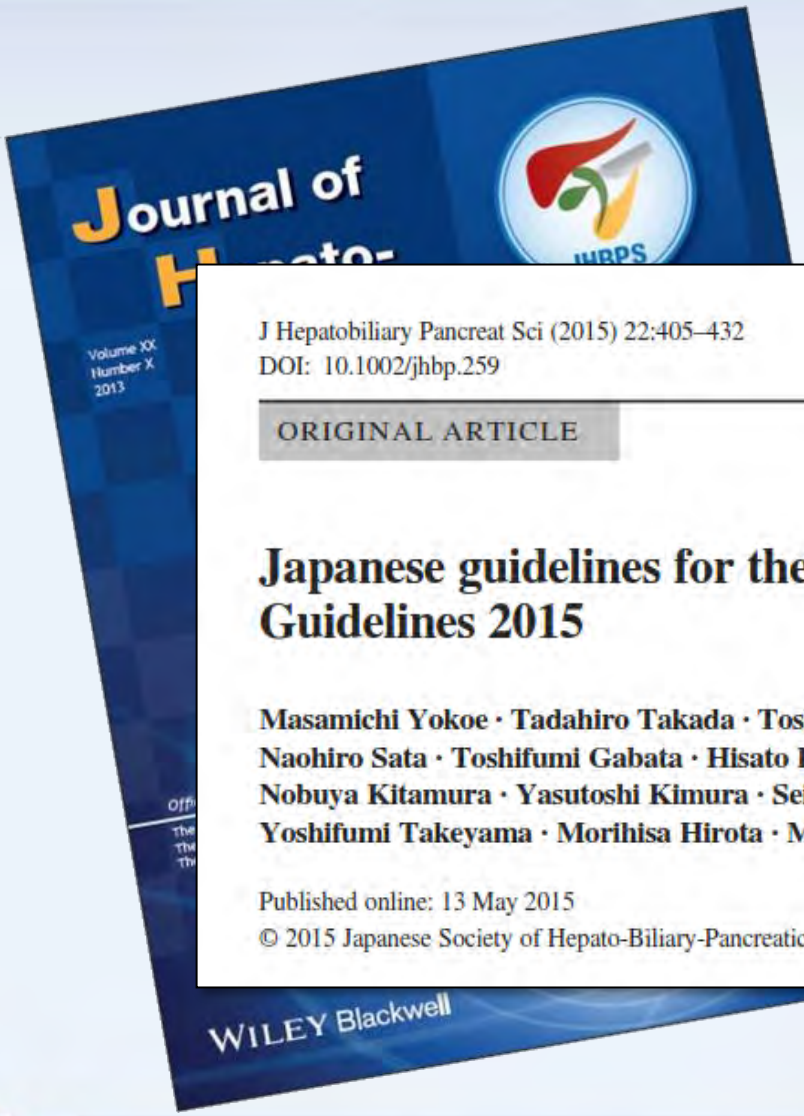
Available online xxx



J Hepatobiliary Pancreat Sci (2015) 22:405–432
DOI: 10.1002/jhbp.259

ORIGINAL ARTICLE

Japanese guidelines for the management of acute pancreatitis: Japanese Guidelines 2015

Masamichi Yokoe · Tadahiro Takada · Toshihiko Mayumi · Masahiro Yoshida · Shuji Isaji · Keita Wada · Takao Itoi · Naohiro Sata · Toshifumi Gabata · Hisato Igarashi · Keisho Kataoka · Masahiko Hirota · Masumi Kadoya · Nobuya Kitamura · Yasutoshi Kimura · Seiki Kiriyama · Kunihiro Shirai · Takayuki Hattori · Kazunori Takeda · Yoshifumi Takeyama · Morihisa Hirota · Miho Sekimoto · Satoru Shikata · Shinju Arata · Koichi Hirata

Published online: 13 May 2015

Acute Pancreatitis
Mario Campli

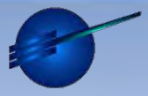
Workgroup for the update of the guidelines of the laparoscopic approach to acute abdomen

Acute Pancreatitis

Mario Campli

SICE 2015

Workgroup for the update of the guidelines of the laparoscopic approach to acute abdomen






iap international association of pancreatology
investigate . innovate . inspire

APA AMERICAN PANCREATIC ASSOCIATION

Pancreatitis
Werkgroep Nederland

Acute Pancreatitis
Mario Campli

In mild gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be performed as soon as the patient has recovered and during the same hospital admission

THE COCHRANE COLLABORATION

Early versus delayed laparoscopic cholecystectomy for acute gallstone pancreatitis (Review)

Gurusamy KS, Nagendran M, Davidson BR

The Cochrane Database of Systematic Reviews, Sep. 2013

WILEY

In mild gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be performed as soon as the patient has recovered and during the same hospital admission

Early versus delayed laparoscopic cholecystectomy for acute

THE CO
COLLAB

Key results

Based on the observations in the one trial included in this review, there appears to be no evidence of increased risk of complications after early laparoscopic cholecystectomy. Early laparoscopic cholecystectomy may shorten the total hospital stay in people with mild acute pancreatitis.

Quality of the evidence

The one trial identified is at high risk of bias, i. e. there was potential to arrive at wrong conclusions because of the way that the study was designed and conducted.

In mild gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be performed as soon as the patient has recovered and during the same hospital admission

Early versus delayed laparoscopic cholecystectomy for acute

Key resu

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Early cholecystectomy safely decreases hospital stay in patients with mild gallstone pancreatitis: a randomized prospective study.
Ann Surg. 2010 Apr;251(4):615-9

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Early versus delayed laparoscopic cholecystectomy for acute

Key resu

Aboulian A, Chan T, Yaghoubian A et al.

Bouwense SAW, Bakker OJ, van Santvoort HC et al.
Safety of cholecystectomy in the first 48 hours after admission for gallstone pancreatitis not yet proven
Ann Surg 2011 May; 253(5):1053–54.

with

Isogai M, Kaneoka Y and Maeda A
Is early cholecystectomy within 48 hours of admission for mild gallstone pancreatitis classified by Ranson Score appropriate?
Ann Surg 2011 May; 253(5): 1052–53.

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Petrov MS and Windsor JA
Very early cholecystectomy in patients with predicted mild acute pancreatitis: caution advised
Ann Surg 2011 May; 253(5):1051–52

In mild gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be performed as soon as the patient has recovered and during the same hospital admission

Early versus delayed laparoscopic cholecystectomy for acute

BJS

Original article

Timing of cholecystectomy after mild biliary pancreatitis

O. J. Bakker, H. C. van Santvoort, J. C. Hagenaars, M. G. Besselink, T. L. Bollen, H. G. Gooszen and A. F. Schaapherder, for the Dutch Pancreatitis Study Group

Br J Surg (2011) 98, 1446–1454 *doi:10.1002/bjs.7587*

Abstract: Prospective cohort, 308 patients in 15 Dutch Hospitals. A delay in cholecystectomy after mild biliary pancreatitis carries a substantial risk of recurrent biliary events. Endoscopic sphincterotomy reduces the risk of recurrent pancreatitis but not of other biliary events

In mild gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be performed as soon as the patient has recovered and during the same hospital admission

Early versus delayed laparoscopic cholecystectomy for acute

BJS

Original article

Timing of cholecystectomy after mild biliary pancreatitis

GIE

ORIGINAL ARTICLE: Clinical Endoscopy

Early cholecystectomy and ERCP are associated with reduced readmissions for acute biliary pancreatitis: a nationwide, population-based study

Geoffrey C. Nguyen, MD, PhD, Morgan Rosenberg, MD, Rachel Y. Chong, MD, PhD, Christopher A. Chong, MD

Gastrointest. Endosc., vol. 75, no. 1, pp. 47–55, Jan. 2012.

In mild gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be performed as soon as the patient has recovered and during the same hospital admission

Early versus delayed laparoscopic cholecystectomy for acute

BJS

Original article

Timing of cholecystectomy after mild biliary pancreatitis

GIE

ORIGINAL ARTICLE: Clinical Endoscopy

Early cholecystectomy and ERCP are associated with reduced

AJG

Am J Gastroenterol 2012; 107:1096-1103

ORIGINAL CONTRIBUTIONS

nature publishing group

Natural History Following the First Attack of Acute Pancreatitis

Dhiraj Yadav, MD, MPH, Michael O'Connell, PhD and Georgios I. Papachristou, MD

Using the Pennsylvania Health Care Cost Containment Council, we identified 7456 County residents with incident AP. Readmissions following a sentinel attack are common. Cholecystectomy should be considered as soon feasible after an attack of biliary AP. Natural history of CP may be altered through early behavioral intervention.

In mild gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be performed as soon as the patient has recovered and during the same hospital admission

Early versus delayed laparoscopic cholecystectomy for acute

BJS

Original article

Timing of cholecystectomy after mild biliary pancreatitis

GIE

ORIGINAL ARTICLE: Clinical Endoscopy

Early cholecystectomy and ERCP are associated with reduced

Am J Gastroenterol 2012; 107:1096-1103

ORIGINAL CONTRIBUTIONS

nature publishing group

ANNALS OF SURGERY

vol. 255, no. 5, pp. 860–866, 2012

REVIEW

Timing of Cholecystectomy After Mild Biliary Pancreatitis

A Systematic Review

Mark C. van Baal, MD, Marc G. Besselink, MD, PhD, Olaf J. Bakker, MD, Hjalmar C. van Santvoort, MD, PhD, Alexander F. Schaapherder, MD, PhD, Vincent B. Nieuwenhuijs, MD, PhD, Hein G. Gooszen, MD, PhD, Bert van Ramshorst, MD, PhD, and Djamila Boerma, MD, PhD, for the Dutch Pancreatitis Study Group

In mild gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be performed as soon as the patient has recovered and during the same hospital admission

In patients with mild acute pancreatitis, found to have gallstones in the gallbladder, a cholecystectomy should be performed before discharge to prevent a recurrence of acute pancreatitis.

Cholecystectomy during index admission for mild biliary pancreatitis appears safe and is recommended. Interval cholecystectomy after mild biliary pancreatitis is associated with a substantial risk of readmission for recurrent biliary events, especially recurrent biliary pancreatitis.

To prevent the recurrence of gallstone-induced acute pancreatitis, cholecystectomy is recommended for cases where such surgery is possible. A cholecystectomy should be performed as soon as gallstone-induced acute pancreatitis has been resolved.

In mild gallstone-associated acute p… cholecystectomy should be perform… has recovered and during the same…

Bouwense et al. Trials 2012, 13:225
http://www.trialsjournal.com/content/13/1/225

STUDY PROTOCOL

TRIALS

Open Access

Pancreatitis of biliary origin, optimal timing of cholecystectomy (PONCHO trial): study protocol for a randomized controlled trial

Stefan A Bouwense[1], Marc G Besselink[2,3,4], Sandra van Brunschot[1], Olaf J Bakker[2], Hjalmar C van Santvoort[2], Nicolien J Schepers[1], Marja A Boermeester[4], Thomas L Bollen[5], Koop Bosscha[6], Menno A Brink[7], Marco J Bruno[8], Esther C Consten[9], Cornelis H Dejong[10], Peter van Duijvendijk[11], Casper H van Eijck[12], Jos J Gerritsen[13], Harry van Goor[14], Joost Heisterkamp[15], Ignace H de Hingh[16], Philip M Kruyt[17], I Quintus Molenaar[2], Vincent B Nieuwenhuijs[18], Camiel Rosman[19], Alexander F Schaapherder[20], Joris J Scheepers[21], Marcel BW Spanier[22], Robin Timmer[23], Bas L Weusten[23], Ben J Witteman[24], Bert van Ramshorst[3], Hein G Gooszen[1], Djamila Boerma[3]* and for the Dutch Pancreatitis Study Group

Abstract

Background: After an initial attack of biliary pancreatitis, cholecystectomy minimizes the risk of recurrent biliary pancreatitis and other gallstone-related complications. Guidelines advocate performing cholecystectomy within 2 to 4 weeks after discharge for mild biliary pancreatitis. During this waiting period, the patient is at risk of recurrent biliary events. In current clinical practice, surgeons usually postpone cholecystectomy for 6 weeks due to a perceived risk of a more difficult dissection in the early days following pancreatitis and for logistical reasons. We hypothesize that early laparoscopic cholecystectomy minimizes the risk of recurrent biliary pancreatitis without increasing the difficulty of dissection and the surgical complication rate compared with interval laparoscopic cholecystectomy.

Methods/Design: PONCHO is a randomized controlled, parallel-group, assessor-blinded, superiority multicenter trial. Patients are randomly allocated to undergo early laparoscopic cholecystectomy, within 72 hours after randomization, or interval laparoscopic cholecystectomy, 25 to 30 days after randomization. During a 30-month period, 266 patients will be enrolled from 18 hospitals of the Dutch Pancreatitis Study Group. The primary endpoint is a composite endpoint of mortality and acute re-admissions for biliary events (that is, recurrent biliary pancreatitis, acute cholecystitis, symptomatic/obstructive choledocholithiasis requiring endoscopic retrograde cholangiopancreaticography including cholangitis (with/without endoscopic sphincterotomy), and uncomplicated biliary colics) occurring within 6 months following randomization. Secondary endpoints include the individual endpoints of the composite endpoint, surgical and other complications, technical difficulty of cholecystectomy and costs.

Discussion: The PONCHO trial is designed to show that early laparoscopic cholecystectomy (within 72 hours) reduces the combined endpoint of mortality and re-admissions for biliary events as compared with interval laparoscopic cholecystectomy (between 25 and 30 days) after recovery of a first episode of mild biliary pancreatitis.

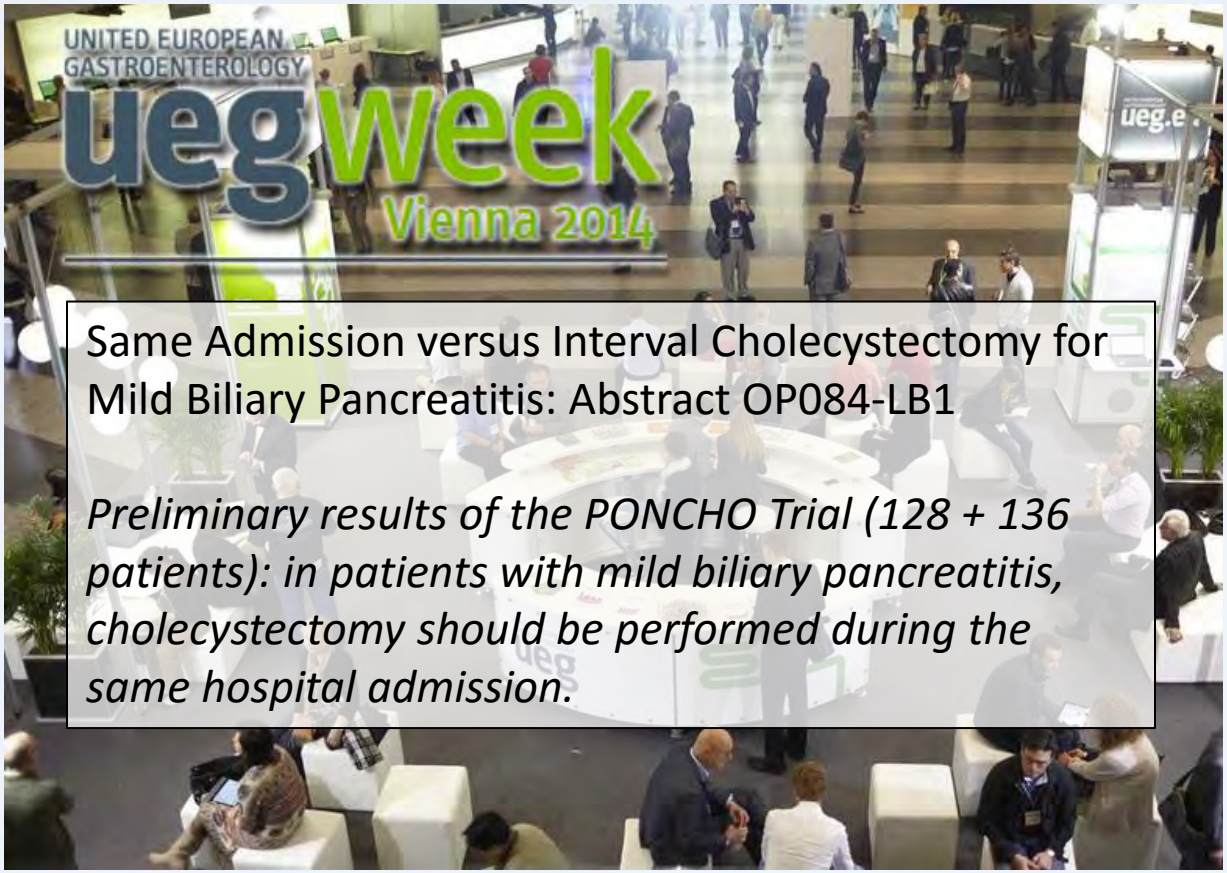
(Continued on next page)

* Correspondence: d.boermo@antoniusziekenhuis.nl
[1]Department of Surgery, St Antonius Hospital, PO 2500, Nieuwegein EM 3430, the Netherlands
Full list of author information is available at the end of the article

Acute Pancreatitis
Mario Campli

SICE 2015

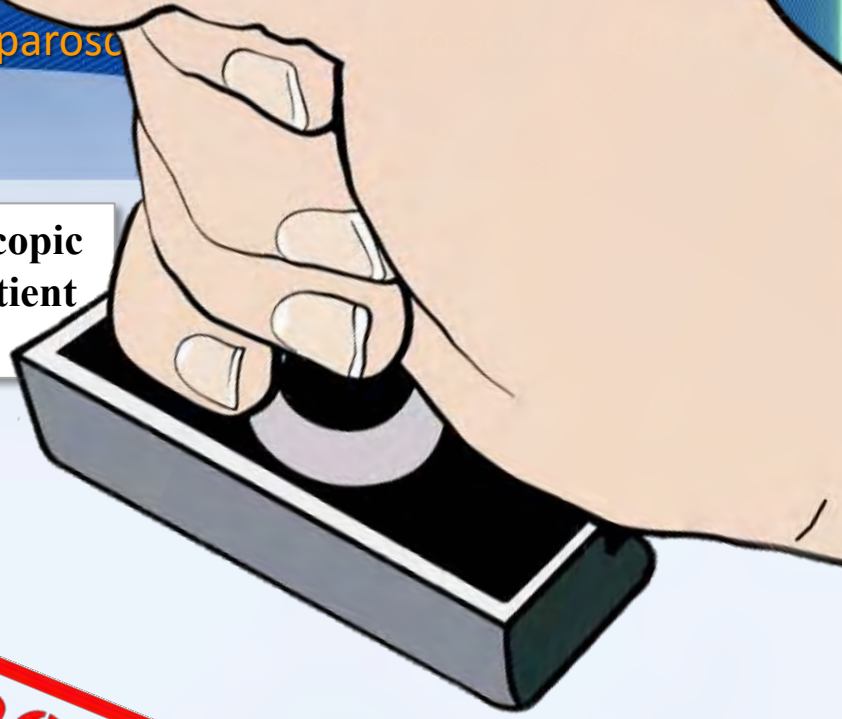
In mild gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be performed as soon as the patient has recovered and during the same hospital admission



Same Admission versus Interval Cholecystectomy for Mild Biliary Pancreatitis: Abstract OP084-LB1

Preliminary results of the PONCHO Trial (128 + 136 patients): in patients with mild biliary pancreatitis, cholecystectomy should be performed during the same hospital admission.

In mild gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be performed as soon as the patient has recovered and during the same hospital admission



STRONG STATEMENT

In severe gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be delayed until there is sufficient resolution of the inflammatory response and clinical recovery

In severe gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be delayed until there is sufficient resolution of the inflammatory response and clinical recovery

Objective early identification of severe acute pancreatitis

John H.C. Ranson, Kenneth M. Rifkind, Daniel F. Roses, Simon D. Fink, Kenneth Eng, S. Arthur Localio

American Journal of Gastroenterology, 1974

ARCHIVES OF SURGERY

A clinically based classification system for acute pancreatitis. Summary of the International Symposium on Acute Pancreatitis, Atlanta, 1992.

Pancreas

ORIGINAL ARTICLE

Classification of acute pancreatitis—2012: revision of the Atlanta classification and definitions by international consensus

Peter A Banks,[1] Thomas L Bollen,[2] Christos Dervenis,[3] Hein G Gooszen,[4] Colin D Johnson,[5] Michael G Sarr,[6] Gregory G Tsiotos,[7] Santhi Swaroop Vege,[8] Acute Pancreatitis Classification Working Group

Determinant-Based Classification of Acute Pancreatitis Severity

An International Multidisciplinary Consultation

*E. Patchen Dellinger, MD,† Christopher E. Forsmark, MD,‡ Peter Layer, MD, PhD,§ Philippe Lèvy, MD,‖ Enrique Maraví-Poma, MD, PhD,¶ Maxim S. Petrov, MD, MPH, PhD,# Tooru Shimosegawa, MD, PhD,** Ajith K. Siriwardena, MD,†† Generoso Uomo, MD,‡‡ David C. Whitcomb, MD, PhD,§§ and John A. Windsor, MBChB, MD, FRACS#; on behalf of the Pancreatitis Across Nations Clinical Research and Education Alliance (PANCREA)*

612 ORIGINAL CONTRIBUTIONS

PANCREAS AND BILIARY TRACT

A Comparative Evaluation of Radiologic and Clinical Scoring Systems in the Early Prediction of Severity in Acute Pancreatitis

Thomas L. Bollen, MD[1,2], Vikesh K. Singh, MD, MSc[3,4], Rie Maurer, MA[3], Kathryn Repas, BA[3], Hendrik W. van Es, MD[2], Peter A. Banks, MD[2] and Koenraad J. Mortele, MD[2,5]

Seven CT scoring systems (CT severity index [CTSI], modified CT severity index [MCTSI], pancreatic size index [PSI], extrapancreatic score [EP], extrapancreatic inflammation on CT score [EPIC], mesenteric oedema and peritoneal fluid score [MOP], and [Balthazar] grade) as well as two clinical scoring systems: Acute Physiology, Age, and Chronic Health Evaluation [APACHE II] and Bedside Index for Severity in AP [BISAP] were comparatively evaluated

In severe gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be delayed until there is sufficient resolution of the inflammatory response and clinical recovery

Best Practice & Research Clinical Gastroenterology 27 (2013) 727–743

Contents lists available at ScienceDirect

Best Practice & Research Clinical Gastroenterology

8

Early management of acute pancreatitis

Nicolien J. Schepers, MD, PhD Candidate [a, d, *],
Marc G.H. Besselink, MD, PhD, Surgeon [b],
Hjalmar C. van Santvoort, MD, PhD, Surgical Resident [c],
Olaf J. Bakker, MD, PhD Candidate, Surgical Resident [c],
Marco J. Bruno, MD, PhD, Professor, Gastroenterologist [d],
for the Dutch Pancreatitis Study Group

[a] Department of Operation Rooms, Radboud University Nijmegen Medical Center, Nijmegen, The Netherlands
[b] Department of Surgery, Academic Medical Center, Amsterdam, The Netherlands
[c] Department of Surgery, University Medical Center, Utrecht, The Netherlands
[d] Department of Gastroenterology and Hepatology, Erasmus Medical Center, Rotterdam, The Netherlands

In severe gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be delayed until there is sufficient resolution of the inflammatory response and clinical recovery

Best Practice & Research Clinical Gastroenterology 27 (2013) 727–743

Contents lists available at ScienceDirect

Gastrointest Interv 2013; 2:36-46

Contents lists available at SciVerse ScienceDirect

Gastrointestinal Intervention

ırnal homepage: www.gi-intervention.or

Review Article

Diagnosis and management of acute pancreatitis and its complications

Carolyn S. Dupuis, Veronica Baptista, Giles Whalen, Adib R. Karam, Anupam Singh, Wahid Wassef, Young H. Kim

[a] Department of Gastroenterology and Hepatology, Erasmus Medical Center, Rotterdam, The Netherlands

In severe gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be delayed until there is sufficient resolution of the inflammatory response and clinical recovery

ELSEVIER

Review Article

Diagnosis and mana

Carolyn S. Dupuis, Veroni
Young H. Kim

nature REVIEWS GASTROENTEROLOGY & HEPATOLOGY

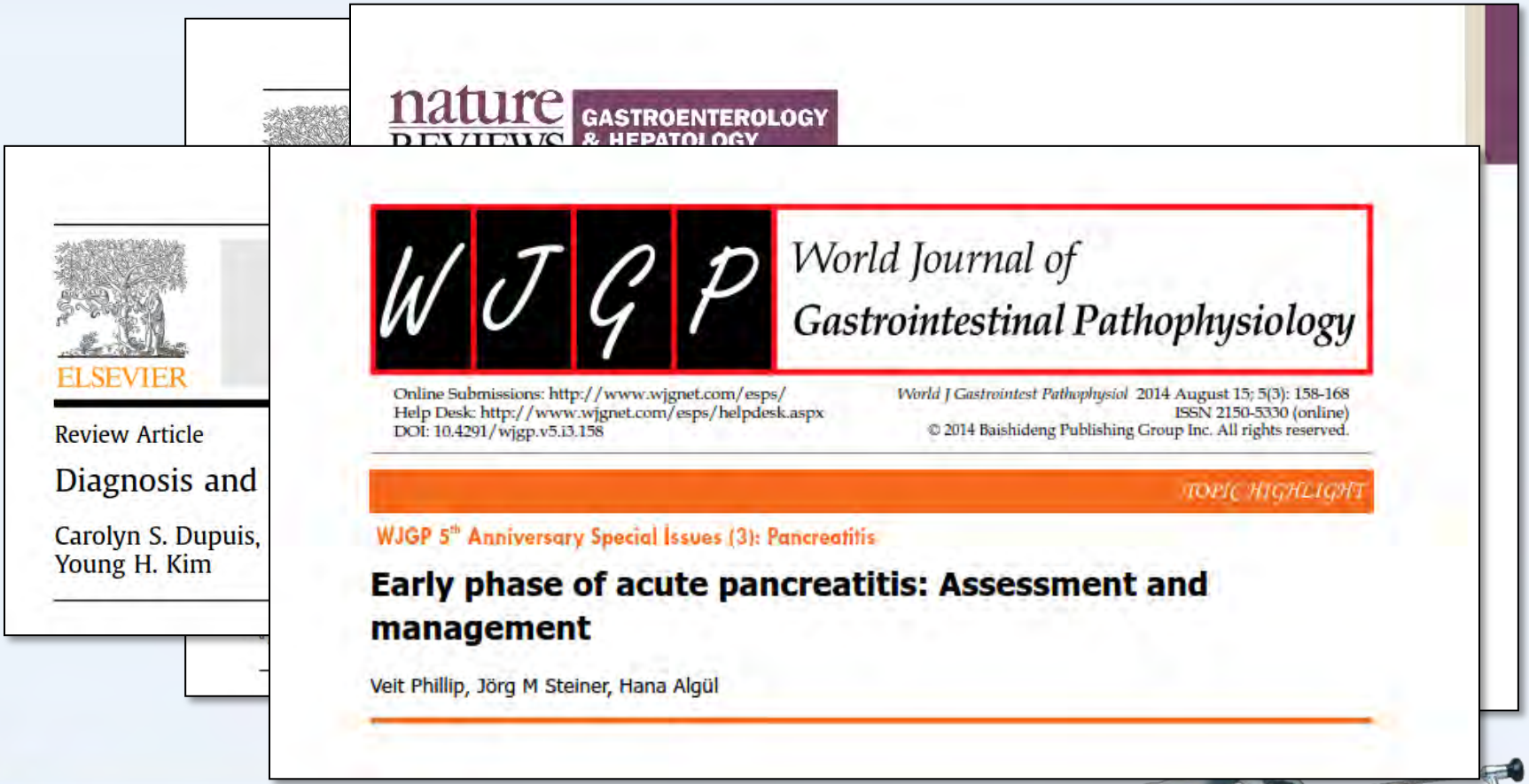
Treatment options for acute pancreatitis

Olaf J. Bakker, Yama Issa, Hjalmar C. van Santvoort, Marc G. Besselink, Nicolien J. Schepers, Marco J. Bruno, Marja A. Boermeester and Hein G. Gooszen

Abstract | This Review covers the latest developments in the treatment of acute pancreatitis. The Atlanta Classification of acute pancreatitis has been revised, proposing several new terms and abandoning some of the old and confusing terminology. The 2012 Revised Atlanta Classification and the determinant-based classification aim to universally define the different local and systemic complications and predict outcome. The most important differences between these classifications are discussed. Several promising treatment options for the early management of acute pancreatitis have been tested, including the use of enteral nutrition and antibiotics as well as novel therapies such as haemofiltration and protease inhibitors. The results are summarized and the quality of evidence is discussed. Finally, new developments in the management of patients with infected pancreatic necrosis are addressed, including the use of the 'step-up approach' and results of minimally invasive necrosectomy.

Bakker, O. J. *et al. Nat. Rev. Gastroenterol. Hepatol.* advance online publication 25 March 2014; doi:10.1038/nrgastro.2014.39

In severe gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be delayed until there is sufficient resolution of the inflammatory response and clinical recovery



In severe gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be delayed until there is sufficient resolution of the inflammatory response and clinical recovery

In a patient with necrotizing biliary AP, in order to prevent infection, cholecystectomy is to be deferred until active inflammation subsides and fluid collections resolve or stabilize.

Cholecystectomy should be delayed in patients with peripancreatic collections until the collections either resolve or if they persist beyond 6 weeks, at which time cholecystectomy can be performed safely.

A cholecystectomy should be performed as soon as gallstone-induced acute pancreatitis has been resolved.

In severe gallstone-associated acute pancreatitis, laparoscopic cholecystectomy should be delayed until there is sufficient resolution of the inflammatory response and clinical recovery

In a patient with necrotizing biliary AP, in order to prevent infection, cholecystectomy is to be deferred until active inflammation subsides and fluid collections resolve or stabilize.

Cholecystectomy should be delayed in patients with peripancreatic collections until the collections either resolve or if they persist beyond 6 weeks, at which time cholecystectomy can be performed safely.

STRONG STATEMENT

A cholecystectomy should be performed as soon as gallstone-induced acute pancreatitis has been resolved.

Apart from cases in which an emergency ERCP is indicated, in case of CBD stones, clearance should be obtained by preoperative ERCP or by laparoscopic removal of bile duct stones during cholecystectomy

WJGE World Journal of Gastrointestinal Endoscopy

Online Submissions: http://www.wjgnet.com/esps/
bpgoffice@wjgnet.com
doi:10.4253/wjge.v6.i2.32

World J Gastrointest Endosc 2014 February 16; 6(2): 32-40
ISSN 1948-5190 (online)

REVIEW

Modern approach to cholecysto-choledocholithiasis

Lapo Bencini, Cinzia Tommasi, Roberto Manetti, Marco Farsi

There is no consensus on the correct strategy for the care of simultaneous gallbladder and common bile duct stones. Many therapeutic options are available, including laparoscopic, endoscopic, percutaneous and open traditional techniques, either through a combination of these treatments or by conducting them in a stepwise sequence.

WJGE | www.wjgnet.com February 16, 2014 | Volume 6 | Issue 2 |

Apart from cases in which an emergency ERCP is indicated, in case of CBD stones, clearance should be obtained by preoperative ERCP or by laparoscopic removal of bile duct stones during cholecystectomy

World Journal of Surgery
Springer

World J Surg (2012) 36:2146–2153
DOI 10.1007/s00268-012-1648-3

Treatment of Common Bile Duct Stones in Sweden 1989–2006: An Observational Nationwide Study of a Paradigm Shift

Birger Sandzén · Markku M. Haapamäki · Erik Nilsson · Hans C. Stenlund · Mikael Öman

The shift from choledochotomy to endoscopic treatment for CBDS observed in our study is in accordance with previous findings in Europe and in the United States. In Sweden, the preferred method for treatment of common bile duct stones has shifted from choledochotomy to endoscopic sphincterotomy. From 1988 to 2006, the incidence of intervention on the common bile duct has increased 28%.

Apart from cases in which an emergency ERCP is indicated, in case of CBD stones, clearance should be obtained by preoperative ERCP or by laparoscopic removal of bile duct stones during c

Surg Endosc
DOI 10.1007/s00464-015-4273-z

Surgeons, ERCP, and laparoscopic common bile duct exploration: do we need a standard approach for common bile duct stones?

Rebeccah B. Baucom[1] · Irene D. Feurer[1,2] · Julia S. Shelton[1] · Kristy Kummerow[1,3] · Michael D. Holzman[1] · Benjamin K. Poulose[1]

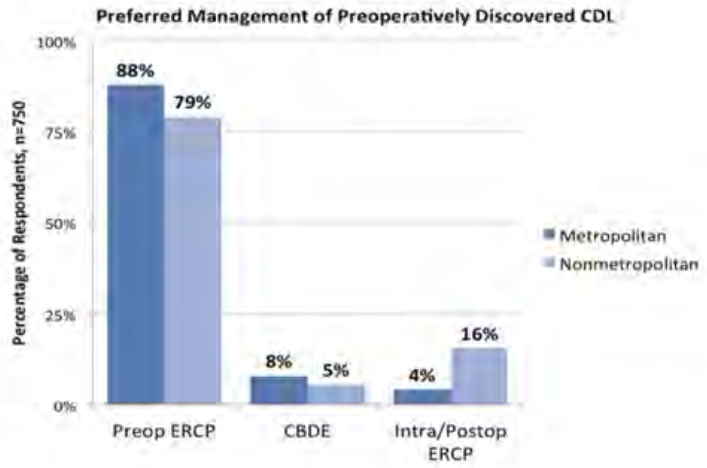


Fig. 7 Preferred management of preoperatively discovered choledocholithiasis (CDL) by metropolitan locale. A significantly greater proportion of surgeons practicing in metropolitan areas preferred preoperative ERCP compared with those in nonmetropolitan areas, and a higher proportion of nonmetropolitan surgeons preferred intraoperative or postoperative ERCP ($p < 0.001$)

Apart from cases in which an emergency ERCP is indicated, in case of CBD stones, clearance should be obtained by preoperative ERCP or by laparoscopic removal of bile duct stones during cholecystectomy

Patients with acute pancreatitis and concurrent acute cholangitis should undergo ERCP within 24h of admission; ERCP is not needed early in most patients with gallstones pancreatitis who lack laboratory or clinical evidence of ongoing biliary obstruction

ERCP is not indicated in predicted mild biliary pancreatitis without cholangitis. ERCP is probably not indicated in predicted severe biliary pancreatitis without cholangitis. ERCP is probably indicated in biliary pancreatitis with common bile duct obstruction. ERCP is indicated in patients with biliary pancreatitis and cholangitis. Urgent ERCP (<24 hrs) is re-quired in patients with acute cholangitis. Currently, there is no evidence regarding optimal timing of ERCP in patients with biliary pancreatitis without cholangitis

Early ERCP/ES should be performed in gallstone-induced acute pancreatitis when complications of cholangitis or prolonged passage disorder of the biliary tract are suspected.

[*In severe acute* pancreatitis] Urgent ERCP should be per-formed within 24 hours in patients with acute cholangitis. ERCP should be per-Formed within 72 hours from admission when an impacted biliary stone has been demonstrated

Apart from cases in which an emergency ERCP is indicated, in case of CBD stones, clearance should be obtained by preoperative ERCP or by laparoscopic removal of bile duct stones during cholecystectomy

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[Intervention Review]

Early routine endoscopic retrograde cholangiopancreatography strategy versus early conservative management strategy in acute gallstone pancreatitis

Frances Tse , Yuhong Yuan

Publication status and date: New, published in Issue 5, 2012.

ABSTRACT

In patients with acute gallstone pancreatitis, there is no evidence that early routine ERCP significantly affects mortality, and local or systemic complications of pancreatitis, regardless of predicted severity. Our results, however, provide support for current recommendations that early ERCP should be considered in patients with co-existing cholangitis or biliary obstruction.

Apart from cases in which an emergency ERCP is indicated, in case of CBD stones, clearance should be obtained by preoperative ERCP or by laparoscopic removal of bile duct stones during cholecystectomy

Pancreas
JOURNAL OF NEUROENDOCRINE TUMORS AND PANCREATIC DISEASES AND SCIENCES
Wolters Kluwer
774 | www.pancreasjournal.com
Pancreas • Volume 42, Number 5, July 2013

REVIEW

Lack of Consensus on the Role of Endoscopic Retrograde Cholangiography in Acute Biliary Pancreatitis in Published Meta-Analyses and Guidelines

A Systematic Review

Erwin-Jan M. van Geenen, MD, PharmD, PhD, Hjalmar C. van Santvoort, MD, PhD,† Marc G.H. Besselink, MD, PhD,†‡ Donald L. van der Peet, MD, PhD,§ Karel J. van Erpecum, MD, PhD,|| Paul Fockens, MD, PhD,¶ Chris J.J. Mulder, MD, PhD,# and Marco J. Bruno, MD, PhD***

Abstract: There is consensus in guidelines and meta-analyses that ERCP/ES is indicated in patients with acute biliary pancreatitis and coexisting cholangitis and/or persistent cholestasis. Consensus is lacking on the role of routine early ERCP/ES in patients with predicted severe ABP

Apart from cases in which an emergency ERCP is indicated, in case of CBD stones, clearance should be obtained by preoperative ERCP or by laparoscopic removal of bile duct stones during

ISRCTN registry

BioMed Central
The Open Access Publisher

ISRCTN97372133 DOI 10.1186/ISRCTN97372133

Acute biliary Pancreatitis: early Endoscopic retrograde cholangiography plus sphincterotomy versus Conservative treatment (APEC trial)

Contact details
Prof M.J. Bruno
Erasmus Medical Center
Department of Gastroenterology and Hepatology
s-Gravendijkwal 230
Rotterdam 3015CE Netherlands

Overall trial start date
01/12/2012

Overall trial end date
31/10/2017

Study hypothesis

We hypothesize that early endoscopic retrograde cholangiography (ERC) plus sphincterotomy improves the outcome of patients with acute biliary pancreatitis without cholangitis in whom the disease course is predicted to be severe.

Intervention

The trial will be performed by the Dutch Pancreatitis Study Group. A total of 232 patients will be randomized in 25 participating centers of the Dutch Pancreatitis Study Group.

1. Intervention group: early (<24 hours of admission) ERC plus sphincterotomy.
2. Comparison group: conservative (expectative) management, delayed ERC when clinically indicated.

The total duration of follow-up is until 6 months after randomization.

Apart from cases in which an emergency ERCP is indicated, in case of CBD stones, clearance should be obtained by preoperative ERCP or by laparoscopic removal of bile duct stones during cholecystectomy

When pancreatic necrosis requires treatment for clinical signs of sepsis or multiorgan failure that does not improve despite optimal therapy, a step-up approach consisting of percutaneous drainage, followed, if necessary, by minimally invasive retroperitoneal debridement should be undertaken. Open surgery should be reserved to patients not responding to minimally invasive treatment

When pancreatic necrosis requires treatment for clinical signs of sepsis or multiorgan failure that does not improve despite optimal therapy, a step-up approach consisting of percutaneous drainage, followed, if necessary, by minimally
surgery sh
treatment

DECEMBER 2012 VOL. 6 ISSUE 6 pp. 745-753 EXPERT-REVIEWS.COM

EXPERT REVIEW OF GASTROENTEROLOGY & HEPATOLOGY

informa healthcare

An update on minimally invasive therapies for pancreatic necrosis

Jeffrey J Easler[1], Amer Zureikat[2], and Georgios I. Papachristou[3]
[1]*Division of Gastroenterology, Hepatology and Nutrition, Pittsburgh, PA, USA*
[2]*Division of Gastrointestinal Surgery, University of Pittsburgh Medical, Pittsburgh, PA, USA*
[3]*Division of Gastroenterology, Veterans Affairs Pittsburgh Health System, Pittsburgh, PA, USA*

Read more: http://informahealthcare.com/doi/abs/10.1586/egh.12.48

When pancreatic necrosis requires treatment for clinical signs of sepsis or multiorgan f… approach co… minimally i… surgery sho… treatment

Gastroenterology

www.gastrojournal.org Volume 141 Number 5 October 2015

CLINICAL—PANCREAS

A Conservative and Minimally Invasive Approach to Necrotizing Pancreatitis Improves Outcome

HJALMAR C. VAN SANTVOORT,* OLAF J. BAKKER,* THOMAS L. BOLLEN,‡ MARC G. BESSELINK,* USAMA AHMED ALI,* A. MARJOLEIN SCHRIJVER,* MARJA A. BOERMEESTER,§ HARRY VAN GOOR,‖ CORNELIS H. DEJONG,¶ CASPER H. VAN EIJCK,** BERT VAN RAMSHORST,## ALEXANDER F. SCHAAPHERDER,‡‡ ERWIN VAN DER HARST,§§ SIJBRAND HOFKER,‖‖ VINCENT B. NIEUWENHUIJS,¶¶¶ MENNO A. BRINK,¶¶ PHILIP M. KRUYT,### ERIC R. MANUSAMA,*** GEORGE P. VAN DER SCHELLING,‡‡‡ TOM KARSTEN,§§§ ERIC J. HESSELINK,‖‖‖ CORNELIS J. VAN LAARHOVEN,¶¶¶¶ CAMIEL ROSMAN,#### KOOP BOSSCHA,**** RALPH J. DE WIT,‡‡‡‡ ALEXANDER P. HOUDIJK,§§§§ MIGUEL A. CUESTA,‖‖‖‖ PETER J. WAHAB,¶¶¶¶ and HEIN G. GOOSZEN* for the Dutch Pancreatitis Study Group

*Department of Surgery, University Medical Center Utrecht, Utrecht; ‡Departments of Radiology and *Surgery, St Antonius Hospital, Nieuwegein; §Department of Surgery, Academic Medical Center, Amsterdam; ‖Department of Surgery, Radboud University Nijmegen Medical Center, Nijmegen; ¶Department of Surgery and NUTRIM, Maastricht University Medical Center, Maastricht; **Department of Surgery, Erasmus Medical Center, Rotterdam; ##Department of Surgery, Leiden University Medical Center, Leiden; §§Department of Surgery, Maasstad Hospital, Rotterdam; ‖‖Department of Surgery, University Medical Center Groningen, Groningen; ¶¶Department of Gastroenterology, Meander Medical Center, Amersfoort; ***Department of Surgery, Gelderse Vallei Hospital, Ede; ***Department of Surgery, Leeuwarden Medical Center, Leeuwarden; ‡‡‡Department of Surgery, Amphia Medical Center, Breda; §§§Department of Surgery, Rainier de Graaf Hospital, Delft; ‖‖‖Department of Surgery, Gelre Hospital, Apeldoorn; ¶¶¶Department of Surgery, St Elisabeth Hospital, Tilburg; ###Department of Surgery, Canisius Wilhelmina Hospital, Nijmegen; ****Department of Surgery, Jeroen Bosch Hospital, Den Bosch; ‡‡‡‡Department of Surgery, Medisch Spectrum Twente, Enschede; §§§§Department of Surgery, Medical Center Alkmaar, Alkmaar; ‖‖‖‖Department of Surgery, Vrije Universiteit Medical Center, Amsterdam; and ¶¶¶¶Department of Gastroenterology, Rijnstate Hospital, Arnhem, The Netherlands

CLINICAL PANCREAS

Acute Pancreatitis
Mario Campli

When pancreatic necrosis requires treatment for clinical signs of sepsis or multiorgan failure that do approach consisting of per minimally invasive retrop surgery should be reserve treatment

JAMA The Journal of the American Medical Association

PRELIMINARY COMMUNICATION

Endoscopic Transgastric vs Surgical Necrosectomy for Infected Necrotizing Pancreatitis

A Randomized Trial

Olaf J. Bakker, MD
Hjalmar C. van Santvoort, MD, PhD
Sandra van Brunschot, MD
Ronald B. Geskus, PhD
Marc G. Besselink, MD, PhD
Thomas L. Bollen, MD
Casper H. van Eijck, MD, PhD
Paul Fockens, MD, PhD
Eric J. Hazebroek, MD, PhD
Rian M. Nijmeijer, MD
Jan-Werner Poley, MD
Bert van Ramshorst, MD, PhD
Frank P. Vleggaar, MD, PhD
Marja A. Boermeester, MD, PhD
Hein G. Gooszen, MD, PhD
Bas L. Weusten, MD, PhD
Robin Timmer, MD, PhD
for the Dutch Pancreatitis Study Group

Context Most patients with infected necrotizing pancreatitis require necrosectomy. Surgical necrosectomy induces a proinflammatory response and is associated with a high complication rate. Endoscopic transgastric necrosectomy, a form of natural orifice transluminal endoscopic surgery, may reduce the proinflammatory response and reduce complications.

Objective To compare the proinflammatory response and clinical outcome of endoscopic transgastric and surgical necrosectomy.

Design, Setting, and Patients Randomized controlled assessor-blinded clinical trial in 3 academic hospitals and 1 regional teaching hospital in the Netherlands between August 20, 2008, and March 3, 2010. Patients had signs of infected necrotizing pancreatitis and an indication for intervention.

Interventions Random allocation to endoscopic transgastric or surgical necrosectomy. Endoscopic necrosectomy consisted of transgastric puncture, balloon dilatation, retroperitoneal drainage, and necrosectomy. Surgical necrosectomy consisted of video-assisted retroperitoneal debridement or, if not feasible, laparotomy.

Main Outcome Measures The primary end point was the postprocedural proinflammatory response as measured by serum interleukin 6 (IL-6) levels. Secondary clinical end points included a predefined composite end point of major complications (new-onset multiple organ failure, intra-abdominal bleeding, enterocutaneous fistula, or pancreatic fistula) or death.

When pancreatic necrosis requires treatment for clinical signs of sepsis or multiorgan failure that does not improve despite optimal therapy, a step-up approach minimall surgery s treatmen

SURGERY

A MONTHLY JOURNAL DEVOTED TO THE ART AND SCIENCE OF SURGERY

Minimally invasive operations for acute necrotizing pancreatitis: Comparison of minimally invasive retroperitoneal necrosectomy with endoscopic transgastric necrosectomy

Dirk Bausch, MD, Ulrich Wellner, MD, Sebastian Kahl, MD, Simon Kuesters, MD, Hans-Jürgen Richter-Schrag, MD, Stefan Utzolino, MD, Ulrich T. Hopt, MD, Tobias Keck, MD, *and* Andreas Fischer, MD, *Freiburg, Germany*

Background. *A "step-up" approach is currently the treatment of choice for acute necrotizing pancreatitis. Our aim was to evaluate the outcome of minimally invasive retroperitoneal necrosectomy (MINE) and endoscopic transgastric necrosectomy (ETG) and to compare it to open necrosectomy (ONE).*

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Volume 152 Number 3
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CENTRAL SURGICAL ASSOCIATION
AMERICAN ASSOCIATION OF ENDOCRINE SURGEONS
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When pancreatic necrosis requires treatment for clinical signs of sepsis or multiorgan failure that does not improve despite optimal therapy, a step-up approach consisting of percutaneous drainage, followed, if necessary, by minimally invasive retroperitoneal debridement should be undertaken. Open surgery should be reserved to patients not responding to minimally invasive treatment

Frontiers of Medicine

RESEARCH ARTICLE

Volume 5 • Number 3
September 2011

高等教育出版社
Springer

Treatment of severe acute pancreatitis through retroperitoneal laparoscopic drainage

Chun Tang*, Baolin Wang*, Bing Xie, Hongming Liu, Ping Chen (✉)

Department of Hepatobiliary Surgery, Research Institute of Surgery, Daping Hospital, Third Military Medical University, Chongqing 400042, China

Abstract A treatment method based on drainage via retroperitoneal laparoscopy was adopted for 15 severe acute pancreatitis (SAP) patients to investigate the feasibility of the method. Ten patients received only drainage via retroperitoneal laparoscopy, four patients received drainage via both retroperitoneal and preperitoneal laparoscopy, and one patient received drainage via conversion to laparotomy. Thirteen patients exhibited a good drainage effect and were successfully cured without any other surgical treatment. Two patients had encapsulated effusions or pancreatic pseudocysts after surgery, but were successfully cured after lavage and B ultrasound-guided percutaneous catheter drainage. SAP treatment via retroperitoneal laparoscopic drainage is an effective surgical method, resulting in minor injury.

When pancreatic necrosis requires treatment for clinical signs of sepsis or multiorgan failure that does not improve despite optimal therapy, a step-up approach consisting of percutaneous drainage, followed, if necessary, by minimally invasive retroperitoneal debridement should be undertaken. Open surgery should be reserved to patients not responding to minimally invasive treatment

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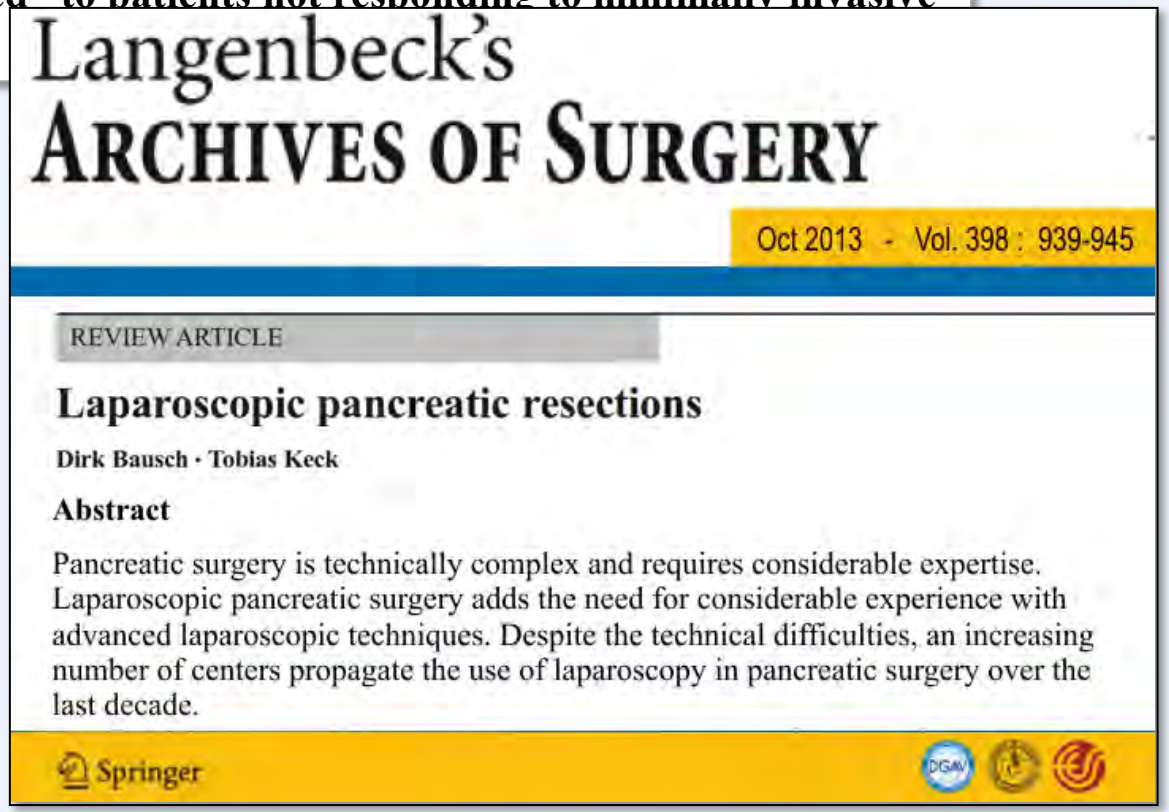
TECHNICAL REPORT

Retroperitoneal Minimally Invasive Pancreatic Necrosectomy Using Single-port Access

Marek Wronski, MD, PhD, Wlodzimierz Cebulski, MD, PhD, Maciej Slodkowski, MD, PhD, Dominika Karkocha, MD, and Ireneusz Wojciech Krasnodebski, MD, PhD

When pancreatic necrosis requires treatment for clinical signs of sepsis or multiorgan failure that does not improve despite optimal therapy, a step-up approach consisting of percutaneous drainage, followed, if necessary, by minimally invasive retroperitoneal debridement should be undertaken. Open surgery should be reserved to patients not responding to minimally invasive treatment



Langenbeck's
ARCHIVES OF SURGERY

Oct 2013 - Vol. 398 : 939-945

REVIEW ARTICLE

Laparoscopic pancreatic resections

Dirk Bausch · Tobias Keck

Abstract

Pancreatic surgery is technically complex and requires considerable expertise. Laparoscopic pancreatic surgery adds the need for considerable experience with advanced laparoscopic techniques. Despite the technical difficulties, an increasing number of centers propagate the use of laparoscopy in pancreatic surgery over the last decade.

Springer

When pancreatic necrosis requires treatment for clinical signs of sepsis or mult… appr… mini… surg… tr…

In stable patients with infected necrosis, surgical, radiologic, and/or endoscopic drainage should be delayed preferably for more than 4 weeks to allow liquefication of the contents and the development of a fibrous wall around the necrosis (walled-off necrosis). In symptomatic patients with infected necrosis, minimally invasive methods of necrosectomy are preferred to open necrosectomy.

[…] indications for intervention […] are: 1) Clinical suspicion of, or documented infected necrotizing pancreatitis with clinical deterioration, preferably when the necrosis has become walled-off, 2) […] ongoing organ failure for several weeks after the onset of acute pancreatitis […] surgical necrosectomy should ideally be delayed until collections have become walled-off, typically 4 weeks after the onset of pancreatitis […] The optimal interventional strategy […] is initial image-guided percutaneous (retroperitoneal) catheter drainage or endoscopic transluminal drainage, followed, if necessary, by endoscopic or surgical necrosectomy.

If possible, therapeutic intervention for infected pancreatic necrosis should be performed after 4 weeks of onset, when the necrosis has been sufficiently walled off. […] percutaneous (retroperitoneal) drainage or endoscopic transluminal drainage should be first given, and if no improvement is achieved, necrosectomy should then be performed. Necrosectomy by endoscopic or retroperitoneal approach is recommended.

The interventional strategy for necrotising pancreatitis should be delayed as long as possible, preferably until 4 weeks after the onset of disease. According to local expertise, the optimal interventional strategy for patients with pancreatic necrosis is the minimally invasive step-up approach

When pancreatic necrosis requires treatment for clinical signs of sepsis or multiorgan failure that does not improve despite optimal therapy, a step-up approach consisting of percutaneous drainage, followed, if necessary, by minimally invasive retroperitoneal debridement should be undertaken. Open surgery should be reserved to patients not responding to minimally invasive treatment

The abdominal compartment syndrome should be managed by prompt laparostomy or fasciotomy; laparoscopy is formally contra-indicated in these cases.

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Bi-Monthly
AN INTERNATIONAL PEER REVIEWED MEDICAL JOURNAL FROM PAKISTAN

LOW LEVEL EVIDENCE

Open Access

Case Report

A minimally invasive management for abdominal compartment syndrome in severe acute pancreatitis

Han-kui Hu[1], Xiao-jiong Du[2], Ang Li[3], Neng-wen Ke[4], Wei-ming Hu[5]

Department of Hepato-Biliary-Pancreatic Surgery,
West China Hospital, 37 GuoXue Rd, Chengdu 610041, Sichuan Province, China.

ABSTRACT

Three patients with severe acute pancreatitis (SAP) developed into overt abdominal compartment syndrome (ACS) and confirmed or suspected infection of necrotic tissue. We successfully treated these patients by minimally invasive decompression with the assist of laparoscope after the failures of intensive care treatments. This technique we report here may be another safe and effective management for ACS in SAP.

doi: http://dx.doi.org/10.12669/pjms.291.2721

The abdominal compartment syndrome should be managed by prompt laparostomy or fasciotomy; laparoscopy is formally contra-indicated in these cases.

PAKISTAN JOURNAL OF MEDICAL SCIENCES

ISSN 1682 - 024X

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Case Report

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Han-kui Hu[1], Xiao-jiong

Department
West China Hospital, 37 G

ABSTRACT

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LOW LEVEL EVIDENCE

World Journal of Emergency Medicine

World J Emerg Med, Vol 6, No 1, 2015

Original Article

23

Embryonic natural orifice transluminal endoscopic surgery in the treatment of severe acute pancreatitis complicated by abdominal compartment syndrome

Hui-ming Zhu, Shao-qing Guo, Xiu-min Liao, Li Zhang, Li Cai

Department of Gastroenterology, Affiliated Donghua Hospital of Sun Yat-sen University, Dongguan 523110, Guangdong Province, China

The abdominal compartment syndrome should be managed by prompt laparostomy or fasciotomy; laparoscopy is formally contra-indicated in these cases.

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Case Report

A minimally invasi

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World Journal of Emergency Medicine

23

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Sun Yat-sen University, Dongguan 523110, Guangdong

CLINICAL ENDOSCOPY

LOW LEVEL EVIDENCE

KoMCI Korean Medical Citation Index

CASE REPORT

Print ISSN 2234-2400 / On-line ISSN 2234-2443

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Open Access

Abdominal Compartment Syndrome in Severe Acute Pancreatitis Treated with Percutaneous Catheter Drainage

Soonyoung Park, Seungho Lee, Hyo Deok Lee, Min Kim, Kyeongmin Kim, Yusook Jeong and Seon Mee Park

Department of Internal Medicine, Chungbuk National University College of Medicine and Medical Research Institute, Cheongju, Korea

The abdominal compartment syndrome should be managed by prompt laparostomy or fasciotomy; laparoscopy is formally contra-indicated in these cases.

Pancreas
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Wolters Kluwer
665 | www.pancreasjournal.com
Pancreas • Volume 43, Number 5, July 2014

REVIEW

Abdominal compartment syndrome in acute pancreatitis

A Systematic Review

van Brunschot S., Schut AJ, Bouwense SA, Besselink MG, Bakker OJ, van Goor H, Hofker S, Gooszen HG, Boermeester MA, van Santvoort HC; Dutch Pancreatitis Study Group.

Abstract

Abdominal compartment syndrome is a lethal complication of acute pancreatitis. We performed a systematic review to assess the treatment and outcome of these patients. After screening 169 articles, 7 studies were included. Abdominal compartment syndrome during acute pancreatitis is associated with high mortality and morbidity. Studies are relatively small and have methodological shortcomings.

The optimal timing and method of invasive interventions, as well as their effect on clinical outcomes, should be further evaluated.

The abdominal compartment syndrome should be managed by prompt laparostomy or fasciotomy; laparoscopy is formally contra-indicated in these cases.

Acute Appendicitis

Nereo Vettoretto

Diagnosis

US to clinical exam (EL 2)

CT in equivocal cases, to reduce negative appendectomy rate (NAR) and missed perforations (EL 2).

Obese may benefit from CT to reduce NAR (EL 4)

Alvarado score (with a cut-off of 4) for diagnosis and for stratification of candidates to CT scan (EL 4)

Absence of specific bioumoral marker (EL 2)

- *Toorenvliet BR, Wiersma F, Bakker RFR, Merkus JWS, Breslau PJ, Hamming JF. Routine ultrasound and limited computed tomography for the diagniosis of acute appendicitis. World J Surg 2010;34:2278-85.*
- *Shogilev DJ, Duus N, Odom SR, Shapiro NI. Diagnosing appendicitis: evidence-based review of the diagnostic approach in 2014. West J Emerg Med. 2014 Nov;15(7):859-71.*
- *Jones RP, Jeffrey RB, Shah BR, Desser TS, Rosenberg J, Olcott EW.J OURNAL CLUB: The Alvarado Score as a Method for Reducing the Number of CT Studies When Appendiceal Ultrasound Fails to Visualize the Appendix in Adults.AJR Am J Roentgenol. 2015 Mar;204(3):519-26.*
- *Coursey CA, Nelson RC, Moreno RD, Patel MB, Beam CA, Vaslef S. Appendicitis, body mass index, and CT: is CT more valuable for obese patients than thin patients? Am Surg. 2011 Apr;77(4):471-5.*

Laparoscopic Appendectomy: when?

gold standard in pre-menopausal women (EL 1)

> 65 years improved clinical outcomes (in terms of length of stay (LOS), mortality and overall morbidity) compared with OA (EL 3)

Improved outcomes in obese (BMI >30) (EL 2)

feasible in men, even if advantages over OA in the latter group are not demonstrated (EL 2)

- *Sauerland S, Jaschinski T, Neugebauer EA. Laparoscopic versus open surgery for suspected appendicitis. Cochrane Database Syst Rev. 2010 Oct 6;(10):CD001546.]*
- *Ward NT, Ramamoorthy SL, Chang DC, Parsons JK. Laparoscopic appendectomy is safer than open appendectomy in an elderly population. JSLS. 2014 Jul;18(3).*
- *Ciarrocchi A(1), Amicucci G(1).Laparoscopic versus open appendectomy in obese patients: A meta-analysis of prospective and retrospective studies. J Minim Access Surg. 2014 Jan;10(1):4-9.*
- *Tzovaras G, Baloyiannis I, Kouritas V, Symeonidis D, Spyridakis M, Poultsidi A, Tepetes K, Zacharoulis D. Laparoscopic versus open appendectomy in men: a prospective randomized trial. Surg Endosc. 2010;24(12):2987-92*

Complicated appendicitis

Defined as abscess, perforation, gangrene, generalized peritonitis

can be approached laparoscopically in experienced context (EL 3)

significant advantages, comprehending lower overall complications, readmission rate, SBO rate, infections of the surgical and faster recovery (EL 3)

- *Wang CC, Tu CC, Wang PC, Lin HC, Wei PL. Outcome comparison between laparoscopic and open appendectomy: evidence from a nationwide population-based study. PLoS One. 2013 Jul 12;8(7):e68662.*
- *Yeh CC, Wu SC, Liao CC, Su LT, Hsieh CH, Li TC. Laparoscopic appendectomy for acute appendicitis is more favorable for patients with comorbidities, the elderly, and those with complicated appendicitis: a nationwide populationbased study. Surg Endosc 2011;* ***25****: 2932-2942*
- *Masoomi H, Mills S, Dolich MO, Ketana N, Carmichael JC, Nguyen NT, Stamos MJ. Comparison of outcomes of laparoscopic versus open appendectomy in adults: data from the Nationwide Inpatient Sample (NIS), 2006-2008. J Gastrointest Surg 2011; 15: 2226-2231*
- *Isaksson K, Montgomery A, Moberg AC, Andersson R, Tingstedt B. Long-term follow-up for adhesive small bowel obstruction after open versus laparoscopic surgery for suspected appendicitis. Ann Surg. 2014 Jun;259(6):1173-7.*

Risk of conversion

Conversion stratifies morbidity to "open" appendectomy
Factors affecting higher rates of conversion:

- Preoperative: patients with >5 days of symptoms, >20000 WBC count, > 45 years males, ruptured appendicitis on CT scan, comorbidities, obese (EL 4)

- Intraoperative: perforation, retrocecal position, abscess, peritonitis

- *Gupta N, Machado-Aranda D, Bennett K, Mittal VK. Identification of preoperative risk factors associated with the conversion of laparoscopic to open appendectomies. Int Surg. 2013 Oct-Dec;98(4):334-9.*
- *Antonacci N, Ricci C, Taffurelli G, Monari F, Del Governatore M, Caira A, Leone A, Cervellera M, Minni F, Cola B. Laparoscopic appendectomy: Which factors are predictors of conversion? A high-volume prospective cohort study. Int J Surg. 2015 Jul 29;21:103-107.*

Peritoneal lavage

low-volume lavage and complete aspiration in non-peritonitis patients (EL3) (LE 2 study in children has not demonstrated advantages in terms of intraabdominal abscesses (IAA) of >500ml)

>6-8lt are needed to lower significantly bacterial charge (EL 4) in generalized peritonitis.

- *Moore CB, Smith RS, Herbertson R, Toevs C. Does use of intraoperative irrigation with open or laparoscopic appendectomy reduce post-operative intra-abdominal abscess? Am Surg. 2011 Jan;77(1):78-80.*
- *St Peter SD, Adibe OO, Iqbal CW, Fike FB, Sharp SW, Juang D, Lanning D, Murphy JP, Andrews WS, Sharp RJ, Snyder CL, Holcomb GW, Ostlie DJ. Irrigation versus suction alone during laparoscopic appendectomy for perforated appendicitis: a prospective randomized trial. Ann Surg. 2012 Oct;256(4):581-5*
- *Ohno Y, Furui J, Kanematsu T. Treatment strategy when using intraoperative peritoneal lavage for perforated appendicitis in children: a preliminary report. Pediatr Surg Int. 2004;20:534-7*

Drainage and risk of IAA

Recommended in generalized peritonitis (EL 3)

No routine use recommended (more complications, LOS and transit recovery time (EL 3), despite the widespread opinion that aspiration of the residual fluid after peritoneal lavage in the first 24 h postop might lower the incidence of IAA in case of insufficient lavage (EL 5)

The increase of post-operative IAA in LA is not confirmed by more recent reviews (EL 2) even if database longitudinal studies still demonstrate a two-fold increase of IAA in LA vs OA

- *Allemann P, Probst H, Demartines N, Schäfer M. Prevention of infectious complications after laparoscopic appendectomy for complicated acute appendicitis: the role of routine abdominal drainage. Langenbecks Arch Surg. 2011 Jan;396(1):63-8*
- *Lin HF, Lai HS, Lai IR. Laparoscopic treatment of perforated appendicitis.World J Gastroenterol. 2014 Oct 21;20(39):14338-47*
- *Kapischke M, Caliebe A, Tepel J, Schulz T, Hedderich J. Open versus laparoscopic appendectomy: a critical review. Surg Endosc. 2006;20:1060-8*
- *Tuggle KR, Ortega G, Bolorunduro OB, Oyetunji TA, Alexander R, Turner PL, Chang DC, Cornwell EE 3rd, Fullum TM. Laparoscopic versus open appendectomy in complicated appendicitis: a review of the NSQIP database. J Surg Res. 2010 Oct;163(2):225-8*

Appendiceal inflammatory masses

3.8% of appendicites

Immediate surgery has higher morbidity vs non-surgical treatment (OR 3.3)(EL 2)

Non-surgical treatment followed by interval appendectomy has higher morbidity than no appendectomy (EL 2)

…BUT Failure 7.2%, recurrency 7.4%, malignancy 1.5%

Interval LA carries advantages over interval OA (EL 4)

- *Meshikhes AW. Management of appendiceal mass: controversial issues revisited. J Gastrointest Surg. 2008 Apr;12(4):767-75. Epub 2007 Nov 13*
- *Carpenter SG, Chapital AB, Merritt MV, Johnson DJ. Increased risk of neoplasm in appendicitis treated with interval appendectomy: single-institution experience and literature review. Am Surg. 2012 Mar;78(3):339-43. Review.*
- *Andersson RE, Petzold MG. Nonsurgical treatment of appendiceal abscess or phlegmon: a systematic review and meta-analysis. Ann Surg 2007; 246: 741-748*
- *Tannoury J, Abboud B. Treatment options of inflammatory appendiceal masses in adults. World J Gastroenterol. 2013 Jul 7;19(25):3942-50.*
- *Rashid A, Nazir S, Kakroo SM, Chalkoo MA, Razvi SA, Wani AA. Laparoscopic interval appendectomy versus open interval appendectomy: a prospective randomized controlled trial. Surg Laparosc Endosc Percutan Tech. 2013 Feb;23(1):93-6.*

Pregnancy

Is feasible in every trimester (EL 2) but the choice must be put in each surgeons' hands, as advantages are minor (less pain, less infections, less early deliveries) if compared to the risk of fetal loss, which is increased in LA if compared to OA (EL 2), without difference in maternal complications between LA and OA (EL 3).

- *Jackson H, Granger S, Price R, Rollins M, Earle D, Richardson W, Fanelli R. Diagnosis and laparoscopic treatment of surgical diseases during pregnancy: an evidence-based review. Surg Endosc. 2008;22(9):1917-27*
- *Wilasrusmee C, Sukrat B, McEvoy M, Attia J, Thakkinstian A. Systematic review and meta-analysis of safety of laparoscopic versus open appendicectomy for suspected appendicitis in pregnancy. Br J Surg. 2012 Nov;99(11):1470-8*
- *Cheng HT, Wang YC, Lo HC, Su LT, Soh KS, Tzeng CW, Wu SC, Sung FC, Hsieh CH. Laparoscopic appendectomy versus open appendectomy in pregnancy: a population-based analysis of maternal outcome.Surg Endosc. 2014 Aug 30.*

Removal of a normal appendix

In the presence of other diseases at exploration LA is not opportune

If no other disease and normal appendix is recommended to remove the appendix to prevent a 32.9% of readmission for abdominal pain (EL 3)

Morbidity of appendectomy is similar to that of an explorative laparoscopy. If the practice's rate of abscesses is minimal, than appendectomy is advised in order to prevent recurrent pain and readmission and to gain the "endoappendicites", which count for 11-26% of normal appendices at pathologic examination (EL 4)

If a normal appendix is associated with preoperatory discovery of suspected faecalith or faecal impaction appendectomy is advised (EL 4).

- *Bhangu A, Begaj I, Ray D. Population level analysis of diagnostic laparoscopy versus normal appendicectomy for acute lower abdominal pain. Int J Surg. 2014 Dec;12(12):1374-9.*
- *Garlipp B, Arlt G. Laparoscopy for suspected appendicitis. Should an appendix that appears normal be removed?. Chirurg. 2009 Jul;80(7):615-21.*
- *Ramdass MJ, Young Sing Q, Milne D, Mooteeram J, Barrow S. Association between the appendix and the fecalith in adults. Can J Surg. 2015 Feb;58(1):10-4.*

Appendiceal stump closure

Stapler reduces operative time and superficial wound infections (LE 1) and may reduce IAA (LE 3)

Higher costs (6 to 12 fold) influence the choice toward loop-closure, nevertheless attention must be payed to training issues since LA is mostly performed by younger surgeons, hence an easier and technically standardized closure device might prove advantageous (EL 5)

- *Kazemeier G, in't Hof KH, Saad S, Bonjer HJ, Sauerland S. Securing the appendiceal stump in laparoscopic appendectomy: evidence for routine stapling? Surg Endosc. 2006;20:1473-6*
- *Sahm M, Kube R, Schmidt S, Ritter C, Pross M, Lippert H. Current analysis of endoloops in appendiceal stump closure. Surg Endosc 2011; 25: 124-129*
- *Lin HF, Lai HS, Lai IR. Laparoscopic treatment of perforated appendicitis.World J Gastroenterol. 2014 Oct 21;20(39):14338-47*
- *Beldi G, Vorburger SA, Bruegger LE, et al. Analysis of stapiling versus endoloops in appendiceal stump closure. BJS 2006:93;1390-93*

Trocars

Various positions and trocar size might be used

Needlescopy only in selected and not complicated cases due to its higher rate of conversions and prolonged OT time (EL 1) and failed to prove any benefit in a recent comparison with standard LA (EL 4).

- *Sajid MS, Khan MA, Cheek E, Baig MK. Needlescopic versus laparoscopic appendectomy: a systematic review. Can J Surg. 2009;52:129-134*

Single port and NOTES

SINGLE PORT: equivalent safety in experienced hands (EL 1) even with conventional and low-cost devices (EL 4) with patient-percieved benefits in cosmesis (EL 2).

NOTES (trans-vaginal) in women with uncomplicated appendicitis, has seen a growing interest, with more than 100 cases published in a recent systematic review (EL 2), with advantages on pain and recovery over LA (EL 3).

- *Vettoretto N, Cirocchi R, Randolph J, Morino M. Acute appendicitis can be treated with single-incision laparoscopy: a systematic review of randomized controlled trials. Colorectal Dis. 2015 Apr;17(4):281-9*
- *Lee SE, Choi YS, Kim BG, Cha SJ, Park JM, Chang IT. Single port laparoscopic appendectomy in children using glove port and conventional rigid instruments. AnnSurg Treat Res. 2014 Jan;86(1):35-8*
- *SCARLESS Study Group, Ahmed I, Cook JA, Duncan A, Krukowski ZH, Malik M, MacLennan G, McCormack K. Single port/incision laparoscopic surgery compared with standard three-port laparoscopic surgery for appendicectomy: a randomized controlled trial. Surg Endosc. 2015 Jan;29(1):77-85.*
- *Yagci MA, Kayaalp C. Transvaginal appendectomy: a systematic review. Minim Invasive Surg. 2014;2014:384706*
- *Bernhardt J(1), Steffen H, Schneider-Koriath S, Ludwig K. Clinical NOTES appendectomy study: comparison of transvaginal NOTES appendectomy in hybrid technique with laparoscopic appendectomy. Int J Colorectal Dis. 2015 Feb;30(2):259-67.*

Fast-track

Is on study:

prevalently in children (EL 4)

and one-day or outpatient surgery is beginning to be studied also for adults (EL 4)

- *Lasso Betancor CE, Ruiz Hierro C, Vargas Cruz V, Orti Rodríguez RJ, Vázquez Rueda F, Paredes Esteban RM. [Implementation of "fast-track" treatment in paediatric complicated appendicitis]. Cir Pediatr. 2013 Apr;26(2):63-8.*

- *Frazee RC, Abernathy SW, Davis M, Hendricks JC, Isbell TV, Regner JL, Smith RW. Outpatient laparoscopic appendectomy should be the standard of care for uncomplicated appendicitis. J Trauma Acute Care Surg. 2014 Jan;76(1):79-82*

Costs

Not determining in favouring open or LA, unless there is a routinary application of costly technology (EL 2).

- *Gorenoi V, Dintsios CM, Schonermark M, Hagen A. Laparoskopische vs. offene Appendektomie. Systematische Ubersicht zur medizinischen Wirksamkeit und gesundheitsokonomische Analyse. HTA-Bericht 148. In: Deutsche Agentur fur Health Technology Assessment des Deutschen Instituts fur Medizinische Dokumentation und Information (DAHTA@DIMDI) (Hrsg.). Schriftenreihe Health Technology Assessment (HTA) in der Bundesrepublik Deutschland. DAHTA-Datenbank des DIMDI, Koln, 2006*

Gynecologic disorders

Luca Ansaloni

Introduction

The most common diagnoses encountered in female patients with acute lower abdominal and/or pelvic pain are:

1. *ectopic pregnancy (EP),*
2. *adnexal torsion (AT),*
3. *endometriosis,*
4. *pelvic inflammatory disease (PID), and*
5. *hemorrhagic ovarian cysts.*

McWilliams GD, Hill MJ, Dietrich CS 3rd (2008) Gynecologic emergencies. Surg Clin North Am 88:265–283

Methods - Strategy search

According to the consensus statement, we searched for key words on PubMed database from January 2011, till December 2014. Furthermore a manual search was added. Key words were:

For diagnostic laparoscopy in acute gynecolologic disorders:
(("laparoscopy"[MeSH Terms] OR "laparoscopy"[All Fields] OR ("diagnostic"[All Fields] AND "laparoscopy"[All Fields]) OR "diagnostic laparoscopy"[All Fields]) AND acute[All Fields] AND ("genital diseases, female"[MeSH Terms] OR ("genital"[All Fields] AND "diseases"[All Fields] AND "female"[All Fields]) OR "female genital diseases"[All Fields] OR ("gynecologic"[All Fields] AND "disorders"[All Fields]) OR "gynecologic disorders"[All Fields])) AND ((Meta-Analysis[ptyp] OR Randomized Controlled Trial[ptyp] OR systematic[sb]) AND "2010/01/01"[PDat] : "2014/12/31"[PDat])
6 studies, 2 pertinent

For ectopic pregnancy:
(("laparoscopy"[MeSH Terms] OR "laparoscopy"[All Fields]) AND ("pregnancy, ectopic"[MeSH Terms] OR ("pregnancy"[All Fields] AND "ectopic"[All Fields]) OR "ectopic pregnancy"[All Fields] OR ("ectopic"[All Fields] AND "pregnancy"[All Fields]))) AND ((Meta-Analysis[ptyp] OR Randomized Controlled Trial[ptyp] OR systematic[sb]) AND "2010/09/21"[PDat] : "2015/09/19"[PDat])
9 studies, 1 pertinent, (manual search: 4 studies)

For adnexal torsion:
(("laparoscopy"[MeSH Terms] OR "laparoscopy"[All Fields]) AND adnexal[All Fields] AND torsion[All Fields]) AND ("2010/09/22"[PDat] : "2015/09/20"[PDat])
71 studies, 13 pertinent

For benign ovarian tumor:
(benign[All Fields] AND ("ovarian neoplasms"[MeSH Terms] OR ("ovarian"[All Fields] AND "neoplasms"[All Fields]) OR "ovarian neoplasms"[All Fields] OR ("ovarian"[All Fields] AND "tumour"[All Fields]) OR "ovarian tumour"[All Fields]) AND ("laparoscopy"[MeSH Terms] OR "laparoscopy"[All Fields])) AND ((Meta-Analysis[ptyp] OR Randomized Controlled Trial[ptyp] OR systematic[sb]) AND "2010/09/22"[PDat] : "2015/09/20"[PDat])
5 studies, 3 pertinent

For endometriosis:
(("endometriosis"[MeSH Terms] OR "endometriosis"[All Fields]) AND ("laparoscopy"[MeSH Terms] OR "laparoscopy"[All Fields])) AND ((Meta-Analysis[ptyp] OR Randomized Controlled Trial[ptyp] OR systematic[sb]) AND "2010/09/22"[PDat] : "2015/09/20"[PDat])
An abstracts' review was done and full text papers were retrieved to be examined and the contents compared with the current 2011 Guidelines.
The new evidence was added grading it according to CEBM Levels of Evidence [1] by Oxford University.
83 studies, 6 pertinent

For pelvic inflammatory disease:
(("pelvic inflammatory disease"[MeSH Terms] OR ("pelvic"[All Fields] AND "inflammatory"[All Fields] AND "disease"[All Fields]) OR "pelvic inflammatory disease"[All Fields]) AND ("laparoscopy"[MeSH Terms] OR "laparoscopy"[All Fields])) AND ((Meta-Analysis[ptyp] OR Randomized Controlled Trial[ptyp] OR systematic[sb] OR Clinical Trial[ptyp] OR Review[ptyp]) AND "2010/09/22"[PDat] : "2015/09/20"[PDat])
22 studies, 5 pertinent

For hemorrhagic ovarian cysts:
(("rupture"[MeSH Terms] OR "rupture"[All Fields] OR "ruptured"[All Fields]) AND ("corpus luteum"[MeSH Terms] OR ("corpus"[All Fields] AND "luteum"[All Fields]) OR "corpus luteum"[All Fields]) AND ("laparoscopy"[MeSH Terms] OR "laparoscopy"[All Fields])) AND ("2010/09/22"[PDat] : "2015/09/20"[PDat])
8 studies, 3 pertinent

204 studies, 33 pertinent + 4 manual search = 37

Results – Diagnostic laparoscopy

- Many acute GD can be approached safely and effectively with laparoscopy, with the aim not only to correctly diagnose the diseases but also to treat them (LE 4)
- In gynecological emergencies, transvaginal and conventional US with the aid of a pregnancy test can formulate a differential diagnosis in a high percentage of patients (LE 4). However, DL is better than US (LE 3) and may lead to the modification of an incorrect preoperative diagnosis in up to 40 % of cases (LE 4). Early DL results in the accurate, prompt, and efficient management of acute abdominal pain, particularly in general practice (LE 4), especially in the case of appendicitis (LE 2).

- Efficiency of DL in acute gynecologic disorders yielded only 2 references, the previous Guidelines and a SR on NSAP.
- The latter established that early laparoscopy (EL) performed better in establishing a final diagnosis (79.2-96.9%) vs. active observation (AO) (28.1-78.1%); however, the final therapeutic utility of laparoscopy was lower than the diagnostic rate (10.9-86.5%). The mortality rate of EL was similar to AO, and morbidity ranged from 1.15 to 23.72% in EL compared with the range from 1.9 to 31.14% in AO. The length of hospital stay ranged from 1.3 to 4.18 days in EL compared with the range from 2 to 7.3 days in AO. Unfortunately in this SR there is an important heterogeneity between the populations and in the degree of methodologic quality in the included studies (LE2).

Domínguez LC et al. Early laparoscopy for the evaluation of nonspecific abdominal pain: a critical appraisal of the evidence. Surg Endosc. 2011;25(1):10-8.

Results – Ectopic pregnancy

- Laparoscopic surgery should be undertaken because its total cost is less, is fast and fertility outcome is comparable to laparotomy; sick leave and hospitalization are shorter and adhesion development is minor compared to laparotomy (LE 2).
- Hemodynamic instability is a contraindication for laparoscopy

- A SR compares medical and surgical treatment costs, concluding that the treatment of small EP in haemodynamically stable patients (defined by HCG levels <1,500 IU/l) is medically successful and cost-effective, but with HCG levels between 1,500 IU/l and 3,000 IU/l, the treatment costs are similar and finally with HCG levels >5,000 IU/l the surgical treatment is more cost-effective (LE 2).
- Recent reports indicate that where availability of suitable operative equipment, nursing teams, and advanced laparoscopic skills are present, laparoscopy is indicated even in the case of **hemodynamic instability** because it allows rapid access to pelvic structures (LE 3).

Ebner F et al. Treatment cost evaluation of extrauterine gravidity: a literature review of medical and surgical treatment costs. Arch Gynecol Obstet. 2015 Mar;291(3):493-8.
Cengiz H et al. Is laparoscopic surgery safe in patients with an elevated shock index due to ruptured ectopic pregnancy? Clin Exp Obstet Gynecol. 2013;40(3):418-20.
Cohen A et al. Laparoscopy versus laparotomy in the management of ectopic pregnancy with massive hemoperitoneum. Int J Gynaecol Obstet. 2013 Nov;123(2):139-41.
Odejinmi F et al. Operative laparoscopy as the mainstay method in management of hemodynamically unstable patients with ectopic pregnancy. J Minim Invasive Gynecol. 2011 Mar-Apr;18(2):179-83.

Results – Adnexal torsion

- Laparoscopy for ovarian conservation is recommended to treat patients with AT because of its associated shorter hospital stay, fewer postoperative complications, and ovarian preservation (LE 4).
- The studies found in the last 5 years, all LE 4, confirm previous recommendations: laparoscopy in treatment of AT seems effective even during pregnancy.

- When ovarian cysts are found during DL, they should be treated laparoscopically (LE 2). Laparoscopic surgery was also reported to be superior compared to open surgery for resecting other types of ovarian cysts (LE 2).
- No further studies of high level of evidence have been found during the last 5 years regarding this topic, so recommendations are confirmed. Regarding the treatment of benign ovarian tumor during pregnancy a SR has shown that the practice of laparoscopic surgery is associated with benefits and harms. However, the evidence for the magnitude of these benefits and harms is drawn from case series studies, associated with potential bias. LE 4

Ashwal E et al. Presentation, Diagnosis, and Treatment of Ovarian Torsion in Premenarchal Girls. J Pediatr Adolesc Gynecol. 2015 Mar 28. pii: S1083-3188(15)00166-7.
Nair S et al. Five year retrospective case series of adnexal torsion. J Clin Diagn Res. 2014 Dec;8(12):OC09-13.
Brun JL et al. Management of presumed benign ovarian tumors: updated French guidelines. Eur J Obstet Gynecol Reprod Biol. 2014 Dec;183:52-8.
Fujishita A, et al. Outcome of conservative laparoscopic surgery for adnexal torsion through one-stage or two-stage operation. J Obstet Gynaecol Res. 2015 Mar;41(3):411-7.
Vijayalakshmi K, et al. Clinico-pathological profile of adnexal torsion cases: a retrospective analysis from a tertiary care teaching hospital. J Clin Diagn Res. 2014 Jun;8(6):OC04-7.
Al-Shukri M, et al. A clinicopathological study of women with adnexal masses presenting with acute symptoms. Ann Med Health Sci Res. 2014 Mar;4(2):286-8.
Bouet PE, et al. Laparoscopic management of recurrent adnexal torsion in the second and third trimesters of pregnancy. Eur J Obstet Gynecol Reprod Biol. 2013 Sep;170(1):294-5.
Spinelli C, et al. Adnexal torsion in children and adolescents: new trends to conservative surgical approach -- our experience and review of literature. Gynecol Endocrinol. 2013 Jan;29(1):54-8.
Tsafrir Z, et al. Adnexal torsion: cystectomy and ovarian fixation are equally important in preventing recurrence. Eur J Obstet Gynecol Reprod Biol. 2012 Jun;162(2):203-5.
Malamas FM, et al. Adnexal torsion: don't give up on the ovary. J Obstet Gynaecol. 2012 Apr;32(3):314-5.
Chang SD, et al. Surgical intervention for maternal ovarian torsion in pregnancy. Taiwan J Obstet Gynecol. 2011 Dec;50(4):458-62.
Koo YJ, et al. A 10-year experience of laparoscopic surgery for adnexal masses during pregnancy. Int J Gynaecol Obstet. 2011 Apr;113(1):36-9.
Karayalçın R, et al. Conservative laparoscopic management of adnexal torsion. J Turk Ger Gynecol Assoc. 2011 Mar 1;12(1):4-8.
French College of Gynecologists and Obstetricians. [Recommendations for clinical practice: Presumed benign ovarian tumors--short text]. J Gynecol Obstet Biol Reprod (Paris). 2013 Dec;42(8):856-66.
Bunyavejchevin S, Phupong V. Laparoscopic surgery for presumed benign ovarian tumor during pregnancy. Cochrane Database Syst Rev. 2013 Jan 31;1:CD005459.

Results – Endometriosis

- Surgical treatment may be indicated in some patients and may be performed as an open procedure or laparoscopically, although no trials have compared the two approaches (LE 5). More evidence is available on the comparative effectiveness of laparoscopic excision versus conservative treatment of endometriosis. Although these studies included elective rather than emergency patients, their results indicate that laparoscopic excision results in clear and patient-relevant advantages as opposed to conservative treatment (LE 1).
- Although include elective rather than emergency patients, six further studies of high level of evidence (LE 1-2) have been found during the last 5 years regarding this topic, so recommendations are confirmed. In particular there is moderate quality evidence that laparoscopic surgery to treat mild and moderate endometriosis reduces overall pain and increases live birth or ongoing pregnancy rates.

Ulrich U, et al. Guideline for the Diagnosis and Treatment of Endometriosis: Long Version – AWMF Registry No. 015-045. Geburtshilfe Frauenheilkd. 2014 Dec;74(12):1104-1118.
Jin X, Ruiz Beguerie J. Laparoscopic surgery for subfertility related to endometriosis: a meta-analysis. Taiwan J Obstet Gynecol. 2014 Sep;53(3):303-8. doi: 10.1016/j.tjog.2013.02.004.
Duffy JM, et al. Laparoscopic surgery for endometriosis. Cochrane Database Syst Rev. 2014 Apr 3;4:CD011031.
Brown J, Farquhar C. Endometriosis: an overview of Cochrane Reviews. Cochrane Database Syst Rev. 2014 Mar 10;3:CD009590.
Ballester M, et al. Urinary dysfunction after colorectal resection for endometriosis: results of a prospective randomized trial comparing laparoscopy to open surgery. Am J Obstet Gynecol. 2011 Apr;204(4):303.e1-6.
Hudelist G, et al. Diagnostic accuracy of transvaginal ultrasound for non-invasive diagnosis of bowel endometriosis: systematic review and meta-analysis. Ultrasound Obstet Gynecol. 2011 Mar;37(3):257-63.

Results – PID

Initial management of a suspected follicular or hemorrhagic cyst is supportive management and continued observation with a repeat pelvic ultrasound in approximately 4–6 weeks to document resolution. Indications for immediate operative intervention include a large amount of peritoneal fluid found on transvaginal ultrasound, hemodynamic instability, and severe pain. Delayed operative management is indicated for patients in whom pain does not improve with conservative management or for persistent tumors to rule out a neoplastic process. A cystectomy is recommended as opposed to a unilateral salpingooophorectomy in reproductive-aged women. Laparoscopic evaluation is usually feasible; however, if cancer is suspected, laparotomy may be necessary to ensure complete removal and for staging purposes (LE 5). Laparoscopic surgery advantages over laparotomy include shorter hospital stay without increased adverse events (LE 3).

No further studies of high level of evidence have been found during the last 5 years (only LE 4) regarding this topic, so recommendations are confirmed [238, 239, 240].

Wang H, et al. Hemoperitoneum from corpus luteum rupture in patients with aplastic anemia. Clin Lab. 2015;61(3-4):427-30.
Vidaković S, et al. Ruptured corpus luteum cyst in early pregnancy: a case report. Srp Arh Celok Lek. 2013 Sep-Oct;141(9-10): 689-92.
Sun WC, Li W, et al. Corpus luteum hemorrhage in a patient with aplastic anemia. J Obstet Gynaecol Res. 2013 Jan;39(1):399-401.

Final statement

When gynecologic disorders are the suspected cause of abdominal pain, diagnostic laparoscopy (DL) should follow conventional diagnostic investigations, especially US (GoR A), and, if needed, a laparoscopic treatment of the disease should be performed (GoR A).
Close cooperation with the gynecologist is strongly recommended (GoR A).

When gynecologic disorders are the suspected cause of abdominal pain, diagnostic laparoscopy (DL), although should follow conventional diagnostic investigations, especially US, seems better than active observation (Recommend), and, if needed, a laparoscopic treatment of the disease should be performed (Recommend).
Close cooperation with the gynecologist is strongly suggested (Recommend).

Non Specific acute Abdominal Pain

Michele Carlucci

Surg Endosc (2008) 22:1353–1383
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Diagnostic laparoscopy guidelines

This guideline was prepared by the SAGES Guidelines Committee and reviewed and approved by the Board of Governors of the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), November 2007

Nonspecific acute abdominal pain (NSAP) is defined as acute abdominal pain that lasts less than 7 days and for which the diagnosis remains uncertain after baseline examination and diagnostic tests and not requiring urgent procedure

Table 2 GAPEDS phase 1: CPVs

Age	Does examination change during ED visit?
Sex	Does pain resolve during ED visit?
Pulse rate, initial	Does patient vomit during ED visit?
Systolic blood pressure, initial	Urinalysis, leukocyte esterase positive?
Respiratory rate, initial	Urinalysis, nitrite positive?
Temperature, initial	Urinalysis, ketones positive?
Pain, diffuse or localized	Urinalysis, leukocytes present?
Pain location, if localized	Urinalysis, erythrocytes present?
Pain, sudden or gradual onset	Venous pH
Does pain radiate?	Venous base excess
Nausea in past 24 hours?	CBC, leukocyte count
Vomiting in past 24 hours?	Amylase, serum
Anorexia in past 24 hours?	Lipase, serum
Diarrhea in past 24 hours?	AST, serum
Flatus in past 24 hours?	ALT, serum
Melena in past 24 hours?	Alkaline phosphatase, serum
Hematochezia in past 24 hours?	Total bilirubin, serum
Hematemesis in past 24 hours?	Direct bilirubin, serum
Bowel sounds present?	Glucose, serum
Rebound tenderness?	Serum urea nitrogen
McBurney point tenderness?	Creatinine, serum
Murphy sign present?	AAS predicts UI required?
Rovsing sign present?	NHCT predicts UI required?
Costovertebral angle tenderness present?	ED diagnosis
Stool grossly bloody?	Final diagnosis
Stool heme positive?	UI required?

CBC indicates complete blood count; AST, aspartate aminotransferase; ALT, alanine aminotransferase.

American Journal of Emergency Medicine (2005) 23, 709–717

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The American Journal of Emergency Medicine

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Original Contribution

Derivation of a clinical guideline for the assessment of nonspecific abdominal pain: the Guideline for Abdominal Pain in the ED Setting (GAPEDS) Phase 1 Study☆

Robert T. Gerhardt MD, MPH, FACEP[a,c,*], Brian K. Nelson MD, MS[c], Sean Keenan MD[a], Leah Kernan RN, MSN[a], Andrew MacKersie MD[b], Michael S. Lane MD[b]

Table 5 GAPEDS phase 1: accuracy of CART models for prediction of NSAP requiring UI

Model	Sensitivity	Specificity	PPV	NPV	LR+	LR−	Risk (95% CI)	Cross-validated risk (95% CI)
1: History and physical	0.25	0.92	0.65	0.69	3.17	0.81	0.32 (0.25-0.39)	0.32 (0.25-0.39)
2: History, physical, and laboratory analysis	0.39	0.88	0.64	0.72	3.25	0.69	0.30 (0.23-0.37)	0.35 (0.28-0.42)
3: history, physical, laboratory analysis, and AAS	0.56	0.81	0.62	0.77	2.94	0.54	0.28 (0.21-0.35)	0.36 (0.29-0.43)
4: history, physical, laboratory analysis, AAS, and NHCT	0.92	0.90	0.83	0.95	9.2	0.09	0.10 (0.06-0.14)	0.10 (0.06-0.14)

PPV indicates positive predictive value; NPV, negative predictive value; LR+, positive likelihood ratio; LR−, negative likelihood ratio; CI, confidence interval.

CT is a crucial step in the algorithm of assesment of NSAP **EL1**

NSAP

Michele Carlucci

Surg Endosc
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REVIEW

Early laparoscopy for the evaluation of nonspecific abdominal pain: a critical appraisal of the evidence

Luis C. Domínguez · Alvaro Sanabria · Valentin Vega · Camilo Osorio

Diagnostic laparoscopy is a safe and feasible procedure also in ICU patients ***EL1***

Not enough evidence for routinary use of early lps

Acute Nonspecific Abdominal Pain

A Randomized, Controlled Trial Comparing Early Laparoscopy Versus Clinical Observation

Mario Morino, MD, Luca Pellegrino, MD, Elisabetta Castagna, MD, Eleonora Farinella, MD, and Patrizio Mao, MD, FACS

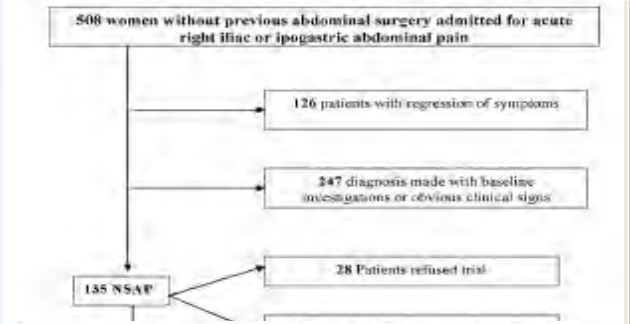


TABLE 3. Final Diagnosis at Discharge in the 2 Groups

	LAP Group [no. (%)]	OBS Group [no. (%)]	*P*
Diagnosis	42/53 (79.2)	23/51 (45.1)	<0.001
Preoperative diagnosis (%)	—	9/51 (17.6)	—
Acute appendicitis	16/53 (30.2)	3/51 (6.0)	0.003
PID + salpingitis	8/53 (15.1)	14/51 (27.5)	0.2
Adhesions	4/53 (7.5)	1/51 (1.9)	0.4
Ovarian cyst	10/53 (18.9)	2/51 (3.9)	0.013
Ectopic pregnancy	1/53 (1.8)	0	0.9
Cholecystitis	0	1/51 (1.9)	0.9
Endometriosis	1/53 (1.8)	1/51 (1.9)	0.5
IBD	0	1/51 (1.9)	0.9
Carcinoid tumor	1 (1.8)	0	0.9
No diagnosis	11/53 (20.7)	28/51 (55.2)	<0.001

LAP indicates early laparoscopy; OBS, clinical observation; IBD, inflammatory bowel disease; PID, pelvic inflammatory disease.

TABLE 5. Comparative Data

	LAP Group	OBS Group	*P*
Hospital stay (days)	3.7 ± 0.8	4.7 ± 2.4	0.004
Range	1–5.5	1–11	
Analgesic therapy (days)	1.3 ± 0.7	1.2 ± 1.0	0.6
Range	1–4	0–5	
Mortality & morbidity	0 & 2	0 & 1	NS
Radiations (mSv)	1.1 ± 1.0	2.2 ± 5.1	0.1
Range	0.1–2.1	0.1–22	
3-mo recurrence (%)	20.8	52.2	<0.001
12-mo recurrence (%)	15.9	25.0	0.4
Intervention after discharge (%)	0	13.6	0.035

LAP indicates early laparoscopy; OBS, clinical observation; NS, not significant.

reduced hospital stay and early recurrence **EL1**

NSAP

Michele Carlucci

Acute Nonspecific Abdominal Pain

A Randomized, Controlled Trial Comparing Early Laparoscopy Versus Clinical Observation

Mario Morino, MD, Luca Pellegrino, MD, Elisabetta Castagna, MD, Eleonora Farinella, MD, and Patrizio Mao, MD, FACS

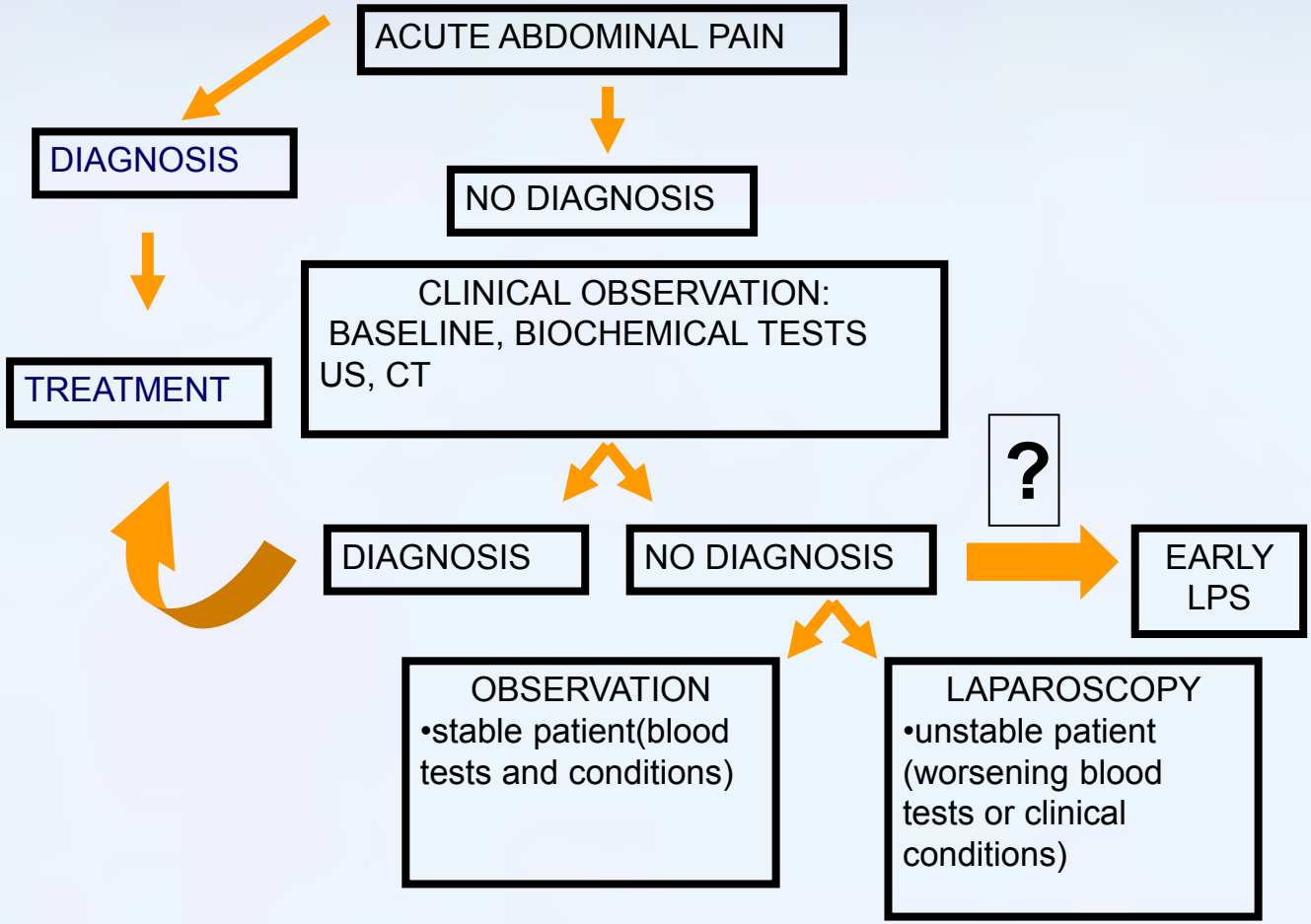
TABLE 4. Comparative Costs per Patients

		LAP		OBS		
	Unit Cost	**Time**	**Cost (€)**	**Time**	**Cost (€)**	***P***
Operating room	467 € per hr	1.00 hr	467	0.98 h	233*	
Hospital stay	300 € per day	3.7 days	1110	4.7 d	1410	
Baseline investigations	—	—	140	—	140	
Second line investigations	—	—	—	—	71	
Management of recurrences	—	—	—	—	164†	
Total (€)			1717		2018	NS

*Only 26 patients in OBS were submitted to laparoscopy.
†Six patients in OBS underwent laparoscopy after discharge.
LAP indicates early laparoscopy; OBS, clinical observation; NS, not significant.

Costs saving

Long term recurrence ? **EL 3** ***Long term follow up*** ?


ACUTE ABDOMINAL PAIN
DIAGNOSIS
NO DIAGNOSIS
TREATMENT
CLINICAL OBSERVATION:
BASELINE, BIOCHEMICAL TESTS
US, CT
DIAGNOSIS
NO DIAGNOSIS
?
EARLY
LPS
OBSERVATION
•stable patient(blood tests and conditions)
LAPAROSCOPY
•unstable patient (worsening blood tests or clinical conditions)

References:

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-Stefanidis D, Richardson WS et al. The role of diagnostic laparoscopy for acute abdominal conditions: an evidence based review. Surg Endosc. 2009; 23: 16-23

-Gagne, D.J., Malay, M.B. et al. Bedside diagnostic minilaparoscopy in the intensive care patients. Surgery 2002; 131(5): 491-6

-Pecoraro, A.P. Cacchione, R. et al. The routine use of diagnostic laparoscopy in the intensive care unit. Surg. Endosc 2001; 15(7):638-41

-Champault G, Rizk N, Lauroy J et al. Right iliac fosse in women: conventional diagnostic approach versus primary laparoscopy. A controlled study (65 cases) Ann Chir 1993; 47:316-319

-Decadt B, Sussman L, Lewis MO, et al. Randomized clinical trial of early laparoscopy in the management of acute non-specific abdominal pain Br J Surg. 1999; 86:1383-1386

-Morino M, Pellegrino L, et al. Acute Nonspecific abdominal pain: a randomized, controlled trial comparing early laparoscopy versus clinical observation. Ann Surg 2006; 244: 881-888.

-Maggio A.Q., Reece-Smith A.M. et al. Early laparoscopy versus active observation in acute abdominal pain: Systematic review and meta-analysis. Int. Journ. of Surg. 2008; 6:400-403

Perforated Peptic Ulcer

Antonino Mirabella

Perforated peptic Ulcer: the diagnosis

The diagnosis of a perforated peptic ulcer (PPU) is based on clinical history, clinical examination, and instrumental investigations. A CT scan of the abdomen is the most reliable exam, not only for the diagnosis of perforation (sensibility nearly 100 % for the detection of pneumoperitoneum), but also to identify the perforation site (specificity approximately 86 %) (LE 2b).

A DL is possible when preoperative exams are not sufficiently clear for definitive diagnosis (LE 1a).

However, failing to identify a PPU represents one of the most frequent causes of conversion to laparotomy (LE1a) .

Original bibliography according Oxford CEBM 2009 → Oxford CEBM 2011

Hainaux B, Agneessen E, Bertinotti R, De Maertelaer V, Rubesova E, Capelluto E, Moschopoulos C (2006) LE 2b → LE 3
Accuracy ofMDCT in predicting site of gastrointestinal tract perforation. AJR Am J Roentgenol 187:1179–1183

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Prevalence and duration of postoperative pneumoperitoneum: sensitivity of CT vs left lateral decubitus radiography. AJR Am J Roentgenol 161:781–785

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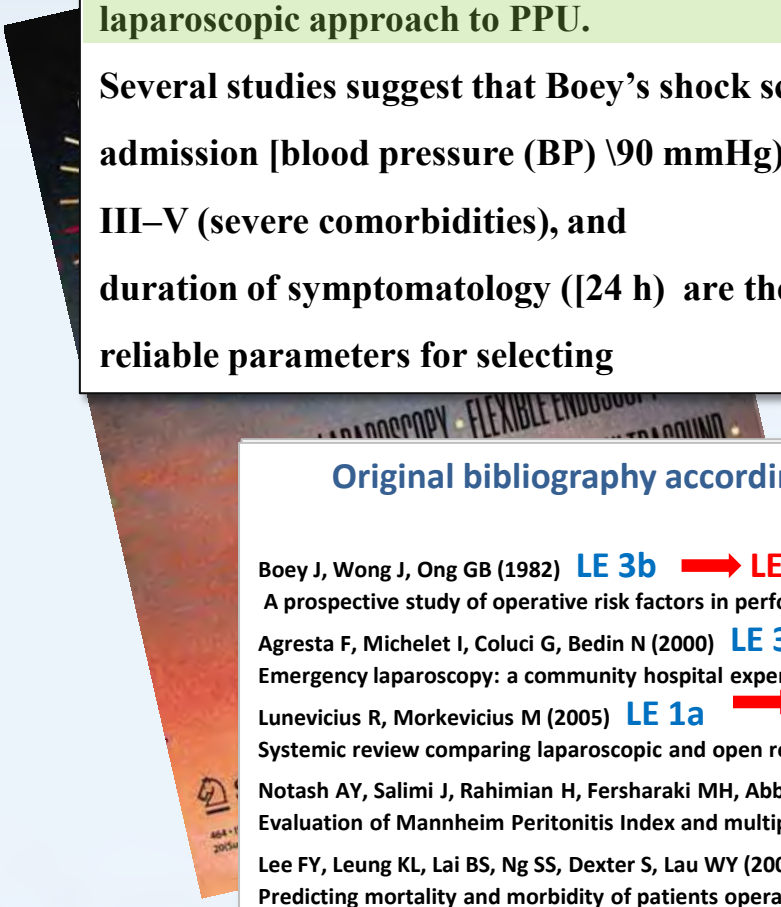
Siu WT, Leong HT, Law BKB, Chau CH, Li AC, Fung KH, Tai YP, Li MKW (2002) LE 1a → LE 2
Laparoscopic repair for perforated peptic ulcer: a randomized controlled trial. Ann Surg 235(3):313–319

Lau H (2004)) LE 1a → LE 2
Laparoscopic repair of perforated peptic ulcer: a meta-analysis. Surg Endosc 18:1013–1021

Perforated peptic Ulcer: Selection of patients

To date, there is no unanimous agreement about which group of patients might benefit from a laparoscopic approach to PPU.

Several studies suggest that Boey's shock score on admission [blood pressure (BP) \90 mmHg), ASA III–V (severe comorbidities), and duration of symptomatology ([24 h) are the most reliable parameters for selecting patients (LE 3b). The laparoscopic approach is safe in patients with no risk factors (Boey score = 0) (LE 1a). Other principles of selection have been considered: Mannheim Peritonitis Index (MPI) (LE 2b), age >70 years (LE 3b) , APACHE II (LE 3b), and surgeon's skill in miniinvasive surgery.



Original bibliography according Oxford CEBM 2009 ➡ Oxford CEBM 2011

Boey J, Wong J, Ong GB (1982) LE 3b ➡ LE 2
A prospective study of operative risk factors in perforated duodenal ulcers. Ann Surg 195(3):265–269

Agresta F, Michelet I, Coluci G, Bedin N (2000) LE 3b ➡ LE 3
Emergency laparoscopy: a community hospital experience. Surg. Endosc 14:484–487

Lunevicius R, Morkevicius M (2005) LE 1a ➡ LE 2
Systemic review comparing laparoscopic and open repair for perforated peptic ulcer. Br J Surg 92:1195–1207

Notash AY, Salimi J, Rahimian H, Fersharaki MH, Abbassi A (2005) LE 2b ➡ LE 3
Evaluation of Mannheim Peritonitis Index and multiple failure score in patients with peritonitis. Ind J Gastroenterol 24:197–200

Lee FY, Leung KL, Lai BS, Ng SS, Dexter S, Lau WY (2001) LE 3b ➡ LE3
Predicting mortality and morbidity of patients operated on for perforated peptic ulcers. Arch Surg 136:90–94

Perforated Peptic Ulcer: closure technique

The choice of perforation closure technique depends on lesion characteristics: if margins are edematous, friable, and/or difficult to mobilize, repair can be limited to an omental patch, eventually associated with one or more sealant devices (LE 5); when the margins can be easily brought together, without tension, direct suturing can be sufficient with or without omentoplasty (LE 3a). To make the PPU repair simpler, and consequently reducing operating times, a "sutureless" technique has been proposed, eventually associated with sealant devices. However, debate exists about whether the reduction of operating times by simplified techniques could be a patient safety issue, with a higher incidence of postoperative complications (especially leakage) (LE 5).

Decontamination of the peritoneal cavity by washing after treatment of PPU is a fundamental step in the surgical procedure (LE 1a)

Original bibliography according Oxford CEBM 2009

Lau WY, Leung KL, Kwong KH, Davey C, Robertson C, Dawson JJ, Chung SC, Li AK (1996) LE 5
A randomized study comparing laparoscopic versus open repair of perforated peptic ulcer using suture or sutureless technique. Ann Surg 224(2): 131–138

Sanabria AE, Morales CH, Villegas MI (2005) LE 1a
Laparoscopic repair for perforated peptic ulcer disease. Cochrane Database Syst Rev (4):CD004778.

Perforated Peptic Ulcer: Conversion/Reintervention

Predictive factors of conversion are shock on admittance and the free interval between the beginning of perforation and the diagnosis >24 h (LE 2b). In Lau's meta-analysis, the reoperation rate was higher after the laparoscopic approach (3.7 %) than after conventional surgery (1.6 %) (LE 1a). Suture site leakage represents the most important cause of reoperation (LE 1a).

Lee APACHE II (5 points) and ulcer size ([10 mm) are independent risk factors for postoperative leak after laparoscopic sutureless fibrin glue repair (LE 3b).

A systematic review by Lunevicius reported a reoperation rate for the laparoscopic approach nearly double that for open surgery (5.3 vs. 2.1 %). The results of these studies, due to many biases, are not enough to definitively clarify the role of the laparoscopic repair for PPU. Further trials are needed.

Original bibliography according Oxford CEBM 2009 → Oxford CEBM 2011

Lagoo S, Mc Mahon RL, Kalkharu M, Pappas TN, Eubanks S (2002). LE 2b → LE 4
The sixth decision regarding perforated duodenal ulcer. JSLS 6:359–368

Katkhouda N, Mavor E, Mason RJ, Campos GMR, Soroushyari A, Berne TV (1999). LE 2b → LE 3
Laparoscopic repair of perforated duodenal ulcers: outcome and efficacy in 30 consecutive patients. Arch Surg 134:845–850

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Lau H (2004). LE1a → LE 2
Laparoscopic repair of perforated peptic ulcer: a meta-analysis. Surg Endosc 18:1013–1021.

Lee FY, Leung KL, Lai BS, Ng SS, Dexter S, Lau WY (2001). LE 3b → LE 4
Predicting mortality and morbidity of patients operated on for perforated peptic ulcers. Arch Surg 136:90–94.

Lunevicius R, Morkevicius M (2005). LE1a → LE2
Systemic review comparing laparoscopic and open repair for perforated peptic ulcer. Br J Surg 92:1195–1207

Perforated Peptic Ulcer: The Outcomes

One of the advantages of laparoscopic surgery is less postoperative pain (LE 1a), but earlier data [199] about pain (within 24 h postoperatively) did not show any difference, probably because of peritoneal inflammation. Recent reports confirms a decrease in the incidence of complications (abdominal wall complications, prolonged postoperative ileus, pulmonary infection, and mortality rate) with laparoscopic surgery compared to open surgery. On the other hand, a greater incidence of intra-abdominal fluid collection (due mostly to leakage at the suture site) has been reported.

However, none of these differences are statistically significant .

The operative times are longer for laparoscopy (LE 1b) (except one study); however, a progressive and constant reduction of operative times over the past 10 years has been seen, probably due to an improvement inthe surgeon's skill, better technology, and better organization of the surgical teams. The hospital stay has been shown to be more favorable for the laparoscopic approach compared to traditional surgery in Siu et al. but not in Lau and Berleff et al.

Original bibliography according Oxford CEBM 2009 ➡ Oxford CEBM 2011

Lunevicius R, Morkevicius M (2005). LE1a ➡ LE2
Systemic review comparing laparoscopic and open repair for perforated peptic ulcer. Br J Surg 92:1195–1207

Lau WY, Leung KL, Kwong KH, Davey C, Robertson C, Dawson JJ, Chung SC, Li AK (1996). LE1a ➡ LE2
A randomized study comparing laparoscopic versus open repair of perforated peptic ulcer using suture or sutureless technique. Ann Surg 224(2):131–138

Miserez M, Eypasch E, Spangenberger W, Lefering R, Troidl H (1996). LE1a ➡ LE3
Laparoscopic and conventional closure of perforated peptic ulcer: a comparison. Surg Endosc 10:831–836

Bertleff M, Halm JA, Bemelman WA, van der Ham AC, van der Harst E, Oei HI, Smulders JF, Steyerberg EW, Lange JF (2009) LE 1b ➡ LE2
Randomized clinical trial of laparoscopic versus open repair of the perforated peptic ulcer: the LAMA trial. World J Surg 33:1368–1373

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Laparoscopic repair for perforated peptic ulcer: a randomized controlled trial. Ann Surg 235(3):313–319

LITERATURE RESEARCH METHOD

PubMed has been searched, at first, with the following criteria: *Limits Activated*: Humans, Clinical Trial, Meta-Analysis, Practice Guideline, Randomized Controlled Trial, Review, English, All Adult: 19+ years, published from 2011/01/01 to 2015/06/31.

***Search details*: laparoscopy, laparoscopic repair, perforated peptic ulcer, perforated duodenal ulcer, PPU.**

- **93 articles screened based on abstract**
- **90 full-text were extracted**
- **30 Articles excluded: subjects not rilevant**
- **60 Articles included**

What's news PPU and LAPAROSCOPY: THE DIAGNOSIS

J Gastrointest Surg (2011) 15:1329–1335
DOI 10.1007/s11605-011-1482-1

ORIGINAL ARTICLE

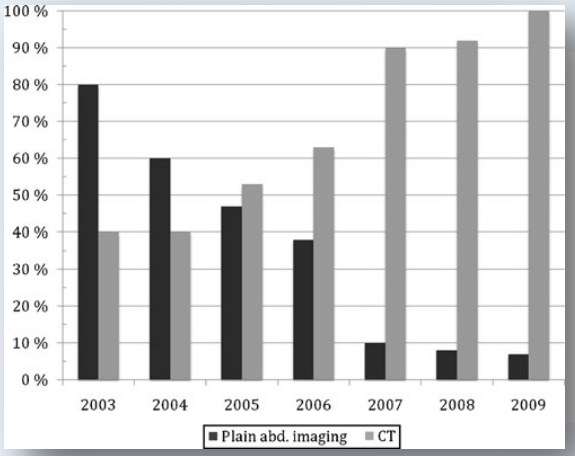
LEV 3

Trends in Diagnosis and Surgical Management of Patients with Perforated Peptic Ulcer

Kenneth Thorsen · Tom B. Glomsaker · Andreas von Meer · Kjetil Søreide · Jon Arne Søreide

NO DIFFERENCE

CT



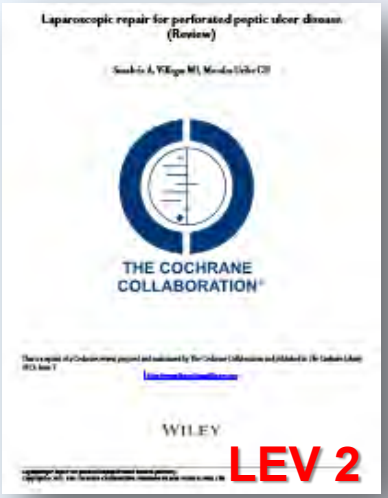
Retrospective,
single institution, population-based review.
114 pat. underwent to surgery for PPU between 2003 and 2009.

- **Pneumoperitoneum:** x-ray in 30 of 41 patients (75%); CT in 76 of 77 patients (98%; <0.001).
- **increased use of CT** as the primary diagnostic tool for PPU and of laparoscopic repair in its surgical treatment.

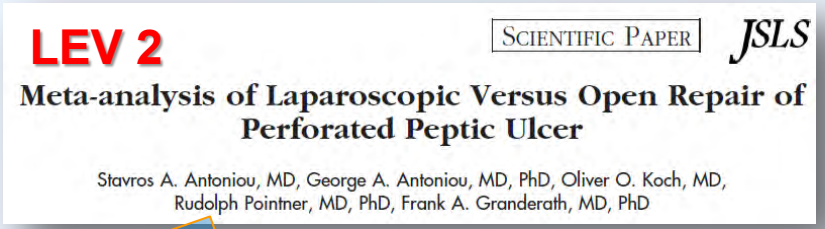
Current practice is to perform a CT scan in the stable patient, and avoid upright chest x-ray or plain radiographs due to the lower sensitivity and potential added delay in diagnosis.

What's new PPU and LAPAROSCOPY: THE OUTCOMES

- 2 meta-analysis: Sanabria (updated in 2012) and Stravos (2013)
- Inconclusive results: the outcomes from laparoscopy not different from those of open surgery .



The Cochrane Library 2005, Issue 4-Updated:2012



NO DIFFERENCE

- ❑ Laparoscopy could be the first therapeutic after considering other variables such as surgeon's experience, costs and availability.
- ❑ It is necessary to have RCT with large sample sizes, better outcomes assessments and in different populations.

What's news PPU and LAPAROSCOPY: Conversion/Reintervention

Nationwide cohort study

726 patients (2011 - 2013)
238 (32·8%) laparoscopy

Original article

BJS 2015; **102**: 382–387 **LEV 3**

Surgical complications after open and laparoscopic surgery for perforated peptic ulcer in a nationwide cohort

M. Wilhelmsen[1], M. H. Møller[2] and S. Rosenstock[1]

[1]Department of Gastroenterology, Surgical Unit, Copenhagen University Hospital Hvidovre, and [2]Department of Intensive Care 4131, Copenhagen University Hospital Rigshospitalet, Copenhagen, Denmark

- 25% of patients were converted.
- 17% (124 of 726) of patients were reoperated (almost 1/5 patients).
  - → persistent leak (43 patients, 5·9 per cent)
  - → wound dehiscence (34, 4·7 per cent).

bias

- ↑ risk of reoperative surgery in patients with laparotomy and converted to open
- ↑ 90-day mortality in patients who had reoperation

What's news PPU and LAPAROSCOPY: Selection of patients

Thorsen *et al. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* 2013, **21**:25
http://www.sjtrem.com/content/21/1/25
[1]Department of Gastrointestinal Surgery, Stavanger University Hospital, POB 8100, Stavanger, N 4068, Norway
[2]Department of Clinical Medicine, University of Bergen, Bergen, Norway

SCANDINAVIAN JOURNAL OF trauma, resuscitation & emergency medicine

REVIEW Open Access

Scoring systems for outcome prediction in patients with perforated peptic ulcer

LEV 3

Kenneth Thorsen[1,2], Jon Arne Søreide[1,2] and Kjetil Søreide[1,2*]

- 11 different scoring systems.
- In 5 studies the accuracy of outcome prediction of different scoring systems was compared.

Scoring systems (reference)	Year of report	Target population	Outcome measured	Parameters evaluated
Boey [14]	1987	Patients with PPU	30 day mortality	Presentation ≥ or <24 hours; presence of preoperative shock; level of comorbidity.
Hacettepe score [17]	1992	Patients with PPU	30 day mortality	Presence of serious medical illness, acute renal failure, white blood cell count, male gender
Jabalpur score [18]	2003	Patients with PPU	30 day mortality	Time from perforation to operation, mean systolic blood pressure preoperatively, heart rate, serum creatinine, age, comorbidity
PULP [19]	2012	Patients with PPU	30 day mortality	Presentation ≥ or <24 hours; presence of preoperative shock; ASA score, presence of aids, active malignancy, liver failure; serum creatinine > 130 mmol/l
ASA [20]	1941	General surgical populations	Preoperative risk assessment for surgical patients	Degree of comorbidity and present systemic disease
Charlson comorbidity index [21]	1987	General surgical populations	Prediction of 1 year mortality for hospitalized patients	Weighting of different comorbidities
Mannheim peritonitis index [23]	2002	General peritonitis	Peroperative prediction of outcome in patients with peritonitis	Age, gender, organ failure, duration of peritonitis, site of perforation, diffuse peritonitis, level of exudate
APACHE II [24]	1985	Critically ill patients	Prediction of outcome for ICU patients	Aids, metastatic cancer, liver failure, immunosuppression, chronic renal insufficiency, haemotologic malignancy, lymphoma, leukemia, age, heart rate, systolic blood pressure, respiratory rate, temperature, GCS, WBC, creatinine, blood gas potassium, sodium, patient origin
SAPS II [25]	1993	Critically ill patients	Prediction of outcome for ICU patients	Aids, metastatic cancer, haemotologic malignancy, age, heart rate, systolic blood pressure, temperature, GCS, urine output, WBC, bilirubin, urea, Potassium, sodium, Patient origin
MPM II [26]	1993	Critically ill patients	Prediction of outcome for ICU patients	Metastatic cancer, liver failure, chronic renal insufficiency, leukemia, age, acute renal failure, arrythmias, heart rate, GI bleeding, GCS, intracranial mass effect, cerebrovascular accident, cpr prior to admission, mechanical ventilation
POSSUM [37]	1991	Surgical patients	Prediction of outcome (mortality) for surgical patients	Respiratory history; cardiac signs; age; heart rate; systolic blood pressure; ecg; GCS; operative severity; multiple procedures, total blood loss, peritoneal soiling, finding of peroperative malignancy; elective or acute surgery, WBC, Hb, urea, potassium, sodium

- ❑ Considerable variations in accuracy for outcome prediction (30 day mortality)
- ❑ The Boey score and the ASA score are most commonly used (the only two studies that report values for morbidity prediction)
- ❑ Other scoring systems are hampered by a lack of validation or by their complexity that precludes routine clinical use
- ❑ The PULP score seems promising but it needs external validation before widespread use.

What's news PPU and LAPAROSCOPY: Selection of patients

Acta Anaesthesiologica Scandinavica
AN INTERNATIONAL JOURNAL OF ANAESTHESIOLOGY AND INTENSIVE CARE, PAIN AND EMERGENCY MEDICINE

Acta Anaesthesiol Scand., 2012 May;56(5):655-62

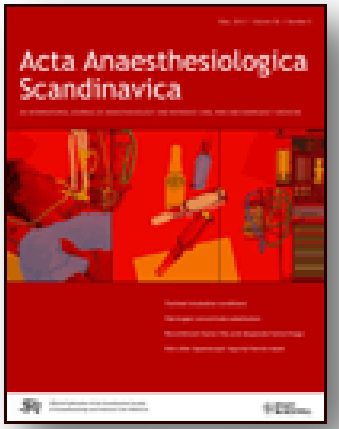
The Peptic Ulcer Perforation (PULP) score: a predictor of mortality following peptic ulcer perforation. A cohort study.

LEV 3

Møller MH, Engebjerg MC, Adamsen S, Bendix J, Thomsen RW
Department of Anaesthesiology and Intensive Care Medicine, Copenhagen University Hospital Bispebjerg, Denmark. mortenhylander@gmail.com

35 hospitals in Denmark. Patients surgically treated for gastric or duodenal PPU between 1 February 2003 and 31 August 2009.
Outcome measure: 30-day mortality.
eight variables: 1) age > 65 years, 2) active malignant disease or AIDS, 3) liver cirrhosis, 4) steroid use, 5) time from perforation to admission > 24 h, 6) pre-operative shock, 7) serum creatinine > 130 µM, and 8) the four levels of the ASA score (from 2 to 5).

The nationwide PULP study



2668 patients: median age of 70.9 years, 55% female.

- **The largest recent study evaluating outcome prediction for PPU patients, that incorporates both the ASA score and the Boey score and can be evaluated preoperatively.**

The score predicted mortality (AUC:0.83) better than the Boey score (AUC 0.70) and the ASA score alone (AUC 0.78)

What's news PPU and LAPAROSCOPY: Selection of patients

observational cohort study
172 patients (January 2001 through December 2010).
50 laparoscopy
Primary outcome: 30-day mortality
28 Patients (16 %) died within 30 days

J Gastrointest Surg (2014) 18:1261–1268
DOI 10.1007/s11605-014-2485-5

[1]Department of Gastrointestinal Surgery, Stavanger University Hospital, POB 8100, Stavanger, N 4068, Norway
[2]Department of Clinical Medicine, University of Bergen, Bergen, Norway

ORIGINAL ARTICLE

What Is the Best Predictor of Mortality in Perforated Peptic Ulcer Disease? A Population-Based, Multivariable Regression Analysis Including Three Clinical Scoring Systems

LEV 3

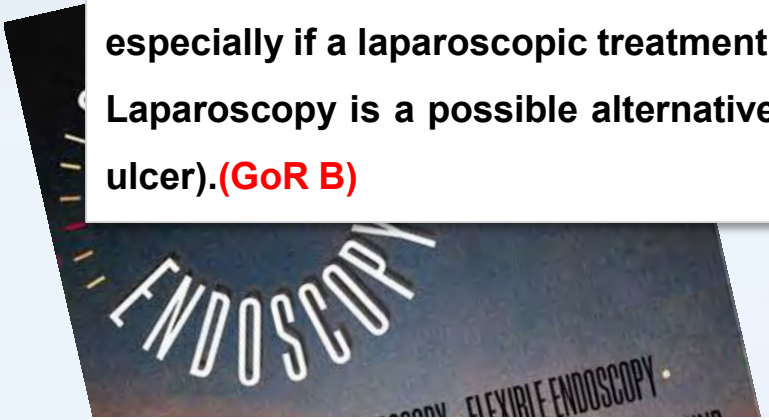
Kenneth Thorsen · Jon Arne Søreide · Kjetil Søreide

- Age, active cancer, hyperbilirubinaemia, hypoalbuminaemia, elevated creatinine and delay from perforation to surgery of >24 h predicted mortality best.
- The PULP score and the ASA score predicted mortality equally well and better than the Boey score, but none of them were optimal.

Perforated peptic ulcer: statement

Laparoscopy is a useful diagnostic tool when preoperative findings are not conclusive, especially if a laparoscopic treatment is likely (GoR A).

Laparoscopy is a possible alternative to open surgery in the treatment of perforated peptic ulcer).(GoR B)



NEW

Laparoscopy is a useful diagnostic tool when preoperative findings are not conclusive, especially if a laparoscopic treatment is likely (Strong Evidence). Laparoscopy is a possible alternative to open surgery in the treatment of perforated peptic ulcer, although to date outcomes are not different from those of open surgery (Weak Evidence).

The use of scoring systems for an adeguate selection of patients migth improve the outcomes. However further investigations are needed before their widespread use because of the considerable variations in outcome prediction (Weak Evidence).

Acute colon obstruction

Alberto Arezzo

Although laparoscopic colon resection for obstructing colon cancer appears to be technically feasible in selected patients, it is rarely used in the emergency setting.
(EL: 4, GoR: WEAK).

- *Gash K, Chambers W, Ghosh A, Dixon AR. The role of laparoscopic surgery for the management of acute large bowel obstruction. Colorectal Dis. 2011 Mar;13(3):263-6.*
- *Frago R, Ramirez E, Millan M, Kreisler E, del Valle E, Biondo S (2014) Current management of acute malignant large bowel obstruction: a systematic review. Am J Surg 207:127-138*
- *Ng SS, Lee JF, Yiu RY, Li JC, Leung WW, Leung KL (2008) Emergency laparoscopic-assisted versus open right hemicolectomy for obstructing right-sided colonic carcinoma: a comparative study of short-term clinical outcomes. World J Surg. 32(3):454-8.*

Expandable stenting (SEMS) for left-sided obstructing neoplasm followed by elective surgery is a successful treatment modality that offers advantages over emergency surgery in terms of increase in successful primary anastomosis, reduction of stoma creation, infections and overall morbidity (EL:1, GoR: STRONG).

However, SEMS placement is followed by laparoscopic surgery in a minority of cases, and long-term oncologic outcomes are under evaluation. (EL:3; GoR:WEAK).

SEMS placement is recommended as the preferred treatment for palliation of malignant colonic obstruction (EL:2, GoR: STRONG), except in patients treated or considered for treatment with antiangiogenic drugs (EL: 3, GoR: STRONG).

- *Huang X, Lv B, Zhang S, Meng L (2014) Preoperative colonic stents versus emergency surgery for acute left-sided malignant colonic obstruction: a meta-analysis. J Gastrointest Surg 18:584-591*
- *Karoui M, Charachon A, Delbaldo C, Karoui M, Charachon A, Delbaldo C, Loriau J, Laurent A, Sobhani I, Tran Van Nhieu J, Delchier JC, Fagniez PL, Piedbois P, Cherqui D (2007) Stents for palliation of obstructive metastatic colon cancer: impact on management and chemotherapy administration. Arch Surg 142:619-623*
- *Sabbagh C, Browet F, Diouf M, Cosse C, Brehant O, Bartoli E, Mauvais F, Chauffert B, Dupas JL, Nguyen-Khac E, Regimbeau JM (2013) Is stenting as "a bridge to surgery" an oncologically safe strategy for the management of acute, left-sided, malignant, colonic obstruction? A comparative study with a propensity score analysis. Ann Surg. 258(1):107-15.*
- *Maruthachalam K, Lash GE, Shenton BK, Horgan AF (2007) Tumour cell dissemination following endoscopic stent insertion. Br J Surg. 94(9):1151-4.*

SEMS and laparoscopic colon resection: data from the literature

Author	Type of study	Number of patients	Interval between SEMS and surgery (days)	Stoma (%)	Conversion to open surgery (%)	Early postoperative morbidity (%)	Hospital stay (days)
Morino et al., 2002 [21]	Retrospective	4	5 (4-5)	0	0	0	7 (5-7)
Balagué et al., 2004 [22]	Retrospective	6	8 (5-14)	0	16.7 open 16.7 hand-assisted	16.7	6.5 (5-12)
Dulucq et al., 2006 [23]	Prospective	14	6.5±2	0	0	10	16.4±5*
Chung et al., 2008 [24]	Retrospective	17	7 (2-11)	17.6	0	11.8	9 (7-49)
Stipa F et al., 2008 [25]	Retrospective	6	16.5 (6-18)	0	0	0	7
Lujan HJ et al., 2013 [15]	Retrospective	12	19 (4-60)	8.3	0	NA	NA

Recently, the European Society for Gastrointestinal Endoscopy published new recommendations for the use of self-expandable metal stents for obstructing colonic and extracolonic cancer:

1. prophylactic colonic metal stent placement is not recommended and should be reserved for symptomatic patients with imaging evidence of obstruction (*strong recommendation, low quality evidence*);

2. colonic metal stent placement as a bridge to elective surgery is not recommended (*strong recommendation, high quality evidence*);

3. colonic metal stent placement is an alternative to emergency surgery only in case of increased risk of postoperative mortality (*weak recommendation, low quality evidence*)

4. colonic metal stent placement is recommended as the preferred treatment for palliation (*strong recommendation, high quality evidence*)

- *van Hooft JE, et al. Self-expandable metal stents for obstructing colonic and extracolonic cancer: European Society of Gastrointestinal Endoscopy (ESGE) Clinical Guideline. Endoscopy 2014, 46(11):990-1053*

Two ongoing RCTs on stent as "bridge to surgery" versus emergency surgery for left colonic malignant obstruction:

1. the *Colorectal Stent Trial (CReST)*, a multi-centre phase III, randomized controlled trial, which should have completed patients recruitment on Dec 31st 2014 *[URL:http://www.birmingham.ac.uk/Documents/college-mds/trials/bctu/crest/CReSTProtocolv2116072009.pdf 2009]*.

2. the *ESCO trial* (NCT00591695 - Enteral Stents for Colonic Obstruction (ESCO)), and is still recruiting.

The future results of these studies as well as other studies on this topic are awaited to better define the role of emergent colonic stenting for obstruction as "bridge to surgery", and consequently the possible role of laparoscopy.

Iatrogenic colon perforations

Alberto Arezzo

Emergent laparoscopic repair is a valid alternative to the open approach in colonic perforations following both diagnostic and therapeutic colonoscopy that are not recognised immediately or failed to be repaired endoscopically (EL: 4, GoR: WEAK).

Early recognition of perforation during diagnostic or therapeutic endoscopy allows immediate repair of the defect endoscopically if feasible.

For those non recognised immediately or failed to repair, emergency surgery is mandatory and may be approached laparoscopically.

The options include a laparoscopic lavage and drainage, eventual defunctioning stoma, or a segmental resection with or without primary anastomosis.

- *Bleier JI, et al.. Initial repair of iatrogenic colon perforation using laparoscopic methods. Surg Endosc 2008; 22: 646-649*
- *Hansen AJ, et al. Laparoscopic repair of colonoscopic perforations: indications and guidelines. J Gastrointest Surg 2007 May;11(5):655-9.*
- *Lohsiriwat V. Colonoscopic perforation: incidence, risk factors, management and outcome. World J gastroenterol 2010 ;16(4):425-30*
- *Rotholtz NA et al. Laparoscopic approach to colonic perforation due to colonoscopy. World J Surg 2010 Aug;34(8):1949-53.*
- *Miranda L, et al. Iatrogenic colonic perforation: repair using laparoscopic technique. SLEPT 2011 Jun;21(3):170-4.*
- *Coimbra C, et al. Laparoscopic repair of colonoscopic perforation:a new standard? Surg Endosc. 2011 May;25(5):1514-7*
- *Samalavicius NE et al. Incidence, risk, management, and outcomes of iatrogenic full-thickness large bowel injury associated with 56,882 colonoscopies in 14 Lithuanian hospitals. Surg Endosc 2013 May;27(5):1628-35*
- *Kim J et al. Comparison of the surgical outcomes of laparoscopic versus open surgery for colon perforation during colonoscopy. Ann Surg Treat Res. 2014 Sep;87(3):139-43*

Inflammatory Bowel Diseases

Alberto Arezzo

In the emergency setting, laparoscopy for the treatment of both ulcerative colitis and Crohn's disease of the colon offers limited advantages in terms of overall morbidity compared to open surgery. (ER: 4, GoR: WEAK).

While laparoscopic elective surgery showed benefits in the management of both ulcerative colitis and colonic Crohn's disease compared to open surgery, in the emergency setting, the advantages of laparoscopy over open surgery are not so evident due to the limited data available. Based on the evidence of case-matched studies with few cases in each series, a limited advantage in terms of overall morbidity may be observed.

- *Marcello PW, et al.. Laparoscopic total colectomy for acute colitis: a case-control study. Dis Colon Rectum 2001; 44: 1441-1445*
- *Seshadri PA, et al. Does a laparoscopic approach to total abdominal colectomy and proctocolectomy offer advantages? Surg Endosc 2001; 15: 837-842*
- *Aarons CB. Laparoscopic surgery for crohn disease: a brief review of the literature.* Clin Colon Rectal Surg. *2013;26(2):122-7.*
- *Bellolio F, et al. Outcomes following surgery for perforating Crohn's disease. Br J Surg 2013 Sep;100(10):1344-8. doi: 10.1002/bjs.9212.*
- *Messenger DE, et al. Subtotal colectomy in severe ulcerative and Crohn's colitis: what benefit does the laparoscopic approach confer? Dis Colon Rectum. 2014 Dec;57(12):1349-57. doi: 10.1097/DCR.0000000000000238.*

Acute diverticulitis

Alberto Arezzo

Hinchey Ia: outpatient treatment (EL: 2, GoR: strong)

- *Biondo S, Golda T, Kreisler E, Espin E, et al. Outpatient versus hospitalization management for uncomplicated diverticulitis: a prospective, multicenter randomized clinical trial (DIVER Trial). Ann Surg. 2014 Jan;259(1):38-44*
- *Shabanzadeh DM, Wille-Jørgensen P. Antibiotics for uncomplicated diverticulitis. Cochrane Database Syst Rev 2012; (11)CD009092*
- *Chabok A, Pahlman L, Hjern F, Haapaniemi S, Smedh K; AVOD Study Group. Randomized clinical trial of antibiotics in acute uncomplicated diverticulitis. Br J Surg 2012; 99: 532 – 539*
- *Ribas Y, Bombardo´ J, Aguilar F, Jovell E, Alcantara-Moral M, Campillo F et al. Prospective randomized clinical trial assessing the efficacy of a short course of intravenously administered amoxicillin plus clavulanic acid followed by oral antibiotic in patients with uncomplicated acute diverticulitis. Int J Colorectal Dis 2010; 25: 1363 – 1370*
- *Kellum JM, Sugerman HJ, Coppa GF, Way LR, Fine R, Herz B et al. Randomized, prospective comparison of cefoxitin and gentamicin – clindamycin in the treatment of acute colonic diverticulitis. Clin Ther 1992; 14: 376 – 384*
- *Daniels L, Ünlü Ç, de Korte N, van Dieren S, Stockmann HB, Vrouenraets BC; Consten EC, van der Hoeven JA, Eijsbouts QA, Faneyte IF, Dijkgraaf MG, Boermeester MA on behalf of Collaborators of the DIABOLO Trial. A randomised clinical trial of observational versus antibiotic treatment for a first episode of uncomplicated acute diverticulitis. United European Gastroenterol J. 2014 Oct; 2(1 Suppl): A1–A131. OP004*

Hinchey I and II, when septic despite medical therapy: percutaneous drainage when feasible (EL: 2, GoR STRONG).

- *Toorenvliet BR, Swank H, Schoones JW, Hamming JF, Bemelman WA. Laparoscopic peritoneal lavage for perforated colonic diverticulitis: a systematic review. Colorectal Dis 2010;12(9):862–7*

Hinchey I and II with persisting sepsis, and Hinchey III might be indications for peritoneal lavage, but this has still to be assessed through RCTs (EL: 3, GoR WEAK).

When successfully performed laparoscopic lavage and drainage does not always necessitate a future elective colonic resection (EL: 3, GoR WEAK).

- *Sorrentino M, Brizzolari M, Scarpa E, et al. Laparoscopic peritoneal lavage for perforated colonic diverticulitis: a definitive treatment? Retrospective analysis of 63 cases. Tech Coloproctol. 2015 Feb;19(2):105-10.*
- *Cirocchi R, Trastulli S, Vettoretto N, et al. Laparoscopic peritoneal lavage: a definitive treatment for diverticular peritonitis or a "bridge" to elective laparoscopic sigmoidectomy?: a systematic review. Medicine (Baltimore). 2015 Jan;94(1):e334. doi: 10.1097/MD.0000000000000334*

Peritoneal lavage

The advantage advocated by the supporters of this technique are:

- avoidance of a large laparotomy and derivative procedures, thus, reducing their consequent complications.

- reduction of postoperative pain and the subsequent use of analgesics,

- lowering of surgical site infections,

- a potential reduction of the rate of incisional hernias,

- amelioration in postoperative disability.

In addition, the recurrence rate of acute diverticulitis' attacks requiring hospitalization is low, and in most patients there is no need for a deferred colonic resection.

Whenever an elective colonic resection is indicated, laparoscopic peritoneal lavage reduces adhesions, therefore, facilitating the laparoscopic approach.

Peritoneal lavage

Recently concerns have been risen about its use even in selected patients. The largest study on peritoneal lavage designed was the LADIES trial *(http://clinicaltrials.gov/show/NCT01317485)*. The study was planned as a 2:1:1 randomisation between laparoscopic lavage and drainage, sigmoidectomy with primary anastomosis and sigmoidectomy with end-colostomy. Recruitment started in April 2010, but in 2013 the laparoscopic lavage and drainage arm was closed on advice of the data and safety monitoring board due to safety issues, with the two other arms still continuing recruitment.

Further evidence is needed, and the ongoing RCTs (DILALA, LapLAND and SCANDIV) will be completed shortly, and they should provide more consistent, comprehensive and conclusive data on this subject.

Peritoneal lavage

"The poor quality *of the existing literature on peritoneal lavage in aggregate and the inherent selection bias in the literature are major obstacles in advocating the widespread adoption of the laparoscopic lavage; the safety of lavage for purulent or fecal peritonitis has not been proven or disproven by the published studies to date."*

- *Feingold D, Steele SR, Lee S, Kaiser A, Boushey R, Buie WD, Rafferty JF (2014) Practice parameters for the treatment of sigmoid diverticulitis. Dis Col Rectum 57, 284-294*

When is laparoscopic resection recommended for the treatment of acute diverticulitis?

Systematic review - National Inpatient Sample (NIS) database – 2,664 laparoscopic resections in 4 years; more than 50% required conversion to open surgery

With no difference in mortality or morbidity, laparoscopic approach resulted a predictor of routine discharge and decreased length of stay, although cost analysis revealed substantial equivalence between groups.

- *Rea JD, Herzig DO, Diggs BS, Cone MM, Lu KC. Use and outcomes of emergent laparoscopic resection for acute diverticulitis. Am J Surg 2012; 203: 639-643*

Small Bowel Obstruction due to adhesions

Mauro Zago

Original bibliography according Oxford CEBM 2009

Original bibliography according Oxford CEBM 2011

Laparoscopic treatment of small bowel obstruction can be successfully accomplished in selected patients (GoR C).

LoE 3b

LoE 3

Laparoscopic treatment of small bowel obstruction can be successfully and safely accomplished (LoE 3).

When feasible, laparoscopic adhesiolisis is associated with a quicker functional recovery and a reduced LOS, with at least similar morbidity and mortality than open surgery (LoE 3).

Selection of patients and preoperative planning is the key for a safe and successful laparoscopic surgery for SBO (LoE 3).

Neither RCTs nor prospective controlled studies comparing open vs. LAP

Sallinen et al. BMC Surgery 2014, 14:77
http://www.biomedcentral.com/1471-2482/14/77

BMC Surgery

STUDY PROTOCOL Open Access

Laparoscopic versus open adhesiolysis for small bowel obstruction - a multicenter, prospective, randomized, controlled trial

Ville Sallinen[1*], Heidi Wikström[1], Mikael Victorzon[2], Paulina Salminen[3], Vesa Koivukangas[4], Eija Haukijärvi[5], Berndt Enholm[6], Ari Leppäniemi[1] and Panu Mentula[1]

SBO due to adhesions
Mauro Zago

@ results expected 2018

@ primary endpoint LOS

* secondary endpoints: functional recovery, enteral nutrition, morbidity and mortality

Sallinen et al. BMC Surgery 2014, 14:77
http://www.biomedcentral.com/1471-2482/14/77

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STUDY PROTOCOL Open Access

Laparoscopic versus open adhesiolysis for small bowel obstruction - a multicenter, prospective, randomized, controlled trial

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The American Journal of Surgery (2011) 201, 111–121

The American Journal of Surgery

Review

Prevention of postoperative peritoneal adhesions: a review of the literature

Beat Schnüriger, M.D., Galinos Barmparas, M.D., Bernardino C. Branco, M.D., Thomas Lustenberger, M.D., Kenji Inaba, M.D., F.R.C.S.C., F.A.C.S., Demetrios Demetriades, M.D., Ph.D., F.A.C.S.*

LAP reduces the rate of postoperative adhesions

SBO due to adhesions
Mauro Zago

Incidence of adhesions-related readmissions

LoE 3

	LAP (%)	Open (%)
Cholecystectomy	0.2	7.1
Colectomy	4.5	9.5
Hysterectomy	0	15.6
Adnexal surgery	0	23.9

Shnuriger 2011

LAP reduces the rate of postoperative adhesions

108,141 patients

4 times increased risk of SBO for open surgery

LoE 3

ORIGINAL ARTICLE

Effect of Laparoscopy on the Risk of Small-Bowel Obstruction

A Population-Based Register Study

Eva Angenete, MD, PhD; Anders Jacobsson, MSc; Martin Gellerstedt, PhD; Eva Haglind, MD, PhD

LAP reduces the rate of postoperative adhesions

The American Journal of Surgery (2012) 204, 779–786

The American Journal of Surgery

LoE 2

Review Article

Laparoscopic versus open adhesiolysis in patients with adhesive small bowel obstruction: a systematic review and meta-analysis

Ming-Zhe Li, M.D.[a,1], Lei Lian, M.D.[b,1], Long-bin Xiao, M.D.[a], Wen-hui Wu, M.D.[a], Yu-long He, M.D.[a], Xin-ming Song, M.D.[a,*]

[a]*Department of Gastrointestinal and Pancreatic Surgery, the First Affiliated Hospital, Sun Yat-sen University, Guangzhou, China 510080;* [b]*Department of Colorectal Surgery, the Sixth Affiliated Hospital (Gastrointestinal Hospital), Sun Yat-sen University, Guangzhou, China 510655*

LAP advantageous for better outcome

The American Journal of Surgery (2012) 204, 779–786

The American Journal of Surgery

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[a]*Department of Gastrointestinal and Pancreatic Surgery, the First Affiliated Hospital, Sun Yat-sen University, Guangzhou, China 510080;* [b]*Department of Colorectal Surgery, the Sixth Affiliated Hospital (Gastrointestinal Hospital), Sun Yat-sen University, Guangzhou, China 510655*

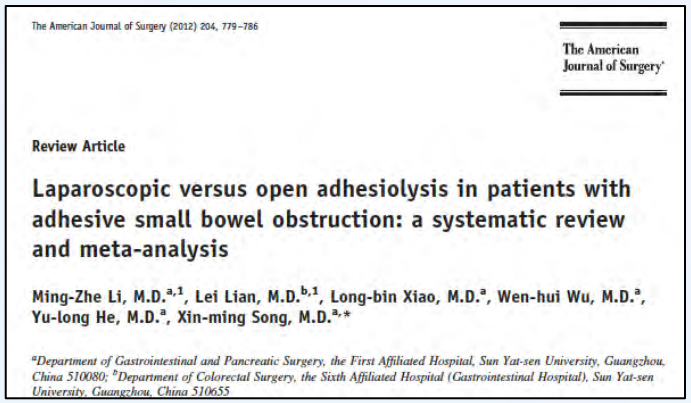
LAP advantageous for better outcome

SBO due to adhesions
Mauro Zago

- ✓ 334 patients in 4 retrospective comparative studies using meta-analytic methods

LoE 2

- ✓ laparoscopic adhesiolysis associated with reduction in
  - overall complication rate ($p < 0.01$)
  - prolonged ileus rate ($p<0.01$)
  - pulmonary complication rate ($p<0.04$)
  - no differences for intraoperative bowel injuries, wound infection and mortality



The American Journal of Surgery (2012) 204, 779–786

The American Journal of Surgery

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LAP advantageous for better outcome

Surg Endosc (2014) 28:2381–2386
DOI 10.1007/s00464-014-3486-x

Laparoscopic versus open surgical management of small bowel obstruction: an analysis of short-term outcomes

Fady Saleh · Luciano Ambrosini · Timothy Jackson · Allan Okrainec

LAP advantageous for better outcome

SBO due to adhesions
Mauro Zago

- ✓ data of the ACS NSQIP between 2005 and 2010
- ✓ 4616 patients operated for SBO (3697 open, 919 LAP)

  Sicker patients, conversions and bowel resections excluded

LAP *(both unadjusted and adjusted ORs)* **revealed a statistically significant advantage over open surgery**

LoE 3

morbidity & 30-day postop mortality (p<0.01)
overall complications (p<0.01)
LOS (p<0.01)

Surg Endosc (2014) 28:2381–2386
DOI 10.1007/s00464-014-3486-x

Laparoscopic versus open surgical management of small bowel obstruction: an analysis of short-term outcomes

Fady Saleh · Luciano Ambrosini · Timothy Jackson · Allan Okrainec

LAP advantageous for better outcome

Surg Endosc
DOI 10.1007/s00464-014-4015-7

Laparoscopic versus open surgical management of adhesive small bowel obstruction: a comparison of outcomes

James Byrne · Fady Saleh · Luciano Ambrosini · Fayez Quereshy · Timothy D. Jackson · Allan Okrainec

LAP advantageous for better outcome

SBO due to adhesions
Mauro Zago

- ✓ 269 patients
- ✓ 83 (30.9%) managed LAP
- ✓ conversion rate 38.6%

Surg Endosc
DOI 10.1007/s00464-014-4015-7

Laparoscopic versus open surgical management of adhesive small bowel obstruction: a comparison of outcomes

James Byrne · Fady Saleh · Luciano Ambrosini · Fayez Quereshy · Timothy D. Jackson · Allan Okrainec

Laparoscopy allowed

quicker recovery (time of passage of flatus**, p<0.005)**

reduced LOS (5 vs. 7 days**, p<0.031)**

reduced overall complication rate (27.7 vs. 43.6%**, p<0.014)**

LoE 3

LAP advantageous for better outcome

SBO due to adhesions
Mauro Zago

- ✓ data of the ACS NSQIP between 2005 and 2010
- ✓ significant reduction of 30-days mortality and of major complications with LAP

LoE 3

Surg Endosc (2014) 28:65–73
DOI 10.1007/s00464-013-3162-6

Laparotomy for small-bowel obstruction: first choice or last resort for adhesiolysis? A laparoscopic approach for small-bowel obstruction reduces 30-day complications

Kristin N. Kelly · James C. Iannuzzi · Aaron S. Rickles · Veerabhadram Garimella · John R. T. Monson · Fergal J. Fleming

LAP advantageous for better outcome

Workgroup for the update of the guidelines of the laparoscopic approach to acute abdomen

REVIEW Open Access

Bologna guidelines for diagnosis and management of adhesive small bowel obstruction (ASBO): 2013 update of the evidence-based guidelines from the world society of emergency surgery ASBO working group

Salomone Di Saverio[1†], Federico Coccolini[5], Marica Galati[1], Nazareno Smerieri[1], Walter L Biffl[4], Luca Ansaloni[5], Gregorio Tugnoli[1], George C Velmahos[7], Massimo Sartelli[8], Cino Bendinelli[13], Gustavo Pereira Fraga[17], Michael D Kelly[3], Frederick A Moore[11], Vincenzo Mandalà[6], Stefano Mandalà[6], Michele Masetti[1], Elio Jovine[1], Antonio D Pinna[2], Andrew B Peitzman[16], Ari Leppaniemi[15], Paul H Sugarbaker[9], Harry Van Goor[10], Ernest E Moore[4], Johannes Jeekel[12] and Fausto Catena[2,14*†]

Consensus statement

doi:10.1111/j.1463-1318.2012.02968.x

Laparoscopic adhesiolysis: consensus conference guidelines

N. Vettoretto*, A. Carrara†, A. Corradi‡, G. De Vivo§, L. Lazzaro¶, L. Ricciardelli, F. Agresta††, C. Amodio‡‡, C. Bergamini§§, G. Borzellino¶¶, M. Catani***, D. Cavaliere†††, R. Cirocchi‡‡‡, S. Gemini§§§, A. Mirabella¶¶¶, N. Palasciano****, D. Piazza††††, M. Piccoli‡‡‡‡, M. Rigamonti§§§§, M. Scatizzi¶¶¶¶, E. Tamborrino***** and M. Zago††††† on behalf of the Italian Association of Hospital Surgeons (Associazione dei Chirurghi Ospedalieri Italiani – ACOI)**

SBO due to adhesions
Mauro Zago

SICE 2015

Surg Endosc (2012) 26:12–17
DOI 10.1007/s00464-011-1885-9

The role of laparoscopy in the management of acute small-bowel obstruction: a review of over 2,000 cases

Donal B. O'Connor · Desmond C. Winter

29 %

LoE 3

A trend toward a reduced conversion rate

LAP should be preceded by adequate preoperative imaging

The American Journal of Surgery (2014) 208, 470–475

The American Journal of Surg

Clinical Science

Single-port laparoscopic treatment of small bowel obstruction

Byung Jo Choi, M.D.[a], Say-June Kim, M.D., Ph.D.[a], Sang Chul Lee, M.D., Ph.D.[a,*], Jae Im Lee, M.D.[b]

[a]Department of Surgery, Daejeon St. Mary's Hospital, The Catholic University of Korea, Daeheung-dong 520-2, Joong-gu, Daejeon, Republic of Korea; [b]Department of Surgery, Uijeongbu St. Mary's Hospital, The Catholic University of Korea, Uijeongbu, Republic of Korea

Best Practice & Research Clinical Gastroenterology 28 (2014) 3–17

Contents lists available at ScienceDirect

Best Practice & Research Clinical Gastroenterology

ELSEVIER

1

Laparoscopy in the acute abdomen

Benoit Navez, MD, Professor *, Julie Navez, MD, Resident

Department of Abdominal Surgery and Transplantation, Cliniques universitaires Saint-Luc, 10 Avenue Hippocrate, 1200 Brussels, Belgium

LoE 4-5

Selection of patients

SBO due to adhesions

Mauro Zago

Laparoscopic treatment of small bowel obstruction can be successfully and safely accomplished (LoE 3).

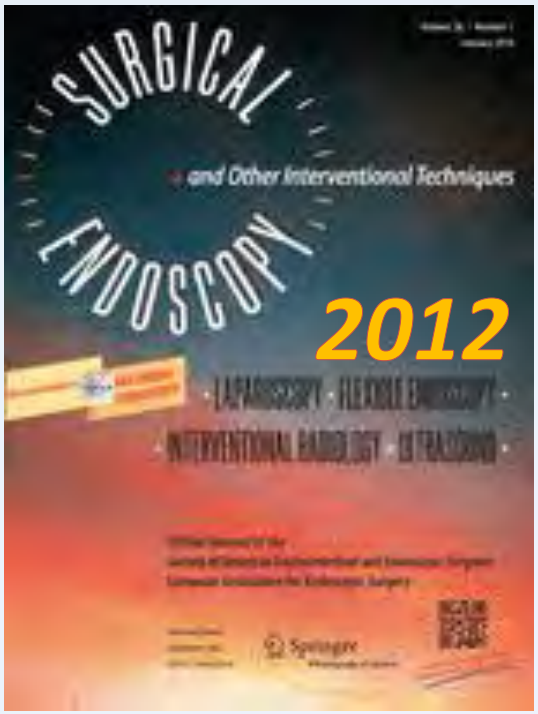
When feasible, laparoscopic adhesiolisis is associated with a quicker functional recovery and a reduced LOS, with at least similar morbidity and mortality than open surgery (LoE 3).

Selection of patients and preoperative planning is the key for a safe and successful laparoscopic surgery for SBO (LoE 5).

WEAK FOR STATEMENT

Laparoscopic treatment of Incarcerated hernias

Carlo Bergamini - Giovanni Alemanno



Incarcerated/strangulated hernias

Laparoscopic surgery, including TEP or TAPP repair, may be performed for the treatment of nonreducible or strangulated inguinal hernias (GoR B). The laparoscopic repair of noninguinal incarcerated hernias (diaphragmatic, either congenital or acquired, supravesical or spigelian, obturator, and internal hernias) may be performed, but further studies are necessary to validate this approach (GoR D).

In the natural history of inguinal hernia, 0.29–2.9 % of cases become incarcerated, and 10–15 % of these become strangulated and gangrenous, a complication with a mortality rate of up to 5 % in the elderly [261–266].

In 1993, Watson demonstrated the feasibility of laparoscopic hernia repair (LHR) for incarcerated hernias [267]. In 2003, a Cochrane library study showed that the outcome of elective LHR is at least equivalent to that of the open approach [268]. This study was confirmed in 2010 by an extensive meta-analysis [269]. On the other hand, there are no comparative studies between the laparoscopic and the open approach in emergency adult cases.

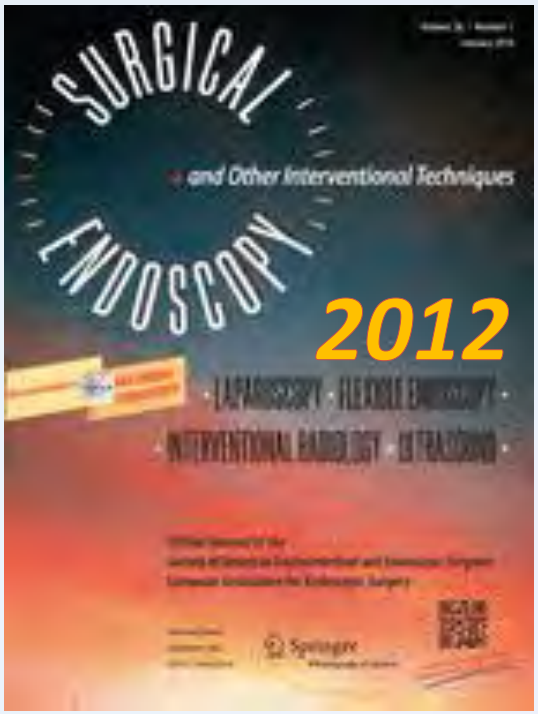
A review of cohort studies on laparoscopic repair of incarcerated groin hernias was published in 2009 by Deeba et al., updating the information given in the previous reduce during the surgical manipulations. A randomized controlled study (LE 1b) suggested that this was an effective technique that involves the introduction of the laparoscope into the hernia sac to evaluate the viability of the herniated loop, thus avoiding unnecessary laparotomy [278].

There have been only a few single-case or small case series studies (LE 4) on the laparoscopic treatment of nonreducible retroxiphoid diaphragmatic hernias. They concluded that there is the need for consensus on this subject [279, 280].

Acquired diaphragmatic paraesophageal incarcerated hernias are approached by laparoscopy by some authors in low-level studies (LE 4). The most important absolute contraindication to this procedure seems to be the presence of gastric necrosis [281–284].

The mini-invasive repair of rare abdominal wall acute hernias, such as supravesical and spigelian, is rarely described. Most case reports (LE 4) concern emergency obturator hernioplasties, with good results in terms of resolution of symptoms and hospital stay [285–297].

Finally, there are several articles on the laparoscopic repair of incarcerated internal hernias such as the paraduodenal, paracecal, broad uterus ligament, transmesosigma, and iatrogenic (caused by surgical changes to the anatomy) hernias. Even though all of the studies are of low LE, the



Asian Journal of Endoscopic Surgery
Official Journal of ISES, ELSA, and AETE

Asian J Endosc Surg ISSN 1758-5902

ORIGINAL ARTICLE

Laparoscopic versus open repair for strangulated groin hernias: 188 cases over 4 years

GPC Yang, CTY Chan, ECH Lai, OCY Chan, CN Tang & MKW Li

Department of Surgery, Pamela Youde Nethersole Eastern Hospital, Hong Kong, China

Incarcerated hernias
Carlo Bergamini – Giovanni Alemanno

SICE 2015

RESULTS

Table 3 Postoperative results and follow-up

	Laparoscopic group	Open group	*P*-value
Hospital stay, mean ± SD (days)	4.39 ± 1.99	7.34 ± 2.354	0.307
Wound infection (*n*)	0	12 4 laparotomy wounds 8 groin wounds	0.018
Hematoma (*n*)	2	5	0.918
Seroma (*n*)	8	7	0.074
Chronic pain (*n*)	0	0	–
Mesh infection (*n*)	0	0	–
Recurrence (*n*)	1	3	0.815
Follow up, mean ± SD (months)	24 ± 15.24	25.095 ± 14.48	0.421
Lost at follow-up (*n*)	4 (7%)	6 (4.58%)	0.494

EL4

RESULTS BIAS

Table 1 Preoperative patients' characteristics and clinical presentations

	Laparoscopic group ($n = 57$)	Open group ($n = 131$)	*P*-value
Men : women	39:18	115:16	0.485
Age, mean ± SD (years)	67.88 ± 14.943	74.99 ± 14.338	0.002
ASA 1 & 2	55	89	< 0.005
ASA 3 & 4	2	42	
Left	23	55	0.343
Right	31	74	
Bilateral	3	2	
Recurrent hernia	6	16	0.810
Intestinal obstruction	12 (21%)	24 (18.32%)	0.689

RETROSPECTIVE

Asian Journal of Surgery

Asian Journal of Endoscopic Surgery
Official Journal of ISES, ELSA, and AETF

Asian J Endosc Surg ISSN 1758-5902

ORIGINAL ARTICLE

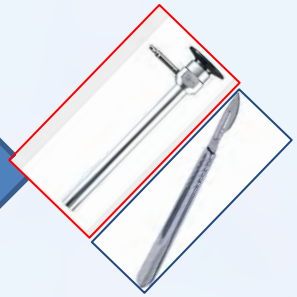
Laparoscopic versus open repair for strangulated groin hernias: 188 cases over 4 years

GPC Yang, CTY Chan, ECH Lai, OCY Chan, CN Tang & MKW Li

Department of Surgery, Pamela Youde Nethersole Eastern Hospital, Hong Kong, China

OTHER SUGGESTIONS

combined techniques



TEP/TAPP

Asian Journal of Surgery

Asian Journal of Endoscopic Surgery
Official Journal of ISES, ELSA, and AETF

Asian J Endosc Surg ISSN 1758-5902

ORIGINAL ARTICLE

Laparoscopic versus open repair for strangulated groin hernias: 188 cases over 4 years

GPC Yang, CTY Chan, ECH Lai, OCY Chan, CN Tang & MKW Li

Department of Surgery, Pamela Youde Nethersole Eastern Hospital, Hong Kong, China

Table 2 Operative details

	Laparoscopic group	Open group
Operative time, mean ± SD (min)	79.82 ± 29.571	80.75 ± 35.161
TEP (*n*)	48	-
TAPP (*n*)	5	-

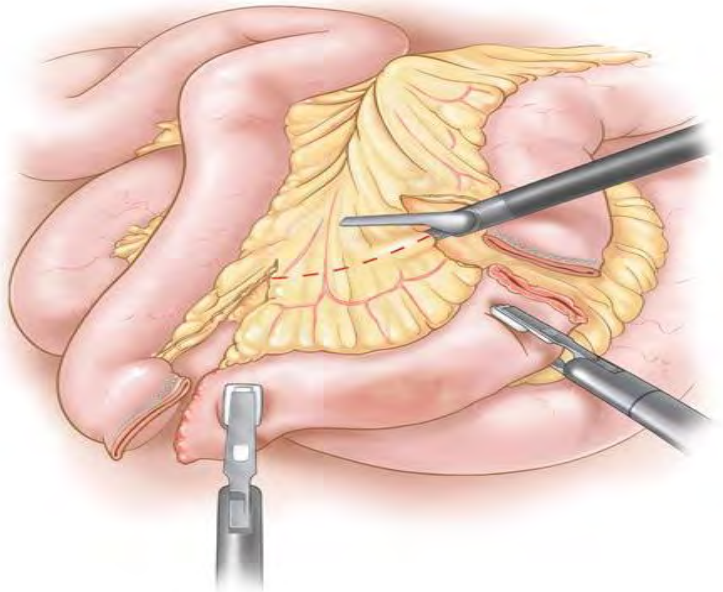


Figure 1 Large incarcerated scrotal hernia—anterior and lateral views.

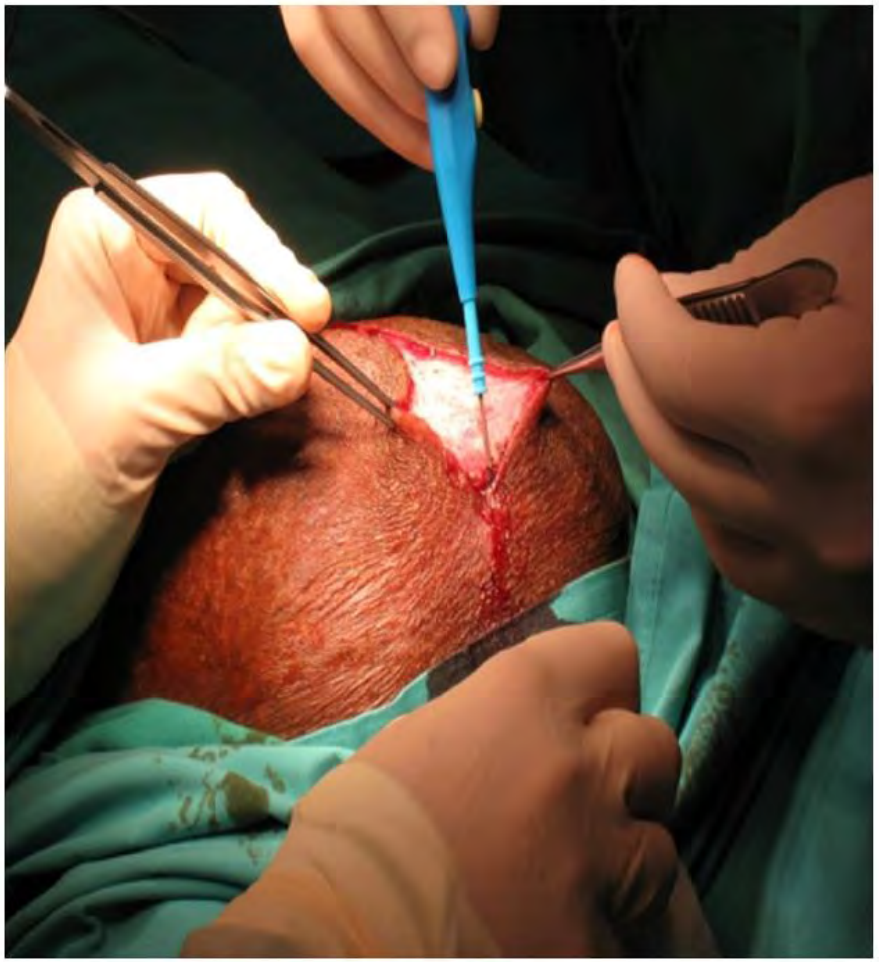


Figure 2 Paramedian scrotal incision (2–2.5 cm).

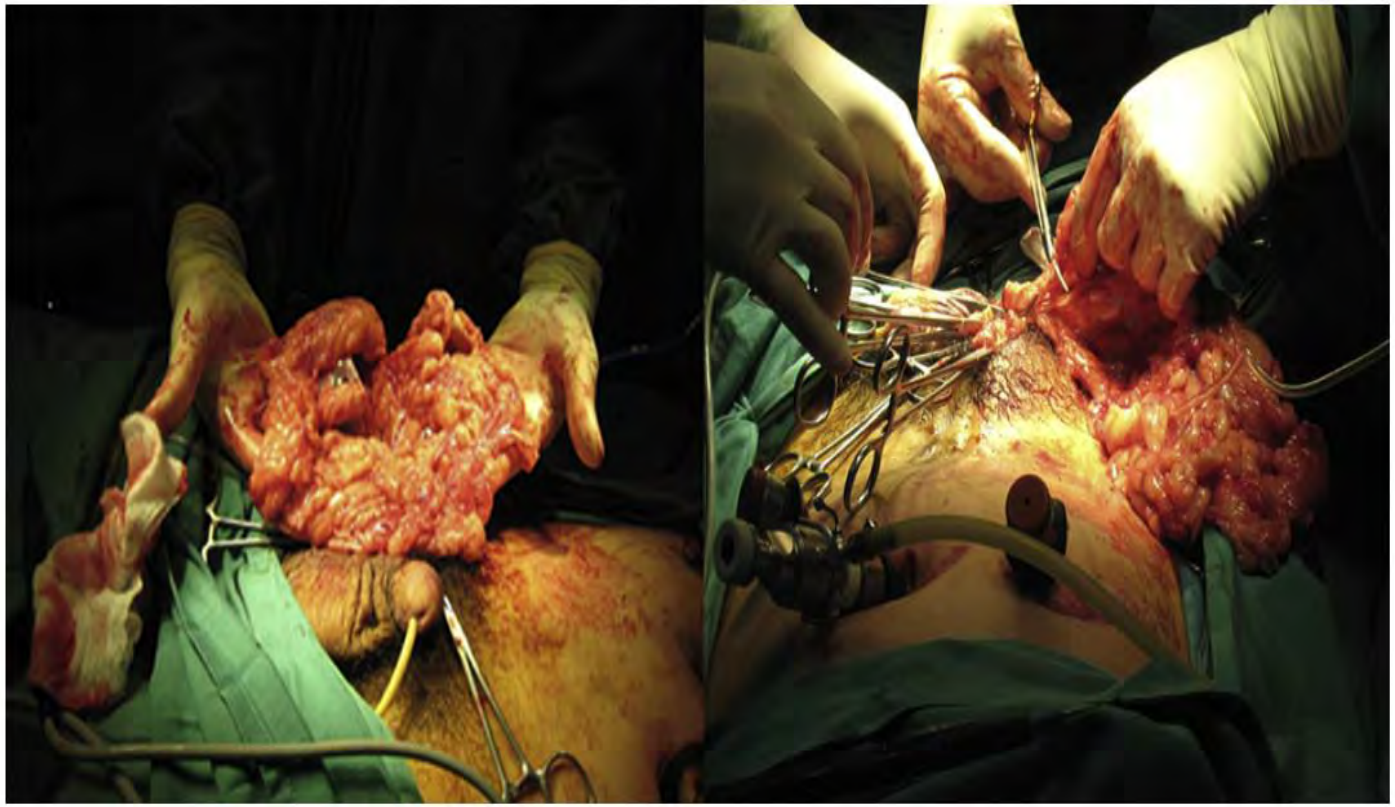


Figure 3 Excision of the omentum was performed when encountered upon opening of the scrotal sac.

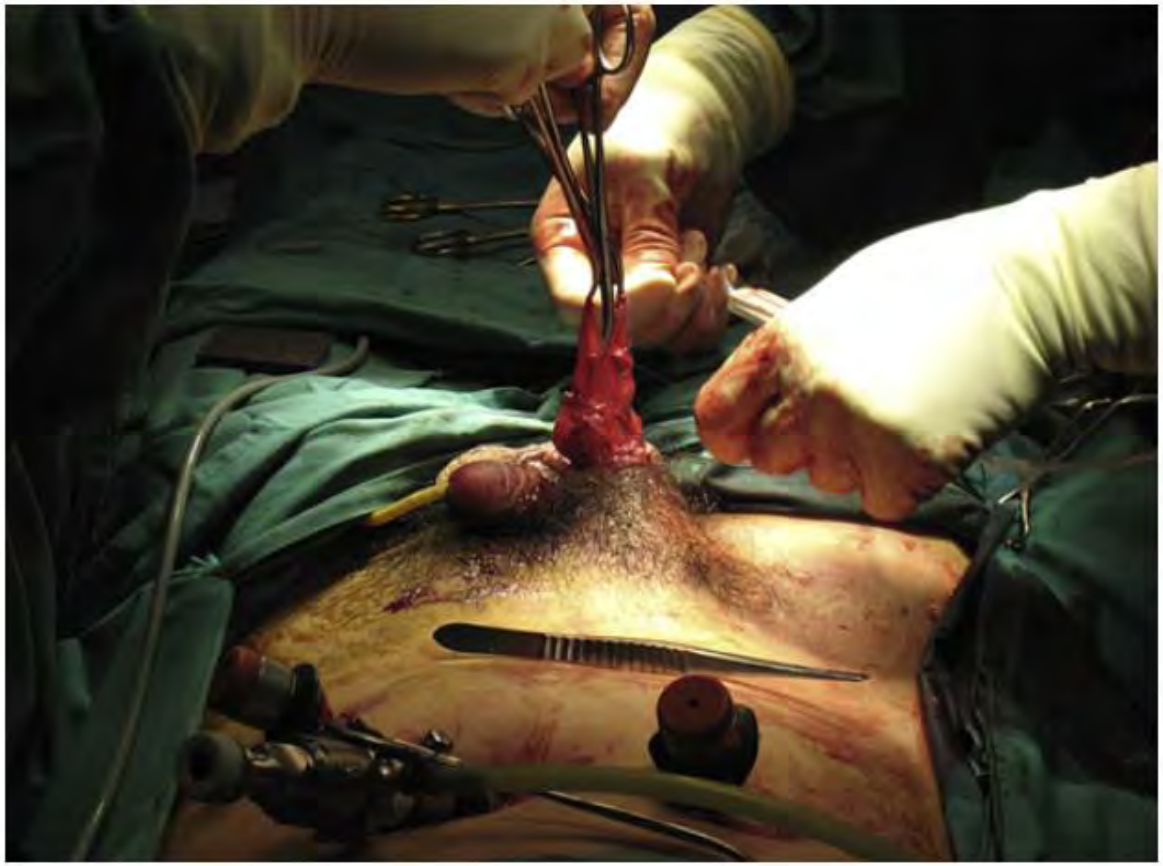
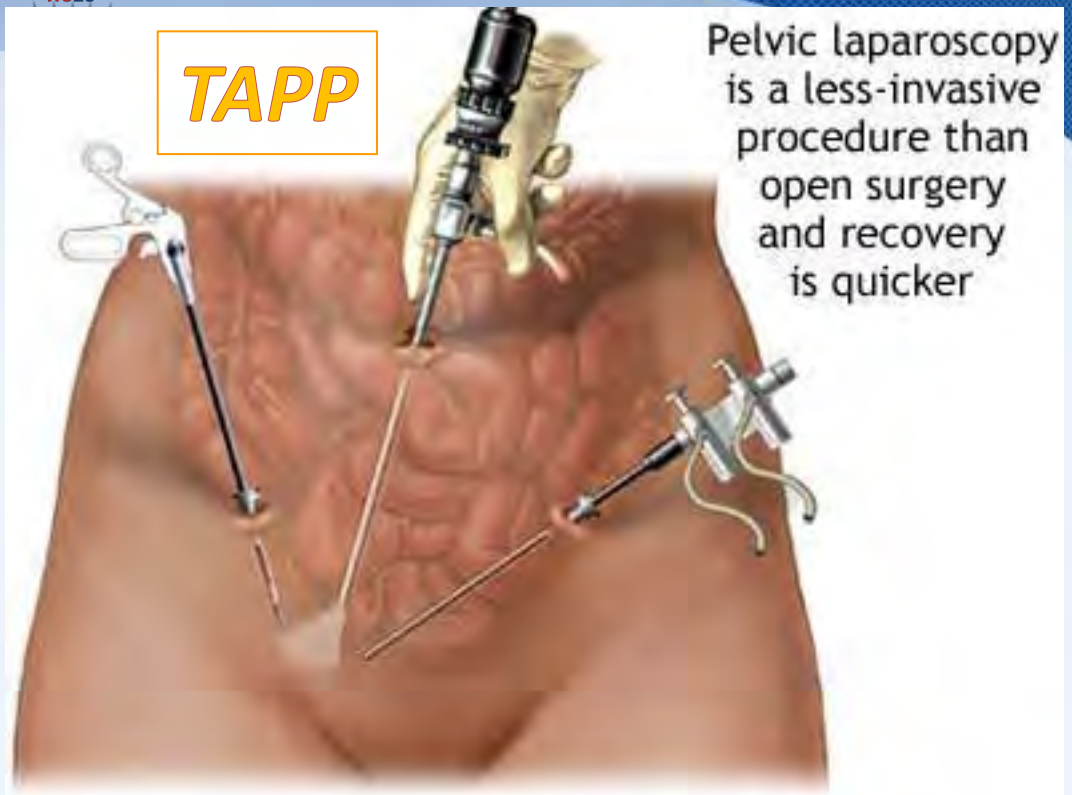


Figure 4 Ligation of the sac before re-insufflation of the abdomen.

EL4



An argument in favor of TAPP is the fact that, unlike TEP or open technique where the surgeons have a few minutes to make a decision on bowel resection, trans-abdominal approach allows the reassessment of the viability of bowels at the end of the procedure, thereby avoiding unnecessary bowel resection

ORIGINAL ARTICLE

Combined laparoscopic and open extraperitoneal approach to scrotal hernias

G. S. Ferzli · S. Rim · E. D. Edwards

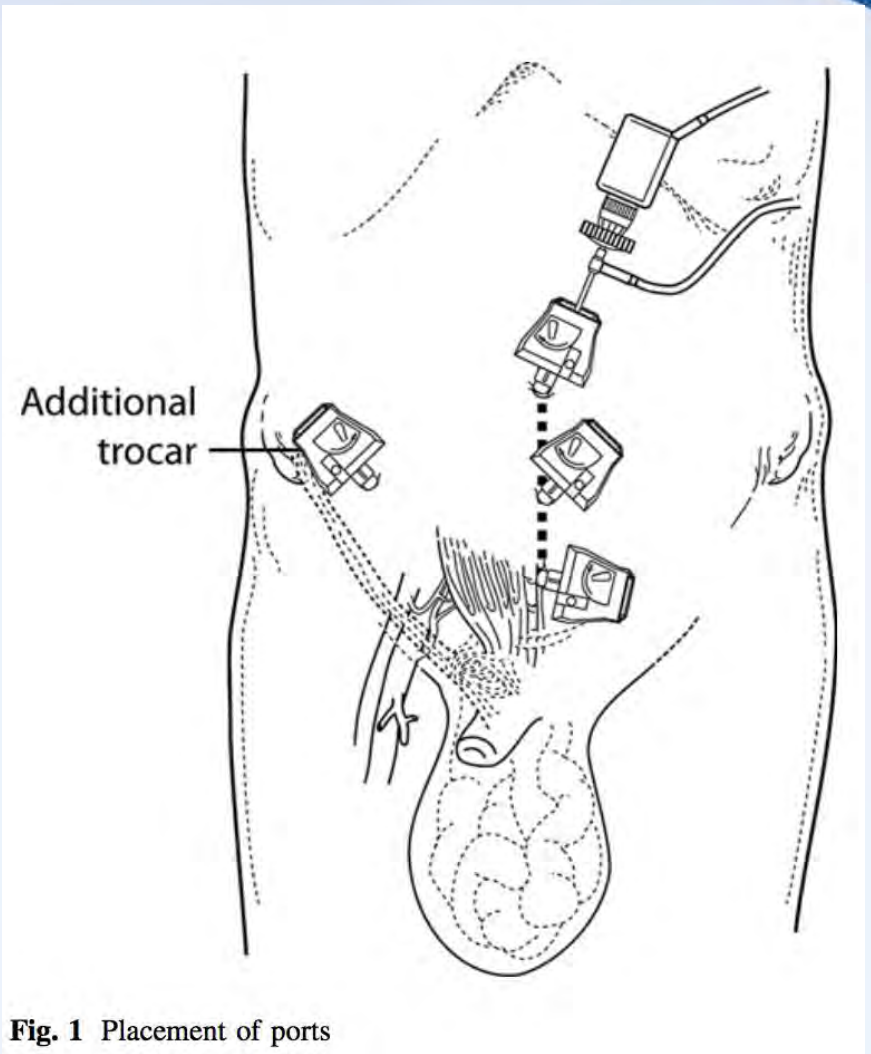


Fig. 1 Placement of ports

ORIGINAL ARTICLE

Combined laparoscopic and open extraperitoneal approach to scrotal hernias

G. S. Ferzli · S. Rim · E. D. Edwards

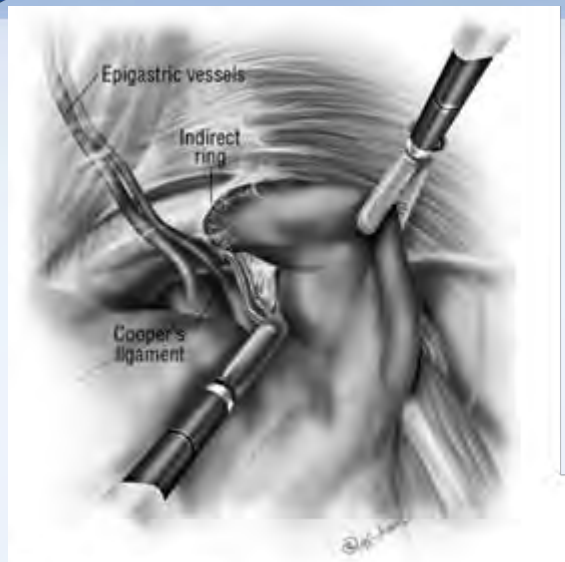


Fig. 2 Reducing the hernia sac

Fig. 3 Reducing the hernia sac

ORIGINAL ARTICLE

Combined laparoscopic and open extraperitoneal approach to scrotal hernias

G. S. Ferzli · S. Rim · E. D. Edwards

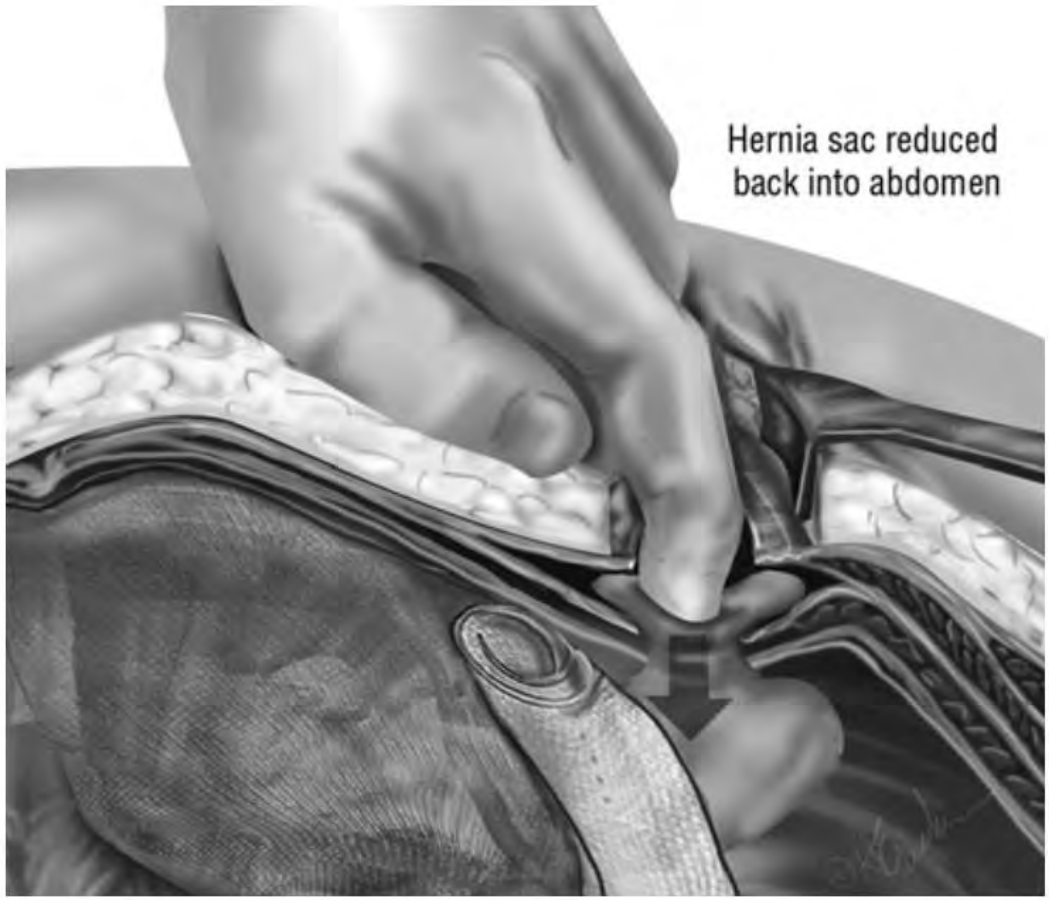
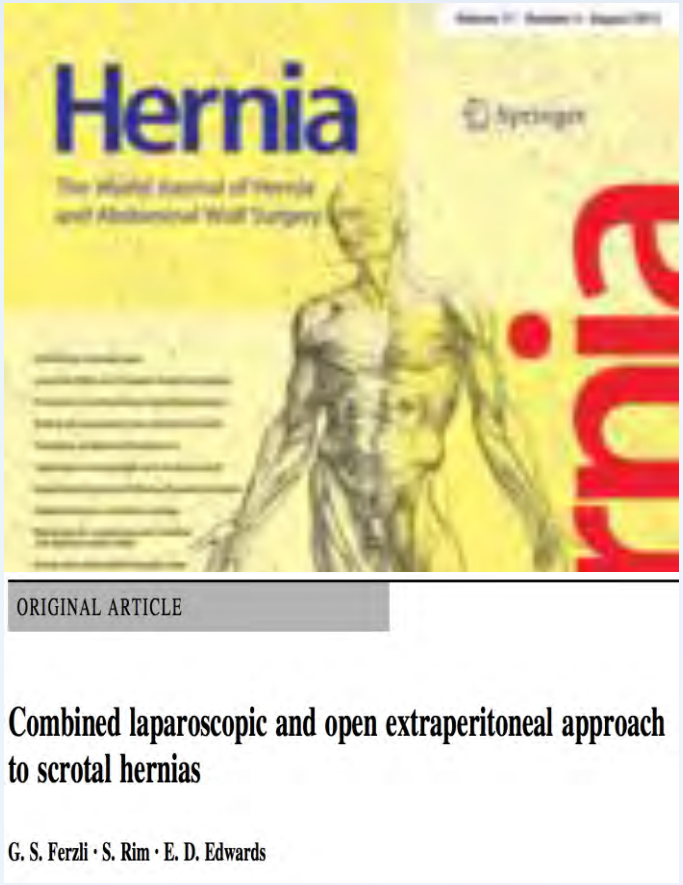


Fig. 8 Reducing the sac into the abdomen

EL4



We prefer the TEP because we feel that laparoscopic extraperitoneal preparation of the preperitoneal floor avoids the usual struggle of an open preperitoneal repair and results in a larger and better positioned of mesh than in an open anterior approach. In addition, dissection of the ccord structures does not rely on invagination of the sac which makes the dissection more difficult when dealing with the scrotal hernia

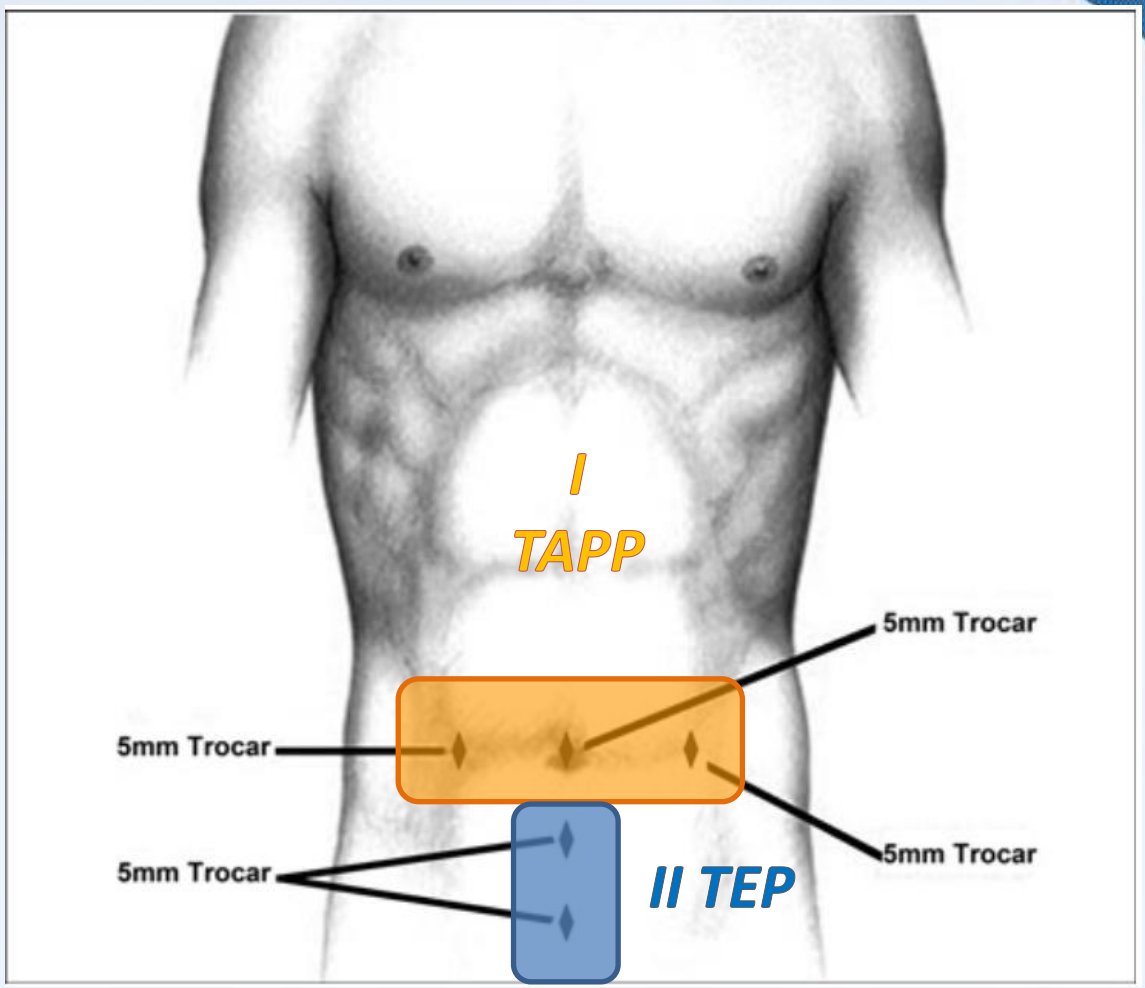
The combined technique allow the surgeon to achieve an adequate peritoneal dissection of the cord in these cases of longstanding nature of these hernias with the attendant anatomic distortion and an appropriate distension of the mesh (ELECTION)

EL4

ORIGINAL ARTICLES

The combined laparoscopic approach for the treatment of incarcerated inguinal hernia

Aviad Hoffman · Eyal Leshem · Oded Zmora · Orit Nachtomi · Moshe Shabtai · Amram Ayalon · Danny Rosin



EL4

ORIGINAL ARTICLES

The combined laparoscopic approach for the treatment of incarcerated inguinal hernia

Aviad Hoffman · Eyal Leshem · Oded Zmora · Orit Nachtomi · Moshe Shabtai · Amram Ayalon · Danny Rosin

Table 1 Demographic and clinical characteristics

	n (%)
Demographics	
Male gender	11 (73)
Mean age: years (range)	57 ± 22 (25–88)
Clinical findings	
Acute incarceration	8 (53)
Chronic incarceration (irreducible)	7 (46)
Recurrent hernia	3 (20)
Right side	10 (66)
Contralateral hernia	3 (20)
Procedure	
Laparoscopy followed by TEP	11 (73)
TEP	3 (20)
Laparoscopy converted to open surgery	1 (7)
Outcome	
Mean operative time: min (range)	51 ± 17 (22–77)
Mean hospital stay: days (range)	3 ± 2 (1–7)
Major complications/infections	0
Mean follow-up: months (range)	24.6 ± 12.2 (14–52)

Table 1 Clinical summary of four patients with strangulated hernia who underwent the two-stage laparoscopic surgery

Case no.	Age/sex	Site of strangulated hernia	Occult hernia	TEP duration (min)	Days between the 1st and 2nd surgeries
1	7e/M	Rt. indirect inguinal	None	98	8
2	8β/F	Rt. obturator	Rt. indirect inguinal Lt. direct inguinal Lt. obturator Bilat. femoral	87	9
3	86/F	Lt. femoral	Rt. obturator Rt. indirect inguinal	173	24
4	8ϙ/F	Rt. femoral	Lt. obturator	112	13

EL4 delay

Risk of resection

WHAT'S NEW

miscellaneous

anecdotal

EL5

Indian J Surg (June 2013) 75(Suppl 1):S439–S441
DOI 10.1007/s12262-012-0778-z

CASE REPORT

De Garengeot Hernia: A Case Report and Review of Literature

Aashish Shah · Haridarshan Sira janardhan

Received: 11 November 2010 / Accepted: 20 November 2012 / Published online: 9 December 2012

Abstract Femoral Hernia constitutes a small percentage of groin herniae,but have always been associated with significantly high morbidity.This is partly due to the difficulties in diagnosing the hernia and also due to its propensity for incarceration because of its anatomy. We report a rare case of De Garengeot Hernia which is the herniation of the appendix into a femoral hernia.While this is rare in itself, acute appendicitis in a strangulated femoral hernia is even more uncommon.

Keywords Femoral hernia · Acute appendicitis · Contrast Enhanced CT · Diagnostic laparoscopy · Laparotomy · Anatomical repair

Introduction

Femoral hernias occur just below the inguinal ligament when the abdominal contents pass through the femoral canal. Femoral hernia is relatively uncommon type, accounting for only 3 % of all hernias. Whereas femoral hernias can occur in both male and female population, almost all of them develop in women because of the wider bone structure of the female pelvis [1]. Herniation of the appendix into a femoral hernia—also called De Garengeot hernia—is a rare but a well-recognized entity. It is generally an incidental finding during hernia repair. Acute appendicitis in a strangulated femoral hernia is even more uncommon. Because of its rarity, we present a case report of a 46-year-old female diagnosed to have acute appendicitis with obstruction in the femoral canal with a brief review on the literature.

A. Shah · H. Sira janardhan
Department of MAS and GI Surgery, Fortis Hospital,
Bannerghatta Road,
Bangalore 560076, India

A. Shah (✉)
76-1-1, VR Layout, 1st Phase JP Nagar,
Bangalore 560078, India
e-mail: ashlap@yahoo.com

Case Report

A 46-year-old female was admitted in our hospital with an acute onset of periumbilical abdominal pain of 3 days duration, associated with loose stools for 2 days. The patient also had a history of mild fever for 2 days and bilious vomiting 1 day before admission.

There were no history of hematemesis, melena, or hematochezia, and the patient denied any previous history of similar episodes. The patient had a past medical history of left hemiplegia (the right middle cerebral artery territory infarct), rheumatic heart disease, and atrial fibrillation.

The patient was on the following medications:

Acitrom tablet 1 mg
Restyl 0.25 mg
Betaloc 25 mg
Eltroxin 50 μg

On admission, the patient was hemodynamically stable and in sinus rhythm. She was febrile with a temperature of 99 °F and was mildly dehydrated. Her abdominal examination revealed features of peritonism in the right iliac fossa, right lumbar region, and suprapubic area.

There was generalized tenderness all over the abdomen. There was no palpable mass in the abdomen. Though free on both sides, the hernial orifice was tender on palpation on the right side. Bowel sounds were sluggish.

Incarcerated hernias

Carlo Bergamini – Giovanni Alemanno

SICE 2015

WHAT'S NEW

miscellaneous
anecdotal

EL5

Hindawi Publishing Corporation
Case Reports in Surgery
Volume 2011, Article ID 491802, 4 pages
doi:10.1155/2011/491802

Case Report

Laparoscopic Diagnosis of Incarcerated "Spigelian Hernia": Report of a Case and Review of the Literature

Sanoop Koshy Zachariah and Priya Jose

Department of General Gastrointestinal and Laparoscopic Surgery, Medical College, Kolenchery, Cochin, Kerala 682311, India

Correspondence should be addressed to Sanoop Koshy Zachariah, skzach@yahoo.com

Received 20 July 2011; Accepted 17 August 2011

Academic Editors: O. Dalpiaz and E. Zacharakis

Spigelian hernias are rare hernias, representing only about 1-2% of all abdominal hernias. An accurate preoperative diagnosis of this condition is often difficult because the physical presence of these hernias is often not demonstrable owing to its peculiar anatomic location. Many patients with Spigelian hernias, therefore, may have no obvious findings on clinical examination. The diagnosis is even trickier in obese patients wherein the hernia sac may lie in an intraparietal plane, masked by the abdominal subcutaneous fat. Here we describe a case of incarcerated Spigelian hernia where clinical and radiological findings were inconsistent and the accurate diagnosis was made by laparoscopy and was followed by a laparoscopic-assisted repair using an open anterior approach with an onlay mesh. We therefore feel that laparoscopy can be a useful tool for confirming the diagnosis and also for performing a definitive repair in doubtful cases of Spigelian hernias.

1. Introduction

The Spigelian hernia (SH) is named after the Belgian anatomist Adriaen Van Den Spigehel who described the semilunar line (linea spigeli) in 1645 [1]. However, the Spigelian hernia was first described and defined by Josef Klinkosch in 1764. [2]. A Spigelian hernia is the protrusion of preperitoneal fat, peritoneal sac, or viscera through a congenital or acquired defect in the Spigelian aponeurosis. These are rare hernias representing only about 1-2% of all abdominal hernias and fewer than 1,000 cases being reported in the literature. Although the incidence of Spigelian hernias is low, they are the most common type of spontaneous lateral ventral hernias. They frequently present between 50–60 years of age, with a male to female ratio of 1 : 1.18 and occur twice as often on the right side compared to the left [2]. Reported incarceration rates are around 17%, with acute presentations in 10% and the lack of reliable physical examination findings in 36% of patients [3].

2. Case Report

A 45-year-old-woman presented with a history of sudden onset of right-sided lower abdominal pain since five hours and was associated with vomiting. She gave a history of recurrent episodes of right-sided lower abdominal pain since the past 2 years and several imaging studies done over this time period, including ultrasonography and computed tomography scans, failed to reveal the etiology of her symptoms. She had no previous surgical history, but was recently detected to have type 2 Diabetes Mellitus. Clinical examination revealed an obese abdomen with maximal focal tenderness in the right lower quadrant. However, a vague fullness was palpable in the lower right quadrant which corresponded to the site of maximal tenderness. She was afebrile, the heart rate was 90/minute, blood pressure was 140/90 mm of Hg, and the bowel sounds were hyperperistaltic. Laboratory investigations were unremarkable except for neutrophilic leucocytosis. Plain abdominal radiograph and ultrasonography were inconclusive. Hence, with a provisional clinical diagnosis of an appendicular pathology, the patient was taken-up for laparoscopic surgery.

Prior to the induction of anaesthesia, the patient's abdomen was palpated and the area of maximal focal tenderness and the fullness was outlined with a marking pen (Figure 1(a)). Pneumoperitoneum was created by an open technique and a 30-degree 10 mm telescope was used

Incarcerated hernias
Carlo Bergamini – Giovanni Alemanno

WHAT'S NEW

miscellaneous

anecdotal

EL5

J Gastrointest Surg (2012) 16:1433–1435
DOI 10.1007/s11605-012-1846-1

CASE REPORT

Laparoscopic Transabdominal Preperitoneal Hernioplasty for Reduction En Masse of an Incarcerated Inguinal Hernia: A Case Report

Chin-Chia Wu · Jung-Cheng Kang · Yu-Min Huang

Received: 16 January 2012 / Accepted: 10 February 2012 / Published online: 1 March 2012

Abstract
Introduction Reduction en masse is a rare complication of an incarcerated inguinal hernia. Its occurrence should be suspected when intestinal obstruction persists despite a seemingly successful manual reduction or hernioplasty.
Case Report We report our experience in the management of a reduction en masse of a direct inguinal hernia. The diagnosis was established by computed tomography of the abdomen. The reduction en masse, as well as an accompanying indirect hernia, was successfully managed with laparoscopic transabdominal preperitoneal hernioplasty.
Conclusion The safety, effectiveness, and minimal invasiveness conferred by the laparoscopic approach justified its application under such conditions.

Introduction

Reduction en masse is a rare complication of an incarcerated inguinal hernia, occurring in approximately 1 of 13,000 hernias.[1] It arises when the incarcerated sac is reduced into the properitoneal space with forcible manipulation or during the operation. The intestinal loop remains trapped in the sac, however, and obstruction persists.[1–3] If left unrecognized and untreated, strangulation may develop and result in significant morbidity and mortality.[4] We report our experience in the management of a reduction en masse of a direct inguinal hernia, where a laparoscopic transabdominal preperitoneal (TAPP) hernioplasty successfully treated the patient.

C.-C. Wu · J.-C. Kang
Division of Colorectal Surgery, Department of Surgery, Buddhist Tzu Chi General Hospital and Tzu Chi University, Hualien, Taiwan

Y.-M. Huang (✉)
Division of General Surgery, Department of Surgery, Buddhist Tzu Chi General Hospital and Tzu Chi University, No. 707, Sec. 3, Zhongyang Rd., Hualien 97002, Taiwan
e-mail: y.m.huang@yahoo.com.tw

Case Report

An 85-year-old man presented with an irreducible lump over his left groin for several hours. The lump had been noted for about 1.5 years and was reducible to manipulation previously. He had a history of stroke and was on prolonged warfarinization. In the emergency room, the lump was reduced with forcible manipulation. He refused further surgical intervention because of concerns about the risks associated with his age and underlying medical condition. Unfortunately, abdominal distension and pain occurred soon after discharge from our hospital. He visited our emergency room again about 6 h later. On examination, his abdomen was soft but distended. Tenderness was noted over the left lower abdomen, but there was no longer a lump over his left groin. Computed tomography showed a cyst-like lesion containing bowel loops over his left pelvis (Fig. 1a, b). Under the impression of a small bowel obstruction caused by reduction en masse of an inguinal hernia, a laparoscopic TAPP hernioplasty was performed.

Under general anesthesia, an 11-mm trocar (Ethicon Endo-Surgery, USA) was inserted via a subumbilical minilaparotomy to create the pneumoperitoneum and for the

Incarcerated hernias

Carlo Bergamini – Giovanni Alemanno

WHAT'S NEW

miscellaneous
anecdotal

EL5

Surg Endosc (2013) 27:3421–3429
DOI 10.1007/s00464-013-2884-9

VIDEOS

Laparoscopic repair of a lumbar hernia: report of a case and extensive review of the literature

Sebastian Suarez · Juan D. Hernandez

Received: 9 March 2012 / Accepted: 15 February 2013 / Published online: 30 April 2013

Abstract Lumbar hernias are a protrusion of intra-abdominal contents through a weakness or rupture in the posterior abdominal wall. They are considered to be a rare entity with approximately 300 cases reported in the literature since it was first described by Barbette in 1672. Petit described the inferior lumbar triangle in 1783 and Grynfeltt described the superior lumbar triangle in 1866; both are anatomical boundaries where 95 % of lumbar hernias occur, whereas the other 5 % are considered to be diffuse. Twenty percent of lumbar hernias are congenital and the other 80 % are acquired; the acquired lumbar hernias can be further classified into either primary (spontaneous) or secondary. The typical presentation of lumbar hernias is a patient with a protruding semispherical bulge in the back with a slow growth. However, they may present with an incarcerated or strangulated bowel, so it is recommended that all lumbar hernias must be repaired as soon as they are diagnosed. The "gold standard" for diagnosing a lumbar hernia is a CT scan, because it is able to delineate muscular and fascial layers, detect a defect in one or more of these layers, evaluate the presence of herniated contents, differentiate muscle atrophy from a real hernia, and serve as a useful tool in the differential diagnosis, such as tumors. Recent studies have demonstrated the advantages of a laparoscopic repair instead of the classic open approach as the ideal treatment option for lumbar hernias. We report a case of a spontaneous lumbar hernia initially diagnosed as a lipoma and corrected with the open approach, but after relapsing 2 years later it was corrected using a laparoscopic approach. It is followed by an extensive review of lumbar hernias literature regarding history, anatomy, and surgical techniques.

Keywords Hernia · Lumbar hernia · Laparoscopy · Prosthetic mesh

A lumbar hernia is the protrusion of intra-abdominal contents through a weakness or rupture in the posterior abdominal wall. Lumbar hernias are a rare entity and are a difficult diagnosis infrequently made even by surgeons. This leads to delayed detection; therefore, most patients arrive at the hospital's emergency department with an incarcerated or strangulated hernia. It was first described as early as 1672; however, there has been a lack of reports ever since. The hernia generally protrudes through two described anatomical constants, which are the inferior triangle of Petit and the superior triangle of Grynfeltt-Lesshaft. They commonly present as a protruding bulge in the posterior abdominal wall and are diagnosed both clinically by detecting classical signs of hernias and by using a CT scan, which can identify the location and contents of such defect. The treatment should always be surgical to avoid complications; recent evidence has recommended the laparoscopic approach instead of the direct open approach, originally defined as the standard treatment for lumbar hernias.

Presented at the SAGES 2012 Annual Meeting, March 7–10, 2012, San Diego, CA.

Electronic supplementary material The online version of this article (doi:10.1007/s00464-013-2884-9) contains supplementary material, which is available to authorized users.

S. Suarez · J. D. Hernandez (✉)
School of Medicine, Universidad de los Andes, Department of Surgery, Hospital Universitario Fundación Santa Fe de Bogota, Carrera 7 No 116-05, Cuarto Piso, Bogotá, Colombia
e-mail: juandah@uniandes.edu.co

Incarcerated hernias
Carlo Bergamini – Giovanni Alemanno

WHAT'S NEW

miscellaneous
anecdotal

EL5

Int J Surg Case Rep. 2011; 2(8): 290–292.
Published online 2011 Oct 1. doi: 10.1016/j.ijscr.2011.09.004
PMCID: PMC3215224

A pseudo-TEP repair of an incarcerated obturator hernia

Marco Maricevich and David Farley
Department of Surgery, Mayo Clinic, 200 First Street, S.W., Rochester, MN 55905, United States
Marco Maricevich: ude.oyam@ocram.hciveciram; David Farley: ude.oyam@divad.yelraf
Corresponding author. Tel.: +1 507 284 8240; fax: +1 507 538 7288. Email: ude.oyam@ocram.hciveciram
Received 2011 Sep 5; Accepted 2011 Sep 7.

Go to:

Abstract

Introduction

Obturator hernia (OH) is a rare condition and difficult to diagnose. While they account for as few as 0.073% of all hernias, mortality can be as high as 70%. The typical clinical presentation for OH is small bowel obstruction. Computed tomography is the diagnostic tool of choice. Surgical repair is mandatory in virtually all cases of OH and traditionally consists of performing an exploratory laparotomy.

Presentation of case

A 90-year-old female was admitted to our surgical service with signs of small bowel obstruction and a CT scan revealing incarcerated fatty tissue and small bowel within a left OH.

STATEMENT

INCARCERATED HERNIA MAY BE REDUCED BY LAPAROSCOPY ALSO USING AN HYBRID TECHNIQUE TOGETHER WITH LAPAROTOMY OR CONSISTING OF A TWO STAGED LAPAROSCOPY, EITHER WITH TEP OR TAPP APPROACH

NEW

WEAK RACCOMANDATION

Laparoscopic approach to incarcerated or strangulated Incisional and ventral hernias

Micaela Piccoli

Search strategy

Pubmed Search Terms:
"incarcerated incisional/ventral hernia", "laparoscopic repair", "laparoscopic acute management", "incarcerated incisional ventral hernia repair"

- **(2012-2015)**

- randomized controlled trials (RCT)
- meta-analysis
- systematic reviews focused on the topic
- other studies (comparative or case-control studies, case series, expert reviews) were included too

OXFORD 2011
GRADE METHOD (weak and strong)

ARTICLES: 18

2005

Consensus Conference EAES

- The open approach remains the standard treatment for incarcerated hernia
- Laparoscopy: selected patients and maximum expertise

2010

Italian Consensus (SIC, ACOI, SICE and the Italian Chapter of Hernia Society)

- Laparoscopy: the incidence of intra- and postoperative complications and recurrences in emergency cases was the same as in elective cases.
- Expertise: emergency surgery ; laparoscopic repair of abdominal wall in elective cases.

2012

Consensus Development Conference on Laparoscopic approach to acute abdomen (SICE, ACOI, SIC, SICUT, SICOP, EAES)

- The laparoscopic approach to incarcerated ventral and incisional hernias may be performed in selected patients.

What is new?

Main points

- Selection criteria for patients undergoing laparoscopic repair in emergency
- Use of biological prosthesis in contaminated field
- Surgical details

Neither randomized control trials or prospective controlled studies are available in literature

Selection criteria of patients

Best cases for laparoscopy
• Absence of marked abdominal distension (<5 cm) (EL3)
• Absence of peritonitis and intestinal ischemia (EL4)
• Absence of high-septic-risk situations (enterocutaneous fistulas) (EL4)
• Absence of major defects with loss of domain (EL4)

Laparoscopy remains contraindicated in these cases (EL3):
• High operative risk
• Haemodynamic instability
• Massive abdominal distension
• Perforative or bowel necrosis
• Limitated laparoscopic experience

What is new?

- Non-viable intestinal has not to be considered as a contraindication for prosthetic repair.
- The immediate mesh repair is preferably deferred only in cases of abundant peritoneal contamination (Bessa 2013)

The Consensus Development Conference on laparoscopic treatment of ventral hernias (SICE 2013)

- The biological meshes provides a new prospective in the contaminated surgical field, in laparoscopic emergency hernia repair too, with good results in terms of recurrence and wound infection (Franklin 2008)
- Their laparoscopic use is recommended in controlled trials (LAPSIS 2010)

EL 3

- The search showed no study directly comparing different methods of adhesiolysis and their risks, although an Italian consensus conference recommended cold and sharp adhesiolysis.

After 2013…what is new?

EL 3

Navez B1, Navez J2. **Laparoscopy in the acute abdomen.** *Best Pract Res Clin Gastroenterol. 2014 Feb;28(1):3-17.*

Bittner R, Bingener-Casey J, Dietz U, et al. **Guidelines for laparoscopic treatment of ventral and incisional abdominal wall hernias (International Endohernia Society (IEHS)) – Part 1.2.3** *Surg Endosc 2014; 28: 2-29.*

Bessa SS, Abdel-Razek AH. **Results of prosthetic mesh repair in the emergency management of the acutely incarcerated and/or strangulated ventral hernias: a seven years study.** *Hernia 2013 Feb;17(1):59-65.*

Maciej Pawlak, Kamil Bury, Maciej Śmietański. **The management of abdominal wall hernias – in search of consensus.** *Videosurgery Miniinv 2015; 10 (1): 49–56.*

Statement (weak reccomendation)

- Laparoscopic treatment of incarcerated or strangulated ventral/incisional hernia can be successfully accomplished in selected patients and restricted to surgeons with maximum expertise in this field.

- Even if the laparoscopic implant of biological mesh is feasible, the use of these meshes should be restricted to contaminated field in open surgery. Their laparoscopic use is recommended in controlled trials.

- No study directly comparing different methods of adhesiolysis and their risks. To avoid enterotomy, it is safer to use cold and sharp adhesiolysis or ultrasonic dissection.

Abdominal trauma

Salomone Di Saverio
A.Birindelli - G.Tugnoli

Guidelines 2012

Statement #1

*After **penetrating** trauma of the abdomen, laparoscopy may be useful in hemodynamically stable patients with documented or equivocal penetration of the anterior fascia (Gor B).*

References according to Oxford CEBM 2009

Stefanidis D, Surg Endosc 2009 LoE3a
Uranus S,. Eur J Trauma Emerg Surg 2010 LoE 5
Leppaniemi A, J Trauma 2003 LoE 1b
Choi YB, Surg Endosc 2003 LoE 4
Smith RS, Am J Surg 1995 LoE 2b
Zantut LF, J Trauma 1997 LoE 2b

Guidelines 2015

Statement #1

*After **penetrating** trauma to the abdomen, laparoscopy may have both a diagnostic and therapeutic role in hemodynamically stable patients with documented or suspected peritoneal penetration **(Recommendation Strong).***

References according to Oxford CEBM 2011

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Uranus S,. Eur J Trauma Emerg Surg 2010 LoE 5

Leppaniemi A, J Trauma 2003 LoE 2 (diagnostic)

Choi YB, Surg Endosc 2003 LoE 4

Smith RS, Am J Surg 1995 LoE 3

Zantut LF, J Trauma 1997 LoE 3

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Khubutiya MSh, Surg Laparosc Endosc Percutan Tech. 2013 LoE 3

Johnson JJ, Am J Surg. 2013 LoE 4

O'Malley E, World J Surg. 2013 LoE 3

Grushka J,Scand J Surg. 2014 LoE 5

Koto MZKoto MZ, J Laparoendosc Adv Surg Tech A. 2015 LoE 4

Chestovich PJ, J Trauma Acute Care Surg. 2015 LoE 4

Uranues S, World J Surg. 2014 LoE 3

Guidelines 2012

Statement #2

*Laparoscopy should be considered in hemodynamically stable **blunt** trauma patients with suspected intraabdominal injury and equivocal findings on imaging studies or even in patients with negative studies but with a high clinical likelihood for intra-abdominal injury (''unclear abdomen'') to exclude relevant injury (GoR C).*

References according to Oxford CEBM 2009

Stefanidis D, Surg Endosc 2009 LoE3a
Uranus S,. Eur J Trauma Emerg Surg 2010 LoE 5
Smith RS, Am J Surg 1995 LoE 2b
Mathonnet M., Surg Endosc 2003 LoE 4
Fabian TC,Ann surg 1993 LoE 3b

Guidelines 2015

Statement #2

*Laparoscopy should be considered in hemodynamically stable **blunt** trauma patients with suspected intra-abdominal hollow viscus injuries on imaging studies and equivocal peritoneal findings or in patients with negative imaging but with high clinical suspicion of intra-abdominal hollow viscus injury (“unclear abdomen”)* ***(Recommendation Weak).***

References according to Oxford CEBM 2011

Stefanidis D, Surg Endosc 2009 LoE3
Uranus S,. Eur J Trauma Emerg Surg 2010 LoE 5
Smith RS, Am J Surg 1995 LoE 3
Mathonnet M., Surg Endosc 2003 LoE 4
Fabian TC,Ann surg 1993 LoE 3
Khubutiya MSh, Surg Laparosc Endosc Percutan Tech. 2013 LoE 3
Johnson JJ, Am J Surg. 2013 LoE 4
Grushka J, Scand J Surg. 2014 LoE 5

Guidelines 2012

Statement #3

*To optimize results, the procedure should be incorporated in **institutional diagnostic and treatment algorithms** for trauma patients (Gor D).*

References according to Oxford CEBM 2009

Stefanidis D,Surg Endosc 2009 LoE3a
Choi YB, Surg Endosc 2003 LoE 4
Weinberg JA, Injury 2007 LoE 4
Smith RS, Am J Surg 1995 LoE 2b
Matthews BD,Surg Endosc 2003 LoE4

Guidelines 2015

Statement #3

In order to achieve enhanced outcomes, the use of laparoscopy in abdominal trauma should be incorporated into ***institutional diagnostic and treatment algorithms (Recommendation Weak).***

References according to Oxford CEBM 2011

Stefanidis D, Surg Endosc 2009 LoE3 (no algorithm)
Choi YB, Surg Endosc 2003 LoE 4
Weinberg JA, Injury 2007 LoE 4
Smith RS, Am J Surg 1995 LoE 3
Matthews BD,Surg Endosc 2003 LoE4
Casali M, Ann Ital Chir. 2008 LoE 4
DeMaria EJ, J Laparoendosc Adv Surg Tech A. 2000 LoE 3
O'Malley E, World J Surg. 2013LoE 3
Lee PC, Surg Innov. 2014 LoE 4
Mjoli M, Surg Endosc. 2015 LoE 4
Koto MZKoto MZ, J Laparoendosc Adv Surg Tech A. 2015 LoE 4

Guidelines 2015

Statement #4

The use of laparoscopy for trauma is feasible only if the patient is ***hemodynamically stable*** *and should be avoided in the presence of any* ***contraindications*** *for laparoscopic surgery* ***(Recommendation Strong).***

References according to Oxford CEBM 2011

Cuschieri A.,Ann R Coll Surg Engl 1988 LoE 2
Leppaniemi A, J Trauma 2003 **LoE 2**
Uranus S,. Eur J Trauma Emerg Surg 2010 **LoE 5**
Stefanidis D, Surg Endosc 2009 **LoE 3**
Matthews BD,Surg Endosc 2003 **LoE4**
Weinberg JA, Injury 2007 LoE 4
Choi YB, Surg Endosc 2003 LoE 4
Warren O, Emerg Surg 2006 LoE 5
Smith RS, Am J Surg 1995 LoE 3
Zantut LF, J Trauma 1997 LoE 3
Sosa JL, J Trauma 1995 LoE4
Mathonnet M., Surg Endosc 2003 LoE 4
Fabian TC,Ann surg 1993 LoE 3
Marks JM, Surg Endosc 1997 LoE 4
Como JJ, J Trauma 2010 LoE 5
Lin HF,World J Surg 2010 LoE4
Kawahara NT, J Trauma 2009 LoE 4
Mjoli M, Surg Endosc. 2015 **LoE 4**
Koto MZKoto MZ, J Laparoendosc Adv Surg Tech A. 2015 LoE 4
Lim KH, *W*orld J Emerg Surg. 2015 **LoE 4**
Lin HF, *A*m J Surg. 2015 **LoE 4**
Lee PC, *S*urg Innov. 2014 **LoE 4**
Di Saverio S. J Trauma Acute Care Surg. 2014 **LoE 5**
Khubutiya MSh, Surg Laparosc Endosc Percutan Tech. 2013 **LoE 3**
Johnson JJ, Am J Surg. 2013 **LoE 4**
O'Malley E, World J Surg. 2013 **LoE 3**
Grushka J, Scand J Surg. 2014 **LoE 5**
Zafar SN, Am J Surg. 2015 **LoE 2**
Uranues S, World J Surg. 2014 LoE 3

Guidelines 2015

Statement #5

*The use of laparoscopy for trauma should be attempted only after completion of appropriate learning curve and acquisition of specific **skills**, by surgeons with both open and laparoscopic surgical expertise **(Recommendation Weak).***

References according to Oxford CEBM 2011
Author's recommendation not based on the data

Stefanidis D, Surg Endosc 2009 **LoE 3**
Di Saverio S. J Trauma Acute Care Surg. 2014 **LoE 5**
O'Malley E, World J Surg. 2013 **LoE 3**
Grushka J, Scand J Surg. 2014 **LoE 5**
Villavicencio RT, J Am Coll Surg 1999 **LoE 3**
Zafar SN, Am J Surg. 2015 - *Author's recommendation not based on the data*
Chestovich PJ, J Trauma Acute Care Surg. 2015 **LoE 4**
Choi YB, Surg Endosc 2003 LoE 4
Zantut LF, J Trauma 1997 LoE 3
Lim KH, World J Emerg Surg. 2015 **LoE 4**
Lin HF, Am J Surg. 2015 **LoE 4**
Lee PC, Surg Innov. 2014 **LoE 4**

Guidelines 2015

Statement #6

The use of laparoscopy in selected trauma patients, especially after penetrating abdominal trauma, is associated with a ***decreased negative laparotomy rate, decreased morbidity, shortened hospital length of stay (Recommendation Strong)*** *as well as fewer wound infections and ileus complications, potentially no missed injuries and increased cost-effectiveness* ***(Recommendation Weak).***

References according to Oxford CEBM 2011

Stefanidis D, Surg Endosc 2009 LoE3 (low missed injuries,LOS, laparotomy,morbidity
Uranus S,. Eur J Trauma Emerg Surg 2010 LoE 5 (LOS,laparotomy, morbidity and costs)
Chen RJ, J Trauma 1998 LoE 4
Choi YB, Surg Endosc 2003 LoE 4 (laparotomies and costs)
Warren O, Emerg Surg 2006 LoE 5 (laparotomies,costs and LOS)
Smith RS, Am J Surg 1995 LoE 3 (no missed injuries,negative laparotomies,LOS)
Zantut LF, J Trauma 1997 LoE 3 (laparotomies,no missed injuries)
Mathonnet M., Surg Endosc 2003 LoE 4 (laparotomies)
Fabian TC,Ann surg 1993 LoE 3 (laparotomies and LOS)
Marks JM, Surg Endosc 1997 LoE 4 (laparotomy, LOS, costs)
Como JJ, J Trauma 2010 LoE 5 (laparotomies)
Villavicencio RT, J Am Coll Surg 1999 LoE 3
Leppaniemi A, J Trauma 2003 LoE 2 (laparotomy)
Sosa JL, J Trauma 1995 LoE4 (LOS,morbidity)
Kaban GK, Surg Innov 2008 LoE 4 (laparotomies)
Kawahara NT, J Trauma 2009 LoE 4 (laparotomy)
McQuaz N Jr, Am Surg 2003 LoE4 (laparotomy)
Lin HF,World J Surg 2010 LoE4 (LOs,laparotomy)
DeMaria EJ, J Laparoendosc Adv Surg Tech A. 2000 LoE 3 (costs,laparotomy,LOS,costs,no missed injury)
Chestovich PJ, J Trauma Acute Care Surg. 2015 LoE 4
Lim KH, World J Emerg Surg. 2015 LoE 4 (LOS,morbidity,wound infection)
Lin HF, Am J Surg. 2015 LoE 4 (LOS,wound infection,avoid laparotomy,no missed injury)
Lee PC, Surg Innov. 2014 LoE 4
Chestovich PJ, J Trauma Acute Care Surg. 2015 LoE 4
Koto MZ, J Laparoendosc Adv Surg Tech A. 2015 LoE 4
Mjoli M, Surg Endosc. 2015 LoE 4
Di Saverio S. J *Trauma Acute Care Surg. 2014* LoE 5
Uranues S,. World J Surg. 2014 LoE 3
Khubutiya MSh, Surg Laparosc Endosc Percutan Tech. 2013 LoE 3
Johnson JJ, Am J Surg. 2013 LoE 4
O'Malley E, O'Malley E, World J Surg. 2013 LoE 3
Zafar SN, Zafar SN, Am J Surg. 2015 LoE 2 (LOS)

Guidelines 2015

Statement #7

Laparoscopy is effective for both the diagnosis and repair of ***diaphragmatic injuries****, in patients sustaining* ***left upper quadrant*** *thoraco-abdominal injuries*

(Recommendation Strong)

References according to Oxford CEBM 2011

Stefanidis D, Surg Endosc 2009 LoE3 (for diagnosis)

Matthews BD,Surg Endosc 2003 LoE4 (repair)

Leppaniemi A, J Trauma 2003 LoE 2 (for Diagnosis)

Uranus S,. Eur J Trauma Emerg Surg 2010 LoE 5 (Diagnosis and treatment)

Como JJ, J Trauma 2010 -> *Diagnostic laparoscopy may be considered as a tool to evaluate diaphragmatic lacerations as well as peritoneal penetration (Level 2) i.e. Level 2: The recommendation is reasonably justifiable by available scientific evidence and strongly supported by expert opinion. This recommendation is usually supported by class II data or a preponderance of class III evidence.*

Friese RS, J Trauma 2005 LoE4 *(for diagnosis)*

Casali M, Ann Ital Chir. 2008 LoE 4

Yahya A,.Lybyan J Med 2008 LoE4 (diagnosis and repair)

Warren O, Emerg Surg 2006 LoE 5 (for repair)

Smith RS, Am J Surg 1995 LoE 3 (for repair)

Zantut LF, J Trauma 1997 LoE 3 (for repair)

McQuaz N Jr, Am Surg 2003 LoE4 (for diagnosis)

O'Malley E,. World J Surg. 2013 LoE 3

Grushka J, Scand J Surg. 2014 LoE 5

Mjoli M, Surg Endosc. 2015 LoE 4

Berg RJ, Injury 2014 LoE 4

Yucel M, Injury. 2015 LoE 4 (for diagnosis)

Zafar SN, Am J Surg. 2015 LoE 2 (for repair)

Berg RJ, J Trauma Acute Care Surg. 2014 LoE 4

Koto MZ, J Laparoendosc Adv Surg Tech A. 2015 LoE 4

Uranues S, World J Surg. 2014 LoE 3

Khubutiya MSh, Surg Laparosc Endosc Percutan Tech. 2013 LoE 3

Johnson JJ, Am J Surg. 2013 LoE 4

Acute mesenteric ischemia

Gianfranco Cocorullo

gianfranco.cocorullo@unipa.it

THE PROBLEM

Only few articles was published in the last five years

We need to step up efforts

Workgroup for the update of the guidelines of the laparoscopic approach to acute abdomen

RIF. N°	YEAR	TITLE	PAT	LE	CONCLUSIONS
1	2012	Tshomba Y1, Coppi G, Marone EM, Bertoglio L, Kahlberg A, Carlucci M, Chiesa R. Diagnostic laparoscopy for early detection of acute mesenteric ischaemia in patients with aortic dissection. Eur J Vasc Endovasc Surg. 2012 Jun;43(6):690-7.	202	2	CTA is the gold standard for AMI diagnosis;
2	2014	Acosta S.(2014). Surgical management of peritonitis secondary to acute superior mesenteric artery occlusion. World J Gastroenterol. 2014 Aug 7;20(29):9936-41.	6670	1	Laparotomy could be useful to confirm cases of AMI without signs of SMA (superior mesenteric artery) occlusion at CTA
3	2007	Paral J, Ferko A, Plodr M, Raupach J, Hadzi-Nikolov D, Dolezal D, Chovanec V. Laparoscopic diagnostics of acute bowel ischemia using ultraviolet light and fluorescein dye: an experimental study.Surg Laparosc Endosc Percutan Tech. 2007 Aug;17(4):291-5	12	2b->3	To increase the sensibility of laparoscopy in the diagnosis of AMI in the latest ten years some studies had shown the possibility of using fluorescein to underline the bowel areas interested by ischemia
4	2011	Meriggi F, Alloni A, Gramigna P, Tramelli P, Vigano M. Acute aortic dissection with intestinal ischemia: what to do first. Ann Thorac Cardiovasc Surg. 2011;17(6):631-3.	1	4	Laparoscopic primary access overall in AoD is an important tool for leading therapeutic decision and timing
5	2010	Wyers MC, Acute mesenteric ischemia: diagnostic approach and surgical treatment. Semin Vasc Surg. 2010 Mar;23(1):9-20.	-	1	the first treatment of AMI is bowel revascularization. The second step is the reassessment of bowel viability. If possible the time of 20 or 30 minutes after revascularization should be spent before decision making about bowel
6	2008	Palanivelu C, Rangarajan M, Maheshkumaar GS, Rajan PS. Relaparoscopy in the management of acute abdomen due to localized ischemic bowel: a novel technique--case report. Int J Surg. 2008 Dec;6(6):e89-91	1	4	In a limited number of cases, when revascularization has been performed with endovascular access, it is possible to evaluate bowel perfusion and perform bowel resection laparoscopically. It will possible to perform one step anastomosis or to defer this step to the second look

Diagnosis

The gold standard for the diagnosis according with the consensus statement of SICE and latest literature articles is multidetector CT Angiography (CTA) with sensibility of 93.3% and specificity of 95.9% (EL1) [1] ***retrospective study (2012)****Tshomba Y, et al. Diagnostic laparoscopy for early detection of acute mesenteric ischaemia in patients with aortic dissection. Eur J Vasc Endovasc Surg. 2012 Jun;43(6):690-7.*

Laparotomy could be useful to confirm cases of AMI without signs of SMA (superior mesenteric artery) occlusion at CTA (EL1) [2]. *Rewiew (6670) Acosta S.(2014). Surgical management of peritonitis secondary to acute superior mesenteric artery occlusion. World J Gastroenterol. 2014 Aug 7;20(29):9936-41.*

In 2012 was published a study that underline the feasibility of a diagnostic laparoscopy in AMI after AoD. In this case, when there aren't conditions for rapid CTA performing or when a previous CTA had been not conclusive laparoscopy can reduce the number of unnecessary laparotomies overall in elderly critically ill patients (EL2) [1]. ***retrospective study (2012)****Tshomba Y, et al. Diagnostic laparoscopy for early detection of acute mesenteric ischaemia in patients with aortic dissection. Eur J Vasc Endovasc Surg. 2012 Jun;43(6):690-7.*

Diagnosis

The best of laparoscopy in AMI diagnosis is the second look and bedside use (directly in ICU when possible) overall in patients with Aortic dissection type B (chronic type)(EL 2) [1] ***retrospective study (202 pat)****Tshomba Y, et al. Diagnostic laparoscopy for early detection of acute mesenteric ischaemia in patients with aortic dissection. Eur J Vasc Endovasc Surg. 2012 Jun;43(6):690-7.*

Laparoscopy may be a feasible alternative to CTA in patients with kidney failure that contraindicates injection of iodate CT contrast medium (EL 2) [1].
retrospective study (202 pat)*Tshomba Y, et al. Diagnostic laparoscopy for early detection of acute mesenteric ischaemia in patients with aortic dissection. Eur J Vasc Endovasc Surg. 2012 Jun;43(6):690-7.*

If an explorative diagnostic laparotomy (or laparoscopy) is performed as the first diagnostic step, a SMA angiography should be performed at the same time (EL 1) [2] *Rewiew (6670 pat) Acosta S.(2014). Surgical management of peritonitis secondary to acute superior mesenteric artery occlusion. World J Gastroenterol. 2014 Aug 7;20(29):9936-41.*

Diagnosis

To increase the sensibility of laparoscopy in the diagnosis of AMI in the latest ten years some studies had shown the possibility of using fluorescein to underline the bowel areas interested by ischemia (EL3-4) [3] ***experimental study on pigs (12 pat)*** *Paral J et al. Laparoscopic diagnostics of acute bowel ischemia using ultraviolet light and fluorescein dye: an experimental study.Surg Laparosc Endosc Percutan Tech. 2007 Aug;17(4):291-5*

laparoscopic primary access overall in AoD is an important tool for leading therapeutic decision and timing [5]. ***Case report***

Meriggi F, Alloni A, Gramigna P, Tramelli P, Vigano M. Acute aortic dissection with intestinal ischemia: what to do first. Ann Thorac Cardiovasc Surg. 2011;17(6):631-3.

Surgical Therapy

Literature underlines that the first treatment of AMI is bowel revascularization (EL 2) [5]. *retrospective study (nd)Wyers MC, Acute mesenteric ischemia: diagnostic approach and surgical treatment. Semin Vasc Surg. 2010 Mar;23(1):9-20.*

The second step is the reassessment of bowel viability. If possible the time of 20 or 30 minutes after revascularization should be spent before decision making about bowel (EL 2) [5]. *retrospective study (nd)Wyers MC, Acute mesenteric ischemia: diagnostic approach and surgical treatment. Semin Vasc Surg. 2010 Mar;23(1):9-20.*

If no vascular surgeon is available, resection of obvious necrotic bowel should be performed and after the abdomen closure the patient should be transported to a vascular surgical center (EL 1) [2]. *Rewiew (6670 pat) Acosta S.(2014). Surgical management of peritonitis secondary to acute superior mesenteric artery occlusion. World J Gastroenterol. 2014 Aug 7;20(29):9936-41.*

Surgical Therapy

In a limited number of cases, when primary laparoscopy access is feasible and revascularization has been performed with endovascular access, it is possible to evaluate bowel perfusion laparoscopically and a laparoscopical bowel resection. The surgeon will have to assess it is possible to perform "one step anastomosis" or to delay anastomosis to the second look

case report

Palanivelu C, Rangarajan M, Maheshkumaar GS, Rajan PS. Relaparoscopy in the management of acute abdomen due to localized ischemic bowel: a novel technique--case report. Int J Surg. 2008 Dec;6(6):e89-91

Conclusions

The gold standard for the primary diagnosis is CTA and laparoscopy has a limited rule.

Fluorescein not increases significantly the sensibility and specificity of the laparoscopy.

In AMI after AoD laparoscopy may be useful:

- in presence of suggestive clinical signs, without peritonitis
- if there aren't conditions for the rapid execution of CTA or non conclusive previous CTA.
- if CTA isn't feasible for IRC that contraindicate injection of iodate CT contrast medium.
- furthermore laparoscopic primary access overall in AoD is an important tool for leading therapeutic decision and timing.

The main rule of laparoscopy in AMI is the second look,

From terapeutic point of view the usefulness of laparoscopy in AMI is today limited only for few cases.

SICE 2015