British Journal of Medicine & Medical Research
5(12): 1465-1469, 2015, Article no.BJMMR.2015.166
ISSN: 2231-0614

SCIENCEDOMAIN *international*
www.sciencedomain.org

Brief Useful Comments on Laparoscopic Surgery in Acute Abdomen

Efstathios T. Pavlidis[1*], Maria Vousvouki[1], Christina Mouratidou[1], Athanasios Kofinas[1], Georgios Giulekas[1], Nikolaos Asaloumidis[1] and Theodoros E. Pavlidis[1]

[1]Aristotle University of Thessaloniki, Medical Faculty, Second Surgical Propedeutic Department, Hippocration Hospital, Konstantinoupoleos 49, 546 42 Thessaloniki, Greece.

Authors' contributions

This work was carried out in collaboration between all authors. Author ETP designed research and wrote the paper. Author MV performed research and analyzed data. Authors CM, AK, GG and NA searched literature and reviewed the paper. Author TEP reviewed and approved the paper.

Article Information

DOI: 10.9734/BJMMR/2015/14656
Editor(s):
(1) Salomone Di Saverio, Emergency Surgery Unit, Department of General and Transplant Surgery, S. Orsola Malpighi University Hospital, Bologna, Italy.
Reviewers:
(1) Anonymous, Skåne University Hospital and Lund University, Lund, Sweden.
(2) Ramesh Gurunthan, Department of Surgery, Tuanku Jaafar Hospital, Seremban, Negeri Sembilan, Malaysia.
Complete Peer review History: http://www.sciencedomain.org/review-history.php?iid=719&id=12&aid=6963

Review Article

Received 13th October 2014
Accepted 22nd October 2014
Published 15th November 2014

ABSTRACT

The use of laparoscopic surgery tends to become more and more popular, nowadays. It has also been extended in the management of acute abdominal disease as a diagnostic and as a therapeutic tool. However, its therapeutic use requires special experience and appropriate instrumentation, in addition to a reliable definite diagnosis. Based on randomized, controlled trials, it can be postulated that laparoscopic surgery in acute abdomen is feasible, safe and effective in acute cholecystitis, acute appendicitis and gastroduodenal ulcer perforation. There are still conflicting aspects in perforated diverticular disease and small bowel obstruction. In case of purulent peritonitis attention must be paid in order to avoid residual abscess formation and sepsis by thorough irrigation of the peritoneal cavity and on time antibiotic therapy. The proper indication for each case under the certain emergency circumstances is crucial.

**Corresponding author: Email: pavlidth@med.auth.gr, pavlidth@auth.gr;*

Keywords: Laparoscopic surgery; acute abdomen; abdominal emergency; emergency operation; peritonitis; obstruction.

1. INTRODUCTION

Laparoscopic surgery, with the advantages of minimally invasive surgery, has a well defined role, nowadays, in the therapeutic management of diseases, which cause acute abdomen [1-7]. Abdominal sepsis was initially a contraindication for laparoscopy, because of the assumed risk of bacterial overgrowth and subsequent endotoxemia, hypercapnia or missing purulent intraabdominal collection [1]. However, experimental studies did not show any evidence of increased bacteraemia from pneumoperitoneum, but instead of it, even a beneficial effect of carbon dioxide [8]. So, laparoscopy is considered a therapeutic tool in selected cases as well as a diagnostic tool. Generally, it should be stressed that as recommended in case of sepsis the intraabdominal pressure must be kept under 12 mm Hg and the antibiotic administration must be started before pneumoperitoneum creation [1]. Nevertheless, some brief useful comments are needed specifically to clarify better the following conditions. These comments are in accordance with the European Association of Endoscopic Surgery (EAES) guidelines and a newer consensus statement of experts [4,7].

2. ACUTE CHOLECYSTITIS

Doubtless, laparoscopic surgery has absolute apply in cholecystectomy, not only in selected cases, but also in emergency cases of acute cholecystitis [1,9-12].

Laparoscopic cholecystectomy has absolute indication in patients, with acute cholecystitis, appropriate for surgery, without serious pathological conditions. However, laparoscopic cholecystectomy applies only in 30% at the USA and in 20% at the United Kingdom. In cases of severe inflammation or in patients with impaired pathological conditions, percutaneous transhepatic cholecystostomy under imaging guidance is an alternative reasonable option.

The timing of the procedure and the precise assessment of the onset of symptoms are crucial. Emergency laparoscopic cholecystectomy (within 48-72 hours) is urgently needed. In time laparoscopic cholecystectomy (within 4-7 days) is indicated. After this time-line, in sub-acute phase, delayed surgery is prohibitive until the lapse of 6-8 weeks.

Great attention and special experience is required at the dissection of cystic duct and cystic artery. The criteria to convert the laparoscopic cholecystectomy to open must be looser. Necessary prerequisite for a safe operation is the adequate exposure of the Calot's triangle. In different circumstances, open surgery is imposed so as to avoid unwilling and disaster complications, mainly the devastating common bile duct injury. Subtotal cholecystectomy in such difficult cases is a reasonable alternative option to avoid bile duct injury or conversion to open surgery.

3. PERFORATION OF DUODENAL BULB ULCER

The initial enthusiasm for laparoscopic treatment of perforated duodenal bulb ulcer has subsided. It applies only in 5-10% of the cases and only in certain conditions with well-defined indications [1,13-19].

The major encountered problems are related to the leakage of the sutured area (7%), the intraabdominal abscesses formation and the need of re-operation (5.3%). Great experience in advanced laparoscopic operations is required.

A contraindication is patients with Boey score 3 (age>70 years, onset of symptoms >24 hours). During this time, purulent peritonitis is combined with growth of pseudo-membranes, whose presence makes laparoscopic surgery impossible, because of the difficulty in dissecting and complete removal of them.

Additionally, the size of perforation (>10mm), the inability to locate the ulcer and the difficulty in posing and tying the sutures, due to the friability of the tissues, indicates conversion to open surgery.

However, the indication for laparoscopic management should be individualized and depends on the experience and skills of the surgeon.

4. ACUTE APPENDICITIS

Acute appendicitis is the most common cause of acute abdomen. There are no doubts for the necessity of laparoscopy, mostly in women, in

order to distinguish appendicitis from acute pelvic inflammatory disease. Laparoscopic appendectomy has been performed with certain indications [1,20-22]. Lowering the wound complications is the main advantage of laparoscopic procedure, especially in obesity.

Therapeutic laparoscopic appendectomy depends on appropriate timing and local conditions. The entrenchment of inflammation makes surgical manipulations difficult to proceed.

Successful laparoscopic appendectomy by far outweighs from open, but enough experience, appropriate and available equipment are required.

Relevant contraindication is the perforated-gangrenous vermiform appendix, due to more frequent formation of intraabdominal abscesses.

During pregnancy, open surgery is preferable because of the high risk, with laparoscopic surgery, of miscarriage the fetus.

5. INTESTINAL OBSTRUCTION

There have been limited application of laparoscopic surgery in cases of intestinal obstruction [1,23-25]. There are not randomized, controlled trials comparing laparoscopic or laparoscopic assisted with open surgery.

In any case, the pneumoperitoneum must be created with direct vision (Hasson's method) and the use of Verres needle should be avoided, so as to prevent the small bowel injury due to its dilatation and existing adhesions.

The main indications for laparoscopic surgery include solitary loop-shaped adhesion, loose adhesions, strangulated inguinal hernia, whose reducing can be combined with transabdominal preperitoneal mesh placement (TAPP), and intussusception, which is rare in adults.

The most preferable cases for laparoscopic procedure are those with few previous abdominal scars, proximal obstruction, moderate abdominal distention and small bowel diameter less than 5 cm.

6. PERFORATED DIVERTICULAR DISEASE

Use of laparoscopic surgery in perforated diverticular disease is very limited and controversial [1,26-28]. There are not randomized, controlled trials.

The application of peritoneal lavage combined with drainage catheters placement is recommended in purulent peritonitis (Hinchey stage 3), but not in fecal peritonitis (Hinchey stage 4), because of the rapid bacterial overgrowth and sepsis, which is life threatening. In this case the Hartmann's procedure is mandatory.

Consequently, two main queries are raised. What is the appropriate timing for the application of the method and if this applicable in case of pseudo-membranes presence. How can they be removed effectively, especially those diffuse located between intestinal loops, considering that any surgical manipulation is not allowed in the intestine, omentum or elsewhere.

Thus, it should be applied in selected patients.

7. CONCLUSION

Laparoscopic surgery in acute abdomen is feasible, safe and effective in acute cholecystitis, acute appendicitis and gastroduodenal ulcer perforation. There are still conflicting aspects in perforated diverticular disease and small bowel obstruction. Consequently, randomized controlled trials are needed to evaluate the place of laparoscopic procedures in these cases. The appropriate patient selection and the most suitable management option are important in improving outcome.

CONSENT

Not applicable.

ETHICAL APPROVAL

Not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Navez B, Navez J. Laparoscopy in the acute abdomen. Best Pract Res Clin Gastroenterol. 2014;28:3-17.

2. Ning N, Xia SY, Ma B, Li R, Du XH. Application of laparoscopic technique in acute abdomen of gastrointestinal surgery. Zhonghua Wei Chang Wai Ke Za Zhi. 2013;16:960-962.
3. Agrusa A, Romano G, Di Buono G, Dafnomili A, Gulotta G. Laparoscopic approach in abdominal emergencies: a 5-year experience at a single center. G Chir 2012;33:400-403.
4. Agresta F, Ansaloni L, Baiocchi GL, Bergamini C, Campanile FC, Carlucci M, Cocorullo G, Corradi A, Franzato B, Lupo M, Mandalà V, Mirabella A, Pernazza G, Piccoli M, Staudacher C, Vettoretto N, Zago M, Lettieri E, Levati A, Pietrini D, Scaglione M, De Masi S, De Placido G, Francucci M, Rasi M, Fingerhut A, Uranüs S, Garattini S. Laparoscopic approach to acute abdomen from the Consensus Development Conference. Surg Endosc. 2012;26:2134-2164.
5. Fu JY, Chen C. Reason analysis of reoperation after failed laparoscopic surgery for acute abdomen. Zhonghua Wei Chang Wai Ke Za Zhi. 2012;15:608-610.
6. Schietroma M, Piccione F, Carlei F, Clementi M, Bianchi Z, De Vita F, Amicucci G. Peritonitis from perforated appendicitis: stress response after laparoscopic or open treatment. Am Surg. 2012;78:582-590.
7. Sauerland S, Agresta F, Bergamaschi R, Borzellino G, Budzynski A, Champault G, Fingerhut A, Isla A, Johansson M, Lundorff P, Navez B, Saad S, Neugebauer EA. Laparoscopy for abdominal emergencies: evidence-based guidelines of the European Association for Endoscopic Surgery. Surg Endosc. 2006;20:14-29.
8. Chatzimavroudis G, Pavlidis TE, Koutelidakis I, Giamarelos-Bourboulis E, Atmatzidis S, Kontopoulou K, Marakis G, Atmatzidis K. CO2 pneumoperitoneum prolongs survival in an animal model of peritonitis compared to laparotomy. J Surg Res. 2009;152:69-75.
9. Gurusamy KS, Samraj K, Fusai G, Davidson BR. Early versus delayed laparoscopic cholecystectomy for biliary colic. Cochrane Database Syst Rev. 2008;4:CD007196.
10. Gurusamy K, Samraj K, Gluud C, Wilson E, Davidson BR. Meta-analysis of randomized controlled trials on the safety and effectiveness of early versus delayed laparoscopic cholecystectomy for acute cholecystitis. Br J Surg. 2010;97:141–150.
11. Han IW, Jang JY, Kang MJ, Lee KB, Lee SE, Kim SW. Early versus delayed laparoscopic cholecystectomy after percutaneous transhepatic gallbladder drainage. J Hepatobiliary Pancreat Sci. 2012;19:187-193.
12. Borzellino G, Sauerland S, Minicozzi AM, Verlato G, Di Pietrantonj C, de Manzoni G, Cordiano C. Laparoscopic cholecystectomy for severe acute cholecystitis. A meta-analysis of results. Surg Endosc. 2008;22:8-15.
13. Zimmermann M, Wellnitz T, Laubert T, Hoffmann M, Begum N, Bürk C, Bruch HP, Schlöricke E. Gastric and duodenal perforations: what is the role of laparoscopic surgery? Zentralbl Chir. 2014;139:72-78.
14. Motewar A, Tilak M, Patil D, Bhamare N, Bhople L. Laparoscopic versus open management of duodenal perforation: a comparative study at a District General Hospital. Prz Gastroenterol. 2013;8:315-319.
15. Lunevicius R, Morkevicius M. Systematic review comparing laparoscopic and open repair for perforated peptic ulcer. Br J Surg. 2005;92:1195-207.
16. Sanabria AE, Morales CH, Villegas MI. Laparoscopic repair for perforated peptic ulcer disease. Cochrane Database Syst Rev. 2005;4:CD004778.
17. Sommer T, Elbroend H, Friis-Andersen H. Laparoscopic repair of perforated ulcer in Western Denmark - a retrospective study. Scand J Surg. 2010;99:119-121.
18. Bertleff MJ, Lange JF. Laparoscopic correction of perforated peptic ulcer: first choice? A review of literature. Surg Endosc. 2010;24:1231-1239.
19. Lunevicius R, Morkevicius M. Management strategies, early results, benefits, and risk factors of laparoscopic repair of perforated peptic ulcer. World J Surg. 2005;29:1299-1310.
20. Sauerland S, Jaschinski T, Neugebauer EA. Laparoscopic versus open surgery for suspected appendicitis. Cochrane Database Syst Rev 2010;10:CD001546.
21. Li X, Zhang J, Sang L, Zhang W, Chu Z, Li X, Liu Y. Laparoscopic versus conventional appendectomy-a meta-analysis of randomized controlled trials. BMC Gastroenterol. 2010;10:129-136.
22. Walsh CA, Tang T, Walsh SR. Laparoscopic versus open appendicectomy in pregnancy: a

systematic review. Int J Surg. 2008;6:339-344.
23. Cirocchi R, Abraha I, Farinella E, Montedori A, Sciannameo F. Laparoscopic versus open surgery in small bowel obstruction. Cochrane Database Syst Rev. 2010;2:CD007511.
24. Chousleb E, Shuchleib S, Chousleb A. Laparoscopic management of intestinal obstruction. Surg Laparosc Endosc Percutan Tech. 2010;20:348-350.
25. Essani R, Bergamaschi R. Laparoscopic management of adhesive small bowel obstruction. Tech Coloproctol. 2008;12:283-287.
26. Collins D, Winter DC. Laparoscopy in diverticular disease: Controversies. Best Pract Res Clin Gastroenterol. 2014;28:175-182.
27. Toorenvliet BR, Swank H, Schoones JW, Hamming JF, Bemelman WA. Laparoscopic peritoneal lavage for perforated colonic diverticulitis: a systematic review. Colorectal Dis. 2010;12:862-867.
28. Alamili M, Gögenur I, Rosenberg J. Acute complicated diverticulitis managed by laparoscopic lavage. Dis Colon Rectum. 2009;52:1345-1349.

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sciencedomain.org/review-history.php?iid=719&id=12&aid=6963