MEDWIN PUBLISHERS
Committed to Create Value for Researchers

International Journal of Surgery & Surgical Techniques
ISSN: 2578-482X

Study of Risk Factors for Morbidity in Emergency Abdominal Laparoscopy Surgery

Smail Ammari* and Taieb M

Department of General Surgery, Ain Taya Hospital, Algiers University, Algeria

***Corresponding author:** Smail Ammari, Department of General Surgery, Ain Taya Hospital, Faculty of Medicine of Algiers, Ben Youcef Ben Khedda University Algiers, Algiers, Algeria, Tel: +213771396182; Email: s.ammari@univ-alger.dz

Research Article

Volume 8 Issue 1

Received Date: May 01, 2024

Published Date: May 20, 2024

DOI: 10.23880/ijsst-16000212

Abstract

Introduction: Emergency laparoscopy is regarded as a challenging and high-risk domain due to the requisite expertise in both laparoscopic and emergency surgery. Additionally, the physical fatigue of surgical teams and the urgency context contribute to potential increased morbidity rates in emergency surgery. Furthermore, a primary concern with laparoscopy is the frequency of deep collections.

The objective of our study was to evaluate the risk factors for morbi-mortality associated with laparoscopic intervention in non-traumatic acute abdominal emergencies.

Materials and Methods: A descriptive, prospective, evaluative study was conducted between February 2018 and October 2021, encompassing 337 patients undergoing laparoscopic surgery for non-traumatic acute abdominal emergencies.

Results: Among the 337 operated patients, perioperative morbidity was 0.3%, and postoperative morbidity was 6.2% (21 patients). These postoperative complications were classified as grade I in 85.71% of cases (18 patients). The mean age of the patients was 38 years ± 15 years. Body mass index (BMI) was above 25 in 179 patients (53.11%). The mean operative time across all pathologies was 52.09 minutes ± 24.14 minutes (Range: 14-178 minutes). The average overall hospitalization duration was 1.5 days (Range: 1 to 8.5 days).The only factor correlated with the occurrence of postoperative complications was obesity (p=0.003).

Conclusion: Emergency laparoscopy does not exacerbate morbidity and can be safely performed for the management of acute abdominal emergencies.

Keywords: Acute Abdomen; Deep Collections; Emergency Laparoscopy; Morbidity

Abbreviations: BMI: Body Mass Index; OCT: Ovarian Cyst Torsions.

Introduction

The mortality associated with laparoscopic procedures, irrespective of the operated pathology, is exceptionally low, ranging from 2 to 5 per 100,000 laparoscopies [1,2]. In other series, mortality varies from 0 to 4.6% [3]. The overall morbidity of emergency laparoscopy ranges from 0% to 24% in Italian series [3-5].

For some authors, emergency laparoscopy remains a challenging and potentially risky domain for several reasons. These include the requisite for extensive expertise in both laparoscopic and emergency surgery, the incidence of deep

collections, the high rate of surgical revisions, prolonged operative times, technical challenges in cases of diffuse peritonitis, anesthesia issues particularly in patients with comorbidities, and the limited resources of the operating room during nighttime and beyond regular working hours [6-9].

The primary criticism of laparoscopic approaches is the frequency of postoperative deep collections. Indeed, according to some authors, laparoscopy is responsible for twice as many deep abscesses as the McBurney incision [10-13]. However, other authors argue that the rate of abscesses is similar between laparoscopic and conventional approaches [14,15].

Thus, based on these data, the morbidity and mortality of emergency laparoscopic procedures may be higher than those of scheduled laparoscopic surgery. The objective of our study was to evaluate the morbi-mortality of laparoscopic approaches in non-traumatic acute abdominal emergencies.

Materials and Methods

Study Type

This is a descriptive, prospective, evaluative study conducted between February 2018 and October 2021 at the University Department of General Surgery of Ain Taya Hospital (CHU Alger EST, Algeria). Our study involved 337 patients who underwent laparoscopic surgery for non-traumatic acute abdominal emergencies.

Study Population

We included all adult patients aged 15 years and older presenting exclusively with non-traumatic acute surgical abdominal emergencies where laparoscopy is already recognized as the gold standard or has strong evidence, such as acute appendicitis and its complications (phlegmons, abscesses, and generalized peritonitis), acute lithiasic cholecystitis with symptom onset within the last 7 days, peritonitis due to peptic ulcer perforation, acute intestinal obstructions due to adhesions, ectopic pregnancies, ovarian cyst torsions, and non-specific acute abdominal pain.
Exclusion criteria are summarized in Table 1.

Septic and/or hypovolemic shock states
Traumatic emergencies: abdominal wounds and contusions
General contraindications to laparoscopy
Patients classified as ASA: IV

Table 1: Exclusion Criteria.

Results

Demographic and Clinical Characteristics of the Study Population

In our study, 337 patients were included and underwent surgery. Among them, 190 were females (56.4%), with a mean age of 38 years ± 15 years (range 15 to 82 years). The body mass index (BMI) was above 25 in 179 patients (53.11%). Comorbidities were found in 109 patients (32.3%), and scarred abdomen in 90 patients (26.7%). Patients were classified as ASA I in 74.8% (252 patients), ASA II in 22% (74 patients), and ASA III in 3.3% (11 patients). Pregnant women represented 4.2% (8 patients), with a mean gestational age of 15 weeks of amenorrhea (WA) ± 7.29 WA (range 7 to 29 WA).

Surgical interventions were performed both during the day and at night. We operated on 211 patients (62.6%) outside regular working hours (between 4:00 PM and 8:00 AM). The distribution of surgical interventions based on their timing was as follows: from 8:00 AM to 4:00 PM, we operated on 126 patients (37.4%); from 4:00 PM to 12:00 AM, 189 patients (56.10%); and from 12:00 AM to 8:00 AM, 22 patients (6.2%).

The various operated pathologies are summarized in Table 2.

Pathologies		N	%
Acutes appendicitis	Acute uncomplicated appendicitis	141	41.90%
	Appendiceal phlegmon	6	1.80%
	Appendiceal abscess	25	7.50%
	Generalized appendiceal peritonitis	6	1.80%
Acute lithiasic cholecystitis		88	25.90%
Ovarian cyst torsions (OCT)		27	8.10%
Ectopic pregnancies		23	6.90%
Peritonitis due to peptic ulcer perforation		10	3%
Acute intestinal adhesive obstructions		8	2.40%
Non-specific acute abdominal pain		2	0.60%
Retrocecal internal hernia		1	0.30%
Total		337	100%

Table 2: Operated Pathologies.

The average operative time across all pathologies was 52.09 minutes ± 24.14 minutes (Range: 14-178 minutes). The overall anesthesia duration (surgical intervention duration) was 75.35 minutes ± 25.17 minutes (Range: 29 - 203 minutes).

Intraoperatively, technical difficulties were encountered in 11.7% of cases (39 patients) (Table 3).

Types of Intraoperative Difficulties:	n	%
Difficulties related to inflammation and complications of certain operated pathologies	32	9.70%
Difficulties related to the learning curve in certain pathologies	3	0.90%
Difficulties in achieving complete peritoneal lavage during generalized peritonitis	3	0.90%
Difficulties related to obesity: inadequately sized trocars due to the significant thickness of patients' adipose tissue.	1	0.30%
Total	39	11.70%

Table 3: Summary of Different Types of Intraoperative Difficulties.

Perioperative morbidity was 0.3%. This involved a small (approximately 1 cm) injury to the small intestine. The overall conversion rate was 0.3%. Additionally, three (03) coelio-assisted surgical interventions were performed for extracorporeal intestinal resections. No deaths were recorded.

The average overall hospitalization duration was 1.5 days (Range: 1 to 8.5 days), and the average postoperative hospitalization duration was 1 day (Range: 1 to 7.5 days).

The rate of postoperative complications was 6.2% (n = 21 patients) (Table 4). According to the Clavien-Dindo classification, these postoperative complications were classified as grade I in 85.71% of cases (n = 18 patients), grade IIIa in 4.76% of cases (n = 01 patient), and grade IIIb in 9.52% of cases (n = 02 patients). The management of these complications is detailed in Table 5.

We conducted an analytical study to identify risk factors for postoperative morbidity (Table 6). The only factor correlated with the occurrence of postoperative complications was obesity (p = 0.003).

The threshold for body mass index (BMI) at which these complications occurred was 26 (BMI ≥ 26 according to the Youden test).

Type of Complication	n	%
Superficial sepsis of the umbilical orifice	13	4
Purulent collections around the trocar site	3	1
Deep collections in the right iliac fossa	3	1
External biliary fistula (Poor sealing of the cystic stump)	1	0
Parietal sepsis at the mini-laparotomy site	1	0
Total	21	6

Table 4: Types of Postoperative Complications.

Types of Complications:	Management	N	%
Deep collections	Re-hospitalization + intensive care + surgical revision	2	1
	Re-hospitalization + ultrasound-guided drainage + antibiotic sensitivity testing	1	0
External biliary fistula	Re-hospitalization + rehydration and monitoring	1	0
Parietal collections around the trocar site	Drainage under local anesthesia + local care	3	0,3
Parietal sepsis	Local care	14	4
Total		21	6

Table 5: Management of Early Postoperative Complications.

	Parameters	P-value
Postoperative morbidity	Gender	0.387
	Age	0.284
	Body Mass Index (BMI):	0.003
	ASA Physical Status Classification	0.392
	Difficulties encountered between hospitalization and admission to the operating room	0.48
	Schedule of surgical interventions	0.3
	Operative time	0.082
	Operated pathology	0.732
	Perioperative macroscopic aspect (evolving forms)	0.226
	Duration of postoperative hospitalization	0.458

Table 6: Factors Associated with Postoperative Morbidity.

Discussion

In our series, the rate of postoperative morbidity (all pathologies included) was 6.2% (n=21 cases). These complications were classified as grade I according to the Clavien-Dindo classification in 85.71% (n=18 cases). Septic complications accounted for 95.24% (n = 20 patients), with 13 cases (61.90%) being umbilical port site infections. These postoperative complications were observed in 80% (n=17 cases) following appendectomies, with 3 cases (14.28%) of deep abscesses and 3 cases (14.28%) of purulent collections around trocar sites recorded after appendectomies.

The study of risk factors for the occurrence of postoperative complications, using the chi-square test (χ^2), shows that there is a significant relationship between body mass index (BMI) and the occurrence of postoperative complications (p-value = 0.03). BMI is a risk factor for postoperative complications. A BMI of 26 represents the threshold beyond which postoperative complications occur (Youden's test).

Thus, in our study, the most plausible risk factors explaining the relationship between obesity and postoperative septic complications are: increased tissue aggression by instruments at the umbilical port site during the performance of "open laparoscopy". The latter was often challenging and subject to technical difficulties in obese individuals due to significant adipose tissue. This tissue aggression led to significant local inflammatory reaction with increased release of free fatty acids resulting in dysregulation of secretory factors, such as adipokines, which could contribute to the occurrence of umbilical port site sepsis in the postoperative period.

The second factor in our work was the extraction of operative specimens through the umbilical port site, which although protected in an endobag, was often challenging in obese subjects, especially in cases of appendectomy specimens. The risk of contamination in these cases can be significant, hence the importance of proper patient relaxation under anesthesia at the time of specimen extraction.

The overall morbidity of emergency laparoscopy varies from 0% to 24% in Italian series [3-5]. The morbidity rate reported in our series, which was 6.2%, is consistent with the morbidity rates reported in the literature ranging from 2.1% to 7.9%, as shown in Table 7. We observe from these figures that laparoscopy does not entail significant morbidity.

Series/ Pathologies	Caruso, et al. [9]	Cocorullo, et al. [16]	Cisse, et al. [17]	Agresta, et al. [18]	Karamanakos, et al. [19]	Perri, et al. [20]	Napolitano, et al. [21]	Our Study
Sample Size	300	75	100	5790	540	221	97	337
Overall Morbidity	8%	7,7 %	5%	2,1 %	7,9 %	3%	5,2 %	6,2 %

Table 7: Rates of Postoperative Morbidity in Laparoscopic Surgery Reported in the Literature.

The main criticism of laparoscopic approach in emergency settings is the frequency of deep collections, particularly following surgical treatment of acute appendicitis and generalized peritonitis.

Studies have demonstrated that the laparoscopic approach is associated with fewer wall abscesses than the McBurney incision [11,22]. However, it is responsible for twice as many deep abscesses as the McBurney incision [11-13,22].

For some authors, the rate of abscesses is identical between the laparoscopic and classical approaches [14,15].

In a multicenter cohort study involving 6,805 cases of acute appendicitis divided into two groups (one group of patients operated on through the classical approach and another group operated on laparoscopically), Jianguo Cao clearly demonstrated that the occurrence of deep abscesses is not systematically linked to the laparoscopic approach. Thus, the non-use of the laparoscopic approach for fear of deep abscesses is not justified [23].

Conclusion

Our results suggest that laparoscopy does not entail significant morbidity. Our morbidity rate is not high, and the same applies to the morbidity rates reported in the literature. The frequency of deep abscesses, which remains the main criticism of the laparoscopic approach, is not high in our series. This observation has also been made by several studies reported in the literature. Thus, the non-use of laparoscopy in abdominal surgery due to fear of deep abscess formation is not justified.

References

1. Marret H, Pierre F, Chapron C, Perrotin F, Body G, et al. (1997) Complications of laparoscopy caused by trocards. Préliminaire study in the frame of the national registry

of the French endoscopy society (SFEG). J gynecol obstet Biol reprod 26(4): 405-412.

2. Querleu D, Chapron C, Chevallier L, Bruhat MA (1993) Complications of gynecologic laparoscopic surgery--a French multicenter collaborative study. N Engl J Med 328(18): 1355.

3. Mandala V (2012) The role of laparoscopy in Emergency abdominal surgery.

4. Lupinacci RM, Menegaux F, Tresallet C (2015) Emergency laparoscopy: Role and implementation. J Visc Surg 152(6): S65-71.

5. Memon MA, Fitztgibbons RJ (1997) The Role of Minimal Access Surgery in the Acute Abdomen. Surgical Clinics of North America 77(6): 1333-1353.

6. Di Saverio S (2014) Emergency laparoscopy: a new emerging discipline for treating abdominal emergencies attempting to minimize costs and invasiveness and maximize outcomes and patients' comfort. J Trauma Acute Care Surg 77(2): 338-350.

7. Mandrioli M, Inaba K, Piccinini A, Biscardi A, Sartelli M, et al. (2016) Advances in laparoscopy for acute care surgery and trauma. World J Gastroenterol 22(2): 668-680.

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

9. Caruso C, La Torre M, Benini B, Catani M, Crafa F, et al. (2011) Is laparoscopy safe and effective in nontraumatic acute abdomen. J Laparoendosc Adv Surg Tech A 21(7): 589-593.

10. Sauerland S, Jaschinski T, Neugebauer EA, Mosch CG, Eikermann M (2010) Laparoscopic versus open surgery for suspected appendicitis. Cochrane Database Syst Rev 11(11): CD001546.

11. Rivkine E, Lo Dico R, Soyer P, Pautrat K, Valleur P, et al. (2011) Reflection on the rate of deep abscesses in clinical practice of laparoscopy for uncomplicated acute appendicitis: proposal for a reasoned choice. Journal of Visceral Surgery 148(5): 452-454.

12. Fleming FJ, Kim MJ, Messing S, Gunzler D, Salloum R, et al. (2010) Balancing the risk of postoperative surgical infections: a multivariate analysis of factors associated with laparoscopic appendectomy from the NSQIP database. Ann Surg 252(6): 895-900.

13. Sauerland S, Lefering R, Neugebauer EA (2002) Laparoscopic versus open surgery for suspected appendicitis. Cochrane Database Syst Rev 6(10): CD001546.

14. Kathouda N, Mason RJ, Towfigh S, Gevorgyan A, Essani R (2005) Laparoscopic versus open appendectomy: a prospective randomized double blind study. Ann Surg 242(3): 439-448.

15. Asarias JR, Schlussel AT, Cafasso DE, Carlson TL, Kasprenski MC, et al. (2011) Incidence of postoperative intraabdominal abscesses in open versus laparoscopic appendectomies. Surg Endosc 25(8): 2678-2683.

16. Cocorullo G, Falco N, Tutino R, Fontana T, Scerrino G, et al. (2016) Open versus laparoscopic approach in the treatment of abdominal emergencies in elderly population. G Chir 37(3): 108-112.

17. Cisse M, Konate I, Ka O, Dieng M, Tendeng J, et al. (2015) Emergency laparoscopy at Aristide Le Dantec hospital : the first 100 cases. Hospital Center University Aristide Le Dantec (CHU Dakar), Africa. E-memoires of the Académie Nationale de Chirurgie 8(3): 78-81.

18. Agresta F, Campanile FC, Podda M, Cillara N, Pernazza G, et al. (2017) Current status of laparoscopy for acute abdomen in Italy: a critical appraisal of 2012 clinical guidelines from two consecutive nationwide surveys with analysis of 271,323 cases over 5 years. Surg Endosc 31(4): 1785-1795.

19. Karamanakos SN, Sdralis E, Panagiotopoulos S, Kehagias I (2010) Laparoscopy in the emergency setting: a retrospective review of 540 patients with acute abdominal pain. Surg Laparosc Endosc Percutan Tech 20(2): 119-124.

20. Perri SG, Altilia F, Pietrangeli F, Dalla Torre A, Gabbrielli F, et al. (2002) Laparoscopy in abdominal emergencies. Indications and limitations. Chir Ital 54(2): 165-178.

21. Napolitano L, Waku M, Liddo G, Innocenti P (2008) Laparoscopic approach to acute abdomen: a single-center clinical experience. G Chir 29(1-2): 47-50.

22. Sauerland S, Jaschinski T, Neugebauer EA (2010) Laparoscopic versus open surgery for suspected appendicitis. Cochrane Database Syst Rev 6(10): CD001546.

23. Cao J, Tao F, Xing H, Han J, Zhou X, et al. (2017) Laparoscopic Procedure is Not Independently Associated With the Development of Intra-Abdominal Abscess After Appendectomy: A Multicenter Cohort Study With Propensity Score Matching Analysis. Surg Laparosc Endosc Percutan Tech 27(5): 409-414.