

Laparoscopy for Abdominopelvic Emergencies at the Auxerre Hospital: Patients' Epidemiological Profile, Diagnostic and Therapeutic Contribution

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Abstract

Case Report

This study aims to investigate the epidemiological profile of patients and the diagnostic and therapeutic contribution of emergency laparoscopy at the Centre Hospitalier Auxerre (CHA) in France. It's a year-long descriptive retrospective study conducted at the Auxerre Hospital. Out of 1130 laparoscopies, 245 were emergencies, i.e., 21.68% of laparoscopies. The mean age of our study population was 37 ± 22.78 years with patients ranging from 3 to 93-year-old. The sex ratio was 0.96. The main indications for emergency laparoscopies at CHA were acute appendicitis (44.9%) followed by exploratory laparoscopies (18.8%). Eight percent (8%) of the emergency laparoscopies were later converted to laparotomies, for the following reasons: difficult exposure, multiple adhesions, intestinal dilatation, hypercapnia. Regarding the surgical procedures, an appendectomy was performed in 37.1% of cases whereas peritoneal lavage and drainage following appendectomy were performed cavity in 18.4% of cases. We highlight a laparoscopic transdiaphragmatic pericardial fenestration performed to drain pericardial effusion due to cardiac tamponade, an uncommon procedure even in western practice. The mean duration of the procedure was 53 ± 32.52 minutes, ranging from 11 minutes and 214 minutes. The low postoperative morbidity of 6.53% in our study is one of the undeniable advantages of the laparoscopic approach. The other advantage of laparoscopy is the shortened hospital stay, even in the context of an abdominal emergency. Ample evidence of this is the average hospital stay of 5 ± 5.4 days with 60.4% of patients spending less than 5 days in the hospital.

Keywords: laparoscopy-emergency-surgery.

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INTRODUCTION

Laparoscopy is a modern minimally invasive approach serving both diagnostic and therapeutic purposes [1,2]. Its numerous advantages including reduced parietal trauma and infectious risk, lessened pain, reduced risk of postoperative ileus, postoperative bridges, and reduction of aesthetic damage, have ensured its prompt implementation [3,4].

Laparoscopy is the leading approach for abdominopelvic surgery. Moreover, indications for laparoscopic surgery have been extended to emergencies with increasingly complex procedures. Laparoscopy holds an increasingly important place in the surgical management of non-traumatic abdominal emergencies, either for diagnostic or therapeutic purposes. Improving results have been obtained over the last decade thanks to the increasing experience of surgeons and better instrumentation [5].

In the literature, there are few studies strictly devoted to emergency laparoscopy and which situate its place. In this study, we offer to review the management of abdominopelvic emergencies by laparoscopy at the Centre Hospitalier d'Auxerre (CHA) in France to confirm the advantages in this context.

PATIENTS AND METHOD

This is a retrospective study with a descriptive aim conducted over the period from January 1 to December 31, 2017, at the CHA of Auxerre.

The study was carried out in the operating theater of the CHA and departments performing laparoscopies such as visceral surgery, gynecology, and urology.

The study population consisted of all patients admitted to the operating room during the study period for an emergency procedure and whose management

involved laparoscopy. All patients registered in the operating theater database as having undergone an unscheduled laparoscopy in 2017 were included regardless of the procedure's unfolding. Patients with incomplete or non-existent records were excluded from the study.

We retrieved from the hospital's IT department a database of patients who met the inclusion criteria and were admitted to the operating room during the study period. Associating search criteria, "laparoscopy" and "emergency" allowed us to extract this list from the global database. All these patients' files, operative reports, and hospitalization reports were analyzed to constitute our database in the form of an Excel file.

Quantitative variables such as the patient's age, the duration of the operation, and hospitalization, as well as qualitative variables such as gender, history, indications (the reason or diagnosis that led to the decision to perform an emergency operation), and per operative findings were studied. The data were processed using SPSS20 software, and the tables and figures were produced in Excel 2007.

RESULTS

In the year 2019, 4579 surgical procedures were performed (all departments combined) in the CHA's operating theater, 1130 of which were laparoscopies. 245 emergency laparoscopies were performed i.e., 21.68%. Our study, therefore, focused on these 245 procedures. Their distribution based on specialty is shown in Table I.

The mean age of our population was 37 ± 22.78 years, ranging from 3 to 93 years old. The sex ratio was 0.96. The majority of patients who underwent emergency laparoscopy during the study period had no particular medical history.

The main indications for emergency laparoscopy at the CHA were acute appendicitis (44.9%) followed by exploratory laparoscopy (18.8%) as shown in Table II. There was also one case of cardiac tamponade.

Intraoperative findings were dominated by acute appendicitis (35.1%), followed by appendicular peritonitis (15.9%) and extrauterine pregnancy (6.9%). There were 4 cases of laparoscopy (1.6%) (Table 3).

Regarding surgical procedures (table 4), appendectomy was performed in 37.1% of cases, and appendectomy, washing, and drainage of the abdominal cavity in 18.4% of cases. We also note the laparoscopic pericardial-diaphragmatic fenestration performed for tamponade to drain the pericardial effusion.

The mean duration of the procedure was 53 ± 32.52 minutes, ranging from 11 to 214 minutes (Figure 1). Only 8% of the emergency laparoscopies were converted to laparotomy as shown in figure 2 for the following reason: difficult exposure, multiple adhesions, intestinal dilatation, hypercapnia.

Most of the patients had uneventful postoperative courses (figure 3). The average hospital stay was 5 ± 5.4 days, ranging from 1 to 38 days. 60.4% of the patients spent less than 5 days in the hospital (figure 4).

Table-I: distribution of emergency laparoscopies by specialty

Specialty	Number	Percentage
Visceral surgery	198	80,82
Gynecology	46	18,77
Urology	01	0,41
Total	245	100

Table-II: Distribution of Emergency Coelioscopic by Indications at the CHA

Indications	Number	Percentage
Appendicular abcess	4	1,6
intra-abdominal abcess	4	1,6
appendagitis	1	0,4
Acute appendicitis	110	44,9
Biopsy	1	0,4
Acute cholecystitis	6	2,4
Exploratory laparoscopy	46	18,8
Ectopic pregnancy	14	5,7
hemoperitoneum	5	2,0
Hernia or complicated eventration	10	4,1
Hydrosalpinx	1	0,4
Intestinal invagination	1	0,4
Ovarian cyst	4	1,6
Occlusion	9	3,7
Appendicular peritonitis	17	6,9
Colonic perforation peritonitis	1	0,4
gastroduodenal perforation peritonitis	3	1,2

Indications	Number	Percentage
Abdominal wound	3	1,2
Sigmoiditis	2	0,8
Tamponade	1	0,4
Colorectal tumor	1	0,4
Volvulus	1	0,4
Total	245	100

Table-III: Distribution by intraoperative findings

Intraoperative findings	Number	Percentage
appendicular abscess	7	2,9
intra-abdominal abscess	5	2,0
tubo-ovarian abscess	3	1,2
mesenteric adenolymphitis	2	0,8
Adenopathy	1	0,4
acute appendagitis	1	0,4
acute appendicitis	86	35,1
peritoneal carcinosis	6	2,4
Cholecystitis	6	2,4
Endometriosis	1	0,4
pericardial effusion	1	0,4
uterine myoma	1	0,4
Ectopic pregnancy**	17	6,9
Hemoperitoneum	6	2,4
complicated hernia or eventration	12	4,9
Hydrosalpinx	2	0,8
intestinal invagination	1	0,4
ovarian cyst	9	3,7
Peritoneal dialysis catheter migration	1	0,4
cecal necrosis	1	0,4
Adhesive bowel obstruction / adhesion	7	2,9
appendicular peritonitis	39	15,9
peritonitis of gynecological cause	2	0,8
colonic perforation peritonitis	1	0,4
peritonitis by gastroduodenal perforation	3	1,2
peritonitis due to gall bladder perforation	2	0,8
post-op peritonitis	1	0,4
non-penetrating wound	2	0,8
White balance laparoscopies	4	1,6
Salpingitis	1	0,4
Sigmoiditis	2	0,8
torsion of Meckel's diverticulum	1	0,4
torsion of ovarian cyst	3	1,2
colorectal tumor	3	1,2
ovarian tumor	1	0,4
gynecological tumor	1	0,4
Volvulus	3	1,2
Total	245	100,0

Table-IV: distribution of surgical procedures

Surgical procedure	Number	Percentage
Removal of abdominal adhesions / adhesiolysis	1	0,4
Abstention	6	2,4
Salpingo-oophorectomy	7	2,8
Appendectomy	91	37,1
appendectomy lavage	1	0,4
appendectomy, lavage and drainage	45	18,4
Biopsy	4	1,6

Surgical procedure	Number	Percentage
Cholecystectomy	6	2,4
Colectomy	6	2,4
hernia or ventricular cure	12	4,9
digestive bypass	1	0,4
intestinal disinvagination	1	0,4
detorsion of appendix + cystectomy	3	1,2
small bowel detorsion	1	0,4
exeresis of Meckel's diverticulum	1	0,4
pericardial diaphragmatic fenestration	1	0,4
hemostasis lavage drainage	2	0,8
Hysterectomy	1	0,4
Cystectomy	5	2,0
lavage drainage	11	4,5
uterine myomectomy	1	0,4
patient omentectomy	1	0,4
Abstention	1	0,4
repositioning of peritoneal dialysis catheter	1	0,4
resection and anastomosis of the small intestine	3	1,2
anterior resection of the rectum + anastomosis	1	0,4
caecal resection + appendectomy	1	0,4
Salpingectomy	19	7,8
Removal of abdominal adhesions / adhesiolysis	5	2,0
Splenectomy	1	0,4
digestive suture, lavage drainage	5	2
Total	245	100

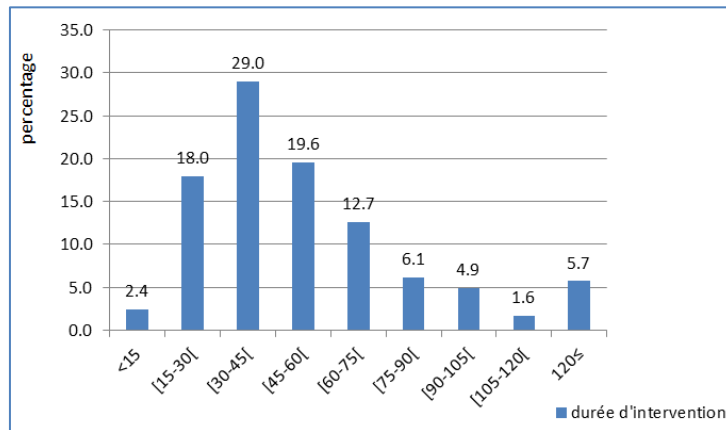


Fig-1: distribution by the duration of surgery



Fig-2: Percentage of emergency laparoscopies converted to laparotomies (blue for non-converted surgeries; orange for converted surgeries)

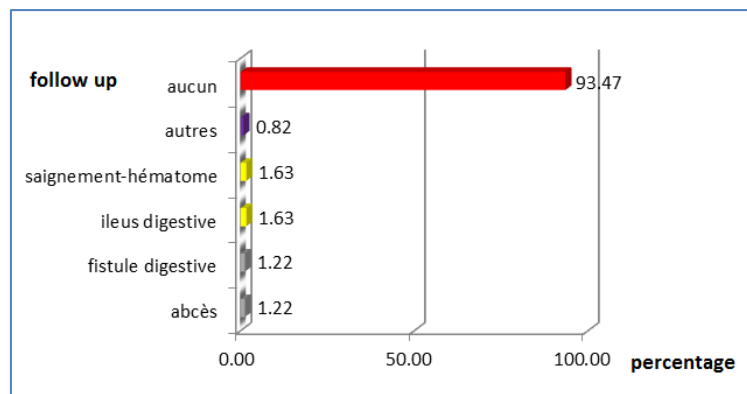


Fig-3: Distribution of Patients by postoperative follow up (93.47 % of patients had uneventful postoperative follow up)

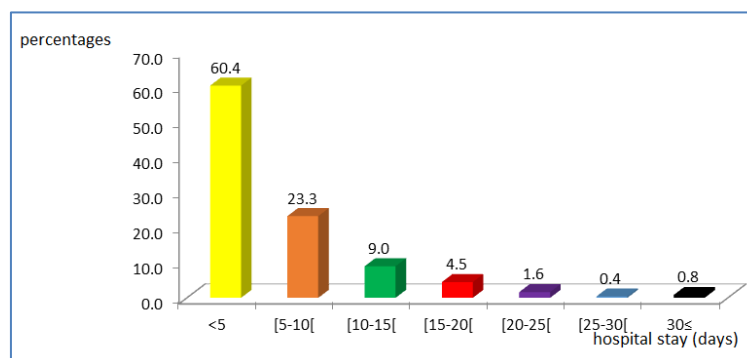


Fig-4: Distribution of Patients by Length of Hospitalization

DISCUSSION

During our study period, 21.68% of laparoscopies were performed in emergency. This confirms the fact that a laparoscopy is an important tool in the therapeutic armamentarium, even in the emergency context. Its feasibility is reinforced by the presence of a trained team and the availability of equipment ready for use day and night. This is common in most western hospitals. Karamanakos *et al.* in Greece reported 38.2% of laparoscopies in abdominal emergencies [22]. According to Agresta *F et al.* in Italy, emergency laparoscopies counted for 64.3% of emergency surgeries [23]. It should be noted that visceral surgery and gynecology are the two specialties that often practice emergency laparoscopy. In our study, urology performed only 0.41% of emergency laparoscopies.

The patients were of all ages with a mean age of 37 ± 22.78 years in our study. In the Greek and Italian articles, median ages were 51 ± 19.2 years and 42.3 ± 17.2 years respectively [22, 23]. We found a female predominance with a sex ratio of 0.94. The female predominance in our study could be explained by the inclusion of gynecological cases. However, this is also the case in other studies from Karamanakos and Agresta, where 55.5% and 56.47% of the patients were women, respectively. Three-quarters of our population had no particular history. This can be easily explained by their young age.

The main indications for emergency laparoscopy at the CHA are, in ascending order of frequency: acute appendicitis (44.9%), exploratory laparoscopy (18.8%), appendicular peritonitis (6.9%), ectopic pregnancy (5.7%), complicated hernias and eventrations (4.1%), and intestinal occlusions (3.7%). This trend varies from one facility to another. The Italian study reported in ascending order of frequency: acute appendicitis, acute cholecystitis, intestinal obstruction, peptic ulcer, and colonic perforation. However, we cannot compare these two results because, on one hand, at the CHA, cholecystitis is often treated medically first before being scheduled for surgery, and on the other hand, because we included gynecological emergencies. In a prospective study carried out in a university hospital in Senegal, Cissé *et al.* reported their first 100 emergency laparoscopies, collected from 2006 to 2008. The pathologies encountered were dominated by acute generalized peritonitis (57%) followed by acute appendicitis (18%) and occlusion due to flange (11%) [24]. The predominance of acute generalized peritonitis can be explained by the delay in medical consultation and care in this country which, like others in Africa, does not have a widespread health insurance system.

In our series, the intraoperative findings were consistent with the preoperative indications. This indicates the diagnostic reliability of preoperative investigations in developed countries.

In certain cases of abdominal emergencies, especially painful ones, where diagnostic precision is not provided by the usual means of exploration, exploratory laparoscopy can be used. There were 46 such cases during our study period, with only 4 laparoscopies that were not performed, and we can deduce that exploratory laparoscopy succeeded in making the diagnosis in 93.48% of cases. This is more efficient than the 84% of Karamanakos and less than the 98.1% of Agresta. The pathologies found intraoperatively during exploratory laparoscopy in our study are dominated by adnexal pathologies, peritoneal carcinosis, acute generalized peritonitis, and tumors. Similar findings are reported in the literature with similar diagnoses established after exploratory laparoscopy [22, 23, 25, 28].

Minimally invasive procedures are currently trending. Thus, nowadays, very few laparoscopic procedures are converted to laparotomy. The conversion rate of 8% observed in our study is much higher than the data in the literature which report 2.2% in Greece [22], 5.8% in 2002 at the Vittorio Veneto Hospital in Italy [25], and 0.15% in the same hospital in 2007 by a team of experts [26]. Several hypotheses could explain this relatively high conversion rate in our population. A poor selection of patients, a lack of experience of our team compared to others, or the fact that sometimes certain procedures are started laparoscopically knowing that they will be converted after a first laparoscopic dissection. In the Senegalese series by Cisse *et al.*, the high conversion rate, which was 14% [24], could be explained by the learning curve. This was their first 100 cases of emergency laparoscopic surgery. The reasons for conversion were generally the same from one study to another, led by adhesions [22-27].

The procedures are summarized in Table 4, with appendectomy taking first place in 37.1% of cases and appendectomy, lavage, and drainage of the abdominal cavity in 18.4% of cases. The average time for this procedure was 53 minutes (ranging from 11 to 68 minutes).

It is important to underline in our study the indication for emergency laparoscopy in a patient who presented a cardiac tamponade. He underwent laparoscopic pericardial-diaphragmatic fenestration. This procedure is not yet part of the laparoscopic routine in most other European hospitals.

Six (06) emergency laparoscopic colectomies were performed over our study period. The indications for colectomy in our series (colonic tumor, complicated sigmoiditis, colonic perforation, and volvulus) are the same as in the international literature [36, 37]. Laparoscopy remains beneficial in emergency colectomy, with the advantages of low morbidity and short hospital stay.

Forty-six (46) emergency gynecologic laparoscopies in our series, mainly salpingectomy, adnexectomy, ovarian cystectomy, and adnexal detorsion.

Eighty-nine-point forty-seven percent (89.47%) of salpingectomies were indicated for complicated tubal ectopic pregnancies, no longer justifying medical treatment. Today it is generally accepted that laparoscopy is the surgical treatment for ectopic pregnancy [45-47]. Laparotomic management of ectopic pregnancies has become quite exceptional and is limited to cases where laparoscopy is contraindicated [45]. As for adnexectomies, they were performed for tubo-ovarian abscesses, ovarian cysts, hydrosalpinx, and adnexal tumors.

The low postoperative morbidity is one of the undeniable advantages of the laparoscopic approach (Figure 3). Belega A and Pechman DM reported this low morbidity rate [41, 42]. This advantage is confirmed in emergencies where laparoscopy is still of great value with an uneventful postoperative course in 93.47% in our study despite the complexity of some surgical procedures. This corresponds to postoperative morbidity of 6.53%, which is lower than in Greece (7.9%), but still higher than the rate of 1.9% found by the Italian team. The postoperative complications can be minimal, including parietal hematomas, reflex ileus, or more serious with digestive fistulas.

The other advantage praised by the precursors of laparoscopy is the short hospital stay, even in the context of an abdominal emergency (figure 4). As evidence, we found a mean hospital stay of 5±5.4 days and 60.4% of the patients spent less than 5 days in the hospital. Our result is similar to the data reported in the literature.

CONCLUSION

Laparoscopy is relevant in the context of an emergency, either as the last diagnostic method for an etiologic diagnosis despite a well-conducted workup or as a minimally invasive therapeutic approach. In the context of abdominal emergencies, the purpose of surgery is to treat a problem that is frequently life-threatening. Therefore, converting a laparoscopy to a laparotomy should not be considered as a failure or a fault, but as proof of the discernment capacities of the surgeon who must also take into account his own experience, his work environment (technical equipment, instrumentation, anesthetists) and the patient's past medical condition.

REFERENCES

1. Botchorishvili, R., Velemir, L., Wattiez, A., Tran, X., Bolandard, F., & Rabischong, B. (2007). Coelioscopie et coeliochirurgie: principes généraux et instrumentation. EMC. Elsevier Masson SAS,

- Paris), *Techniques chirurgicales-Gynécologie*, 14, 515-41.
2. Fall, E.H.M. (2004). La laparoscopie au service de chirurgie générale du chu A le Dantec de Dakar: etude retrospective de janvier 2004 à Juin 2008 sur 280 cas. [Thèse de doctorat d'université; Médecine]. Dakar: Université Cheik Anta Diop; Faculté de médecine; 2014.
 3. Sauvat, F., & Revillon, Y. (2006). Chirurgie coelioscopique et laparoscopique chez l'enfant. *EMC, Pédiatrie*, 4-019.
 4. Buisson, P., Leclair, M. D., Podevin, G., Laplace, C., Lejus, C., & Heloury, Y. (2005). Chirurgie coelioscopique chez l'enfant. *Archives de pédiatrie*, 12(9), 1407-1410.
 5. Lupinacci, R. M., Menegaux, F., & Trésallet, C. (2015). Place et mise en œuvre de la laparoscopie en situation d'urgence. *Journal de Chirurgie Viscérale*, 152(6), S12-S19.
 6. Karamanakos, S. N., Sdralis, E., Panagiotopoulos, S., & Kehagias, I. (2010). Laparoscopy in the emergency setting: a retrospective review of 540 patients with acute abdominal pain. *Surgical Laparoscopy Endoscopy & Percutaneous Techniques*, 20(2), 119-124.
 7. Agresta, F., Ciardo, L. F., Mazzarolo, G., Michelet, I., Orsi, G., Trentin, G., & Bedin, N. (2006). Peritonitis: laparoscopic approach. *World Journal of Emergency Surgery*, 1(1), 1-5.
 8. Cisse, M., Tendeng, M. J., KA O, K. I., Dieng, M., Dia, A., & Toure, C. T. (2009). La laparoscopie en urgence à la clinique chirurgicale de l'hôpital A. Le Dantec de Dakar: Les 100 premiers cas. *Acad Nat Chir*, 8, 78-81.
 9. Agresta, F., De Simone, P., & Bedin, N. (2004). The laparoscopic approach in abdominal emergencies: a single-center 10-year experience. *JSLs: Journal of the Society of Laparoendoscopic Surgeons*, 8(1), 25.
 10. Cuesta, M. A., Eijsbouts, Q. A. J., Gordijn, R. V., Borgstein, P. J., & De Jong, D. (1998). Diagnostic laparoscopy in patients with an acute abdomen of uncertain etiology. *Surgical endoscopy*, 12(7), 915-917.
 11. Agresta, F., Mazzarolo, G., Ciardo, L. F., & Bedin, N. (2008). The laparoscopic approach in abdominal emergencies: has the attitude changed?. *Surgical endoscopy*, 22(5), 1255-1262.
 12. Agrusa, A., Romano, G., Di Buono, G., Dafnomili, A., & Gulotta, G. (2012). Laparoscopic approach in abdominal emergencies: a 5-year experience at a single center. *Il Giornale di chirurgia*, 33(11/12), 400-403.
 13. Catani, M., De Milito, R., Romagnoli, F., Romeo, V., & Modini, C. (2011). Laparoscopic colorectal surgery in urgent and emergent settings. *Surgical Laparoscopy Endoscopy & Percutaneous Techniques*, 21(5), 340-343.
 14. Koh, F. H., Tan, K. K., Tsang, C. B., & Koh, D. C. (2013). Laparoscopic versus an open colectomy in an emergency setting: a case-controlled study. *Annals of coloproctology*, 29(1), 12.
 15. Gervaise, A., & Fernandez, H. (2010). Prise en charge diagnostique et thérapeutique des grossesses extra-utérines. *Journal de gynécologie obstétrique et biologie de la reproduction*, 39(3), F17-F24.
 16. Orazi, G., & Cosson, M. (2003). Traitement chirurgical de la grossesse extra-utérine. *Journal de gynécologie obstétrique et biologie de la reproduction*, 32(7), 3S75-3S82.
 17. Agdi, M., & Tulandi, T. (2009). Surgical treatment of ectopic pregnancy. *Best Practice & Research Clinical Obstetrics & Gynaecology*, 23(4), 519-527.
 18. Belega, A., Popa, D. E., & Vasile, D. (2015). Laparoscopic approach for inguinal hernia emergencies. *Proceedings of The Romanian Academy-series B: Chemistry, Life Sciences and Geosciences Suppl*, 1, 7-11.
 19. Pechman, D. M., Cao, L., Fong, C., Thodiyil, P., & Surick, B. (2018). Laparoscopic versus open emergent ventral hernia repair: utilization and outcomes analysis using the ACSNSQIP database. *Surgical endoscopy*, 32(12), 4999-5005.