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Is night emergency laparoscopy a high-risk surgery?

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Abstract

Introduction: Although laparoscopy has become the gold standard for many abdominal emergency pathologies, emergency nighttime laparoscopic surgery is considered high-risk for several reasons, particularly due to limited resources in the operating room during nighttime hours.

The primary objective of our study is to evaluate the feasibility and safety of nighttime laparoscopy in the management of non-traumatic acute abdomen.

Materials and Methods: Descriptive and prospective, evaluative study conducted between February 2018 and October 2021. Our study included 337 patients undergoing laparoscopic surgery for non-traumatic acute abdominal emergencies.

Results: Among the 337 patients, we operated on 211 patients (62.6%) outside of regular working hours (between 4:00 PM and 8:00 AM), of which 189 patients (56.10%) were operated on from 4:00 PM to 12:00 AM, and 22 patients (6.2%) from 12:00 AM to 8:00 AM. The mean operative time was 52.09 ± 24.14 minutes. Perioperative difficulties related to the operated pathology were encountered in 21 cases (9.95%). The overall mean hospital stay was 1 day (range: 7 hours - 4 days). We compared nighttime laparoscopy with daytime laparoscopy and found an advantage in favor of nighttime laparoscopy in reducing hospitalization duration (p value 0.003).

Conclusion: Nighttime laparoscopy is feasible and safe.

Keywords: Acute abdomen; Nighttime Laparoscopy; Emergency Laparoscopy

1. Introduction

Due to its safety, reproducibility, and numerous advantages such as reducing complications of surgical wounds, postoperative pain, hospital stay, cost, and early return to socio-professional activities [1-6], laparoscopy has seen its field of application expand, becoming the preferred approach in the management of many digestive pathologies, particularly colonic and biliary pathologies [7-12]. Laparoscopy is often requested by patients due to its aesthetic appeal.

The enthusiasm and experience gained by the new generation of surgeons in laparoscopic surgery are other factors that have led to the development and expansion of the use of laparoscopic surgery, making it the gold standard for the majority of abdominal pathologies [2].

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Current concepts are moving towards the least invasive laparoscopic surgery possible, avoiding any skin incision for specimen extraction, using either natural orifices (transvaginal, transrectal, or transgastric routes) commonly referred to as Natural Orifice Transluminal Endoscopic Surgery (NOTES), or the single-incision concept [13].

The use of laparoscopy was once limited to elective scheduled surgery, but over the past two decades, its use has become common in many abdominal emergencies [10, 14-16].

However, nighttime laparoscopy is considered risky due to limited resources in emergency operating rooms at night and/or on weekends [2].

The primary objective of our study is to evaluate the feasibility and safety of nighttime laparoscopy in the management of non-traumatic acute abdomen. The secondary objectives are to assess morbidity rates and the conversion rate of nighttime laparoscopy.

2. Materials and Methods

2.1. Study Design

This was a descriptive and prospective evaluative study conducted between February 2018 and October 2021. Our study included 337 patients who underwent laparoscopic surgery for non-traumatic acute abdominal emergencies.

2.2. Study Population

We included in this study all adult patients aged 15 years and older presenting solely with non-traumatic acute abdominal surgical emergencies where laparoscopy is already recognized as the gold standard or has a high level of evidence. These included acute appendicitis and its complications (such as abscesses and generalized peritonitis), acute lithiasic cholecystitis with symptom onset within the past 7 days, peritonitis due to perforated peptic ulcer, acute intestinal obstructions due to adhesions, ectopic pregnancies, ovarian cyst torsions, and non-specific acute abdominal pain.

We did not include patients classified as ASA (American Society of Anesthesiologists) IV, patients in septic or hypovolemic shock, or traumatic emergencies.

3. Results

In our study, 337 patients were included and operated on. Among them, 190 were female (56.4%), with a mean age of 38 years \pm 15 years (range 15 to 82 years). The body mass index (BMI) was greater than 25 in 179 patients (53.11%). Comorbidities were found in 109 patients (32.3%), and surgical scars on the abdomen were present 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 \pm 7.29 weeks (range 7 to 29 weeks).

Table 1 Operated pathologies

Pathologies	N	%
Acute appendicitis (simple and complicated)	118	55.92
Acute lithiasis cholecystitis	48	22.75
Adnexal torsion	15	07.11
Ectopic pregnancies	14	06.64
Ulcer perforation	08	03.8
Adhesive acute intestinal obstruction	04	01.9
Abdominal pain non-specific acute	04	01.9
Total	211	100

We operated on 211 patients (62.6%) outside regular working hours (between 16:00 and 08:00). The distribution of surgical interventions according to their timing was as follows: from 08:00 to 16:00, we operated on 126 patients (37.4%); from 16:00 to 00:00, 189 patients (56.10%); and from 00:00 to 08:00, 22 patients (6.2%). Table 1 summarizes the different pathologies operated on by nighttime laparoscopy.

Table 2 Summarizes the timing of interventions performed at night (16:00-08:00).

Intervention time		
Operated pathologies	Intervention time	
	4 p.m to midnight	Midnight to 08 :00 a.m
Acute appendicitis (simple and complicated)	114 (54.03 %)	04 (01.9 %)
Acute lithiasis cholecystitis	48 (22.75 %)	00
Adnexal torsion	13 (06.16 %)	02 (0.95 %)
Ectopic pregnancies	12 (5.89 %)	02 (0.95 %)
Peptic ulcer perforation	05 (2.37 %)	03 (1.42 %)
Acute intestinal obstruction	04 (1.9%)	00 (0 %)
Non-specific abdominal pain	03 (1.42%)	01 (0.47 %)
Total	199 (94.31%)	(5.69%)

The average operative time was 52.09 minutes ± 24.14 minutes, with extremes ranging from 14 minutes to 178 minutes. Perioperative difficulties related to the operated pathology were encountered in 21 cases (9.95%). We recorded one small intestine injury (0.3%), and no cases of conversion were recorded at night.

The overall mean hospital stay was 1 day (range: 7 hours to 4 days), and the average postoperative hospitalization duration was 11 hours (range: 4 hours to 7.5 days). No deaths were recorded, and the rate of postoperative complications was 5.21%. Details of postoperative complications are summarized in Table 3.

Table 3 Postoperative complications

Postoperative complications	Number	Percentage
Wound infection	09	4.26 %
Deep collections at the right iliac fossa	02	0.94 %
Total	11	5.21 %

We conducted a comparative study between nighttime and daytime laparoscopy, which demonstrated an advantage in favor of nighttime laparoscopy in terms of reducing hospital stay, as illustrated in Table 4.

Table 4 Night Laparoscopy versus Day Laparoscopy

Settings	Night laparoscopy 211 (62.61%)	Daytime laparoscopy 126 (37.39%)	P value
Operative difficulties	21 (9.95%)	18 (14.29 %)	0.48
Operative time	52.09 mins	49.3 mins	0.082
Conversion rate	0 %	1 (0.79%)	0.732
Operative morbidity	01 (0.47%)	0%	0.226
Operative mortality	0 %	0%	0.392

Postoperative morbidity	12 (5.68%)	09 (7.14%)	0.377
Postoperative mortality	0 %	0%	0.274
Post-operative stay	11 Hours	1 day	0.003

4. Discussion

Laparoscopic surgery, whether planned or emergent, has greatly benefited from the technological advancements of the modern world [1,2,17-19]. Laparoscopic systems are highly sophisticated, offering high-definition imaging quality. The current instrumentation is of high quality, adaptable to various situations. The introduction of new instruments such as articulated graspers, highly efficient endoscopic staplers, and scissors utilizing a variety of modern energies has contributed to the refinement of laparoscopic techniques [2].

The use of laparoscopy in emergency situations is not new; it is gradually becoming a routine procedure as operators become familiar with the involved techniques [20,21].

However, many surgeons are hesitant to perform laparoscopy outside of regular working hours due to limited resources in emergency operating rooms during nighttime and/or weekends [2]. They argue that several studies have shown that nighttime laparoscopy leads to an increased risk of complications [22,23] and conversion [23] due to fatigue and lack of physical freshness among the healthcare teams. However, two series comparing daytime and nighttime laparoscopic cholecystectomy for acute calculous cholecystitis have shown that laparoscopy is safe and feasible regardless of the time of day. The rates of complications and conversion at night do not differ from those during the day [24-26].

In our series, there is no significant relationship between the timing of surgical interventions and overall postoperative morbidity (p value = 0.377 according to the chi-square test). Our results confirm the feasibility of laparoscopy regardless of the timing of its performance. We found a definite advantage for nighttime laparoscopy in reducing hospital stay duration. This aligns perfectly with the findings of certain studies, such as the series by Esther S. Tseng [24], Sammy Siada [25], and Yaghoubian [26], which demonstrated no association between nighttime laparoscopic cholecystectomy and morbidity.

Through a comparative analytical study between nighttime and daytime laparoscopy, our results showed no difference between the two procedures regarding operative difficulties, operative time, conversion rate, mortality rate, and morbidity rate. However, there was a clear advantage for nighttime laparoscopy in reducing hospital stay duration (p value: 0.003). This same observation was made by Siada, who showed that the length of stay was shorter in the nighttime laparoscopy group (2.4 vs. 2.8 days, p = 0.002) [25].

5. Conclusion

Our results have shown that laparoscopic procedures are feasible and safe, both during the day and at night. Nighttime laparoscopy not only does not increase morbidity and conversion rates, but it also offers a clear advantage in reducing hospital stay duration and consequently the cost. In the era of enhanced recovery after surgery and ambulatory surgery, this could be a significant advantage. Surgeons' reluctance to use laparoscopic approaches for emergency procedures at night, due to the perceived increased risk of morbidity and conversion, is not justified.

Compliance with ethical standards

Disclosure of conflict of interest

The author declare that they have no conflicts of interest.

Statement of ethical approval

The data and files of patients presented in this manuscript are available at the Department of General Surgery of the University Hospital of Ain Taya.

Statement of informed consent

All patients consent to their inclusion in this work and the publication of the results.

Author Contributions

All authors contributed to this work.

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