

Should an appendicectomy be performed in the presence of a macroscopically healthy appendix, during laparoscopic exploration?

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Abstract

Introduction: In contrast to the conventional laparotomy approach, the decision to perform an appendicectomy or not in the presence of a macroscopically normal appendix remains contentious during laparoscopic procedures. Our objective is to assess the rate of appendix conservation and conduct a literature review on the management of a macroscopically normal appendix intraoperatively.

Materials and Methods: This was a descriptive, prospective, evaluative study involving 337 patients undergoing laparoscopic surgery for non-traumatic acute abdominal emergencies.

Results: Of the 337 patients operated on, 190 were females (56.4%), with a mean age of 38 years \pm 15 years (range 15 to 82 years). In 7 patients (2.1%), the appendix appeared macroscopically normal intraoperatively, despite preoperative diagnosis favoring acute appendicitis. These 7 patients (6 females and 1 male) all underwent thorough clinical examination and preoperative ultrasound, although CT scans were performed in only 3 patients. Among these 7 patients, 2 had ovarian cyst torsions, 2 had ruptured hemorrhagic ovarian cysts, 1 case was diagnosed as retrocaecal internal hernia, and in 2 patients, no etiology was identified. The appendix was preserved in all 7 cases. All patients received postoperative antibiotic therapy. No postoperative complications or surgical reinterventions were recorded.

Conclusion: Our study demonstrates that a macroscopically normal appendix can be left in situ without postoperative complications or need for surgical reintervention.

Keywords: Appendicitis; Appendectomy; Laparoscopy; Patients

1. Introduction

Clinical examination allows for the diagnosis of acute appendicitis in 80% of cases. The risk of negative appendectomy is 20% if patients are operated solely based on clinical examination [1]. The advancement of imaging, particularly CT scans, with a sensitivity between 80% and 100% and a specificity greater than 90% according to most studies, has reduced the rate of negative appendectomies [1].

However, imaging is not always 100% reliable for all patients, especially with CT scans performed overnight in emergencies. In such situations of diagnostic uncertainty, the risk of false positives and false negatives may exist.

Thus, in cases of diagnostic doubt, if patients are operated on via laparotomy (McBurney's incision), there is not much disagreement, and the tendency is more towards appendicectomy even with a macroscopically healthy appendix. The rate of negative appendectomies in patients operated on by laparotomy is 15% to 32% [2].

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However, if we operate via laparoscopy, the decision to perform an appendectomy or not in the presence of a macroscopically normal appendix remains contentious.

Our objective is to assess the rate of appendix conservation and conduct a literature review on the management of a macroscopically normal appendix intraoperatively.

2. Materials and Methods

2.1. 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 included 337 patients undergoing laparoscopic surgery for non-traumatic acute abdominal emergencies.

2.2. Study Population

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

The non-inclusion criteria were: Septic and/or hypovolemic shock states, Traumatic emergencies: abdominal wounds and contusions, General contraindications to laparoscopy, Patients classified as ASA: IV.

3. Results

3.1. 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 \pm 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 was 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 accounted for 4.2% (08 patients), with a mean gestational age of 15 weeks \pm 7.29 weeks (range 7 to 29 weeks).

Preoperative abdominal-pelvic ultrasound was performed in 320 patients (95%).

In the remaining 17 patients (5%), either ultrasound was not necessary (e.g., cases of intestinal obstructions due to adhesions), or patients already had a CT scan upon arrival at the surgical emergency department.

Abdominal-pelvic CT scan was performed only when necessary and in the absence of contraindications in 56 cases (16.61%).

MRCP (Magnetic Resonance Cholangiopancreatography) was performed in 07 patients (2.07%).

The various pathologies operated on in our study are summarized in Table 1.

Table 1 Various Pathologies Operated On

Pathologies		N	%
Appendicitis	Uncomplicated Acute Appendicitis	141	41.9%
	Appendiceal Phlegmons	06	1.8%
	Appendiceal Abscess	25	7.5 %
	Generalized Appendiceal Peritonitis	06	1.8 %
Acute Lithiasic Cholecystitis		88	2.9 %

Ovarian Cyst Torsions (OCT)	27	08.1 %
Ectopic Pregnancies	23	6.9 %
Peritonitis due to Hollow Organ Perforation	10	03 %
Adhesive Acute Intestinal Obstructions	08	2.4 %
Non-specific Acute Abdominal Pain	02	0.6 %
Retrocaecal Internal Hernia	01	0.3 %
Total	337	100 %

Among the 337 patients operated on, intraoperative laparoscopy corrected the preoperative diagnosis in 7 patients (2.1%). These patients (6 females and 1 male) all underwent thorough clinical examination and preoperative ultrasound, however, CT scans were performed only in 3 patients. The preoperative diagnosis in these patients was acute appendicitis, but intraoperatively, the appendix was macroscopically healthy.

Among these 7 patients

In 2 patients, the preoperative diagnosis based on clinical and ultrasound data was acute appendicitis (with normal laboratory tests), but intraoperatively, ruptured hemorrhagic ovarian cysts were found.

In 2 other patients, the preoperative diagnosis based on clinical and ultrasound data was acute appendicitis, but intraoperatively, ovarian cyst torsions were identified.

In 2 other patients, the preoperative diagnosis based on clinical, ultrasound, and CT scan data was acute appendicitis, but intraoperatively, the appendix was healthy, and no other etiology explaining the symptoms was found (they had non-specific acute abdominal pain).

In 1 patient, the preoperative diagnosis based on clinical, ultrasound, and CT scan data was acute appendicitis, but intraoperatively, a retrocaecal internal hernia was discovered.

Details of the intraoperative correction of the preoperative diagnosis are summarized in Table 2.

Table 2 Summary of 7 Cases of Preserved Appendix

Preoperative Diagnosis	Number of Cases	Intraoperative Diagnosis
Acute Appendicitis	02	Ruptured Hemorrhagic Right Ovarian Cyst
Acute Appendicitis	02	Non-specific Acute Abdominal Pain
Acute Appendicitis	02	Ovarian Cyst Torsion
Acute Appendicitis	01	Retrocaecal Internal Hernia

Postoperatively, all these patients were placed on antibiotic therapy. No complications or need for surgical reintervention were recorded in these patients where the appendix was left in place.

4. Discussion

During a laparotomy (such as McBurney's incision), there is generally little divergence, and the tendency is towards performing an appendicectomy even in the presence of a macroscopically healthy appendix; usually, the appendicectomy is carried out. However, if we operate using laparoscopy, the decision to perform an appendicectomy or not in the presence of a macroscopically normal appendix remains contentious.

Some authors suggest performing an appendicectomy for macroscopically normal appendices during laparoscopic exploration for acute painful syndromes in the right iliac fossa, suggestive of acute appendicitis [3-7]. According to these

authors, acute appendicitis may be in its initial phase, with lesions located intramurally while the appendix appears macroscopically healthy. The risk of false positives and false negatives is reported to be 10% [8-10]. Considering the rare but possible false negatives of laparoscopy, a precautionary laparoscopic appendectomy seems preferable in the absence of other pathologies [11].

A rate of endo-appendicitis ranging from 19% to 40%, and the recurrence of symptoms when the appendix is left in situ, justify this approach [4]. In Christophe Barrat's series, 1.8% of patients underwent subsequent appendectomy within three years [8].

In Roberts' series, 33% of appendectomies for macroscopically normal appendices were found to be inflammatory on histological examination [12]. However, for other authors, the advantage of laparoscopy is to reduce or even eliminate the risk of negative appendectomies that escape radiological exploration.

For the latter, a macroscopically healthy appendix should be left in place because this action could lead to considerable morbidity and mortality, particularly acute intestinal obstructions and infectious complications [3,5, 13-19].

Regarding the risk of endo-appendicitis, proponents of preserving macroscopically healthy appendices rely on antibiotic therapy to cure these early appendicitis cases. Indeed, a three-day course of antibiotics could heal mucosal lesions [7].

In our series, we opted for the latter approach, leaving the macroscopically healthy appendix in place in 5 cases (1.48%). The appendix is a lymphoid organ with a role in the body. Appendectomy is not a trivial procedure; the risk of postoperative complications following a negative appendectomy is 6% [2]. Therefore, performing an appendectomy for a macroscopically healthy appendix exposes patients to serious complications that can be avoided, such as fistulas and deep abscesses.

With follow-up ranging from 8 to 40 months, we recorded no surgical reinterventions or complications for the macroscopically healthy appendices left in place. Thus, with our approach, we avoided five (1.48%) unnecessary appendectomies (negative appendectomy). Our five patients are regularly followed up in outpatient clinics.

The recommendations of expert societies such as the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), the European Association for Endoscopic Surgery (EAES), and the Consensus Development Conference of Italian Societies regarding the management of healthy appendices are as follows [4,20-22]:

- If no other pathology explaining the symptoms of the right iliac fossa is found, the decision to perform an appendectomy should be considered but based on individual clinical data (Level III, Grade A).
- In the presence of another pathology explaining the symptoms of the right iliac fossa, appendectomy is not necessary.

5. Conclusion

Although the question of whether to perform an appendectomy or not in the presence of a healthy appendix during laparoscopic exploration of an acute abdomen remains debated, our results have shown that during laparoscopic procedures, it is possible to preserve the appendix and avoid routine appendectomy when the appendix appears macroscopically healthy. Our findings indicate that leaving a macroscopically healthy appendix in place does not expose patients to complications or the need for surgical reintervention.

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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