

# Non-Traumatic Acute Abdomen: Videolaparoscopic Approach

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## ABSTRACT

**Background and Objective:** Although videolaparoscopy has been considered a safe method for many elective procedures, its use in traumatic and non-traumatic acute abdomen needs to be evaluated. The aim of this article is to evaluate the role of videolaparoscopy in non-traumatic acute abdomen as a method of diagnosis and treatment.

**Methods:** Between January 1992 and December 1996, 462 patients' charts were reviewed, retrospectively. Patients were admitted to the emergency room of São Rafael Hospital with symptoms of non-traumatic acute abdomen. Routine investigation of abdominal pain was performed in all patients, followed by videolaparoscopy. The laparoscopic procedures were done with four main purposes: diagnosis (ie, enteritis); diagnosis and treatment (ie, appendicitis); treatment only, when the diagnosis was known (ie, acute cholecystitis); and in cases where the conversion to conventional laparotomy was necessary, indicating the best incision.

**Results:** The vast majority of patients had inflammatory causes of acute abdomen (82.03%); others causes were hemoperitoneum (11.03%), bowel obstruction (3.25%), perforation of a hollow viscera (1.74%), vascular occlusion (1.3%), and negative laparoscopy (0.65%).

**Conclusions:** This study shows that laparotomy was necessary in only 7.14% of the patients. The videolaparoscopic approach was used for diagnosis (99.35%) and treatment (92.86%) of patients with acute abdomen.

**Key Words:** Acute non-traumatic abdomen, Videolaparoscopy.

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## INTRODUCTION

Patients with abdominal pain have been a great challenge for the general surgeon. In many cases, even after the history, physical examination, laboratory tests and image exams, the diagnosis cannot be concluded.

In referral centers, a laparoscopic approach, has been the “gold standard” for many elective procedures, and has been used for abdominal emergencies, traumatic as well as non-traumatic.

Surgeons can use videolaparoscopy in cases of acute abdomen for 1) diagnosis only (ie, patients with abdominal pain due to endometriosis), 2) diagnosis and treatment (ie, female patients with abdominal pain secondary to appendicitis), 3) treatment only (ie, patients with acute cholecystitis), and 4) indicating the best place to do the incision in cases where conversion to laparotomy is absolutely necessary.

## PATIENTS AND METHODS

Between January 1992 and December 1996, 462 charts of patients who were admitted to the emergency room of the São Rafael Hospital (SRH), with non-traumatic acute abdomen, were reviewed, retrospectively.

The SRH has its own policy to automatically generate a series of laboratory tests for patients with abdominal pain. These tests include a complete blood count (CBC), liver functions tests, serum electrolytes, serum creatinine and blood urea, amylase, urinalysis, B-hCG.

Plain abdominal X-ray, ultrasonography and/or CT scan were required, according to the main complaint associated with a physical exam. Chest radiography and electrocardiogram (ECG) were done to rule out extra-abdominal causes of pain.

Videolaparoscopy was done in all 462 patients to determine the diagnosis and/or treat the patients. All patients were hemodynamically stable.

Preoperative care included six hours fasting, when possible; relief of symptoms of pain, nausea, vomiting, fever, dehydration, electrolyte disturbance, and blood transfusion when indicated.

In all cases, the procedure was done under general anesthesia. The patient's position varied according to the presumptive diagnosis as well as to the surgeon's choice.

Open access techniques to establish pneumoperitoneum were used in cases where patients had abdominal distention, umbilical hernia or previous abdominal surgery near the umbilicus. In the remaining cases, a closed method utilizing the Veress needle to establish pneumoperitoneum was used.

Abdominal pressure was kept under 15 mm Hg to avoid the negative effects of excessive pneumoperitoneum. The first trocar was placed in umbilicus, and other trocars were placed as required by the disease pathology. Prophylactic antibiotic was given in all cases – usually a first- or second-generation cephalosporine. Continued antibiotic therapy was used when indicated.

**RESULTS**

Patients with non-traumatic acute abdomen were classified into seven groups according to etiology (Table 1). The vast majority of the patients had inflammatory acute abdomen (82.03%). Acute appendicitis was the most frequent cause, followed by acute cholecystitis; others causes are listed in the Table 2, as well as the rate of conversion to traditional laparotomy.

**Diagnosis – Group I (Table 3)**

Endometriosis is a frequent cause of abdominal pain. In these cases, abdominal and pelvic fluid was aspirated and sent to pathology. When endometriotic tissues were found, they were cauterized, and the patients were followed by a gynecologist. All five of the patients with acute pancreatitis and three cases of enteritis were submitted to videolaparoscopy without a definite preopera-

tive diagnosis. Conservative treatment was adopted for all of these cases.

**Diagnosis and Treatment – Group II (Table 4)**

Two hundred and ten patients with appendicitis underwent a definitive laparoscopic procedure with a success rate of 97.14%. Three trocars were used; the camera was introduced into the umbilical trocar (10 mm), the second trocar was inserted into the left iliac fosse (10 mm), and the third above the pubis (5 mm). The mesoappendix was cauterized with bipolar electrical current, or secured with titanium clips. The appendiceal base was tied with two endo-loops. In some cases, it was necessary to remove the appendix using an endo-bag to avoid contact with the abdominal wall and thereby reducing the rate of wound infection.

There was no exclusion criteria for choosing the laparoscopic approach for acute appendicitis. The appendix was graded according to the evolution from edema to necrosis; the rate of conversion was very low. In

**Table 1.**  
All patients stratified by etiology.

Inflammatory	379 (82.03%)
Hemorrhage	51 (11.03%)
Vascular	6 (1.3%)
Perforation	8 (1.74%)
Obstruction	15 (3.25%)
Negative	3 (0.65%)
<b>Total</b>	<b>462 (100%)</b>

**Table 2.**  
Patients with inflammatory acute abdomen.

Pathology	Patients	Conversion
Appendicitis	210 (55.20%)	6
Cholecystitis	113 (29.40%)	14
Pelvic Inflamm. Disease	21 (5.44%)	1
Endometriosis	12 (3.16%)	0
Abdominal abscess	12 (3.16%)	2
Pancreatitis	5 (1.30%)	0
Enteritis	3 (0.78%)	0
Biliary peritonitis	3 (0.78%)	0
<b>Total</b>	<b>379 (100%)</b>	<b>23 (6.6%)</b>

**Table 3.**  
Patients in group I (laparoscopic approach with diagnosis).

Pathology	Patients
Endometriosis	12
Pancreatitis	5
Enteritis	3
<b>Total</b>	<b>18 (4.74%)</b>

**Table 4.**

Patients in group II (laparoscopic approach with diagnosis and treatment).

Pathology	Patients
Appendicitis	210
Pelvic Inflamm. Disease	21
Biliary peritonitis	3
<b>Total</b>	<b>234 (61.74%)</b>

**Table 5.**

Patients with abdominal hemorrhage.

Pathology	Patients
Ruptured ovarian cyst	21
Ectopic pregnancy	17
Blood in Douglas Pouch	13
<b>Total</b>	<b>51 (11.03%)</b>

patients with pelvic peritonitis due to pelvic inflammatory disease, an aspiration/washing procedure was performed to clean the abdominal cavity. In one case, it was necessary to perform bilateral salpingectomy, due to an intense salpingitis. In only one case was conversion done (unilateral oophorectomy), due to dense adhesions. Three patients who were submitted to videolaparoscopic cholecystectomy had bile peritonitis postoperatively. In each case, laparoscopy was re-performed and large amounts of bile were found in the abdominal cavity. The cavity was washed and the bile aspirated; a closed drained system was placed after peritoneal toilet. The source of the bile leak was found in only one case. (A small bile duct in the hepatic parenchyma. This was secured with laparoscopic suture.)

Abdominal hemorrhage occurred in 51 female patients due to gynecologic complications. Rupture of an ovarian cyst was the most frequent cause (21 cases), followed by ectopic pregnancy (17 cases). In all of these cases, diagnosis was obtained by ultrasonography. In 13 cases, a small amount of blood was found in the Pouch of Douglas (Table 5). There was no associated pathology. In six patients, vascular occlusion or semi-occlusion was the cause of acute abdomen: ischemic colitis in one case, mesenteric ischemia in two cases, meso ovarian tor-

**Table 6.**

Patients with vascular occlusion.

Pathology	Patients	Conversion
Ischemic colitis	1	0
Mesenteric ischemia	2	2
Ovarian torsion	2	1
Trompa torsion	1	0
<b>Total</b>	<b>6 (1.3%)</b>	<b>3 (50%)</b>

**Table 7.**

Patients with hollow viscera perforation.

Pathology	Patients	Conversion
Perforated ulcer	1	0
Diverticulitis	6	1
Jejunal perforation	1	1
<b>Total</b>	<b>8 (1.74%)</b>	<b>3 (37.5%)</b>

sion in two cases and fallopian tube torsion in one case. Conversion to open procedure was done in cases of mesenteric ischemia in which segmental enterectomies were required. In one of the two cases of meso ovarian torsion (where extensive adhesions were found), open oophorectomy was performed (Table 6).

In hollow viscera perforation (8 cases), six cases were due to diverticulitis, with five cases presenting localized peritonitis treated by aspiration. One patient with sigmoid necrosis, perforation and a large amount of liquid in the abdomen required laparotomy guided by laparoscopy with a sigmoid resection and terminal colostomy (Hartmann procedure). The other two cases of hollow viscera perforation were a jejunal perforation caused by lymphoma. They were treated by laparotomy followed by enterectomy. One case of perforated duodenal ulcer was treated by laparoscopic suture and aspiration/washing (Table 7).

Bowel obstruction occurred in 15 patients: nine had adhesions, which were treated by laparoscopic adhesiolysis with no conversion; two had internal hernia, also treated by laparoscopy; and four patients had bowel obstruction due to colon cancer, which were treated by laparotomy with colectomy (Table 8).

**Table 8.**

Patients with bowel obstruction.

Pathology	Patients	Conversion
Adhesions	9	0
Internal hernias	2	0
Tumors	4	4
<b>Total</b>	<b>15 (3.25%)</b>	<b>4 (26.6%)</b>

**Table 9.**

Patients in group III (laparoscopic approach for treatment).

Pathology	Patients
Cholecystitis	113
Abdominal abscess	12
<b>Total</b>	<b>125 (32.98%)</b>

**Treatment – Group III (Table 9)**

For this group of patients, who had an established diagnosis, laparoscopy was done for therapeutic purposes. The group was composed of 113 cases of acute cholecystitis and 13 cases of intra-abdominal abscess. The patients with clinical, laboratory and ultrasonographic findings of acute cholecystitis were submitted to laparoscopic cholecystectomy. In addition, all cases had pathological confirmation of acute cholecystitis. The European laparoscopic technique modified by Prof. Enrico Croce was used. For patients with a high suspicion of biliary duct stones, endoscopic cholangiography was done with papilotomy as required, and intraoperative cholangiography was done in nine patients with cystic and bile duct dilatation. There were complications in 7.96% of these patients with no mortality. The conversion rate was 12.4%; significantly higher than in the patients with symptomatic chronic cholecystitis treated by laparoscopic cholecystectomy in São Rafael Hospital. All degrees of acute cholecystitis were treated by laparoscopic cholecystectomy. Twelve patients with abdominal abscess were treated by the laparoscopic approach, which was successful in ten cases. One case of pelvic abscess with difficult access and dense adhesions was treated by laparotomy. One case of iatrogenic duodenal lesion (thermal injury during laparoscopic cholecystectomy), with abscess, was treated by laparotomy and suture.

**Table 10.**

Patients in group IV (guiding incisions).

Pathology	Patients
Appendicitis	6
Pelvic Inflamm. Disease	1
Abdominal Abscess	2
Enteritis	1
<b>Total</b>	<b>10 (2.63%)</b>

**Guiding Incisions (Conversion to Laparotomy) – Group IV (Table 10)**

These were patients in whom laparoscopy helped achieve a diagnosis and indicated the best location to perform the incision: six patients with appendicitis, two with abdominal abscess, one with pelvic inflammatory disease and one with enteritis.

**DISCUSSION**

Different regional incidences of pathologies that can cause acute abdomen make comparison among these cases difficult. Even with an expert surgeon and advanced diagnostic tools, it can yet be difficult to make an accurate preoperative diagnosis in many patients, which can delay proper treatment or lead to an unnecessary exploratory laparotomy.<sup>1</sup> Patients with an acute abdomen diagnosis and who undergo laparotomy have a negative rate of exploration as high as 22%. Some studies propose the use of laparoscopy to evaluate acute abdomen as it has high diagnostic accuracy, is associated with a low rate of negative laparotomy, and has low mortality and morbidity.<sup>2-6</sup>

In this study, group I (diagnosis group) was composed of 18 patients with a variety of diagnoses such as pancreatitis and endometriosis in which an accurate diagnosis, provided by laparoscopy, avoided an unnecessary laparotomy. Group II (diagnosis and treatment group) had the most patients in whom laparoscopy defined the diagnosis for the acute abdominal condition and provided surgical treatment by laparoscopic means, including appendicitis in which the proper diagnosis followed by laparoscopic appendectomy reaches a high success rate with a very low conversion rate (2.86%). It can be compared with several studies.<sup>7-9</sup> In reference to pelvic

inflammatory disease, an important subgroup of patients benefited from the laparoscopic approach, especially premenopausal women (in whom differential diagnosis with gynecological conditions can be difficult) except in one case where the patient was submitted to open oophorectomy due to dense adhesions.<sup>10</sup> In a special subgroup formed of three patients with biliary peritonitis, laparoscopic cholecystectomy proved to be an appropriate method for both diagnosis and treatment. Laparoscopy proved to be effective as a diagnostic and therapeutic method in women with abdominal hemorrhage, thus avoiding the open procedure.<sup>11,12</sup> In the subgroup with vascular occlusions, laparoscopy provided an accurate diagnosis and made it possible to avoid laparotomies in patients with ischemic colitis and adnexal torsion (except in one case of mesovarian torsion), requiring the open procedure in mesenteric ischemic cases.<sup>13</sup> In the cases of perforation of hollow viscera from duodenum to colon, diagnosis and minimal-access surgery were benefits of laparoscopy in five patients with diverticulitis and in one patient with perforated duodenal ulcer, thereby avoiding the open procedure.<sup>14,15</sup> Patients with bowel obstruction (the last subgroup), a condition that until recently was not an indication for laparoscopy, were treated by laparoscopy. All of these cases were caused by adhesions or internal hernias. Laparotomy and colectomy were required for the four cases of bowel obstruction due to colonic cancer, as noted by other authors.<sup>16</sup> In group III (treatment group), patients with acute cholecystitis and intra-abdominal abscess were treated by laparoscopy. At the beginning of their experiences with laparoscopic cholecystectomy, many authors excluded acute cholecystitis from their series. Today, a laparoscopic approach has been accepted by many major referral centers.<sup>17,18</sup> This series shows a high-resolution rate with a 12.4% conversion to open procedure. In patients with intra-abdominal abscess where the percutaneous approach was not achieved or indicated by radiology, the laparoscopic approach was used as an option of treatment as in other series.<sup>18,19</sup> Group IV (guiding incision) showed the benefits of a laparoscopic diagnosis in selecting the best site to perform the incision.<sup>20</sup>

## CONCLUSION

This series has shown that in the majority of cases (99.35%) using a laparoscopic approach the surgeon was able to diagnose the cause of non-traumatic acute

abdominal pain and, when used for therapeutic purpose, could treat 93.07% of the cases, with an overall conversion rate of 6.92%.

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