



SPECIFIC FEATURES AND CAPABILITIES OF EMERGENCY LAPAROSCOPY IN THE ACUTE NON-TRAUMATIC ABDOMEN

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SUMMARY

Purpose: The purpose of this study is to analyze the role of emergency laparoscopy to provide the diagnosis in patients with history of acute abdominal pain, where physical examination and diagnostic tests are unrevealing-unclear emergency cases. Also important is to demonstrate the clinical indications as well as the results of urgent laparoscopic surgery in acute abdominal diseases.

Material and Methods: A total of 756 patients with a diagnosis of the acute non-traumatic abdomen were hospitalized for a period of two years from 1.1.2014 to 1.1.2016 in the Department of General, Visceral and Emergency Surgery at UMHATEM “Pirogov”. Of these, women were 402 (53.17%), men 354 (46.83%). The age in this retrospective analysis varied from 18 to 79 years (average 51.3).

Results: Patients divided into 3 groups by suspected diagnosis.

Operations for acute abdomen in group I (711 patients-94.05%) include inflammatory disease-acute cholecystitis, acute appendicitis, ruptured ovarian cyst and acute pancreatitis. Diagnostic accuracy of laparoscopy was 100%.

A total of 26 patients(3.44%) with perforated abdominal viscus (group II) were operated laparoscopically. Diagnostic accuracy of laparoscopy was also 100%.

Of the 19 operated patients (2.51%) for acute intestinal obstruction and mesenteric ischaemia(group III), women were 7, male 12. Diagnostic accuracy of laparoscopy was 100%.

Conclusions: Laparoscopy provided a diagnosis in a large number of patients. It is a very good diagnostic and therapeutic tool. It should be a first-line surgical investigation for undiagnosed abdominal pain with no specific etiology.

Keywords: acute non-traumatic abdomen, peritonitis, approach, conventional surgery, laparoscopy,

INTRODUCTION

Urgent laparoscopy is a minimally invasive surgical procedure that allows the visual examination of intraabdominal organs in order to detect pathology. The video image of the liver, stomach, intestines, gallbladder, spleen, peritoneum, and pelvic organs can be viewed on a monitor after insertion of a telescope into the abdomen. Manipulation and biopsy of the viscera is possible through additional ports.

Diagnostic laparoscopy was first introduced in 1901, when Kelling, performed a peritoneoscopy in a dog and was

called “celioscopy”[1]. A Swedish internist named Jacobaeusc is credited with performing the first diagnostic laparoscopy on human in 1910. He described its application in patients with ascites and for the early diagnosis of malignant lesions[2].

In the nineties of the last century, a number of surgical institutions promoted the use of laparoscopy as a diagnostic or therapeutic tool that can optimize emergency surgical treatment in patients with the acute abdominal disease. For example, a number of cases of non-specific abdominal pain are suspected of acute appendicitis. Especially this is characteristic of young people who have pain and discomfort in the right iliac fossa, and are mistakenly subjected to surgery. In a study of 135 appendectomy patients, in 33% of the cases, patients had no evidence of acute appendicitis [1]. As a diagnostic tool, emergency laparoscopy does not compete with other diagnostic options but complements them, taking into account the risks associated with the method. The efficacy of laparoscopy in this role is mainly related to the postponing of unscheduled urgent laparotomy and the avoidance of “missed diagnosis” [2]. The development of laparoscopic surgical technology and methodology implies the possibility of correct and reliable intra-abdominal diagnosis and a logical, direct transition to therapeutic pathological resolution. A number of urgent surgical abdominal ailments are considered to be appropriate with advantage for laparoscopic surgical treatment: acute appendicitis; acute cholecystitis; perforation of the gastro-duodenal ulcer; acute mesenteric ischemia; bowel strangulation; acute inflammation and ruptured gynecological lesions. The advantages of emergency laparoscopy are expressed in the optimal choice of treatment in urgent surgical conditions, shorter periods of postoperative recovery, significant reduction of postoperative pain and some complications [3, 4, 5, 6, 7, 8]. From more than two decades in the Department of General, Visceral and Emergency Surgery at UMHATEM “Pirogov” we use emergency laparoscopy for diagnostic and therapeutic tool in acute abdominal diseases [9, 10].

The purpose of this study is to analyze the role of emergency laparoscopy to provide the diagnose in patients with history of acute abdominal pain, where physical examination and diagnostic tests are unrevealing-unclear emergency cases. Also important is to demonstrate the clinical

indications as well as the results of urgent laparoscopic surgery in acute abdominal diseases.

MATERIAL AND METHODS

Within a retrospective clinical analysis, 756 patients with acute non-traumatic abdomen were diagnosed with laparoscopy and operated from 1.1. 2014 to 1.1. 2016 in the Department of General, Visceral and Emergency Surgery UMHATEM "Pirogov". The identification of this condition was also made on the basis of history taking, physical examination, laboratory results, radiography, echography and CT. Of the hospitalized, women were 402 (53.17%) and men-354 (46.83%). In this study, the parameters - age, gender distribution, clinical symptoms, mode of treatment, morbidity and mortality were analyzed. The age in this retrospective analysis varied from 18 to 79 years (average 51.3). The distribution by nosological units is given in Table 1.

Table 1. Distribution by nosological units

<i>Nosology in emergency laparoscopic operations</i>	<i>Patients</i>
acute cholecystitis	434(57.41%)
acute appendicitis	223(29.5%)
ruptured ovarian cyst	48(6.35%)
perforated gastro-duodenal ulcer	21(2.78%)
acute mesenteric ischemia	12(1.59%)
bowel strangulation	7(0.92%)
acute pancreatitis	6(0.79%)
acute diverticulitis	5(0.66%)

Indications for emergency laparoscopy for suspected disease were:

1. Peritonitis till 24 hours
2. Acute intestinal obstruction
3. Gynaecological abdominal emergencies
4. Patients with history of acute abdominal pain, if physical examination and diagnostic tests are unrevealing.

Contraindications were:

A/ relative

1. Patients with advanced oncological disease.
2. Pregnant women.

B/ absolute

1. Patients with coagulation disorder.
2. Patients with complicated cardio-vascular and pulmonary disease

Patients under 18 years of age were excluded from the study.

Steps of emergency laparoscopy are:

- o Abdominal organs are inspected for any pathology
- o Abdominal cavity is inspected for fluids.
- o Samples are taken if free fluid is present for laboratory tests (chemistry, cytology or bacteriology).
- o Peritoneal lavage and adhesiolysis may need to be performed to improve visualisation of organs.
- o Therapeutic laparoscopy is then undertaken, if indicated and surgeon is experienced enough.

Ending of the operation.

- o Examine the abdomen for any possible organ injury or haemorrhage.

- o Remove the instrument and then port.
- o Remove telescope leaving gas valve of umbilical port open to let out all the gas.
- o Close the wound with suture

The usual site of insertion of the trocar/cannula for diagnostic laparoscopy is below or to the side of the umbilicus. This position may require to be altered in the presence of abdominal scars. The use of a 30 degree forward oblique telescope is preferable for viewing the surface architecture of organs. By rotation of the telescope, different angles of inspection can be achieved.

Collected data were statistically analysed using SPSS version 19.0. The results were summarized by tracking the morbidity up to one-month post-discharge.

RESULTS

Patients divided into 3 groups by suspected diagnosis and the results have been analyzed.

Operations for acute abdomen in group I (711 patients-94.05%) include inflammatory disease-acute cholecystitis, acute appendicitis, ruptured ovarian cyst and acute pancreatitis(Table 2).. A total of 434 patients with acute cholecystitis were operated laparoscopically. Women were 255, men-179. The grade of ASA was I-II. The average age was 54.5 years. Signs and symptoms of cholecystitis may include: severe pain in your upper right or center abdomen, pain that spreads to your right shoulder or back, tenderness over your abdomen when it's touched, nausea, vomiting. Laparoscopic cholecystectomy was performed in 242 cases, laparoscopic cholecystectomy +local adhesiolysis in 192 cases(because of pericholecystitis). Conversion after laparoscopy was recorded in 29 cases (6.68%). The reasons were massive adhesions between the stomach, abdominal wall and the gallbladder after previous laparotomies, as well as gangrenous perforated cholecystitis with biliary peritonitis. The average hospital stay was 3.2 days. There were 5 patients with wound infection, and another 5 were diagnosed with intraperitoneal complications (abscess, adhesions). The morbidity was 2.3%, mortality-0%. Of the 271 operated patients for acute appendicitis, women were 129, male 142. The average age was 47.3. In 91% of the cases, the overall ASA status was I-II. Clinical signs are well known-rebound tenderness and percussion pain over McBurney's point, from laboratory test- leucocytosis. With peritonitis were 74 (27.3%) patients. Women, diagnosed with ruptured ovarian cyst and acute appendicitis were 48(17.71%), where laparoscopic appendectomy + ovarian cystectomy was performed (Table 2). With unclear diagnosis were 48 women-suspected for acute appendicitis with abdominal pain in ileocecal region, Blumberg(+), local abdominal tenderness, leucocytosis-were diagnosed with ruptured ovarian cyst. Seven patients underwent conversion (2.58%). The reasons were necrosis of appendix base and typhlitis. Intraperitoneal complications (abscess, postoperative adhesions, intestinal lesion) have been reported with 10 cases (3.69%). There were 2 patients with wound infection. Reported morbidity was 4.43%. The hospital stay was an average of 2.7 days. The mortality rate was 0%. With acute pancreatitis were 6 patients(I group). They were with sharp epigastric pain(suspected for perforated ulcer) and diagnosed with acute pancreatitis. Diagnostic accuracy of laparoscopy for this group was 100%.

Table 2. Operations for acute abdomen-inflammatory disease (group I)

Laparoscopic surgery for acute abdomen-inflammatory disease	711(94.05%)
acute cholecystitis	434(57.41%)
acute appendicitis	223(29.5%)
ruptured ovarian cyst	48(6.35%)
acute pancreatitis	6(0.79%)

A total of 26 patients with perforated abdominal viscus (group II) were operated laparoscopically (Table 3). Women were 9, men-17. The grade of ASA was I-II. The average age was 54.5 years. With acute abdominal pain and pneumoperitoneum were 24. Of these 19 were with perforated gastro-duodenal ulcer, 5 with acute diverticulitis. With sharp epigastric pain without pneumoperitoneum were 2 patients(diagnosed with perforated gastro-duodenal ulcer). With unclear diagnosis were 7 patients-5 of them suspected for perforated gastro-duodenal ulcer with acute abdominal pain and pneumoperitoneum were diagnosed with acute diverticulitis, 2-with perforated gastro-duodenal ulcer(without pneumoperitoneum). Conversion after laparoscopy was recorded in 2 out of 26 cases (7.69%). The reason was large callous ulcer and need for gastric resection. The average hospital stay was 4.7 days. There were 3 patients with wound infection, and another 2 were diagnosed with intraperitoneal complications (abscess, adhesions). The morbidity was 15.63%, mortality-0%. Diagnostic accuracy of laparoscopy for this group was also 100%.

Table 3. Operations for acute abdomen-perforated abdominal viscus(group II)

Laparoscopic surgery for acute abdomen- perforated abdominal viscus	26(3,44%)
perforated gastro-duodenal ulcer	21(2.78%)
acute diverticulitis	5(0.66%)

Of the 19 operated patients for acute intestinal obstruction and mesenteric ischaemia (group III), women were 7, male 12 (Table 4). The grade of ASA was II-III. The average age was 63.9 years. Signs and symptoms were intense abdominal pain without abdominal tenderness, leucocytosis and complicated comorbidity(especially arrhythmia). Laparoscopic exploration for acute mesenteric ischemia was performed in 12 cases, laparoscopic adhesiolysis in 7 cases(because of bowel strangulation). With unclear diagnosis were 7 patients- suspected for acute mesenteric ischemia with acute abdominal pain without abdominal tenderness, leucocytosis and complicated comorbidity were diagnosed with bowel strangulation(5 of them with previous laparotomy). Conversion after laparoscopy was recorded in 1 case (5.26%). The reason was need to perform large intestinal resection because of intestinal necrosis. The average hospital stay was 4.3 days. There were 1 patient with wound infection. The morbidity was 5.26%, mortality-57.89%(11 patients died). Diagnostic accuracy of laparoscopy for group III was 100%.

Table 4. Operations for acute abdomen-acute intestinal obstruction and mesenteric ischaemia (group III)

Laparoscopic surgery for acute abdomen- acute intestinal obstruction and mesenteric ischaemia	19(2,51%)
acute mesenteric ischemia	12(1.59%)
bowel strangulation	7(0.92%)

DISCUSSION

The emergency laparoscopy has improved in recent decades for a wide variety of conditions including patients with acute abdomen. Saeian and Reddy concluded that in addition to avoiding unnecessary laparotomy, emergency laparoscopy has proved valuable in the assessment of 64 cases- acute abdomen and ischemic bowel disease[11]. Boyd and Nord concluded that the diagnostic laparoscopy combined with laparoscopic ultrasound is highly accurate in the staging of the intraabdominal malignancies and it is superior to ultrasonography and computed tomography[12]. Majewski conducted a study in 430 patients to investigate a potential benefits of diagnostic laparoscopy in cases of acute abdomen and found that it yielded a diagnosis in 90% and specificity was 83.3%[13]. Karnam and Reddy reveal that diagnostic laparoscopy guides surgeons in preventing unnecessary laparotomies in setting of acute abdomen, oncologists for accurate staging of malignancies and hepatologists in evaluation of acute and chronic disease as well[14]. Rienmann reviewed that the diagnostic laparoscopy increasingly being used by general surgeons in cases of acute abdomen[15]. The study by Alexander G Nagy reveals that acute appendicitis was accurately diagnosed in 12 cases, gastro-duodenal perforation in 9 patients, bowel obstruction in 8 and abdominal tuberculosis in 5 cases, a total of 45 patients[16]. The present study shows 100% of diagnostic accuracy of laparoscopy in patients with acute abdomen, while previous study from Alexander G. Nagy shares the percentage of 90%[16]. Vander Velpen study also showed accuracy of 100%[17].

When assessing the role and specifying the emergency laparoscopy methodology, two aspects are distinguished: the assumption of an expected specific procedure in a mini-invasive version based on in-depth diagnosis and the identification of nature and severity of an undetectable pathology[18].

Emergency laparoscopy should not be applied unconditionally, but as a tool of strictly logically justified choice, taking into account the patient's personal features and the health facilities[19].

The successful practice of emergency laparoscopy is based on an efficient and safe medical-diagnostic procedure, including the mandatory selection of patients, the preparation and experience of surgical teams, and the uncompromising security of safe medical devices and surgical supplies[20,21, 22].

CONCLUSION

Emergency laparoscopy offers a superior overview of the abdominal cavity with minimal trauma to the patient. If further surgery is needed, it may take the form of either

laparoscopic procedure or to open surgery. The incision for open surgery being guided by laparoscopic finding. The complications associated to laparoscopy are fewer and can be minimized further by using mini laparotomy technique. Emergency laparoscopy has many advantages-reduces overall hospital stay and post-operative complications, provides early return to work and better cosmetic outcome.

This study demonstrated that laparoscopy provided a diagnosis in a large number of patients. It is a good tool

for diagnosis and therapeutic surgery. It may be a first-line operative investigation for undiagnosed abdominal pain with no specific aetiology.

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