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V. Yu. Shapovalov

COMPARATIVE ASSESSMENT OF THE TRADITIONAL AND ENDOSCOPIC APPENDECTOMY ACCORDING TO THE RESULTS OF PERFORMING FIRST 1,000 LAPAROSCOPIC APPENDECTOMIES

The Odessa National Medical University, Odessa, Ukraine,
The Military Medical Center of the Southern Region, Odessa, Ukraine

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В. Ю. Шаповалов

СРАВНИТЕЛЬНАЯ ОЦЕНКА ТРАДИЦИОННОЙ И ЭНДОСКОПИЧЕСКОЙ АППЕНДЭКТОМИИ ПО РЕЗУЛЬТАТАМ ВЫПОЛНЕНИЯ ПЕРВОЙ 1000 ЛАПАРОСКОПИЧЕСКИХ АППЕНДЭКТОМИЙ

Одесский национальный медицинский универитет, Одесса, Украина,
Военный медицинский центр Южного региона, Одесса, Украина

Цель исследования — улучшение результатов лечения больных острым аппендицитом путем применения лапароскопической техники в диагностике и лечении заболевания.

При применении лапароскопии ошибочно удалено 0,4 % неизмененных червеобразных отростков. При традиционном методе — 6,5 %. Катаральный аппендицит диагностирован у 36,4 % больных в группе открытых аппендэктомий и лишь у 10,5 % — в группе лапароскопических аппендэктомий, что позволяет говорить о неоправданно выполненной в некоторых случаях аппендэктомии.

Выполнение лапароскопической аппендэктомии по поводу острого аппендицита возможно у 95,9 % больных. Продолжительность выполнения эндоскопической аппендэктомии — (53,4±±7,6) мин достоверно не отличается от таковой открытой операции — (49,2±8,7) мин. Продолжительность лечения больных в стационаре после выполнения лапароскопической аппендэктомии составляет (3,4±0,9) дня, что меньше, чем после открытой операции, — (6,2±1,2) дня. Частота послеоперационных осложнений после выполнения лапароскопической аппендэктомии меньше, чем после открытой операции, — соответственно 3,5 и 6,1 %.

Ключевые слова: острый аппендицит, открытая аппендэктомия, лапароскопическая аппендэктомия.

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The **aim** of the study is improvement of treatment results of patients with acute appendicitis by application of laparoscopic technique in diagnosis and treatment of the disease.

The laparoscopic diagnosis of acute appendicitis allows to avoid “unnecessary” appendectomy inevitable in traditional clinical and laboratory diagnosis. Performance of laparoscopic appendectomies for acute appendicitis is possible in 95.9% of patients. Intracorporal laparoscopic appendectomy was performed in 704 patients. We withdrew patients from the study if conversion to open appendectomy was necessary (28 patients — 4.0%). The appendix stump closure method was assigned in accordance with appendix base inflammatory changes. The patients were divided into 4 groups according to stump securing method. The appendix stump was controlled by using two or three titanic clips in 356 (52.6%) patients, two separate ligatures — in 252 (37.3%) patients, using a linear stapler in 56 (8.3%), and immersion into the ceacum cupola by a purse-string suture was performed in 12 (1.8%) patients. Operation time and complications were analyzed.

Duration of laparoscopic appendectomy — (53.4±7.6) min does not differ from open surgery — (49.2±8.7) min. Duration of in-hospital treatment after laparoscopic appendectomy — (3.4±0.9) days is shorter than after open surgery — (6.2±1.2) days. The rate of postoperative complications after laparoscopic appendectomy is lower than those after traditional open surgery — 3.5 and 6.1% accordingly.

Key words: acute appendicitis, open appendectomy, laparoscopic appendectomy.

Importance of the study

Acute appendicitis (AA) is the most common acute surgical disease of the abdominal organs. Patients with suspected AA make up to 50% of all patients hospitalized in emergency to general surgical in-patient departments. In Ukraine the AA morbidity rate is on average 4.3–5.4 per 1000 population [1; 4].

The disease hazard is caused by complications, the rate of which is from 33 to 43% in Russia. The complication rate after appendectomy is from 4.2 to 16.2%. These indices reach 32.3% in patients over 50 [1; 2].

Lethal outcome in AA makes from 0.1 до 0.5%. The signifi-

cant task for clinicians is an increase of efficacy of diagnosis as well as clinical approbation of new approaches to treatment of the patients with AA. One of such approaches may be diagnosis and treatment of AA using noninvasive technologies, namely videolaparoscopy [1–4].

The aim of the study is improvement of treatment of patients with AA by using laparoscopic technique.

Materials and Methods

The material of the study is results of treatment of 2,346 patients aged from 16 to 88 hospitalized to the department of urgent surgery of MMCC of SR with the preliminary diagnosis of AA.

311 patients (98 were performed traditional surgery, 213 — were operated with the use of videoendoscopic technique) were diagnosed a firm appendicular infiltrate (30) or a diagnosis of AA was excluded during surgery and other diseases were detected (281). 2.035 patients being performed appendectomy were divided into two groups: the 1st group included 1,092 patients who were performed appendectomy with the use of endovideoappliance; the 2nd group consisted of 943 patients performed appendectomy by the traditional open method. Each group was subdivided into groups of patients depending on morphological signs of the disease — with simple (catarrhal — CA), phlegmonic (PA), gangrenous and perforating appendicitis. Subgroups of patients with gangrenous and perforating appendicitis were combined into a subgroup with gangrenous-perforating appendicitis (GPA).

The selection of patients in the groups studied was homogenous. The groups were comparable by sex, patient's age, severity of the disease course, its duration before hospitalization as well as the criteria used — data of the laboratory and instrumental methods of examination.

Besides generally accepted clinical methods all patients were made purposeful laboratory and instrumental methods of examination, ultrasound investigation of the abdominal cavity, retroperitoneal area and organs of the small pelvis by indication. In diagnostically difficult situations 65 patients were made computer tomography and 10 — magnetic-resonance imaging. On detection of a firm appendicular infiltrate 30 patients were performed irrigoscopy for differentiated diagnosis with other diseases of the large intestine.

All open and endoscopic interventions were performed under general multicomponent anesthesia. To perform endosurgical interventions there were used special sets of equipment and instruments manufactured by "Karl Storz", "Martin", "Aesculap" (Germany), "Circon Acmi", "Ethicon" (the USA), "Endomedium" (Russia), "Contact" (Ukraine).

Laparoscopy was performed by a classical technique under the conditions of carboxiperitoneum. Attention was paid to localization of the appendix, its mobility, elasticity, the state of the appendix mesentery. To evaluate the character of the appendix changes there was determined its rigidity and instrumental palpation was made. Revision of the appendix base and extension of the inflammatory infiltration over the cecum cupula was especially carefully made. According to the laparoscopic revision the corresponding endoscopic diagnosis was made which was compared with clinical data and decision was made to perform surgery. At this stage there was made a final decision as to expediency to perform LAE, determined its kind and stage succession. Extra- and intracorporal technique of LAE was used depending on manifestation of the inflammatory changes in the appendix base area and cecum cupula.

Results and Discussion

The diagnosis was confirmed in 943 (87.3%) of 1,080 patients with preliminary diagnosis of AA operated on by the open method, they were performed VAE (Table 1). The diagnosis of AA was not confirmed in 132 (12.2%) patients, they were diagnosed other diseases (mesadenitis, acute gynecological diseases, acute pancreatitis, etc). Secondary changed appendix was removed in 70 (6.5%) of them. Appendectomy was not performed in 5 (0.5%) patients with diagnosed firm appendicular infiltrate.

1,251 patients were operated on with the use of endovideoappliance, the diagnosis was confirmed in 1,092 (87.0%) patients, and they were performed LAE (Table 1). The diagnosis of AA was excluded in 134 (10.6%) patients according to the results of the diagnostic stage of laparoscopy; the unchanged appendix was removed in 5 cases, which made 0.4%.

Appendectomy was not performed in 25 (2.0%) patients who were diagnosed a firm appendicular infiltrate.

VAE was performed using the McBurney approach. The appendix mesentery was intersected after ligation. The appendix stump was ligated by the catgut

Table 1

Forms of AA and Kinds of Surgical Interventions

Surgery	Amount of observations of AA morphological forms			
	CA	PA	GPA	Total
VAE	345 (36.6%)	453 (48.0%)	145 (15.4%)	943 (100%)
LAE	126 (11.5%)	711 (65.1%)	255 (23.5%)	1,092 (100%)
Including conversion	—	10	25	35
Total	471	1164	400	2035

ligation, and then immersed into the purse-string and Z-like sutures. In presence of gangrenous and perforating appendicitis the wound was closed before the subcutaneous cellular tissue.

Among 1,092 patients operated on for AA with the use of endovideoappliance the intracorporal technique of appendectomy was used in 1,035 (94.8%) patients, extracorporal — in 55 (5.2%). The most important stage of LAE is treatment of the mesentery and appendix base.

There were used different methods (Table 2) to treat the appendix mesentery: clipping of its vessels in 34 (3.1%) patients, ligation — in 81 (7.4%), ultrasound scalpel — in 119 (10.9%), electrocoagulation — in 838 (76.7%), endostapler — in 20 (1.8%).

In application of the intracorporal technique of LAE there were also used different methods to treat the appendix base: clipping — in 522 patients, ligation — in 285, immersion — in 57, dissection of the appendix with the aid of endoscopic stapler — in 138 (Table 3).

Macropreparations were removed from the puncture in the right inguinal area in the container to avoid the contact of the infected macropreparation with tissues of the abdominal wall with preliminary irrigation of the container with antiseptic solution. The application of this method prevents suppuration in the puncture area of the anterior abdominal wall. For this purpose there was devised and patented an original method — a special container for evacuation of the macropreparation (a patent of Ukraine 16016 of 15.02.06). Sanation and drainage of the abdominal cavity during LAE is made more completely than in VAE with the use of McBurney approach.

The method of laparoscopically assisted appendectomy (extracorporal technique of appendectomy) was used in presence of the manifested inflammatory changes in the appendix base and a threat of cutting through the clips or ligatures applied to its base. At the same time there was made a revision of the abdominal cavity and treated the appendix mesentery laparoscopically by one of the mentioned methods (see Table 2). This allows to mobilize the cecum cupola and take out the appendix through the puncture extended up to 2–2.5 cm in the right inguinal area. The appendix base was treated by the immersed method. Laparoscopically assisted appendectomy was performed in 55 (5.2%) patients (a patent of Ukraine 16016 of 15.02.06).

Conversion to the open surgery was made in 35 (3.2%) patients. 16 patients were performed medial laparotomy for GPA complicated by extended purulent peritonitis, 19 were operated by McBurney approach: 10 for GPA complicated by extended purulent peritonitis or formation of the appendicular abscess; 2 — in combination of AA with abscess of Douglas pouch with inflammation of the right uterine appendages involved into the suppurative process; 3 — in considerable infiltrative signs of the cecum; 5 — in impossibility to visualize the appendix due to marked adhesive process in the abdominal cavity after previous open interventions into the abdominal organs.

The postoperative complications in VAE developed in 59 (6.3%) patients (the postoperative adhesive diseases — in 4, intraabdominal bleeding — in 3, intraabdominal abscess — in 5, suppuration of the operative wound — in 47), in LAE there were complications in 35 (3.2%): intraabdominal abscess — in 6, carboximediastinum — in 1, suppuration of the operative wound — in 28. Because of intraabdominal abscesses there were performed relaparoscopies, opening, sanation and drainage of abscesses. Carboximediastinum was manifested by weakness of the cardiac activity, eliminating by itself on the 5th postoperative day. The

Table 2

Methods of Treatment of the Appendix Mesentery During LAE

A method of treatment	Amount of observations of AA morphological forms, pathoanatomical form			
	CA	PA	GPA	Total
Clipping	21	13	0	34
Ligation	39	34	8	81
Electrocoagulation	52	591	160	803
Ultrasound scalpel	14	56	49	119
Endostapler ETS-Flex	—	2	18	20
Total	126	696	235	1057

Table 3

A Method of Treatment of the Appendix Base During LAE (Intracorporal Technique)

A method of treatment	Morphological form of AA			
	CA	PA	GPA	Total
Clipping	76	371	75	522
Ligation	25	183	77	285
Application of the purse-string suture	15	29	13	57
Closure with endostapler ETS–Flex	—	89	49	138
Conversion	—	10	25	35
Total	116	682	239	1,037

patient needed cardiometabolic therapy. Suppuration of the postoperative wounds after laparoscopic appendectomy is treated faster as the size of the wound is considerably smaller. The lethal outcome was 0.1% in both groups. The patients died were 89 and 91 years old with perforating appendicitis. Death occurred on the 3rd and 4th day after surgery due to myocardial infarction and acute kidney failure respectively.

Duration of VAE was (47.4±±8.6) min. LAE duration was (51.2±7.3) min. Thus, the average duration of VAE and LAE did not differ significantly (P>0.05).

The average in-hospital stay after LAE for any form of AA was considerably shorter (on average was 3.1±0.9) than after VAE (6.1±1.3), more significant for CA and PA (2.1 and 2.0 times accordingly, P<0.001). The patients diagnosed with perforating AA were discharged from the hospital 1.5 times faster after LAE than after VAE.

In 133 patients in whom AA was not confirmed during diagnostic laparoscopy only 5 patients had been removed pathomorphologically unchanged appendix which made 0.4%. During open appendectomy the number of removed unchanged appendixes was 6.5% that was reliable evidence of efficacy of the videoendoscopic method. The rate of detection of simple (catarrhal) appendicitis in patients operated on with the use of laparoscopic technique is smaller than in those operated on by the open method — 11.5 and 36.6% accordingly.

Conclusions

1. Videolaparoscopic diagnosis allows to elucidate the diagnosis of acute appendicitis, reveal other diseases of the abdominal organs and avoid unjustifiable appendectomy in 6.5%.

2. Performance of laparoscopic appendectomy for acute appendicitis is possible in 95.9% of patients independent on the anatomical localization of the appendix.

3. Differential approach to selection of the treatment methods of the appendix mesentery and base allows to decrease the complication rate after laparoscopic appendectomy 1.7 times compared with appendectomy by the traditional approach.

4. The same duration of the operation and considerably shorter in-hospital stay after videolaparoscopic appendectomy (3.1±0.9) in comparison with traditional surgery (6.1±1.3) allows to consider laparoscopic appendectomy as a method of choice in treatment of acute appendicitis.

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