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LAPAROSCOPY IN DIAGNOSTICS AND TREATMENT OF EMERGENCY DISEASES OF THE ABDOMINAL ORGANS (Literature review)

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Summary: Currently, due to the development of surgical technologies, one of the main tasks in surgery is minimizing surgical trauma and the subsequent reduction in the number of postoperative complications and mortality, as well as the length of hospital treatment of patients while maintaining the quality of surgical care. It is possible to achieve this goal in abdominal surgery with the widespread and widespread introduction of endosurgical technologies into everyday practice. The patient's desire to experience as little suffering as possible contributed to the development of minimally invasive methods, which include endovideosurgery.

Key words: Acute abdomen, Diagnostic laparoscopy.

Relevance: In the development of medicine, there is an important trend towards reducing the morbidity of various methods of diagnosis and treatment of many diseases. Today's requirements in surgery are not only to perform high-tech operations, but also to achieve a high level of rehabilitation after these interventions. Despite the availability of modern clinical laboratory, X-ray, CT, SCT, MRI and ultrasound diagnostics, issues of differential diagnosis of acute surgical diseases remain complex. This is obvious when abdominal symptoms are erased or there is a pronounced polarity of symptoms of the disease. Improved diagnosis and treatment became possible thanks to the rapid development of laparoscopic technologies, which back in the sixties of the 20th century were strictly prohibited “for acute abdomen” [11, 26, 28, 29]. The widespread use of laparoscopy for major urgent diseases of the abdominal organs makes it possible to make a correct diagnosis in an extremely short time and with a high degree of reliability, outline treatment tactics, reduce the percentage of unnecessary laparotomies, and eliminate the possibility of postoperative wound complications and hernias [27,49,56].

Laparoscopy is currently the method of choice for the treatment of various surgical pathologies, as it contributes to less trauma, shorter rehabilitation periods, and quicker recovery.Improvements in laparoscopic technology are helping to expand the indications for choosing this particular surgical approach. Diagnostic laparoscopy is widely used for differential diagnosis of acute surgical pathology[4,37,38, 45, 77].

Today, laparoscopic techniques are used for acute appendicitis, perforated ulcers of the stomach and duodenum, acute cholecystitis, strangulated hernias of the anterior

abdominal wall, acute pancreatitis, intestinal obstruction, acute gynecological diseases, as well as in patients with abdominal trauma [6,8,9, 12,13,16,17,23,31.32, 41, 43]. Unlike laparoscopic cholecystectomy, appendectomy using laparoscopic techniques has not yet become the "gold standard" in the treatment of acute appendicitis. The main reason for this, apparently, is the disagreement that has persisted for many years both in determining the indications and contraindications for this operation, and in views regarding all stages of laparoscopic appendectomy (LAE) [15,29,33,47]. For perforated duodenal ulcers, a frequently used operation is suturing. The operation itself is not pathogenetic in nature and causes frequent relapses. Advances in modern pharmacotherapy for peptic ulcer disease allow us to take a fresh look at this method of surgery, especially in the laparoscopic version [34,50,54,61,69].

The use of the laparoscopic method in emergency abdominal surgery helps to improve the quality of diagnosis and treatment, reduce the number of postoperative complications and mortality, and also reduce the time of treatment for patients. Despite a wide arsenal of non-invasive research methods, the diagnosis of acute surgical diseases of the abdominal organs in some cases is very difficult [42,57,58,60]. In this situation, the use of laparoscopy allows for a timely diagnosis and determination of surgical tactics [62,64,67]. The particular value of the method lies in the possibility of transition from diagnostic manipulations to therapeutic ones. Performing surgical interventions using a laparoscopic approach allows one to achieve a number of important advantages compared to the traditional laparotomic approach. Among the most significant, it should be noted: low trauma, precision in identifying anatomical structures, high-quality visual control of all stages of the operation, reduction in postoperative pain and intestinal paresis. In addition, it is important to reduce the number of wound postoperative complications and the incidence of peritoneal adhesive disease, reduce the length of hospital stay, as well as a good cosmetic result [10,11,30,70,72,74].

Laparoscopic surgery originates from endoscopy - a method of examining the cavities of the human body, the founder of which is considered to be the Persian physician Avicenna (Ibn Sina). He created the first instruments for rectoscopy and examination of the uterine cavity [19]. In 1806, the Italian scientist PH. Bozzini was the first to use an endoscope as a light source using a candle to study the lumen of the rectum, uterine cavity and bladder [20], and almost 50 years later in Paris A. Desormeaux presented his model of an endoscope, where the light source was a gas lamp, and the light was reflected using a silver mirror. Endoscopic lighting remained a significant problem until Thomas Edison invented the incandescent light bulb in 1880. This discovery helped Max Nitze and Leiter improve the cystoscope and use the light bulb as a light source. Subsequently, Brenner designed a cystoscope with an additional channel through which fluid could be injected and even a urethral catheter could be inserted. And finally, in 1889, Boisseau de Rocher separated the optical part and the

light source in the cystoscope. From this period, the active introduction and use of endoscopy as a diagnostic method began, and the basis for the development of therapeutic endoscopy appeared [57].In 1901, G. Kelling (Germany), in an experiment on dogs, for the first time examined the abdominal cavity using a cystoscope, after preliminary air insufflation.

The founder of laparoscopic surgery in Russia is a Russian gynecologist from Petrograd, Professor Dmitry Oskarovich Ott, who performed the world's first ventroscopy in 1901. His students - G.N. Serezhnikov and V.P. Jacobson - in 1907, ventroscopy was used to diagnose ectopic pregnancy and genital tuberculosis [58].

In 1910, the Swedish surgeon Hans Christian Jacobeus (N. S. Jakobaeus) began performing laparoscopy on people to diagnose intra-abdominal syphilis, tuberculosis, liver cirrhosis, and malignant tumors. It was G. Jacobeus who introduced the concept of “laparoscopy”.The surgeon successfully dissected adhesions during thoracoscopy for the first time [7].In 1920, Chicago physician Oxdorff invented and introduced a trocar for inserting laparoscopic instruments with an automatic valve to prevent gas loss. An important stage in the subsequent development of laparoscopic surgery was the invention in 1918 by the German surgeon O. Goetze of an automatic needle for performing pneumoperitoneum.In 1924, Richard Zollikofer from Switzerland proposed using carbon dioxide to create pneumoperitoneum, since it eliminates the possibility of intra-abdominal explosions, unlike nitrogen and air, and is quickly adsorbed by the peritoneum.

A significant stage in the development of laparoscopy is associated with the discoveries and achievements of the German gastroenterologist Heinz Kalk, the founder of the German laparoscopic school. In 1928, Kalk developed a technique for laparoscopic puncture biopsy of the liver, and by 1929 he designed a laparoscope with a special lighting system and a viewing angle of 135°, and a trocar with a working channel for the instrument. This invention accelerated the development of therapeutic laparoscopy [8]. In the period from 1923 to 1962, H. Kalk and his students developed and modified equipment and research methods, the basics of which are currently in use. The first laparoscopic manipulations were mostly carried out without the preliminary creation of an “air cushion”. Therefore, damage to the intestine and large vessels was a major problem until the advent of the safety needle and syringe for gas delivery.

The beginning of therapeutic laparoscopy is associated with the name of S. Fervers, who in 1933 performed dissection of adhesions using electrocoagulation; At that time, the electrosurgical knife and cauterizing instrument, proposed in 1926 by the American physician W. Bovi, were already widely used.Dissection of adhesions in the abdominal cavity using a urethral cystoscope was first performed by C. Fervers in 1933. He described a rare complication - a gas explosion in the abdominal cavity at the time of cauterization of adhesions [10].In 1936, Swiss obstetrician-gynecologist P. E. Boesch

performed the first laparoscopic sterilization of a woman in history.In 1938, the Hungarian surgeon Janos Veress created a version of the needle with a spring, which has survived almost unchanged to this day. The Veress needle was originally designed to create pneumothorax. Subsequently, it began to be used for gas insufflation into the abdominal cavity, which reduced the amount of damage to the intestines and large vessels [9]. One of the key problems in the development of laparoscopy was the lack of reliable and effective methods for stopping bleeding. In 1941, FH Power and AC Barnes [11] introduced high-frequency electric current for hemostasis and this was a powerful impetus for the development of operative laparoscopy given the introduction of electrocoagulation techniques: monopolar (Powers and Barnes, 1941) and bipolar (Rioux and Clouter, 1974) coagulation [eleven]. Important events in the history of laparoscopy were the use (H. Kalk, WY Lee, Royer, FJ Rosenbaum) of laparoscopic cholecystocholangiography and cholangiography [4, 11]. For the first time, puncture of the gallbladder through its wall in the fundus was proposed by WYLee in 1942. Subsequently, this method was used by many authors, but was accompanied by a significant number of complications caused by leakage of bile through the puncture hole. In 1955, FJ Rosenbaum began performing gallbladder punctures under laparoscope control through the liver parenchyma, which dramatically reduced the number of complications. However, the above authors used gallbladder puncture only for diagnostic purposes, filling it with contrast agents [5]. Between 1930 and 1970 The further development of diagnostic and operative laparoscopy is associated with such scientists as: A.M. Aminev, U.A. Aripov. V.V. Vakhidov. G.A.Orlov, A.S. Loginov, G.I. Lukomskoy, Yu.V. Berezov. The further development of laparoscopy was steadily associated with the improvement of laparoscopic equipment. In 1954, the English optical physicist Hopkins developed a device capable of transmitting images through flexible glass fiber. In 1964, Karl Storz created the first extracorporeal light source with light transmission to the laparoscope using fiber optics.

Laparoscopy was used as a diagnostic method until the 60s, and only in the 60-70s did laparoscopy become widely used in surgery. Dynamic laparoscopy, laparoscopic drainage of the abdominal cavity, various types of organostomies (cholecysto-, gastro-, colonostomy, etc.) have become widely used in clinical practice for the treatment of acute surgical and gynecological diseases, but they have become especially important in the treatment of acute cholecystitis and obstructive jaundice [18,21,36,39,46,77]. The most common indication for laparoscopic cholecystostomy is the failure of conservative therapy for acute obstructive cholecystitis and obstructive jaundice in patients with high surgical risk. [3.63,65,71,75,78,80]. Peritonitis was a contraindication to the use of laparoscopic cholecystostomy in these patients. The use of laparoscopic sanitation decompression of the gallbladder in combination with conservative therapy was effective in 80-95% of patients, which allowed the authors to reduce postoperative

mortality in patients with increased surgical risk to 1.6-5%.The subsequent development of surgical (therapeutic) laparoscopy is associated with the nameoutstandingGerman surgeon, gynecologist and engineer.from Kiel K.(K. Semm).In the school he created, the technique of most laparoscopic interventions on the pelvic organs was developed (adhesiolysis, neosalpingostomy, oophorectomy, ovariocystectomy, etc.), and a huge number of laparoscopic instruments and devices were invented that are currently used in laparoscopic surgery [36].Many new instruments (endoscopic scissors with electrocoagulation, endoscopic needle holders, atraumatic clamps, tissue morcelators) were created and tested at the K. Zemm clinic. In 1975, K. Semm published the "Atlas of Gynecological Laparoscopy and Hysteroscopy," and in 1983 he performed laparoscopic appendectomy for the first time.The author used a laparoscope with lateral optics to visualize organs and structures in the pelvic cavity, developed a device for irrigation and aspiration of fluid to maintain the cleanliness of the surgical field, proposed using a self-tightening Roeder loop for ligation of vessels and other structures, as well as a "pusher" for lowering suture node into the abdominal cavity. K. Semm was the developer of a clip applicator for applying titanium clips to vessels, improved the methods of tying intra- and extracorporeal knots, and developed a set of needle holders. Most of the instruments that are currently used by all laparoscopic surgeons (scissors with a hook, microscissors, cone-shaped trocars, atraumatic forceps, vacuum uterine mobilizer) were invented and tested by him and his colleagues. Scientists have developed a pelvic simulator for training surgeons in the technique of operative laparoscopy.Until 1988, more than 14,000 laparoscopic operations were performed in his clinic, and the rate of surgical complications did not exceed 0.3%.With his achievements, K. Semm clearly demonstrated that laparoscopic surgery is safe, low-traumatic and cost-effective [14]. In fact, the work of K. Semm began a new era of endosurgery.

In 1971, Hasson, trying to secure the technique, developed a trocar with a blunt stylet, which is inserted under visual control directly into the abdominal cavity through a minilaparotomy opening. He called his technique open laparoscopy and today it is often called the Hasson technique [3].Numerous instruments, as well as methods of operations, invented and proposed by this outstanding scientist and inventor in the 70-80s of the last century, are still used in our time. It was he who created the automatic insufflator, which allows you to automatically adjust intraperitoneal pressure and the rate of gas introduction into the abdominal cavity. For ligation of vessels and other tubular structures, he proposed the use of a Rader loop, designed and introduced into clinical practice a clipper, with the help of which titanium clips are applied to vessels and bile ducts.

Advances in laparoscopy have led to the emergence of a completely new direction in surgery - laparoscopic surgery. The term "laparoscopic surgery" was first proposed

by Cohen in 1970. One of the key moments in the development of operative laparoscopy was the development and implementation of video equipment into practice. Yuzpe first used a television camera for laparoscopic surgery in 1977, but at that time the video equipment was too bulky, which limited its use. Only in the mid-80s, with the development of microprocessor technology, miniature video cameras appeared, which opened the way for video laparoscopic surgery. The history of video laparoscopic surgery begins in the late 80s, when a new operation, laparoscopic cholecystectomy, was introduced into clinical practice. The world's first LCE was performed by E. Muhe in 1985, which did not use video equipment [17]. Over the next two years, he performed 92 LCEs. This event was preceded by LCE, which was performed on animals by Frimbergerom, Filipi, Mall and Roosma.

A revolution in endosurgery occurred in 1986, when a high-resolution color video camera was invented. It became possible to transmit images from the eyepiece of a laparoscope to a monitor screen, which served as the beginning of video endoscopic surgery. This discovery made it possible to perform complex operations with the active participation of assistant surgeons and make collegial decisions during the operation. The video system magnifies the image several tens of times while maintaining clarity and color reproduction, which allows the surgeon to perform more precise actions and makes it possible to document diagnostic and therapeutic procedures, as well as use the material for training young specialists. Advances in imaging technology were a decisive factor in the development of endosurgery, and the obvious advantages of operative laparoscopy and thoracoscopy led to surgeons increasingly using this method in the late 1980s. By the beginning of the 90s, laparoscopic technology became competitive with traditional (open) surgery and was actively introduced in various areas of medicine, and some interventions even acquired the status of “gold standard”. History owes the development of laparoscopic surgery on the biliary tract to two surgeons: Erich Muhe and Philip Mouret. P. Mouret was the first in the world to perform laparoscopic cholecystectomy in 1987. It was this event that was later called the “Second French Revolution” [15]. Over the next two years, LCE, through the efforts of Mouret, Dubois, McKernan, Perrissat, Saye, Reddick, Olsen, and others, is widely distributed in clinics in Europe and the USA [19, 20, 21]. Following the use of LCE for chronic calculous cholecystitis, as experience accumulated, it became the method of choice for complicated forms of cholelithiasis, which prompted surgeons to develop and implement laparoscopic versions of traditional diagnostic methods and surgical aids: intraoperative cholangiography and choledochoscopy, lithotripsy, choledocholithotomy and even the application of biliodigestive anastomoses. Since the beginning of the 90s, laparoscopic surgery began to take away from laparotomic surgery a significant number of classical interventions, in some of them having now acquired the status of the “gold standard”. Laparoscopic operations on the extrahepatic bile ducts, esophagus, colon,

pancreas, spleen, gastric and duodenal ulcers, hernias of the anterior abdominal wall and hiatus, reflux esophagitis and other pathologies began to be developed and introduced into widespread clinical practice [22 , 23, 24, 25, 26, 27].

As experience accumulated, the indications for laparoscopic surgical interventions expanded. Following laparoscopic cholecystectomy, the clinic mastered laparoscopic vagotomy for duodenal ulcers, laparoscopic interventions for liver and pancreatic cysts, acute pancreatitis, laparoscopic splenectomy, video-assisted operations on the colon and rectum. [28,35,40,48,52,58, 63,65,71,75].

However, at present, there are controversial opinions about the indications and contraindications for laparoscopy for acute diseases of the abdominal organs.This circumstance requires the development of clear recommendations for the use of laparoscopic technologies in emergency surgery.Thus, standardization of the use of diagnostic and therapeutic laparoscopy becomes one of the priorities of modern surgery.

Conclusion: Therefore, research aimed at improving the results of surgical treatment of patients with acute surgical diseases of the abdominal organs, by improving diagnostic and therapeutic laparoscopy, is relevant for solving the above problems and improving the results of surgical treatment of patients with acute surgical diseases.

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