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Research Article

MINIMALLY INVASIVE TECHNOLOGIES IN SURGERY

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ABSTRACT

This article is dedicated to minimally invasive technologies in surgery.

KEYWORDS

Operative endoscopy, papillotomy and stone removal, ultrasound, optical equipment, insufflator, laparoscopic operations.

INTRODUCTION

At present, it is difficult to imagine a full-fledged diagnosis of diseases of internal organs without the use of high-tech methods of instrumental research, such as endoscopy, ultrasound, computed and magnetic resonance imaging, and angiography.

With their help, it is possible to carry out not only various diagnostic procedures, but also minimally invasive therapeutic measures without opening the chest or abdominal cavity. In terms of the effectiveness of the therapeutic effect, these interventions are in no way inferior to traditional ("open") surgical interventions, and some of them simply cannot be performed by "open" surgery. This new direction is called minimally invasive surgery. Minimally invasive surgical interventions currently continue to develop intensively, improve and be introduced into clinical practice.

With the introduction of operative endoscopy, many endoscopic operations have almost completely replaced traditional surgical interventions. These

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include the removal of foreign bodies, small benign and malignant tumors from the bronchi, esophagus, stomach, colon, papillotomy and removal of stones from the common bile duct in case of cholelithiasis, the installation of endoprostheses (stents) in case of extended strictures of the common bile duct, straightening of the volvulus of the sigmoid colon in acute intestinal obstruction.

In recent years, minimally invasive surgery has been developing in two main areas - video endoscopic surgery and interventional radiology - surgical interventions under the control of computed tomography and angiography. Currently, instead of computed tomography, in most cases, ultrasound is used, which is cheaper, eliminates radiation exposure and can be reused in the treatment process.

Endoscopic surgery is a technologically dependent direction, since the clinical application of the method is directly related to the equipment of the operating room, the use of special miniature surgical instruments.

Equipment. The principal set of equipment and instruments required to perform any video-laparoscopic operation can be divided into 3 main groups.

1. Optical equipment. This set includes a 10 mm laparoscope, a miniature video camera attached to it, a light source (similar to that used in routine diagnostic endoscopy) attached to the laparoscope, one or two video monitors, to which the image of the surgical field is transmitted using a video camera. All surgical manipulations are performed by the operator and his assistants, focusing on the screen image on the monitors. In addition, a video recorder is usually used to record from the monitor the progress of the entire operation.
2. Equipment for providing access to the abdominal cavity. It includes an insufflator of gas into the abdominal cavity, attached to a gas cylinder, and trocars of various diameters through which instruments are introduced. Pneumoperitoneum is applied using a special atraumatic needle (Veresh needle). The insufflator provides automatic gas supply to the abdominal cavity depending on the intra-abdominal pressure. If it exceeds a certain value, the introduction of gas is stopped.
3. After applying pneumoperitoneum, for which carbon dioxide is used, a laparoscope is inserted into the abdominal cavity and the abdominal organs are examined. Only after that, under the control of vision, trocars are inserted. There is a special ball valve in the lumen of the trocar, which allows various instruments to be freely inserted through its lumen, but prevents gas from escaping from the abdominal cavity
4. A set of laparoscopic surgical instruments. It usually includes miniature clamps, a dissector, a

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hook for dissecting and coagulating tissues, scissors, atraumatic needles and a needle holder, a tool for applying metal clips to blood vessels, endoscopic staplers, a plastic bag for placing a removed organ in it, and an electric suction tip. Depending on the type of operation, the number of instruments in the set can be expanded or, conversely, reduced.

Anesthesia. Laparoscopic operations are performed under intubation anesthesia with the use of muscle relaxants. General anesthesia, unlike other methods of anesthesia (local, epidural), allows you to fully control adequate pulmonary ventilation, which is especially important in conditions of absorption of carbon dioxide into the blood from the abdominal cavity and high standing of the diaphragm, respiratory excursions of which are limited In malignant neoplasms of the pancreas and liver, the most complex laparoscopic interventions are performed, at the same time, with concomitant compression of the ducts by the tumor, stents are installed, which makes it possible to save the patient from the painful manifestations of obstructive jaundice and malignant neoplasms. Without opening the abdominal cavity, only through a skin puncture, surgeons perform cryodestruction of a liver tumor, which was completely impossible before.

Laparoscopically, it is possible to remove the stomach and the part of the intestine affected by cancer.

For women, not only the cosmetic result after a gynecological operation is important, but also the preservation of functional reproductive capabilities, which is fully ensured by minimally invasive access. Minimally invasive surgical technology for gynecological pathology is widely practiced, surgeons perform manipulations to remove myomatous nodes through the vagina and from the uterine cavity.

In addition to laparoscopic surgery, an increasing number of other minimally invasive operations, video endoscopic interventions or minimally invasive surgical interventions in which surgeons use alternative approaches to internal organs, can be grouped under one term - minimally invasive surgery. This term best reflects the essence of the listed surgical interventions.

Taking into account the interests of patients (that is, minimizing the trauma of the operation) and under the influence of various socio-economic factors (the requirement to reduce the length of patients' stay in the hospital and return them to normal life and work as soon as possible), progress in modern surgery and modern technologies have given rise to a new era in surgery - the era of minimally invasive surgery.

Methods for identifying the stages of tumors, modern diagnostic methods, surgical techniques, including the performance of regenerative operations, due to which the impact on the patient, both mental, psychological,

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and biochemical, has radically changed modern surgery.

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