MINISTRY OF HEALTH OF THE REPUBLIC OF UZBEKISTAN

TASHKENT MEDICAL ACADEMY

EFFICIENCY OF INTERMUSCULAR MINIMAL APPROACH IN HEPATOBILIARY SURGERY

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monograph

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CONTENTS

LIST OF ABBREVIATIONS

WD - wound depth

WL - wound length

GSD - gallstone disease

GB - gallbladder

BD - bile ducts

WDI - wound depth index

LCE - laparoscopic cholecystectomy

CBD - common bile duct

AC - acute cholecystitis

POVH - postoperative ventral hernia

TCE - traditional cholecystectomy

AISA - angle of inclination of the axis of surgical action

SAA - surgical action angle

SA - surgical approach

CCY - cholecytectomy

INTRODUCTION

The number of patients with cholelithiasis and its complications is progressively growing: 10–15% of the world's population suffer from this pathology, increasing every 10 years by an average of 2 times, and now cholecystectomy is becoming dominant in elective and emergency abdominal surgery [49, 70, 168, 169].

According to the Republican Information and Analytical Center of the Ministry of Health of the Republic of Uzbekistan in 2003, 7577 cholecystectomies were performed in Uzbekistan. Of these, 3781 cases were for acute cholecystitis (mortality -1.35%), and chronic 3796 (mortality - 0.42%) [135].

The introduction of new sparing methods (laparoscopic cholecystectomy, minimally invasive surgeries using a mini-assistant device (Prudkov 1992), no doubt, was a huge revolutionary shift in solving problems in the pathology of the gallbladder and biliary tract.

However, the disadvantage of these interventions is the high cost, complexity of equipment, the need for special tools and skills, complications, a number of contraindications and often conversions [41, 179, 252, 137].

Until now, open interventions are widely used in urgent surgery for biliary tract pathology. Of the many proposed incisions, sometimes of historical interest, two are mainly used: a median laparotomy and one of the variants of the subcostal oblique incision. The use of them, especially the median one, was justified and lobbied by us until the 80s by the need to revise the abdominal organs, the hepatopancreatoduodenal zone, conduct simultaneous surgeries, and possibly expand access if necessary.

However, these methods have certain disadvantages, among which the main ones are:

1. Significant injury to the structures of the anterior abdominal wall, a large number of early and late wound complications (eventrations, ventral hernias).
2. A long period of postoperative rehabilitation and disability.
3. Significant cosmetic defect.

4. Decreased quality of life.
5. Adhesive disease of the abdominal cavity [56].

The evolution of mini-approaches or small incisions dates back to 1976. P. Linde et al., [215], shared their experience of cholecystectomy, with preservation of the rectus abdominis muscle.

The best immediate and long-term results of minilaparotomy are reported by F. Dubois et al., 1982 - 1500 cholecystectomy, from a subcostal incision 3-6 cm long [194].

In Russia Zemskov V.S. and M.E. Shor - Chudnovsky (1988) [45] published an article on mini-approach in the right hypochondrium without transection of the rectus abdominis muscle, at a time when a number of authors (L.I. Nechay and et al.., O.B. Milonov and A.A. Mavchun 1990), [87, 88, 79], called the attempt to perform cholecystectomy from small incisions “harmful”.

Minilaparotomic cholecystectomy is as effective as the traditional method, safe, and the complication rate does not exceed 0.6% - 1.2%. [159, 186, 187, 191, 226, 230, 252].

A number of Uzbek surgeons report on the use of small median, pararectal, transverse, oblique incisions: Ataliev A.E. (2001), Nishanov F.N. (2002), Alijanov F.B. (2004), Ergashev U.Yu., Prokhorova I.P. Atajanov Zh.Kh. (2007).

Foreign authors (Sarakos T., et al. 2004). [250], having significant experience in laparoscopic, traditional open and minilaparotomic approaches, they believe that the latter are much cheaper and more economical, while not inferior to LCE in all respects.

Objective: to improve the immediate and long-term results of open cholecystectomy by developing and implementing an oblique intermuscular minilaparotomic sparing approach in the right hypochondrium.

To achieve this goal, we set the following **tasks**:

1. To study, on cadaveric material and in the clinic, spatial relationships with various approaches to the gallbladder and biliary tract, in particular, oblique intermuscular sparing mini-approach.

2. Determine the value of ultrasound in identifying the projection on the skin of the place of the smallest occurrence of the neck of the gallbladder, for a rational choice of incision.

3. To carry out a comparative assessment of the immediate and long-term results of an oblique intermuscular minilaparotomic sparing incision with the most common incisions (median, Kocher's incision) in surgery for diseases of the gallbladder and biliary tract in the clinic.

Scientific novelty.

Intermuscular minilaparotomic sparing approach was developed (on cadavers and in the clinic) and put into practice during surgeries on the gallbladder.

The role of US is determined: in identifying the zone of the smallest occurrence of the neck of the gallbladder, the point marked on the skin is the middle of the skin incision.

A comparative assessment of the frequency of intra and postoperative (early and late) complications depending on different approaches was carried out, and the effectiveness of a new intermuscular sparing approach in surgeries on the gallbladder and ducts was shown.

Object and subject of research. The basis of this work is patients with acute (800) and chronic (528) cholecystitis. Patients who were operated on with a median (820) and right-sided Kocher's incision (58) made up the control group, and those operated on with a sparing intermuscular mini-approach (450), developed in the clinic, constituted the main group.

Anatomical parameters of various approaches were studied on 20 cadavers and in 15 patients.

Methods. General clinical, laboratory, ultrasound, topographic - anatomical (morphometric).

Basic provisions for defense. A sparing intermuscular mini-approach in the right hypochondrium was developed and implemented in the clinic, the center of which, according to ultrasound, is located at the point of least occurrence of the gallbladder neck, according to the main anatomical parameters (direction of the axis of the surgical action, depth of the wound, surgical action angle, angle of

inclination of the axis of the surgical action and approach zone), is not inferior, and in some cases even superior to many traditional incisions (median, subcostal Kocher's approach, adrectal).

Carrying out CCY with this approach does not require additional instruments, while the number of intraoperative complications is lower, and the rehabilitation period is shorter, the quality of life improves, and the number of postoperative ventral hernias is significantly reduced.

Scientific and practical significance of the research results. The development and implementation of an oblique intermuscular sparing approach in the right hypochondrium significantly improves the results of treatment of patients with gallbladder pathology:

1. Minimal invasiveness of approach.
2. The time of the surgery is reduced.
3. Economic costs are reduced.
4. The length of stay of patients in the hospital is reduced.
5. Improves the quality of life of the patient.
6. The number of ventral incisional hernias is sharply reduced compared to other approaches.

Implementation of the results: The developed method has been introduced into the practical work of the surgical department of the Medical Unit of the Heads of Tashkent System, Clinical Hospital of Emergency Medical Care, City Clinical Hospital No.1, and is also used in the process of teaching students of the 7th year of the medical faculty, clinical residents and masters of TMA.

Approbation of research. The main provisions of the work were reported at the 3rd Congress of Surgeons named after Pirogov N.I. (Moscow 2001). At the republican scientific and practical seminar with international participation (Tashkent - 2004), 10th - scientific - practical conference within the framework of the International Exhibition (Perm 2004), at the 12th - International Congress of Surgeons of Hepatologists (Russia 2005), at the scientific - practical conference "Topical issues Specialized Surgery" (Tashkent, 2007), at a meeting of the Society of Surgeons (Tashkent, 2009). The materials of work are used in the educational

process with masters and students of the 7th year of medical and medical-pedagogical faculties of TMA.

The approbation of the work was carried out at the department of GP (December 27, 2008). Interdepartmental approbation 9.10.09. at the Department of General Surgery of the Medical and Pedagogical Faculty, Surgical Diseases of the Dental Faculty of the TMA.

Publication of results. 8 works were published on the topic of the monograph: 3 journal articles (1 in foreign press) and 5 theses, rationalization proposal No. 489 dated 10.04.2006, patent for invention No. 03922, dated 10.27.2006).

The structure and scope of the monograph. The monograph is presented on 106 pages of a computer text (Times New Roman) and consists of an introduction, a literature review, 3 chapters of own research, a conclusion, practical recommendations and a references, including 258 sources (172 domestic and CIS countries and 86 foreign authors). The work is illustrated with 21 figures, 18 tables.

Material and research methods. The archival material of the Medical Unit of the Heads of Tashkent System from 1994 - 1999, Clinical Hospital of Emergency Medical Care 1999 - 2001, City Clinical Hospital No. 1 2001 - 2008, who underwent cholecystectomy, with various approaches, patients with ventral postoperative hernias after open cholecystectomy, was studied.

On 20 corpses and 15 patients, morphometric studies of cholecystectomy with various approaches were studied.

Chapter 1

MODERN PROBLEMS OF APPROACH IMPROVEMENT IN THE SURGICAL TREATMENT OF GALLSTONE DISEASE

1.1.1. Traditional access to the gallbladder and biliary tract

For a long period of time, it was believed that the size and localization of the incision of the anterior abdominal wall in abdominal surgery do not affect the invasiveness of the surgery and do not play a significant role during the postoperative period [124]. “Healing begins at the edges of the wound, not at the ends, although the length of the incision also matters” [164]. Pray before the surgery, but remember that God will not help after an incorrectly performed incision - Arthur King, quotes M. Scheine [164]. A priori, it was believed that the severity of the surgery is mainly due to the volume of surgical intervention directly in the abdominal cavity, on its organs and tissues. Surgeons have always made an incision of such a length that it would be possible to carry out a full revision of the abdominal cavity, make an accurate diagnosis and, thus, to some extent compensate for the low level of preoperative examination of patients, since the main part of the diagnostic process fell on the surgery itself [24, 33, 50, 67, 79, 80, 106, 124, 181, 138].

In the postoperative period, this led to long-term rehabilitation, temporary disability, an increase in bed days, a deterioration in the patient's quality of life, and disability [47, 69, 124, 194].

As a result of denervation and violation of tissue trophism, suppuration of wounds often occurred, ending in eventerations and the formation of postoperative ventral hernias [40, 47, 57, 125, 146, 170].

One of the directions in improving the results of surgical treatment of patients with biliary pathology, in particular the gallbladder, is the improvement of a number of technical aspects of surgical approach [19, 22, 27, 28, 37, 43, 82, 106, 144, 148, 162, 163, 168, 183].

The development of surgical approaches to the gallbladder is associated with the development of biliary surgery and originates in 1882, when Langenbuch performed the first cholecystectomy.

Later, a number of authors studied and proposed various approach options: as can be seen in Figures 1–5, Petrovsky B.V. and E.A. Pochechuev [103], divide all incisions used for surgery on the organs of the hepato-pancreatic-duodenal zone into five groups: 1) oblique cross sections, 2) longitudinal sections, 3) oblique-longitudinal sections, 4) cross sections: 5) extended and combined sections.

The rationality of the surgical approach is determined by a combination of a number of properties of the incision of the anterior abdominal wall: the least trauma, the favorable surgical action angle and the smallest deep wound. [6, 129].

According to Shalaev M.I. and et al. [32], of all the existing approaches to the gallbladder and its pathways, the most physiologically simple and least traumatic is the upper median laparotomy, which is performed in the low-vascular area, when it does not cross the muscles and intercostal nerve trunks. However, according to some authors, upper median laparotomy creates insufficient approach to the extrahepatic biliary tract, especially the gallbladder [32].

Alperovich B.I. [4], both in the indications and in the choice of approach to the gallbladder and extrahepatic biliary tract, cites 27 incisions: Air, Askerkhanov, Avrorov, Braitsev, Beeven, Hoffmann, Hagen - Thorno, Holmann - Gerbode, Hans, Gasset, Kocher's, Kera, Courvoisier, Kalinovskaya, Loebker, Langenbuch, Lenander, Lezhar, Mayo-Robson, Kerte, Pribram, Riedel, Rubeyn, Spasokukotsky and Rubayt, Satinsky; Fedorova.

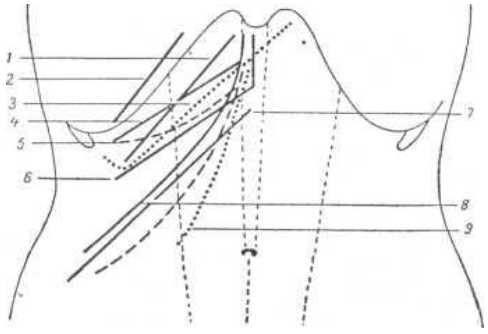


Fig.1. Oblique-cross sections

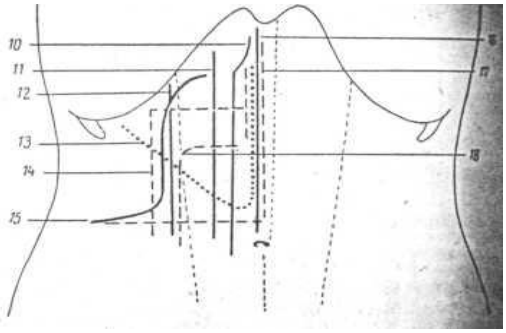
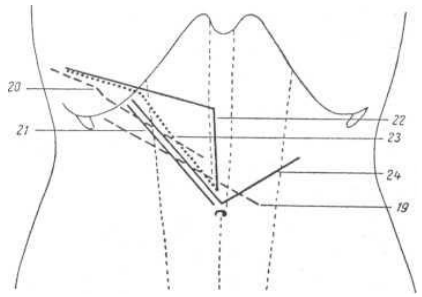


Fig.2. Longitudinal sections

1 - Kocher's; 2 - Pribram; 3. - Sprengel; 4 - Courvasier; 5 - Kera; 6 - S.P. Fedorova; 7 - Shingelton, 8 - V.R. Braitsev; 9 - Mayo.

10 - Riedel; 11 - transrectal Spakukotssky - Laheya, 12 - pararectal Lauson - Tate, 13 - Rio - Branca; 14- Langenbuch; 15 - Beavan; 16 - median Lebker; 17 - Cherni; 18 - Kera.



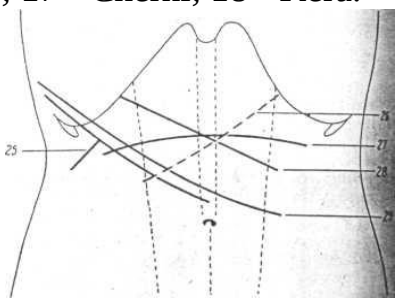


Fig.3. Oblique-longitudinal sections.
19 - Lesena; 20 - Mac - Dermott; 21 - Gosse; 22- Reiferschald; 23- Kirchner; 24 - Kausha..

Fig.4. Cross sections:
25 - Cuneo; 26 - Airl; 27- Sprengel; 28 - Gassel; 29 - F.G.Uglova.

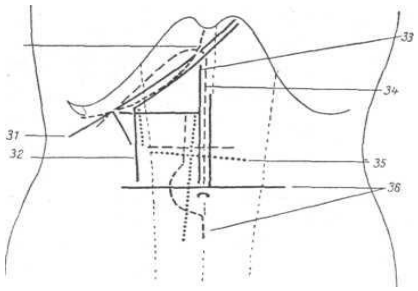


Fig. 5 Extended and combined sections.
30 - extended Kera; 31 - extended Kausha; 32 - extended Kera - Mayo - Robson, 33 - patchwork Legjar. 34 - combined Whipple, 35 - combined Brunshin; 36 - extended G.F. Nikolaev.

A.Y. Sozon Yaroshevich (1954) [129], and his school developed criteria for evaluating surgical approaches for an objective assessment of surgical approaches:

1) The direction of the axis of surgical approach is the line connecting the surgeon's eye with the deepest point of the surgical wound or the most important object of surgical intervention.

2) The angle of inclination of the axis of the surgical action is formed by the axis of the surgical action and the surface of the patient's body within the surgical zone (the plane of the wound aperture). The meaning of this angle is that it determines the angle of view from which the surgeon views the object of the

surgery. The best conditions for the surgery are created if the angle is 90° and the surgeon looks at the object of the surgery directly. Practice shows that when the value of this angle is less than 25°, it is difficult to operate. By the angle of inclination of the axis of the surgical action, it is possible to judge how much the incision corresponds to the location of the object of the surgery is measured, it is with special tools.

3) The surgical action angle is formed by the walls of the cone of the surgical wound. Its significance lies in the fact that it determines the freedom of movement in the wound of the surgeon's fingers and instruments. The larger this angle, the easier it is to operate. At an angle of 90° degrees, the surgery is also easy, as if the organ was lying on the surface. With an angle of 25°, manipulation is carried out uncertainly, and at 10°-14° it is almost impossible without special tools and lighting. The surgical action angle is measured by the Bogdanov N.M. goniometer.

4) Wound depth - the distance between the planes of the upper and lower apertures of the wound. The significance of the wound depth lies in the fact that it determines the ease of action of the surgeon's fingers and instruments. When working with conventional tools, the depth of the wound should not exceed 150 – 200 mm. If the depth of the wound is less than this value, the movements of the surgeon's fingers are free, if more, it is difficult to reach the object of surgical intervention.

5) The accessibility zone is the area of the abdominal cavity or part of the surface of the organ on which confident manipulation is possible. When performing classical surgeries, this indicator will be optimal if the ratio of the values of the upper aperture and the bottom of the wound is approximately 1:1. [129].

When choosing approach for surgical intervention, the surgeon should take care of creating a wide surgical action angle, an accessible inclination of the axis of surgical action and a large accessibility area [10, 14, 57, 117, 163].

According to the research of Kalinovskaya A.M. [51], the location of the gallbladder, and, consequently, the liver gate, can be high or very low.

The high location of the fundus of the gallbladder at the level of – 11 thoracic vertebra (3%), with an extremely low – at the level of 4 lumbar. (13%). However, most often at the level of the 2nd lumbar vertebra (37%), at the level of the 1st lumbar vertebra (37%), at the level of the 3rd lumbar vertebra (9%). In addition to the variation of the vertical location of the gallbladder, its fundus may be close to the midline of the body, or lie against the lateral wall of the abdominal cavity. In 40% of cases, the gallbladder has an oblique arrangement from fundus to top, from right to left, in 30% it is vertical, in 10% it is horizontal, and 15% its axis is bent at an angle.

For an objective comparison of the median and subcostal approaches (47), A.M. Kalinovskaya conducted research and found that for the median incision during gallbladder surgery (guided by the neck of the gallbladder), the depth of the surgical wound ranges from 5 to 11 cm. on average, 6.7 cm. SAA is on average 70 (30 - 95), AISA – thus, it is close to a straight line, falling to 34 and below 10.

When accessing along the edge of the costal arch, the depth of the wound is 5-11 cm (average 6.6 cm), SAA 30 – 95 (average 65). AISA – 10 – 95 (in sred - 65). The best accessibility conditions are provided by the Rio Branco patchwork section, which is of historical interest as more traumatic [5, 47, 129].

According to A.E. Ataliev, 1975 – 1980, and a number of authors [22, 23, 99, 117], in urgent surgery of the biliary tract, median laparotomy has become the most widespread. The use of such approaches was justified and lobbied by the need to audit the abdominal organs, conduct simultaneous surgeries, and possibly expand approach if necessary.

A.A. Shalimov and V.N. Polupan, quoted by G.A. Amanov [5], (1975), indicate that median laparotomy gives a good overview and approach to all organs of the upper abdomen, it is less traumatic, gives the least hemorrhage and is performed in a shorter time. The same opinion is shared by other authors V.K. Shaak, Gose, Poche, F.G. Uglov, I.I. Ishchenko, quoted by Petrovsky B.V., who consider the main motives for the use of median laparotomy to be the least traumatic and technical simplicity, and for the operated - convenience and speed of execution. [23, 103].

A number of authors opposed the median section in the last century: O.A. Yutsevich (1909), G.A.Valyashko (1911), N.M.Volkovich (1926), I.P. Vinogradov (1944), A.A. Toporov (1949) quote Amanov G.A., Kirik V.M. [5, 57], which revealed that the incision along the white line of the abdomen cannot be considered physiological.

Contractions of the oblique and transverse abdominal muscles always greatly stretch the abdominal wound. In addition, tendon stretch fibers intersect perpendicular to the muscle traction line. [5, 57].

A.M. Sokolov (1951), [132], and T.V. Zolotareva (1953), [46], in experiments on dogs, it was found that with pararectal incisions, when more than two intercostal nerves are damaged, sharp degenerative changes occur in the muscles, the anterior – lateral abdominal wall manifested in its atrophy and replacement of fat

S.A.Borovkov (1968), [20], considers the oblique incision made from the costal arch at the level of the VIII intercostal space to the median line of the abdomen, 2-3 cm above the umbilicus, to be the most sparing approach to the extrahepatic bile ducts.

A number of other authors share the same opinion, quoting Geiler L.I., Petrovsky B.V., Pochechuev E.A. [35, 103]. (A.A. Toporov, 1949; T.V. Zolotareva, 1953; A.D. Myasnikov, 1965; Malinovsky N.N. 1976-98, etc.), considering that oblique incisions are more anatomically and physiologically justified incisions. Oblique and oblique-transverse incisions most often coincide with the usual arrangement of vessels and nerves, and with them the muscle bundles are minimally damaged.

According to other authors, oblique incisions parallel to the lower edge of the costal arch (Kocher's, Fedorov incision, etc.) are the most traumatic incisions. These incisions are accompanied by the cutting of all layers of muscles in the upper lateral abdominal wall in directions that do not correspond to the course of their fibers. At the same time, 3 - 4 main trunks are also cut. [5, 23, 57].

G.G. Karavanov (1975), quotes G.A. Amanov, for surgeries on the extrahepatic biliary tract recommends a transverse incision starting from the right anterior axillary line at the level of the X rib to the median line. [5].

The transverse incision was first used in surgical practice back in 1870 by the Russian surgeon P. Chertoroev, quotes A.Yu. Sozon-Yaroshevich, [129].

The authors O.A. Yutsevich in 1909 and O. Sprengel, quote Amanov G.A., Kirik V.M. [5, 57], during surgeries on the stomach, it is recommended to make transverse incisions in the middle of the distance between the xiphoid process and the umbilicus.

V.I. Kolesov and E.V. Kolesov (1962), [58]., B.V. Petrovsky and E.A. Pochechuev, (1969), [103], believe that transverse incisions give wide approach to the subdiaphragmatic space and the upper half of the abdomen. A number of other authors share the same opinion. [5, 23, 35].

According to M.F. Ambrosovsky (1948), [6], and A.M. Dykhno et al.. (1954), transverse incisions also have the advantage that they can be expanded to the right and left without damaging the main trunks of blood vessels and nerves, and this is of great practical importance. At the same time, the rectus muscles, having segmental blood supply and innervation, heal with a good and strong scar after transverse incisions, and hernias occur here in a smaller percentage of cases. [6,164].

Various combined angular incisions, L–shaped, T–shaped and cruciform, are proposed for access to the organs of the upper floor of the abdominal cavity. They create the best conditions for access to these organs. However, these incisions are more traumatic and weaken the function of the abdominal press, quotes G.A. Amanov, 1977). (V.R. Bakhshaliev, 1970; B.S. Rozanov, I.I. Sidorchuk, 1971; [5].

Thus, the greatest traumatism of traditional laparotomy cholecystectomy and related complications (high frequency of wound complications, low mobility of patients after surgery, high percentage of postoperative ventral hernias) require a search in this direction and the development of the gentlest and adequate incisions to prevent these complications.

1.1.2. Laparoscopic cholecystectomy.

A significant achievement in medicine, the optical industry and technology is the development and introduction into clinical practice of modern endoscopic, x-ray television equipment.

Achievements in endoscopic technologies in hepatobiliary surgery have led to the fact that the endoscopic method of treatment has become an alternative to the "open" surgical method and has radically changed the principles of its treatment. In addition, with the help of laparoscopy, diagnostic tasks are solved, as well as problems associated with the treatment of seriously ill patients, especially the elderly, who have contraindications for a major surgery. [176, 177].

As noted by most surgeons-researchers, minimizing the difficulties of laparoscopic ligation, separation and stitching of tissues, which are the "bottleneck" of the entire method, is possible in two ways: 1) by developing fundamentally new special devices; 2) adaptation of orthodox surgical techniques; [9, 148].

Significantly, there was no pain syndrome, a cosmetic effect, a large revision of the abdominal organs, low trauma, short stays in the hospital, contributed to the further development of laparoscopy. [28, 29, 64, 73, 76, 85, 152, 177, 178, 184]. Today we can already say that laparoscopic cholecystectomy has withstood the process of comparative evaluation with the traditional one. [235]. The morbidity and mortality rates are comparable with those in traditional surgeries, and the trauma is certainly less. [38, 75, 76, 91, 131, 145, 151, 204]. In this regard, in recent years, in the surgical treatment of cholelithiasis, there has been a turning point associated with the widespread introduction of laparoscopic techniques. Today, in many leading clinics and centers, gallbladder surgery is performed laparoscopically and is considered the "gold" standard. [33, 38, 64, 152, 168, 174, 189].

A number of authors indicate a lower incidence of pulmonary disorders during and after laparoscopic interventions. [60]. At the same time, other researchers note significant changes in respiratory function during LCE, as a result

of a tense carboxyperitoneum, which may require correction of the parameters of artificial lung ventilation. [13, 109, 122, 216]. A.E. Borisov et al. [141] also revealed signs of pulmonary hypertension at different stages of laparoscopic cholecystectomy in 66.7%. Also, A.J. McMahon et al. [210], based on a randomized trial to assess postoperative pain syndrome, including changes in respiratory function and blood oxygen saturation (67 patients after laparoscopic cholecystectomy and 65 with minilaparotomic approach), noted a less severe pain syndrome with less postoperative reduction in lung function and better blood oxygen saturation in patients with laparoscopic cholecystectomy; supporters of the method consider the latter an alternative in reducing postoperative mortality.

However, despite the clear superiority of this intervention over other methods, many authors point out the disadvantages of the laparoscopic method of surgery. [33, 96, 136, 197, 253]. At the same time, there is no possibility to carry out a palpatory revision of organs and tissues, to separate loose infiltrates with fingers, to put fistulas and sutures on hollow organs with hands. All this limits the possibilities of using laparoscopy in hepatobiliary surgery. [41, 100,137, 179, 252].

At the same time, performing laparoscopic cholecystectomy in acute cholecystitis is associated with certain technical difficulties and an increased risk of damage to important anatomical structures of the hepatoduodenal ligament, the cost of the surgery is 3-10 times higher than the traditional method. In addition, according to most surgeons, laparoscopic cholecystectomy should be undertaken no later than 48-72 hours from the onset of an attack, before the development of infiltrative changes around the gallbladder and hepatoduodenal ligament. [33, 38, 105]. This circumstance forced surgeons to look for other minimally invasive, but less expensive methods of cholecystectomy.

Prof. V.M. Timerbulatov et al. [142], defined the criteria for optimal approaches in endovideosurgical and combined surgeries, studied the state of microcirculation in the peritoneum as an objective indicator of the degree of tissue injury in various surgical approaches. Schematically, the criteria for endosurgical approaches are: 1) the plane of surgical manipulation; 2) the axis of laparoscopic

view; 3) the axis of the surgical action of the tool; 4) surgical action angle; 5) wound depth; 6) accessibility zone.

However, the main working instruments, as a rule, were two, the angle between them was close to 90, the length of the instrument located in the abdominal cavity was half of its total length.

Thus, in the last 10-15 years, in gallstone surgery with the introduction of laparoscopic surgery, there has been a critical rethinking of various aspects of surgical treatment. The high technical equipment required for laparoscopic cholecystectomy made it possible to make the latter a prestigious surgery that has advantages over open cholecystectomy (cosmetics, short duration of treatment, etc.). [2, 3, 50, 63, 66, 180, 217, 218]. At the same time, as M.I. Prudkov, other alternative methods are not sufficiently advertised in the literature - surgeries from a minilaparotomic approach, which do not require a tense pneumoperitoneum and expensive equipment. [256]. According to the authors, who have improved the technique of "open" laparoscopy with the help of special instruments and under visual control, in which the abdominal wall incision does not exceed 5 cm, the "cosmetic effect" of the surgery is no worse than that of laparoscopic cholecystectomy. [110, 115, 256, 258].

So, recently not only Russian, (24, 67, 149, 167) but also our surgeons [29, 120, 126, 160], as well as foreign authors [213, 214, 222, 240], highly appreciate the minilaparotomy approach to perform cholecystectomy, especially in patients with a high surgical risk.

1.1.3. Modern minilaparotomies

The evolution of mini-approaches or small incisions dates back to 1976 (P. Linde et al., [215].), when an article was published about surgeries with preservation of the rectus abdominis muscle, in 1982 F. Dubois et al. [194] report 1500 cholecystectomies performed without any complications from a subcostal incision 3–6 cm long, i.e., by minilaparotomic approach.

In 1988, an article by Zemsky V.S. was published in Russia. and M.E. Shor - Chudnovsky [45], on the use of mini-laporatome subcostal approaches without changing the rectus abdominis muscles - "Some issues of surgery of the extrahepatic bile ducts" article initiated a discussion until 1990, when a number of authors L.I. Nechai et al. [87, 88] called an attempt to perform cholecystectomy from small incisions “harmful”, and Milonov O.B. and Mavchun A.A. [79], accused the authors of imitating the "Western European fashion" i.e. surgery from small incisions. According to A.I. Krakovsky [62], the approach proposed by the authors, with a size of 8–10 cm, is insufficient for cholecystectomy.

However, by the end of the 20th century, a number of authors [159, 185, 187, 191, 226, 230, 252] came to the conclusion that cholecystectomy from a minilaparotomy approach is not inferior in efficiency to the traditional method, because it is safe. the frequency of complications does not exceed 0.6% -1.2%.

From foreign authors already in the 90s of the last century (PelsserE P 1992 Safatlte N), [185, 187, 231, 252], about the best immediate and long-term results of minilaparotomy.), [191, 226], (Nagakawa T. 1993, MeMahon A. J. 1993, Ross S. 1995.). Hungarian scientists led by RozsosI [220, 241, 246] distinguished themselves by perseverance and consistency in teaching the effectiveness of cholecystectomy from minilaparotomic approaches from 1993-1997, having experience of 412 cholecystectomies in 1993, in 1994 607 surgeries with conversions - 0.49%, relaparotomy in 0.49% of patients, mortality - 0.16%, and by 1997 the number of patients with mini-approach reached 1575 cases with a conversion rate of 0.3% (Rozsos I. 2004 Rozsos I., 1996). [186, 220, 241, 246].

Speaking of minilaparotomy, this term should be defined. In most works, including the founders of this method, this is not given. I. Rozsos et al., (1995), [220], who has the largest number of described surgeries (1575), distinguishes several types of laparotomy, depending on the size of the incision: microlaparotomy (skin incision less than 4 cm), which he uses in most surgeries; modern minilaparotomy (incision 4-6 cm long), used mainly for choledocholithiasis or biliary fistulas; classical minilaparotomy (incision 6-8 cm long), and traditional laparotomy (incision 10 cm long).

The main advantage of this technique, according to its supporters, is low trauma and the possibility of early activation of patients, reducing the number of postoperative complications, reducing the length of stay of patients in the hospital and the recovery period, a good cosmetic effect, approaching that of LCE. Moreover, the conversion rate of minilaparotomic approach to laparotomy (from 3.8% to 9.5%) does not exceed that of the laparoscopic technique, although the latter, as a rule, was used in patients with uncomplicated cholecystitis [60, 73, 104, 106, 107, 165, 188].

Twelve years after the negative assessments of mastitis reviewers, mini-approach cholecystectomy has become widespread, including in clinics where its recent opponents work [105]. The accumulated collective experience of hundreds of thousands of surgeries suggests that the method is especially valuable where, due to economic problems, it is impossible to use the laparoscopic technique [192, 223, 237].

Compared to laparoscopic cholecystectomy, minilaparotomic cholecystectomy does not require the creation of a tense pneumoperitoneum. In addition, the cost of equipment is 2-3 orders of magnitude lower than the cost of a standard kit for performing laparoscopic cholecystectomy. The calculation of the quality of life index allows us to draw objective conclusions: about a faster return of patients who underwent minilaparotomy to their usual social and intellectual activities, about the almost complete absence of the influence of negative factors of surgical treatment (pain, dyspepsia, cosmetic defect), about more a high assessment of their health and well-being - all this indicates an increase in the quality of life of operated patients [22, 54, 55, 59, 92].

B.S. Briskin et al. (2005), [22], studied the immediate results of treatment and medical and economic indicators in three groups of patients who underwent traditional cholecystectomy, laparoscopic cholecystectomy and cholecystectomy from minilaparotomic approach. The authors, summing up the costs of surgery, anesthesia, postoperative analgesic therapy, length of stay in the hospital after surgery and the cost of the patient's stay in the hospital, came to the conclusion that

the cost of traditional and laparoscopic cholecystectomy exceeds the cost of minilaparotomic cholecystectomy [64, 92, 173, 176, 177, 234].

Currently, many authors, having a large number of surgeries from minilaparotomic approach, consider the impossibility of a full revision of the abdominal organs as a disadvantage of the method, and if pathological changes in surgical treatment are detected in them, the need to use special tools [44, 71, 72, 86].

Various technical aspects of the minilaparotomy approach, its size and direction, the frequency of switching to traditional laparotomy, and others are discussed in the surgical press. The authors, who have significant experience in surgical interventions from the minilaparotomic approach, consider its dimensions from 3 cm to 7 cm acceptable [3, 81, 124, 192, 210, 227, 229].

In this case, the authors use both pararectal and right subcostal approach; median laparotomy [124, 192, 227].

From the above data, it can be seen that supporters of surgeries on the biliary tract from minilaparotomic approach use incisions of the anterior abdominal wall of various sizes and directions, but the indications for them are most often determined subjectively, which requires further study and objectification. According to O.B. Milonova et al. [79], various technical errors of the surgeon were most often caused by an incorrectly chosen surgical approach, which often leads to unnecessary traumatization of organs and tissues and accidental damage to blood vessels and bile ducts, or other complications.

In the clinic Shulutko A.M. [30], 904 surgeries for cholelithiasis were performed using minilaparotomic approach, on Wednesday, the age was 60.3 + 4.4 years, 36.4% of them had concomitant coronary artery disease, 18.3% had postinfarction cardiosclerosis, 4.1% widespread atherosclerosis in 18.7% - hypertension, in 65.6% - obesity of 2-4 degrees. Four women were operated on in the 2nd - 3rd trimester of pregnancy with a normal delivery. The authors successfully performed combined interventions through minilaparotomy - resection of liver cysts, choledocholithotomy, formed a biliodigestive anastomosis, closed intestinal fistulas, and other surgeries, without fatal outcomes. [30]. In addition, in

112 patients, surgeries from a mini-approach for choledocholithiasis not corrected by the endoscopic method, while in 45.5% of cases, choledocholithotomy was performed with the imposition of choledochoduodenoanastomosis.

From the dissertation work of Boymuradov Sh.E. (2010), it was noted that mini-approaches allowed to reduce the incidence of postoperative complications from 10% - 2.5% and reduce bed-days by 2 times, and in general, minimally invasive surgeries for cholecystectomy reduce the number of postoperative complications from 15% to 6.2%, lethality from 3.4% - 0.9%, number of bed-days from 8-10 b/d to 4-5 b/d. [11].

Beburishvili A.G. et al. (2009), [18], classifies surgical techniques for minimally invasive surgeries: laparoscopic, mini-accessible. The latter are divided into monotechnological and polytechnological. In the author's article [167], since 1993, with the advent of a trend towards minimally invasive surgical interventions in complicated cholecystitis, the optimal timing of surgery, adequate volume and improvement in technique can significantly improve the results of surgical treatment of complicated cholelithiasis.

A number of authors [127, 130] began to use two-stage treatment for cholecystectomy, i.e. first, decompression of the biliary tract, and then the 2nd stage of removal of the gallbladder, thus, they managed to use mini-approaches in complicated diseases of cholelithiasis [257]. Among such scientists: Shalimov A.A. and Kapchak V.M. Dronov A.I. 2001 [162] successfully performed MCE in 167 patients with acute destructive cholecystitis, which accounted for 18.2% of the total number of surgeries for cholelithiasis.

Authors G.V. Duman and M.V. Eckelman (2001) successfully used a mini-approach for biliodigestive anastomoses in patients with obstructive jaundice [39].

M.I. Prudkov [114, 115], and K.I. Titov in 2001 [147], observed the results of the use of mini-laparotomic approach when performing biliary surgeries in patients with cicatricial strictures of the bile ducts.

Studying the literature data, we can safely note the combined use of minimally invasive decompression drainage interventions from a minilaparotomy approach. In patients with a complicated form of cholelithiasis, namely with acute

calculous cholecystitis and choledocholithiasis in elderly and senile patients, prof. Barinov A.P. [15] and his school during 2004-2006 studied 300 patients. Out of 145 patients with complicated cholelithiasis: 43 patients with cholelithiasis complicated by obstructive jaundice, 102 patients with cholelithiasis complicated by acute obstructive or destructive cholecystitis. The majority of patients - 76% suffered from concomitant therapeutic diseases. In the postoperative period, mortality was 0.7%, complications 4.7%.

Thus, it should be noted that surgical interventions from mini-laparotomic approaches for acute calculous cholecystitis and choledocholithiasis in elderly and senile patients are the method of choice, accompanied by a minimal complication rate and are cost-effective [15].

The reasons for access conversion are: a pronounced cicatricial adhesive process in the area of the gallbladder and hepatoduodenal ligament, gallbladder empyema, perivesical inflammatory infiltrate, choledocholithiasis, choledochoduodenal fistula, as well as serious intraoperative complications (bleeding from the cystic artery, extensive trauma to the extrahepatic bile ducts).

Gallbladder empyema, choledochoduodenal fistula, and choledocholithiasis are not always indications for access conversion [106, 162].

Mini-approach conversion is required in 1.5%–12.0% of cases [81, 124, 143, 145, 166, 192].

1.1.4. Assisted minilaparotomy according to M.I. Prudkov

In Russia, the basis of these directions in cholecystectomy was the work of Prudkov D.I. (1968 - 1975), who proposed a method of surgery on abdominal organs with sufficient mobility. Since 1993 Prudkov M.I. and his school developed on cadavers and introduced into the clinic a mini-laparotomic approach for "open" laparoscopy and remote surgery technique, which made it possible to reduce postoperative mortality and complications. However, to perform the surgery by the "open" laparoscopic method, a set of Mini-assistant tools is required, which was developed by the author and his employees. With the help of this basic set, not only cholecystectomy, but surgeries on the ducts and pancreas and some other

organs are feasible [110, 111, 113]. The main advantage of the approach is the large privileges with small dimensions to obtain, which Prudkov and his school use the development of fundamental anatomical and experimental research by Sozon-Yaroshevich, as well as the scheme of surgical approach and criteria for surgical approaches, which provide sufficient conditions for surgeries with endoscopic "open" methods surgery. Considering the methods of performing minilaparotomy by various authors, one can note their diversity: from the use of open laparoscopy (mainly for incisions less than 4 cm), using laparoscopic instruments or modified surgical instruments [112, 114, 239], to the use of various sleeve devices [14, 187, 190, 206].

For open laparoscopy, special instruments are required, including - a short laparoscope mounted on a retractor; retractors with illuminators, retractor and microvideo cameras with monitor output [34, 140, 154, 155, 156].

A critical analysis of the literature data, taking into account the negative aspects of cholecystectomy from the traditional access, as well as experimental studies, allowed in 1993 M.I. Prudkov and et al., to introduce the technique of cholecystectomy from minilaparotomic approach.

This was preceded by attempts by a number of scientists [194, 215, 223], without sufficient technical equipment, to perform cholecystectomy from small incisions (up to 6–8 cm long), which in some cases was a desire to demonstrate their skills, not so much in front of colleagues, but in front of patients. However, a significant number of errors and complications caused by an inadequate revision of the abdominal cavity did not pay off with the seemingly less traumatic surgery [62, 79, 87, 88].

At present, the situation has changed significantly, since with the help of special tools and devices in most patients it is possible to obtain adequate surgical approach to the gallbladder and hepatoduodenal ligament and safely perform cholecystectomy from a laparotomic incision 3–4 cm long. [10, 163]. Even in patients with an exacerbation of the inflammatory process, when ultrasound reveals thickening and bypass of the bladder wall, and modern methods of preoperative diagnostics make it possible to detect and correct pathological changes in the bile

ducts (choledocholithiasis, papillary stenosis) [27, 75, 78, 94, 99, 141, 169, 199, 225], and other organs (polyposis of the stomach, etc.), which was positively evaluated by a number of domestic and foreign surgeons [48, 53, 93, 120, 127, 158, 167, 203].

The same opinion is shared, [V.I. Galyshev, S.D. Zotikov, S.P. Glyantsev], in an article published in the journal Surgery [34], the authors called this surgery "mini-approach cholecystectomy" (MACE). The surgery was performed using a set of standard instruments for surgery on the gallbladder and bile ducts of the «CAH» company (Yekaterinburg). An incision of the abdominal wall was made in the right hypochondrium pararectally or in an oblique direction. After isolation of the cystic duct and cystic artery, they were clipped or ligated. The gallbladder was removed using a monopolar electro-coagulator of the original design. The meaning of MACE of the surgery in elderly and senile patients is the method of choice, the advantages of the latter are the early activation of patients and the rejection of analgesics, the reduction of postoperative complications (3 times), and mortality.

Recently, not only Russian [18, 27, 28, 32, 43, 102, 153, 168] but also foreign authors [175, 218, 220, 221, 226, 236, 238] highly appreciate the minilaparotomic approach for performing cholecystectomy, our surgeons are of the same opinion [3, 73, 75, 77, 78, 52, 65, 134, 136, 139, 168]. When performing cholecystectomy from a minilaparotomic incision, foreign authors [221] use the Bookwolter circular retractors, especially in patients with high surgical risk.

In Uzbekistan, surgeries from minilaparotomy were performed using a set of surgical instruments "mini-assistant" developed by M.I. Prudkov. According to the dissertation of Khuzhabaev S.T. 2008 [161], to perform MLCE in 217 patients with chronic calculous cholecystitis, two variants of minilaparotomy were used, in which the incision length was from 3 to 6 cm: pararectal and oblique subcostal.

Oblique approach in the right hypochondrium was carried out 3–4 cm below the right costal arch and 2–3 cm to the right of the midline at the level of the costal arch angle.

The skin, subcutaneous tissue, and anterior leaf of the sheath of the right rectus abdominis muscle were dissected in layers. Careful hemostasis was

performed along the incision by means of electrosurgical treatment. After that, the fibers of the rectus abdominis muscle were moved apart, and the posterior leaf of the vagina with the peritoneum was opened.

With pararectal approach, the incision was made from the angle of the right costal arch vertically downward, retreating approximately 4–5 cm from the midline of the abdomen, trying to penetrate into the abdominal cavity to the right of the round ligament of the liver, which facilitated further surgical manipulations. To reduce the depth of the wound, the peritoneum was fixed to the skin of the abdomen.

Abdullaev U.U. 2006 [1], the use of minilaparotomic approach in patients with acute calculous cholecystitis in combination with laser therapy allowed to reduce wound complications by 8.6%, reduce the trauma of the surgery and the frequency of early postoperative complications by 17.4% and lethality - from 3.6% to 1.4%.

The search and development of more rational surgical approaches to the gallbladder and biliary tract is impossible without knowledge of the topography of the liver. The great variability in the location of the liver is important, depending on the anatomical constitutional features of the organism, as well as on the changes that occur in connection with the development of the pathological process. All these factors change the topographic and anatomical positions of the liver, which must be taken into account when choosing an approach.

The blood supply, innervation, skeletopy and syntopy of this organ have been sufficiently studied in the literature, but there is little information regarding the location of the gallbladder and biliary tract to nearby organs. No, exact data of the structure depending on body types. In this regard, we decided to study the location of the liver and gallbladder on corpses, and subsequently apply these data in the clinic. To do this, with the help of ultrasound, the location of the incision was determined, which gives the least trauma. As you know, trauma and accessibility have always acted as two warring factors, creating difficulties in choosing a rational approach to the biliary tract and gallbladder. As A.Yu. Sozon-

Yaroshevich rightly notes, in this unity of two opposite factors, approach conditions play a leading role.

There are two main requirements for any surgical approaches: minimal trauma and maximum accessibility to the object of intervention.

In this regard, all the efforts of the surgeon, who builds the surgery plan, should be aimed at solving the first problem with the obligatory provision of the second factor - the least trauma.

1.2. Complications in various surgical approaches for surgical treatment of the biliary tract

1.2.1. Intraoperative and immediate postoperative complications of cholecystectomy

Traditional upper median laparotomy is difficult to tolerate by patients, especially the elderly and senile, it can be equated to thoracotomy, since the volume of postoperative ventilation is reduced by 60% (From the report of Pugaev A.G. at a meeting of the Moscow Society of Surgeons in 2007).

These complications were especially dangerous among elderly patients, since combinations of therapeutic pathology, high surgical risk, as well as simultaneous pathologies lead to high mortality [19, 25, 29, 74, 99, 107, 126, 160].

P.S. Zubeev et al. [133] performed a comparative assessment of the immediate results of surgical treatment of chronic calculous cholecystitis by LCE and cholecystectomy through a mini-approach. LCE, in view of less trauma, contributes to faster rehabilitation of patients, requires a small amount of anesthesia, antibiotic therapy, infusion therapy in the early postoperative period, and provides shorter hospital stays ($P = 0.000001$).

The advantages of the mini-approach are attributed by the authors to a smaller number of intraoperative complications in combination with the possibility of conducting a comprehensive revision of the hepatobiliary system during surgery, believing that mini-approaches in the surgical treatment of chronic calculous cholecystitis are indicated for patients with a aggravated history of

underlying and concomitant diseases. To perform LCE, however, strict selection criteria must be applied [133].

Based on Doppler flowmetry, V.V. Sidorov et al. came to the conclusion that the greatest decrease in microcirculation occurs during laparotomy, which leads to a large tissue injury, with minilaparotomy, the average decrease in microcirculation, and the minimum - with laparoscopy [123].

According to the authors [144, 145], in addition to laparoscopic tools, a surgeon needs tools to perform a mini-approach, which allows in most cases to perform an surgery without abandoning the principles of mini-invasiveness (i.e., if laparoscopic approach fails, switch to mini-laparotomy).

The results of surgeries from mini- approach compared to traditional methods are generally more favorable. The duration of the surgery, intraoperative blood loss and the number of complications do not exceed those for TCE and are usually lower. At the same time, minilaparotomic approach facilitates the course of the immediate postoperative period, significantly reduces the length of the patient's stay in the hospital compared to those with TCE [64, 106].

An important point is that the frequency of intraoperative injuries of the extrahepatic bile ducts in MCE is less than in LCE, and is only 0.2 - 2.5%. The duration of surgery and the incidence of postoperative complications in MCE are also less than after LCE [30, 67, 75, 76, 77, 110, 113, 181, 207, 210, 227].

According to E. Trondsen et al. [211], the traumatism of tissues, the duration of the surgery with TCE took less time than with minimally invasive surgeries.

However, a number of authors [145] argue that TCE takes more time than minimally invasive surgeries ($P<0.01$).

The frequency of complications in cholecystectomy from mini-approach does not exceed 2.7-5.6%, mortality is not more than 0.14-0.7%, and the need for conversion occurs during execution in 0.3-2.9% of cases [31, 111, 157, 206, 209, 224].

Oyogoa S.O et al. (2003); [229], based on randomized trials, did not note significant differences in the duration of the surgery, the terms of hospitalization when using the laparoscopic method and mini-approach.

The degree of dysfunction of vital organs during LCE and in the next few hours after is much less, especially respiratory disorders [121].

However, in LCE, the risk of impaired respiratory function as a result of a tense carboxyperitoneum is almost inevitable, since the pathophysiological effects depend on two points: an increase in intra-abdominal pressure and absorption of carbon dioxide. The last two parameters in patients with cardiovascular and respiratory diseases cause hypercapnia and acidemia, which cannot be corrected without interruption of the carboxyperitoneum, it is necessary to operate with reduced intraperitoneal pressure (8–10 mm Hg), which is not beneficial for surgeons [25, 100 , 196, 197, 198, 210, 212, 253].

According to the literature, we know that for laparoscopy, the optimal pressure when applying carboxyperitoneum is a level of 12-14 mm. rt. st, but during surgery in obese patients with very thick subcutaneous tissue of the anterior abdominal wall, it is necessary to increase the pressure of the carboxyperitoneum, which becomes risky for the patient's life, since the increase in pressure is more than 14 mm. rt. Art., leads to compression of the veins of the abdominal cavity, a decrease in blood flow through the inferior vena cava, and hemodynamic disorders. Changes in mesenteric circulation after LCE up to the development of fatal mesenteric thrombosis up to intestinal infarction [13, 109, 191, 195, 202, 249].

Foreign authors [250], Sarakos T. Antonits P. (2004), conducted studies over 6 years of 1276 patients with cholelithiasis and at the same time LCE - 952 (74.6%), in patients with TCE - 210 (1.65%), minilaparotomic cholecystectomy 114 (8.8%). With LCE, conversion was in 37 patients (3.9%). Complications after LCE and open cholecystectomy were similar to (3.8%), and after minilaparotomic cholecystectomy - (0.8%). Damage to the large bile ducts during the surgery was not observed through the open and minilaparotomic approach.

Shamiyeh A Wayad W - 2004. [248], studied the complications of early and late nature after LCE. Complications resulting from the use of laparoscopic approach, during the formation of approach and problems associated with the implementation of interventions. Imposition of pneumoperitoneum (complication rate 0.2%). Leakage of bile and damage to the bile ducts with a complication rate

at the level (0.2% - 0.8%). One of the specific injuries of the gallbladder during laparoscopy (up to 0.87%).

Studies of the degree of surgical injury, by analyzing changes in homeostasis indicators for injury, have been studied by a number of authors [12, 13, 145, 205, 219, 227, 232, 254]. The hypothalamus, the anterior pituitary gland and the adrenal glands, the so-called stress hormone, are of primary importance in the implementation of such an organism's response to injury. Intraoperative levels of hormones in all methods of cholecystectomy exceed their preoperative values, but the level of decrease in LCE (2.1 - 5.5 times), and MCE (1.3 - 1.8) and TCE (1.1 - 1.8), (145, 76).

Authors Baranov G.A. and Rybachkov V.V. [11], it was found that a large surgical wound causes metabolic shifts and endotoxemia, they found that after LCE the level of medium molecular peptides in the blood was lower by 24.3% (P> 0.05), - 47.5%, methyl ethyl ketone - by 44.5% than after TCE.

An assessment of the level of stress hormones during surgeries on the biliary tract showed that surgeries from a minilaparotomy approach can be classified as minimally invasive in terms of the degree of surgical aggression (161). The level of "stress" hormones is directly proportional to the duration of the surgery - the longer the surgery, the more aggression relative to its average value. Performing surgeries according to the method of M.I. Prudkov, in patients with chronic calculous cholecystitis with an increased surgical risk, it is effective for any category of severity of the surgery, while the complication rate is 6.4% and, as a rule, it is associated with the implementation of "difficult" cholecystectomy, the author states in his work (161). The use of improved MLCE, especially for "difficult" cholecystectomy, can reduce the complication rate to 0.5%.

1.2.2. Late complications after median and subcostal wide approaches

The history of the development of abdominal surgery convincingly confirms the position that incisional hernia is an inevitable consequence of surgery [150, 228].

As a result of denervation and violation of tissue trophism, complications associated with suppuration, ligature fistulas, ventral hernias (15.2%), eventrations, cosmetic defects (rough and uneven scars), adhesive disease of the abdominal cavity, high mortality (2.1%). [40, 47, 95, 146, 170].

The problem of treatment of postoperative and recurrent ventral hernias arose simultaneously with the development of abdominal surgery and remains one of the most acute in abdominal surgery. The number of patients with postoperative and recurrent ventral hernias is quite large. According to different authors, 12 to 33% of all laparotomies end in the formation of incisional hernias [128, 171, 172, 182, 193].

In the United States, up to 100,000 surgeries are performed annually for postoperative hernia of the anterior abdominal wall. [40]. Postoperative ventral hernias are a common disease, accounting for 22–26% of external abdominal wall hernias [8, 118, 119]. Patients with postoperative ventral hernias are a constant contingent of surgical hospitals, and over the past 25 years, with an increase in the number of surgical interventions on the abdominal organs, postoperative ventral hernias have increased by 9 times or more. [69, 26].

Back in 1975, V.N. Yanov [171, 172], analyzed the occurrence of upper-lateral ventral postoperative hernias after surgeries on the liver and biliary tract, performed by subcostal laparotomy, which occupied the first place among ventral hernias, both in frequency of occurrence and in the number of relapses, and relapses of these hernias are observed quite often. According to A.A. Barkov out of 65 operated on with upper-lateral postoperative hernias, recurrences occurred in 32%, according to B.R. Bakhshaliev out of 9 patients - in 6, according to V.M. Ostrovsky out of 5 - in 3, according to V.A. Kozlov out of 8 - in 6, according to

N.Z. Manakov - in all operated patients. In 1996, Martin described a 53-year-old patient in whom hernia recurred after cholecystectomy 7 times [171, 172].

The improvement of surgical methods for the prevention and treatment of wound infection, the use of new types of suture materials, did not affect the frequency of postoperative purulent-inflammatory (from 7 to 38.5%) complications from laparotomic wounds [47], which contribute to the occurrence of eventerations, ligature fistulas, postoperative ventral hernias, accounting for up to 20–26% of all external abdominal hernias, ranking second in frequency after inguinal hernias [17, 21, 42, 47, 116].

About 50 - 60% of patients are people of working age. The problem of treatment, the quality of life of these patients seems to be an urgent socio-economic task [170].

The linea alba at the level of the umbilicus and above the umbilicus is the membranous part of the anterior abdominal wall, its thinnest and potentially weakest point [61].

Long-term complications of laparoscopic cholecystectomy include postoperative hernias of the abdominal wall, which are usually localized in the paraumbilical region and are observed in 0.85–1.2% of operated patients [16, 101].

According to the author Moshkov T.A. – 2007 [84] out of 75 patients with giant ventral hernias, giant hernias more often developed after open cholecystectomy (34 patients), after radical surgery for hernias (26) and after gynecological surgeries (12 patients). Postoperative hernias of gigantic size, according to the author, were more often formed after upper median laparotomies.

In addition, postoperative recurrent ventral hernias are a complex complication, the treatment of which is a serious problem in any hospital. A large hernia should be considered a separate complex disease, with a violation of the functions of not only the respiratory system, but also the skin, muscles, internal organs, which are the more serious, the larger the hernia. [36, 40, 41, 146, 251].

A relatively high percentage of eventrations and postoperative hernias in median incisions contributed to the development of options for other incisions: such as paramedial, transrectal, pararectal, transverse, angular, combined, but,

unfortunately, these approaches are not without drawbacks and many of them have long been abandoned.

In patients with postoperative ventral hernias (POVH), the anterior abdominal wall gradually loses its anatomical, morphological and functional structure. [108]. Muscles due to the development of POVH lose one of the points of support. A change in position leads to a violation of the functional state with a gradual decrease in contractility and the development of contracture. Muscle tissue is replaced by connective and adipose tissue, and there is a decrease in blood flow. Gradually, the processes of atrophy and sclerosis develop. The most pronounced changes in the muscular-aponeurotic structure are observed in the area of the hernial defect, spreading to the entire anterior abdominal wall in large and giant hernias. The fascial framework in the area of the gate is replaced by scar tissue, losing strength and the ability to secure fusion [116, 201]. When comparing morphological data with intraoperative tensometry, a correlation was found between the severity of dystrophic changes in the abdominal wall and the degree of its rigidity [208, 233]. Tissue tension exacerbates microcirculation disorders, dystrophic processes and worsens their trophism. Postoperative hernia is currently considered not as a local process, but as a hernia disease, covering all the anatomical structures of the anterior abdominal wall, leading to its progressive deep morphological changes.

Chapter 2
CHARACTERISTICS OF THE CLINICAL MATERIAL AND RESEARCH METHODS

2.1. Brief description of the clinical material

We analyzed the results of surgeries for the pathology of the gallbladder in 1328 patients who were treated in surgical clinics (on the basis of the Department of Surgical Diseases for GP TMA) for the period from 1994 to 2008.

The age of patients is from 20 to 82 years (mean age 46.6 years). Of these, women - 998 (75.1%), men - 330 (24.9%) (the ratio of women to men is 3:1).

As can be seen from Table 2.1, all patients who underwent open cholecystectomy were divided into 2 groups. The control group consisted of patients who underwent median 820 and wide subcostal Kocher's incision type 58. The main group included 450 patients operated on with intermuscular minilaparotomic approach in the right hypochondrium.

500 (37.65%) patients were operated on for chronic cholecystitis, 828 (62.34%) patients for acute cholecystitis.

Table 2.1

Distribution of patients by age and group

Patients group		Age				In years				Total	
		20 - 44		45 - 59		60 - 74		75 - 90			
		abs.	%	abs.	%	abs.	%	abs.	%	abs.	%
Control	Median	174	13,1	350	26,4	226	17	70	5,3	820	61,84
	Kocher's	10	0,8	14	1,1	16	1,2	18	1,4	58	4,36
Main	Intermuscular	64	4,8	228	17,2	102	7,6	56	4,2	450	33,8
Total		226	17	592	44,6	344	25,9	144	10,8	1328	100

Methods. Diagnosis of acute and chronic calculous cholecystitis and its complications, concomitant diseases were based on a comprehensive clinical and biochemical examination of patients. In the process of examining patients before and in the postoperative period, standard clinical and laboratory research methods were carried out: a complete blood and urine test. In addition to routine methods, the following was studied: the state of the blood coagulation system was assessed on the basis of small coagulogram data (blood clotting time according to Fonio, plasma tolerance to heparin according to Sigg, recalcification time according to Howell, prothrombin index according to Quick, fibrinogen according to Rutberg, fibrinolytic activity according to Kovalsky, aggregative activity platelets according to the ADP test according to the standards), total blood protein by the refractometric method, blood bilirubin and its fractions according to Endrashek, blood diastase according to Volgemut, determination of ALT and AST, in a unified way according to Reitman and Frenkel using the ALT and AST kit. At the same time, we examined patients on x-rays and endoscopy.

Analysis of the clinical material showed that most of our patients had concomitant diseases.

Table. 2.2

The nature of the comorbidity in cholecystitis

№	Pathology	Control (n=878)		Main (n=450)	
		абс.	%	абс.	%
1.	IHD	168	19,1±1,3	74	16,4±1,7
2	Hypertensive disease	148	16,9±1,3	88	19,6±1,9
3	Chr. pneumonia, bronchitis, bronchial asthma.	36	4,1±0,7	24	5,3±1,1
4.	Obesity	246	28,0±1,5	136	30,2±2,2
5	Diabetes Mellitus	35	4,0±0,7	-	-
6.	Chr. hepatitis	53	6,0±0,8	32	7,1±1,2
7	Adhesive disease	64	7,3±0,9	46	10,2±1,4
8	Duodenum ulcer	28	3,2±0,6	16	3,6±0,9
9	Echinococcal cyst of the liver	6	0,68±0,3	4	0,89±0,4
10.	Cirrhosis of the liver	16	1,8±0,4	-	-
11.	Irreducible umbilical hernia	26	3,0±0,6	4	0,89±0,4
12.	Chr. spastic colitis	18	2,1±0,5	8	1,8±0,6
13.	Kidney stone disease	14	1,6±0,4	4	0,89±0,4

14	Diseases of the genital organs	8	0,91±0,3	4	0,89±0,4
	Total	866	98,6±0,4	440	97,8±0,7

As can be seen from Table 2.2, 440 (97.8%) patients with minilaparotomy approach, and with median laparotomy in 866 (98.6%) patients, had comorbidity, which was important in the preoperative preparation of patients and postoperative administration.

Table 2.3

Pathological changes detected during surgery

	Pathology	Control (n=878)		Main (n=450)		Total (n=1328)	
		abs.	%	abs.	%	abs.	%
1.	Obstructive cholecystitis	490	55,8±1,7	230	51,1±2,4	720	54,2±1,4
2.	Purulent cholangitis	35	4,0±0,7	16	3,6±0,9	51	3,8±0,5
3.	Gallbladder carbuncle	10	1,1±0,4	12	2,7±0,8	22	1,7±0,4
4	Paravesical abscess	21	2,4±0,5	14	3,1±0,8	35	2,6±0,4
5.	Local serous peritonitis	81	9,2±1,0	58	12,9±1,6*	139	10,5±0,8
6.	Diffuse peritonitis.	37	4,2±0,7	-	-	37	2,8±0,5
7.	Choledocholithiasis*	72	8,2±0,9	49	10,9±1,5***	121	9,1±0,8
8.	Acalculous cholecystitis	56	6,4±0,8	22	4,9±1,0	78	5,9±0,6
9.	Hydrocele of the gallbladder	76	8,7±0,9	49	10,9±1,5	125	9,4±0,8
	Total:	878	66,1±1,3	450	33,9±1,3***	1328	100

Note: * - significance compared to control groups (* - P <0.05; ***-P <0.001)

As can be seen from Table 2.3, in the main and control groups of patients withacute cholecystitis, local serous peritonitis was found in 139 (10.5%), in 37 (2.8%), dif. peritonitis, of which perforation in the control group in 8 patients. With obstructive cholecystitis in 720 (54.2%) patients: empyema of the gallbladder in 90 patients, dropsy of the gallbladder in 40, disabled gallbladder in 10.

Table 2.4

Removal of the gallbladder

Cholecystectomy		From the neck	From the fundus	Combined method
Median incision (n=820)	abs.	420	214	186
	%	51,2±1,7	26,1±1,5	22,7±1,5
Kocher's incision (n=58)	abs.	36	10	12
	%	62,1±6,4	17,2±5,0	20,7±5,3
Intermuscular incision (n=450)	abs.	322	80	48
	%	71,5±2,1*	17,8±1,8*	10,7±1,5*

Note: * - significance in comparison of intermuscular incision with midline incision * - $P < 0.001$

As can be seen from Table 2.4, 450 patients operated on with a minilaparotomic incision underwent cholecystectomy: from the neck in 322, from the fundus - 80, combined - 48. From the control group in 878 patients in 456 from the neck, from the fundus - in 224, 198 - in a combined way.

2.2. Anatomy - topographic evaluation of various approaches

The choice of rational approach to the hepatobiliary system and substantiation of mini-laparotomic approach was studied on - 20 corpses, at the departments of pathological anatomy of the Tashkent Medical Academy, at the Republican Pathological Anatomical Center. The anatomical features of the oblique intermuscular low-traumatic migrating approach were studied in a comparative aspect with the most common approaches in surgery for gallbladder and biliary tract diseases: Kocher's incision, upper- median laparotomy, pararectal incisions. In the clinic for 15 patients, the parameters of intermuscular sparing approach were studied, in comparison with the Kocher's incision, upper-median laparotomy. In the clinic, a pararectal incision was not used (Table 2.5).

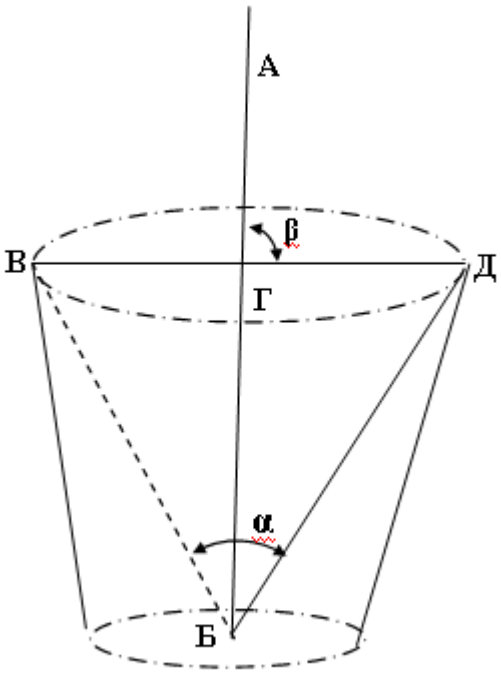
Table. 2.5

The method of surgical approach on corpses, in the clinic

	Surgical approach	Number of Corpses		Number of patients in the clinic	
		abs.	%	abs.	%
1.	Pararectal incision	5	25,0	-	-
2.	Median laparotomy	5	25,0	5	33,3
3.	Kocher's incision	5	25,0	5	33,3
4.	Oblique intermuscular approach	5	25,0	5	33,3
	Total	20	100	15	100

Spatial relationships in the wound were studied by objective methods A.Yu. Sozon-Yaroshevich [121]. The determination of the surgical action angle (SAA) and the angle of inclination of the axis of surgical action (AISA) was carried out using the goniometer of the system N.T.Bednov and A.Yu.Sozon-Yaroshevich (Fig. 4.1).

The surgical action angle, the depth of the wound, the angle of inclination of the axis of the surgical action and the wound depth index were determined in relation to the neck of the gallbladder.



1.А Б - the axis of the surgical action.

2.WD - wound depth.

3. α is the angle of inclination of the axis of the surgical action.

4. β – surgical action angle.

5.WL - wound length.

6. WD/WL x 100 = Wound Depth Index.

Fig.4.1. Method according to Sozon - Yaroshevich.

Five objective criteria were taken into account that characterize the shape of the wound aperture and its position: a) the direction of the axis of the surgical action, b) the depth of the wound, c) surgical action angle, d) the angle of inclination of the axis of the surgical action, and e) the access zone.

The axis of the surgical action was understood as a line connecting the surgeon's eye with the deepest point of the surgical wound or the most important object of intervention. In all forms of the wound cavity, it constitutes the main direction axis along which the surgeon's instruments and hands move, paving the way to the affected organ.

The depth of the wound is the distance from the horizontal plane drawn along the edges of the surgical wound to its deepest point. The significance of the depth of the wound, as an accessibility criterion, lies in the fact that it determines the greater or lesser ease of manipulation of the surgeon's hands and his instruments. When the depth of the surgical wound is less than the length of the surgeon's fingers or fingers armed with an instrument, its cavity is convenient for surgical manipulation; the deeper the wound, the more difficult it becomes for the surgeon to work in its cavity (A. Yu. Sozon - Yaroshevich). (1954). The surgical action angle is formed by the walls of the cone of the surgical wound. Its significance lies in the fact that it determines the possibility of moving the fingers of the surgeon and the instrument in the wound.

The larger this angle, the easier it is to operate. With an angle of 90, the surgery is as easy to carry out as if the organ were lying on the surface. At a 25-degree angle, manipulations are carried out uncertainly, and at a smaller angle (10-14), they are practically impossible. According to [82, 83], A.G. Mirzamukhamedova (1974), the surgical action angle is the most important criterion in the study of surgical approaches. According to the author's observations, during surgical approaches to the liver with particularly unfavorable combinations of indicators of the surgical wound, there may be cases when performing cholecystectomy and suturing the common bile duct is difficult even with a surgical action angle of 65 - 70 *, especially with upper-median approaches.

Under the angle of inclination of the axis of the surgical action is understood the angle formed by the axis of the surgical action and the surface of the patient's body within the surgical wound. Its significance is due to the fact that it determines the angle of view from which the surgeon is forced to consider the object of the surgery. The optimal conditions for the surgery are at an angle of 90, when the surgeon looks directly at the object of the surgery. So, the angle of inclination of the axis of the surgical action indirectly determines how much the surgical incision corresponds to the location of the organ on which the intervention is performed.

The access zone is an indicator of the quality of access that determines the ability of the surgeon to examine the bottom of the wound cavity. If the wound cavity is of the correct shape, the access zone is equal to the area of the lower base of the cone. In some cases, this criterion does not matter when studying surgical approaches to the gallbladder, since its use is recommended in cases where the bottom of the wound cavity is the surface of a large organ. (A.G. Mirzamukhamedov, 1974) [82].

The determination of the listed criteria for assessing online access was carried out using the goniometer of the N.T. Bednov (1954), and a special tool proposed by A.Yu. Sozon - Yaroshevich (1954), somewhat modified by us (Fig. 2.1, 2.2). When studying the spatial relationships in the wound, in addition to the objective criteria described above, the coefficient of use of the incision length, introduced into practice by V.I. Dziuba (1965), calculated by dividing the true length of the wound by the linear length of the incision and multiplying by 100. The resulting figure in percentage terms characterizes the value of the surgical approaches

Fig.2.1. Tool for measuring the angle of inclination of the axis of the surgical action

Rice. 2.2. Protractor Bednova (determination of the axis of the surgical action)

The measurement and identification of indicators of the surgical wound was carried out in relation to the middle of the posterior surface following the following sequence: first, the length of the skin incision was measured, then the true length of the wound (the coefficient of use of the incision length) was determined, then the external aperture was measured in the longitudinal directions, the depth of the wound, and then the angle was determined surgical action and the angle of inclination of the surgical action axis. The assessment of the access zone was given subjectively, depending on the type, nature and extent of the intervention. groups based on ultrasound studies.

Ultrasound examination of the gallbladder remains the basic method for diagnosing hepatopancreto-biliary pathology and allows modeling the topography of the gallbladder and ducts. It is carried out in compliance with its general

principles: 1) the choice of preparation of patients; 2) choice of echography access; 3) choice of echography mode; 4) choice of echography method; 5) choice of echography sensor type; 6) choice of echography sensor frequency; 7) choice of image settings; 7) choice of scanning technique; 9) selection of the obtained echography information.

For echographic visualization (EV) of the biliary tract and bile duct using the ultrasonic device "interSCAN 250" (Germany) and "LOGIQ l - 100" (USA) with convex and linear sensors 3.5 - 5.0 MHz.

Optimization (EV) of echographic visualization was achieved by following the rules for preparing patients with chronic pathology of the biliary tract and bile duct 1) a three-day slag-free diet; 2) 8 - 12 hours' delay from eating before the study.

The second rule is also applicable in patients with acute pathology of the biliary tract and bile duct with 6-12-24 hours of preoperative preparation (antibacterial and detoxification).

Ultrasound of the bile ducts was performed using polypositional and polyprojection techniques.

With EV of the biliary tract and bile duct, the following biometric parameters were determined: 1) anatomical (location, shape, linear dimensions, volume, wall thickness, wall structure); 2) topographic (holotopy, syntopy, skeletontopy); 3) physio-optical (evacuation capacity, bile ejection fraction over time); 4) pathophysiological (violation of all previous parameters, the presence of formations, stones, suspension, fixation).

The object of our study was the holotopic location of the w.p. (mainly its neck), which allowed us to model their topography in the preoperative period with great accuracy for rational surgical approaches. To clarify the diagnosis, the following were chosen:

1) the position of the patient (lying on his back);

2) EV lines - right midclavicular and right midaxillary.

Echotopographic data of the cervix (holography) were noted on the patient's skin: 1) the smallest depth of the neck of the gland from the skin; 2) the ratio of the location of the GB neck to the right midclavicular - dextroposition or sinistroposition, midaxillary - anteposition or retroposition to the lines (Fig. 2.3, Fig. 2.4).

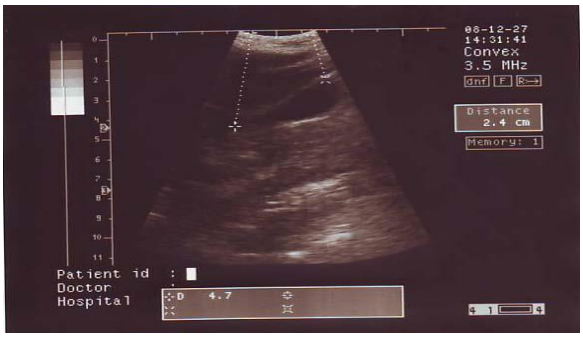


Fig. 2.3. Ultrasound of the smallest occurrence of the neck and fundus of the GB

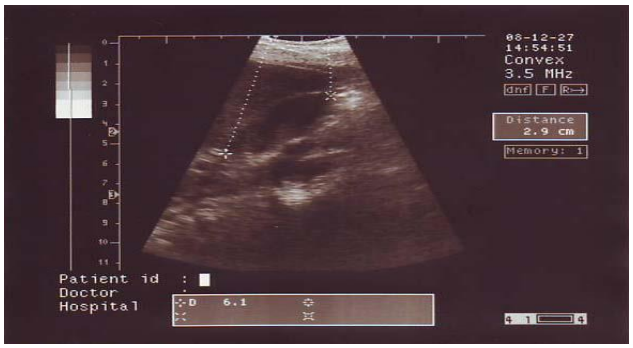


Fig.2.4. Ultrasound of the smallest occurrence of the neck and fundus of the GB.

Statistical research methods: The obtained data were subjected to statistical processing using a package of statistical analysis applications on an IBM Pentium-IV computer with the calculation of the arithmetic mean (M), standard deviation (sigma), standard error (m), relative values (frequency %) , the statistical significance of the obtained measurements when comparing the mean values was determined by the criterion (t) Student. Significance level $P < 0.05$ was taken as statistically significant changes.

Chapter 3

COMPARATIVE EVALUATION OF THE RESULTS OF SURGICAL TREATMENT OF PATIENTS WITH CHOLELITHIASIS

3.1. Intraoperative and immediate postoperative complications after cholecystectomy using various approaches

We analyzed the results of surgeries in 1328 patients with pathology of the biliary tract and gallbladder using a median laparotomy approach, Kocher's incision, right-sided migrating intermuscular approach. Of these, women - 998 (75.1%), men - 330 (24.9%). The age of patients is from 20 to 82 years (mean age 46.6 years). 500 were operated on for chronic cholecystitis, and 828 for acute cholecystitis.

As can be seen from Table 3.1, the most frequent complications were bleeding in 42 (3.2 ± 0.48), and in 29 (3.5 ± 0.65) patients operated on by median approach, in 2 (3.4 ± 2, 43) - with a Kocher-type incision and in 11 (2.4 ± 0.73), with the use of an intermuscular mini-approach (in 4 of them, the incision had to be expanded). Bleeding was stopped during the surgery by vessel ligation (23), suturing or coagulation of the gallbladder bed with a tampon left (18), and in 1 case, when it was impossible to stop bleeding from the bed, tachocomb was successfully used.

Table 3.1

Intraoperative complications in patients with cholecystitis

Intraoperative. complications / Approaches	Bleesing		Choledochus damage		Toral	
	abs.	%	abs..	%	abs..	%
Median incision (n = 820)	29	3,5 ± 0,65	8	1,0 ± 0,34	37	4,5 ± 0,72
Kocher's incision (n = 58)	2	3,4 ± 2,4	1	1,7 ± 1,7	3	5,1 ± 2,91
Intermuscular incision (n = 450)	11	2,4 ± 0,73	4	0,9 ± 0,44	15	3,3 ± 0,85
Total	42	3,2 ± 0,48	13	1,0 ± 0,27	55	4,1 ± 0,55

Damage to the choledochus was in 13 patients (1.0 ± 0.27): in 8 (1.0 ± 0.34) - with a median one, in 1 (1.7 ± 1.7), with a Kocher's incision in 4 (0 .9 ± 0.44) - with intermuscular mini-approaches. In 8 patients, damage to the choledochus was

detected during the surgery - a correction was made: suturing the defect (5), drainage according to Kehr (2), hepaticojejunoanastomosis (1), recovery.

Thus, in a comparative assessment of intraoperative complications (Table 3.1), we did not reveal significant frequencies of them from approaches (P> 0.05). They are equally found both in the group of patients operated on for an acute process and a chronic one.

In the immediate postoperative period, complications such as infiltrates, suppuration of the wound, subhepatic abscesses are noted.

As can be seen from Table 3.2, infiltrates and suppuration of wounds were in 83 (6.3 ± 0.95), and the most pronounced in patients who underwent a median and especially a Kocher-type incision. With intermuscular approaches, these complications were noticeably less, amounting to a total of 16 (3.5 ± 1.23), of which: 10 (2.2 ± 0.69) infiltrates and 6 (1.3 ± 0.54) suppuration.

Table 3.2

Early postoperative complications

Postoperative Complications	Wound infiltrates		Wound suppuration		Subhepatic abscess		Relaparotomy	
	abs.	%	abs.	%	abs.	%	abs.	%
Median incision (n = 820)	24	2,9 ± 0,59	36	4,4 ±0,72	4	0,5 ±0,24	21	2,6 ± 0,55
Kocher's incision (n = 58)	3	5,2±2,9***	4	6,9±3,3** *	-	-	2	3,4 ± 2,4***
Intermuscular incision (n = 450)	10	2,2±0,69* *	6	1,3±0,54* **	2	0,4±0,31	8	1,8 ± 0,62**
Total (n=1328)	37	2,8 ± 0,45	46	3,5±0,50	6	0,5±0,18	31	2,3 ± 0,41

Note: * - reliability in comparison of intermuscular approach with midline incision (**- P < 0.01; ***- P < 0.001)

Subhepatic abscesses occurred equally in 4 (0.5 ± 0.24), with a median of 2 (0.4 ± 0.31), and with intermuscular approach.

Relaparotomies were performed in 31 (2.3 ± 0.41) patients: in 22 (2.7 ± 0.56) patients after a median incision, in 2 (3.4 ± 2.4) patients with a Kocher's incision, and with intermuscular approach in 7 (1.6 ± 0.58) patients.

As can be seen from Table 3.3, relaparotomy for bleeding was in 19 (1.4 ± 0.33), after median approach in 14 (1.7 ± 0.45) patients, Kocher's incision - 1 (1.7 ± 1, 7), miinilaparotomic intermuscular approach in 4 (0.9 ± 0.44) patients. Causes of bleeding from a. cisticus - 14, from the gallbladder bed - 5, additional ligation of vessels in 14 with stitching of the bed, sanitation of the abdominal cavity.

Table 3.3

Reasons for early relaparotomies after CCY

Relaparotomy / Approaches	Bleeding		Choledochus damage		Total	
	abs.	%	abs.	%	abs.	%
Median incison (n = 820)	14	1,7 ± 0,45	8	1,0±0,34	22	2,7±0,56
Kocher's incision (n = 58)	1	1,7± 1,7***	1	1,7±1,7*	2	3,4±2,4***
Intermuscular incision (n = 450)	4	0,9±0,44**	3	0,7±0,38	7	1,6±0,58***
Total (n = 1328)	19	1,4 ± 0,33	12	0,9±0,26	31	2,3±0,41

Note: * - reliability compared between intermuscular approach and median incision (* - P < 0.05; ** - P < 0.01; *** - P < 0.001).

Damage to the choledochus was the reason for relaparotomy in 12 (0.9 ± 0.26). At the same time, in 8 (1.0 ± 0.34) patients with median approach, in 3 (0.7 ± 0.38) with intermuscular and in 1 (1.7 ± 1.7) with Kocher's incision. In 4 patients, ligatures were removed, in 5 with parietal damage - drainage according to Kehr 2, wound suturing 3. At complete intersection, hepaticojejunostomy was performed in 3 patients.

Example. *Sick N.U.U. 1964 was admitted to the 1st CCH 28.11.05 (at 10.20) with complaints of pain in the right hypochondrium and epigastrium radiating to the right shoulder girdle, nausea, dryness and bitterness in the mouth, general weakness. According to the patient, she fell ill acutely 3 days before admission, when, after an error in the diet, she noted the appearance of pain in the right hypochondrium, aggravated without a tendency to stop. GSD in history since 2002. There was no mechanical jaundice. The patient suffers from arterial*

hypertension for a long time. Ulcer history since 1988. The general condition is relatively satisfactory. The skin and visible mucous membranes are of normal color, subcutaneous fatty tissue is developed due to obesity of the II st. In the lungs, vesicular breathing on both sides. Heart tones are muffled, rhythmic. Pulse 70 bpm, BP 140/70 mm.hg. Tongue dry, coated with white. The abdomen is enlarged in size due to subcutaneous fat, is involved in the act of breathing. Palpation tenderness in the right hypochondrium and epigastrium. Liver at the edge of the costal arch. The gallbladder area is painful. The spleen is not enlarged. Positive symptoms of Ortner - Grekov, Murphy, Kerte. Intestinal peristalsis is heard. The stool is prone to constipation. Urination regular, normal color. Ultrasound: Picture of acute calculous cholecystitis. GB size 11.8 x 4.1 cm. Walls up to 16 mm, there is a doubling and signs of destruction in the neck region; a fixed calculus up to 3.2 cm in size. Choledoch 0.6 cm. EGD: Chronic ulcer of the anterior wall of the duodenal bulb 12, 0.2 x 0.5 cm in size, with cicatricial and ulcerative deverticuloid deformity of the bulb. Erosive bulbitis Chronic hypertrophic gastritis. On roentgenoscopy of the lungs without pathology. CBC - Hb - 140 g / l, RBC - 4.6, WBC - 13.0, s / o 81. Bilirubin total - 14.4 mmol / l, direct - abs, blood diastase 14.7 g / l, ALT - 0.65. ECG sinus rhythm. Left ventricular hypertrophy. The patient underwent infusion and antispasmodic therapy for 12 hours, after which the attack was not stopped. WBC 12.4, SEGS 82.

Primary diagnosis: Acute destructive calculous cholecystitis.

Secondary diagnosis: Chronic duodenal ulcer.

29.11.05 10.00 a.m. surgery was performed under endotracheal anesthesia (No. 1282). Laparotomy, median approach up to 14 cm, cholecystectomy from the neck and drainage of the abdominal cavity.

On the 4th day after the surgery, the condition worsened, pain, burning sensation behind the sternum, nausea appeared. Detachable from the drainage tube up to 100 ml with an admixture of bile. On ultrasound in the small pelvis, free fluid is 35-40 ml, the gallbladder bed is without features, the choledochus is not dilated. The general condition of the patient is moderate. Vesicular breathing in the lungs, B\P 110/70 mm. hg. pulse 80 bpm. The tongue is dry. The abdomen is soft.

Intestinal peristalsis is sluggish, but preserved. Peritoneal symptoms. Urination free, normal color. Small amount of stool after enema, brown. It is recommended to continue antibiotic therapy, reduce food intake, and do not remove the drainage tube.

04.11.05. the patient's condition worsens, the pain in the right hypochondrium and the right half of the abdomen increase. On ultrasound, 100 ml of free fluid is determined behind the bladder.

6.11.05. 10.40 a.m. Relaparotomy: in the abdominal cavity up to 200 ml of bile, sanitation, revision - slipping of the cystic duct ligature, stitching it, naso-intestinal intubation and sanitation of the abdominal cavity, drainage.

The postoperative course is smooth. The patient was discharged in a satisfactory condition.

Example. *Patient M.G.R., born in 1969, was admitted to the 1st CCH on 29.10.07. With complaints of pain in the right hypochondrium, epigastric pain, radiating pain to the right shoulder girdle, nausea, dryness and bitterness in the mouth, general weakness. According to the patient, she fell ill 3 days before admission, when, after an error in the diet, she noted the appearance of pain in the right hypochondrium. GSD in history 3-4 months. There was no jaundice. The general condition is relatively satisfactory. The skin and visible mucous membranes are of normal color, subcutaneous fatty tissue is developed. Vesicular breathing in the lungs. Heart tones are muffled, rhythmic. Pulse 82 bpm, BP 110/70 mm.hg. Tongue dry, coated with white. The abdomen is involved in the act of breathing. Palpation tenderness in the right hypochondrium, epigastrium. Liver at the edge of the costal arch. The gallbladder is not palpable, its area is painful. The spleen is not enlarged. Positive symptoms of Ortner - Grekov, Murphy, Kerte. Shchetkin-Blumberg symptom is negative. Percussion hepatic dullness is preserved, there is no dullness in the sloping areas of the abdomen. Intestinal peristalsis is heard. The stool is prone to constipation. Ultrasound: Picture of acute calculous cholecystitis. GB 77 x 26 cm in size. Walls up to 1.0 cm, doubling and signs of destruction are noted, there are many stones in the cavity, up to 2 cm*

in diameter. Choledochus 0.6 cm, EGD: no pathology was found. CBC- Hg-127g / l, RBC-4.0, WBC - 4.7, s / 81. Bilirubin total - 16.4 mmol / l direct - 4.2 mmol / l, indirect - 12.2 mmol / l, blood diastase 20 g/l, urea 3.9, ALT-0.52. ECG: metabolic changes in the myocardium.

30.11.07 under endotracheal anesthesia, a surgery was performed (No. 1445.) laparotomy, intermuscular minilaparotomy approach up to 8 cm long, cholecystectomy from the neck.

After the surgery, the condition worsened - pain, nausea, vomiting, general weakness, discharge from the drainage tube with a hemorrhagic character up to 100 ml BP 80/40 mm.hg. pulse 120 bpm. Vesicular breathing in the lungs. The tongue is wet. The abdomen is soft. Intestinal peristalsis is sluggish. Hg - 77g / l.

Relaporotomy, (31.10.07, 07.20). Expansion of approach to 12-13 cm. In the abdominal cavity, up to 1 liter of blood coming from the gallbladder bed. Stopped by flashing. Sanitation, drainage of the abdominal cavity. (No. 1452).

The postoperative course is smooth. Discharged.

3.2. Late complications (postoperative ventral hernias in patients who underwent cholecystectomy with various approaches)

Without dwelling in detail on the long-term results associated with the so-called "postcholecystectomy syndrome" (gastritis, pancreatitis, hepatitis, residual choledochal stone, leaving long gallbladder stumps, etc.), we focused our attention on postoperative ventral hernias, the frequency of which forced us to reconsider our relation to wide approach.

A retrospective analysis of 786 case histories of patients operated from 1994 to 2008 for POVH revealed the following: after cholecystectomy there were 288 (36.6%) cases, after gynecological surgeries - 172 (21.8%) cases, recurrence of umbilical hernias - 112 (14.2%) and a small number of hernias after other surgeries (Table 3.4).

Thus, the largest number of patients with incisional hernias (36.5%) are those who underwent cholecystectomy, with the majority (92%) using the median approach.

There were 233 (80.9%) women, 55 (19.1%) men (6:1 ratio), 188 (65.2%) people of the most able-bodied age predominated - from 21 to 59 years old. 265 patients were operated on: women - 220 (83.0%), men - 45 (17%) aged 21 to 76 years.

According to the classification of T.I. Makarenko et al. [1984], small hernias (up to 5 cm in diameter) were found in 66 (22.9%) patients, of medium size (5–10 cm) in 90 (31.3%) patients, large sizes (11-30 cm) - in 102 (35.4%) patients, giant (over 30 cm) - in 30 (10.4%) patients. Recurrent hernias were detected in 38 (14.3%), recurrent in 6 (2.3%), thrice recurrent in 3 (1.13%). 84 patients were operated on urgently for a strangulated hernia, and 181 patients were operated on a planned basis, 39 patients had multichamber hernias.

Table 3.4

Postoperative hernias depending on the surgeries

№	Name of surgery	Quantity	
		abs.	%
1.	Hernias - after cholecystectomy -	288	36,5
	A) Median approach	265	33,6
	B) After the Kocher's incision	17	2,2
	B) Intermuscular incision	6	0,8
2.	Gynecological surgeries	172	21,8
3.	Umbilical hernia	112	14,2
4.	Laparotomy for abdominal trauma	96	12,2
5.	Hernias of the white line of the abdomen	48	6,1
6.	Surgeries on the intestines	36	4,6
7.	Resection of the stomach	12	1,5
8.	Echinococcectomy	8	1,0
9.	Pancreatic necrosis	6	0,8
10	Appendectomy	6	0,8
11	Nephrectomy	6	0,8
	Total	788	100

For large hernias, we pay special attention to preoperative preparation and prevention of ACS (abdomen compartmen syndrom) - a syndrome of a small abdomen.

The high frequency of postoperative hernias, a sharp deterioration in the quality of life, repeated heavy, sometimes multiple surgeries make us seriously think about the choice of approach, as well as the need for median laparotomies - a “incision of uncertainty”, of which we ourselves were active propagandists and supporters (Ataliev A.E.) since 1975

As can be seen from Table 3.5, hernia repair with suturing of the abdominal wall defect was performed in 103 (38.9%), the creation of a duplication of the muscular aponeurotic layer was used according to the Sapezhko type, Championier - 106 (40.1%), Yanov - 21 (7.9%) , a simple dissection of the infringing ring in one extremely severe patient with a giant strangulated hernia (recovery). In recent years, encouraging results have been obtained with the use of polypropylene mesh.

Table 3.5

The characteristics of surgeries for POVH

№	Plastic surgery methods	Quantity	
		abs.	%
1.	Suturing an abdominal wall defect	103	38,9
2.	Sapezhko	80	30,2
3	Championier	26	9,8
4.	According to Yanov	21	7,9
5.	Application of propylene mesh	35	13,2
	Total	265	100

Died after surgery 8 (3.01%) patients (mainly from pulmonary heart failure and thromboembolism).

The presence of multiple incisional hernias after median and Kocher's subcostal incisions dictates the need to move away from the wide subcostal incisions that have been common so far, traumatic median laparotomies lobbied by us (incision of uncertainty), leaving their use only if necessary, simultaneous surgeries on the stomach, pancreas and common peritonitis.

Fig.3.1.

Fig.3.2.

Fig. 3.1, 3.2. POVH, (on the side, patient with recurrent hernia, ligature fistula, after upper- median laparotomy 3.2. in direct projection of the abdomen

Fig 3.3. POVH, irregular shape of the abdomen (after CCY, upper median approach)

Fig. 3.4. POVG (8 years after CCY by upper midline approach)

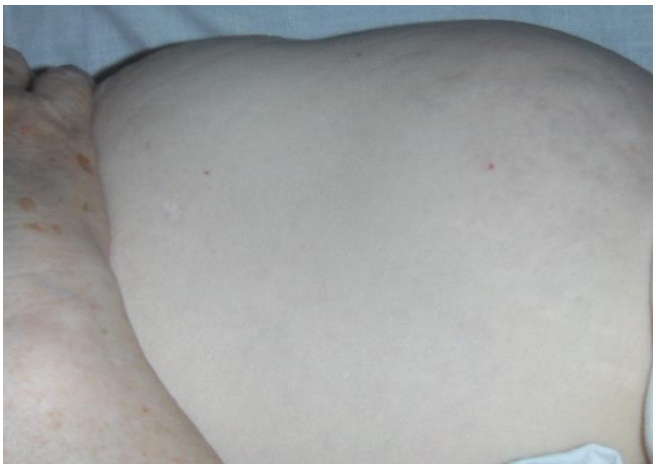


Fig.3.5 POVH

Fig.3.6.Fig. POVH (after CCY)

Fig. 3.7. Rough scar after recurrent POVH

Fig. 3.8. Recurrent POVH, pendulous abdomen

Example 1: *Patient A.A. 1943, case history No. 14803, enrolled on 12.09.06 in 2 x/o 1 CCH, in a planned manner.*

With a complains about the presence of a hernial protrusion of the anterior abdominal wall, pain in this area, periodic constipation.

He suffered viral hepatitis (A) in childhood, in 1990 hepatitis (B). In 1995, according to the patient, he suffered a microstroke, suffers from hypertension.

In 2001, in the TMA clinic, he underwent a cholecystectomy with a median approach, 3 years later a postoperative ventral hernia appeared, for which he was operated on in the Republican Specialized Scientific Center for Surgery (Tashkent) in 2003. After 3 years, again the patient had pain, hernial protrusion.

The general condition of the patient is relatively satisfactory. Skin and visible mucous membranes of normal color. Vesicular breathing in the lungs.

The heart sounds are muffled, the pulse is rhythmic, of satisfactory filling and tension of 84 bpm. BP 140/90 mm.hg.

The tongue is clean, the abdomen is huge, asymmetry due to subcutaneous fat and hernia. On palpation, the abdomen is soft, painful along the surgical scar.

Stasus localis*: on the anterior abdominal wall in the midline of the abdomen there is a postoperative scar, up to 20 cm long, from the xiphoid process to the navel. There is a three-chamber hernia along the course of the surgical scar: the*

first - from 6 X 5 cm in size in the epigastric region, in the umbilical region, on the right half of the scar 4 x 3 cm in size - the second, the third formation along the surgical scar with dimensions of 10 x 15 cm in the umbilical region, which is freely reduced into the abdominal cavity.

Primary Diagnosis: Postoperative recurrent ventral hernia of the anterior abdominal wall.

Secondary diagnosis: Hypertension 2 stage. ischemic heart disease. Angina pectoris. Varicose disease of the lower limb.

Patient 19.09.06. under endotracheal anesthesia, the surgery was performed: hernia repair, plastic surgery of the anterior abdominal wall with a polypropylene mesh alloplasty (sublayn), Lipectomy according to Zoltan. The postoperative course was smooth. On September 23, 2006, a 4-month observation period was discharged - there was no recurrence of hernias.

***Example 2**: Patient M.G. 1936, No. 11313, received on 11.07.06, 02.00 in the 3rd surgical department of the 1st City Clinical Hospital, on an emergency basis, was discharged on 14.07.06.*

Complaints at admission to the presence of a hernial protrusion on the anterior abdominal wall, severe pain in this area, unreducibility in the abdominal cavity from 21:00 on 10.07.06.

In 1995, she underwent a cholecystectomy by median approach. After 1.5 months, the patient developed a postoperative hernia, for which she was operated on in 1999. In 2002, she had a recurrent hernia of the anterior abdominal wall and was again operated on at the RRCEM.

The general condition of the patient is moderate. Skin and visible mucous membranes of normal color. Vesicular breathing in the lungs.

Cardio - vascular system: heart - tones are muffled, the pulse is rhythmic, satisfactory filling and tension 75 bpm. BP 140/70 mm.hg.

The tongue is clean, the abdomen is huge, asymmetry due to subcutaneous fat and hernia. On palpation, the abdomen is soft, painful along the surgical scar.

***Stasus localis**: on the anterior abdominal wall in the midline of the abdomen there is a postoperative scar, up to 14 cm long, from the xiphoid process to the*

navel. There is a two-chamber hernia along the course of the surgical scar: the first one is 10 x 10 cm in size in the epigastric region, the second is in the navel, 10 x 5 cm on the right, painful, does not retract into the abdominal cavity. The cough impulse is negative.

Primary diagnosis *Postoperative recurrent strangulated ventral hernia.*

Secondary diagnosis*: Hypertension 2 stage. ischemic heart disease.*

Surgery 11.07.06. Time - 02.50 under endotracheal anesthesia: hernia repair (the contents turned out to be the omentum and large intestine, found to be viable), dissection of the infringing ring, adhesions, plastic surgery of the anterior abdominal wall, duplication. The postoperative course is smooth 14.06.06 discharged.

Thus, intraoperative complications (bleeding) in relation to the same extent (3.5% and 3.4%), respectively, occur with a median laparotomy and a Kocher-type incision. With intermuscular approach, they were in 2.4%. Damage to the common bile duct was equally (1% and 0.9%), respectively, with median and intermuscular approaches, and (1.7%) damage to the common bile duct with Kocher's incisions is unlikely, it can indicate something, because. only 1 out of 58 operated patients had them.

Early postoperative complications (infiltrates, subhepatic abscesses) occurred equally with both median and intermuscular approaches, and suppuration of wounds to a much lesser extent ($P < 0.05$) occurred with intermuscular approach.

Chapter 4

COMPARATIVE ASSESSMENT OF SURGICAL APPROACH UNDER THE CONDITIONS OF THE EXPERIMENT ON THE CORPSES OF PEOPLE AND IN THE CLINIC

4.1. Comparative evaluation of operative approaches in the experimental conditions on human corpses

A comparative study of various surgical approaches to the gallbladder and biliary tract was carried out from the standpoint of spatial relationships in the wound and the degree of trauma in an experiment on human corpses.

To solve the tasks set on 20 corpses: (10 women, 10 men) aged 21 to 74 years, in a comparative aspect, the most common approaches were studied, 5 in each series: upper median laparotomy, Kocher's incision, pararectal and oblique intermuscular migrating approach. The same approaches, except for the pararectal incision, were studied in the clinic on 15 patients of various constitutions.

4.1.1. Upper - midline laparotomy

The upper- median approach was studied by us on 5 human corpses. Approach was performed as follows: the position of the corpse on the back. The incision was made along the midline from the xiphoid process to the navel by layer-by-layer dissection of the skin, subcutaneous tissue, white line of the abdomen with preperitoneal tissue and peritoneum.

With a skin incision length of 13.8 - 15.2 (14.5 ± 0.2 cm), surgical action anlge is 67.6˚ ± 2.5˚, the depth of the wound is 10.7 ± 0.4, the angle of inclination of the axis of surgical action was 57.0˚ ± 4.4˚, which contributes to the wound depth index of 73.1 ± 2.1 with an external aperture of 14.5 ± 0.2.

The main indicators of the wound in the upper- median approach are given in Table 4.1.

General conditions and spatial relationships in the wound, regardless of the syntopy of the liver, gallbladder and the type of physique of the studied individuals, ensured the mobilization of the gallbladder artery.

Table 4.1

The main indicators of the wound in the median incision

Indicators / Experiment No.	Criteria for an surgical wound				
	Surgical action angle˚	Wound depth in cm	Angle of inclination of the axis of surgical action˚	Wound Depth Index	Wound cm
1. 140. B	60,0˚	9,8	60,0˚	71,0	13,8
2 12 4.B	68,0˚	11,0	50,0˚	77,46	14,2
3. 142. B	65,0˚	10,8	60,0˚	73,97	14,6
4. 146 «B»	70,0˚	12,0	45,0˚	78,94	15,2
5. 133 B	75,0˚	9,8	70,0˚	67,12	14,6
Average value M ± m	67,6˚ ± 2,5	10,8 ± 0,4	57,0˚ ± 4,4	73,7 ± 2,1	14,5 ± 0,2

4.1.2. Kocher's incision

The method used in the clinic for acute and chronic lesions of the gallbladder was performed (on 5 corpses). The position of the corpse on the back, the incision is made 2 cm below the apex of the xiphoid process and parallel to the costal arch, up to 15.8 - 17.0 cm in size to the anterior - axillary line: the skin, subcutaneous tissue, superficial fascia and the anterior plate of the sheath of the rectus abdominis muscle were dissected in top of the cut. If necessary, the rectus muscle is stitched above and below the place of the upcoming intersection. As a result, the upper epigastric vessels enter the sutures. The muscle is dissected between two rows of sutures. After that, the posterior plate of the vagina of the rectus abdominis muscle is dissected, and in the lower part of the incision is the external, internal oblique and transverse abdominal muscles. The preperitoneal tissue and peritoneum are opened, the exposed layers of preperitoneal tissue are

captured together with the peritoneum with two anatomical tweezers, lifted up and palpated with fingers to check whether the wall of the stomach or colon is captured along with the peritoneum. The wound was expanded with a universal screw retractor and hooks. The dimensions of the external wound aperture turned out to be relatively stable and their relatively small fluctuations also depended on the length of the waist. The largest size of the wound aperture reached 17.0 cm, the smallest - 15.8 cm. The average size of the wound window was 16.5 ± 0.2 cm. the average was equal to 8.1 ± 0.2. A more medial projection of the incision with the Kocher's approach made the wound depth relatively small. The greatest depth of the surgical wound was noted in persons with increased nutrition, developed muscles and a high location of the liver, the smallest - in persons with reduced nutrition and a low location of the liver.

The surgical action angle was the best (88.8˚) in patients with reduced nutrition with a long loin and a low position of the liver, the smallest (78.8˚) in patients with increased nutrition with a short loin and a high position of the liver. This angle averaged 84.0˚ ± 3.6. The angle of inclination of the axis of the surgical action varied within 76.8 - 80.4 and averaged 79.0˚ ± 0.7˚, which can be considered quite satisfactory. The wound depth index averaged 49.09˚ ± 1.5˚.

As we can see, from the data in Table 4.2, this online approach does not always provide space in the wound, especially in hypersthenics.

These moments, of course, in clinical conditions make this approach very traumatic and in the postoperative period contribute to the development of severe paresis, paralysis of the intestine, and this, in turn, can cause pulmonary-cardiac complications, wound dehiscence, eventration and postoperative hernia**.**

Table 4.2

The main indicators of the wound with a Kocher's incision

Experiment No:	Surgical action angle°	Wound depth in cm	Angle of inclination of the axis of surgical action˚	Wound depth index	Wound length
1.125 «B»	82,8˚	7,8	78,0˚	46,42	16,8
2.136 «B»	84,9˚	7,6	76,8˚	46,34	16,4
3. 156 «B»	84,9˚	8,6	80,0˚	50,58	16,5

4. 137 «B»	88,8˚	7,8	80,4˚	47,27	17,0
5. 92 «B»	78,8˚	8,6	79,6˚	54,43	15,8
Average value M ± m	84,0˚ ± 3,6˚	8,1 ± 0,2	79,0˚ ± 0,7˚	49,09 ±1,6	16,5 ±0,2

4.1.3. Pararectal incision

Features of pararectal approach were studied on 5 human cadavers. The specified parameters of the wound window with a length of 13.6 ± 0.3 of the skin incision should be considered quite sufficient.

The average wound depth was 8.8 ± 0.4 cm, with extreme values from 8 to 10 cm. The difference in the wound depth depended mainly on the height of the liver, as well as on the nutrition and development of the musculature of the corpse.

Sufficient dimensions of the external aperture with a relatively large depth of the wound gave a small surgical action angle, equal to an average of 76.7˚ ± 1.7˚. The angle of inclination of the axis of the surgical action was 77.2˚ ± 1.0˚, the wound depth index was only 64.8˚ ± 1.9.

The numerical data given in Table 4.3 indicate that with this approach there are no sufficiently good spatial relationships for the action of the surgeon's hands.

Table 4.3

The main indicators of the wound with pararectal approach

Experiment No:	Surgical action angle°	Wound depth in cm	Angle of inclination of the axis of surgical action˚	Wound depth index	Wound length
1.150 «B»	78,9˚	9,0	75,0˚	62	14,5
2.147 «B»	78,0˚	10,0	78,0˚	71,4	14,0
3. 22 «B»	79,0˚	8,0	80,0˚	62,5	12,8
4. 145 «B»	69,8˚	9,0	75,0˚	66,5	13,5
5.133 «B»	77,8˚	8,0	78,0˚	61,5	13,0
Average value M ± m	76,7˚ ± 1,7˚	8,8 ± 0,4	77,2˚ ± 1,0˚	64,8 ± 1,9	13,6 ±0,3

4.1.4 Intermuscular minilaparotomy approach

Based on the study and comparative evaluation of traditional surgical approaches for cholecystectomy, taking into account their positive and negative sides, we developed an intermuscular migratory sparing approach (rac., pre No. 489 10.04.06, author's certificate dated 10.27.06. - No. 03922), in which, thanks to the rational incision and preservation of the vascular nerve bundles, the trauma of approach is significantly reduced, the technique of the surgery is simplified, thereby reducing its duration. This creates the necessary spatial relationships in the wound for the action of the surgeon when removing the gallbladder. Technique for performing a sparing migrating approach: the position of the corpse on the back, the incision was made, on the right 2–3 cm below and parallel to the right edge of the costal arch, 6–8 cm long. The skin, subcutaneous tissue was dissected and the neurovascular bundles were bluntly moved aside, the aponeurosis of the external oblique was opened muscles, and the internal oblique and transverse muscles were stratified along the fibers. Sometimes, if necessary, the anterior and posterior sheets of the sheath of the rectus abdominis muscle were partially dissected, thereby achieving the possibility of retracting it.

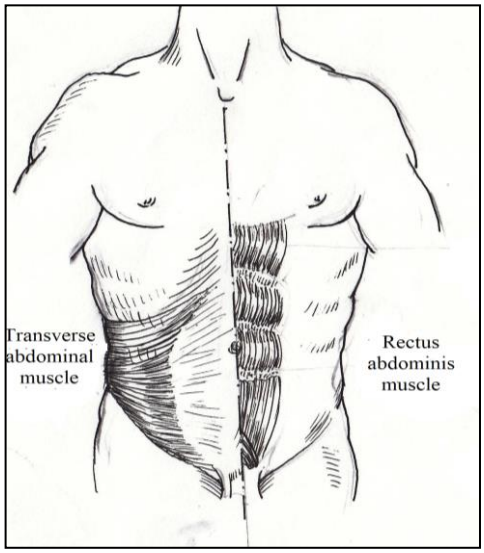


Fig.4.2

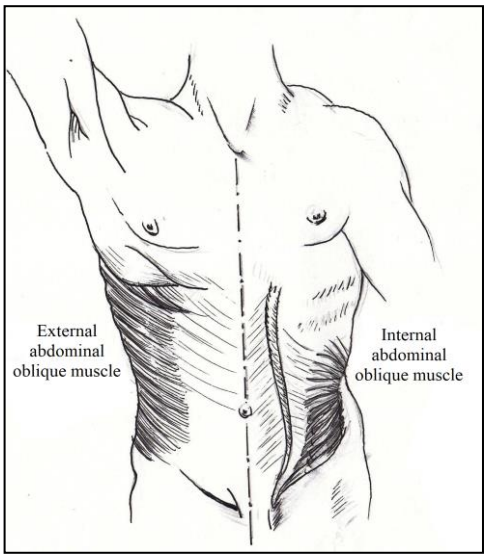


Fig.4.3

Fig.4.2, 4.3. Muscles of the anterior abdominal wall

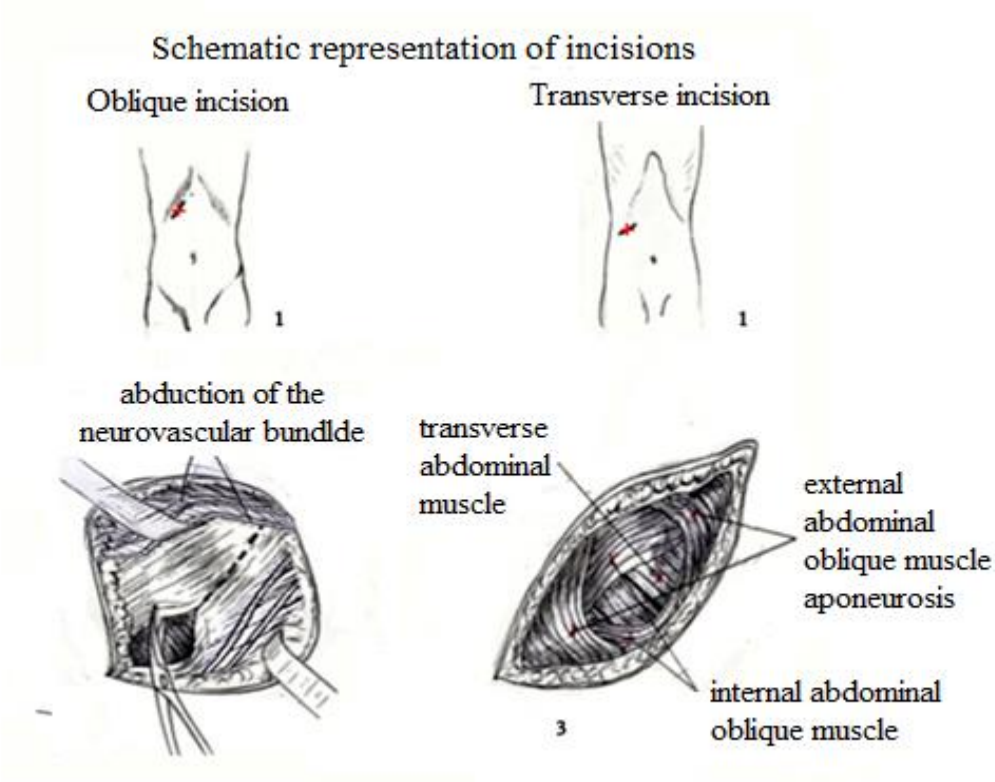


Fig. 4.4. Schematic representation of incisions

As we can see in Table 4.4, the angle of inclination of the axis of the surgical action was subject to small fluctuations (78.0˚ - 95.0˚), and averaged 86.2˚ ± 3.2, indicating the compliance of the approach we offered. The surgical action angle was 87.6˚ ± 2.9 on average. Fluctuations between the largest surgical action angles were insignificant 78.0˚ - 95.0˚. The wound depth index was 95.1 ± 4.5.

Table 4.4

The main indicators of the wound with intermuscular approach

Experiment No:	Surgical action angle°	Wound depth in cm	Angle of inclination of the axis of surgical action˚	Wound depth index	Wound length
1.21 «ВИ»	85,0˚	5,0	78,0˚	83,3	6,0
2.126 «В»	90,0˚	7,0	80,0˚	100,0	7,0
3. 20 «Т»	90,0˚	8,0	90,0˚	106,6	7,5
4. 151 «В»	95,0˚	6,0	95,0˚	85,7	7,0
5. 143 «В»	78,0˚	8,0	88,0˚	100,0	8,0
Average value M ± m	87,6˚ ± 2,9˚	6,8 ± 0,6	86,2˚ ± 3,2˚	95,1 ± 4,5	7,1 ± 0,3

4.2 Comparative assessment of surgical approaches in the clinic

Spatial relationships in the wound were studied by objective methods A.Yu. Sozon - Yaroshevich. (121), Determination of the surgical action angle (SAA), and the angle of inclination of the axis of the surgical action (AISA), was carried out using the goniometer of the N.T. Bednova and A.Yu. Sozon - Yaroshevich.

The surgical action angle, the depth of the wound, the angle of inclination of the axis of the surgical action and the wound depth index were determined in relation to the neck of the gallbladder.

Studies of the spatial relationship in the wound on 15 patients in the analysis of the upper midline Kocher's incision, intermuscular approaches: (no pararectal approaches were performed in the clinic), the same criteria were studied.

4.2.1. Upper mid-section

In comparison with the upper- median approach, sufficient dimensions of the external aperture with a relatively large wound depth at a depth of 9.7 ± 0.3, with an external aperture of 14.0 ± 0.3, gave a small angle of surgical action, equal to the average angle of the surgical action - 74.1˚ ± 3.4, while the wound depth index is 70.0 ± 1.1, which characterizes the upper- median approach from the negative side as not providing good, stable conditions in the wound. In addition, the angle of inclination of the axis of the surgical action was 67.1˚ ± 0.7, the wound depth index was only 68.4 ± 1.9, which, with this approach, was not a good enough spatial relationship for the action of the surgeon's hands.

As we see in Table 4.5, the surgical action angle with this approach is on average 74.1˚ ± 3.4, which creates some inconvenience for the surgeon and increases the surgery time. A long incision and a reduced angle of surgical action increase the invasiveness of the surgery and lead to a significant number of postoperative complications in the form of suppuration of the postoperative wound, postoperative hernias.

Table 4.5

The main indicators of the wound during median laparotomy

Experiment No:	Surgical action angle°	Wound depth in cm	Angle of inclination of the axis of surgical action˚	Wound depth index	Wound length
1.№ 7689	77,5˚	9,8	68,6˚	71,94	13,8
2.№ 8907	76,8˚	8,8	66,4˚	67,56	14,2
3.№ 345	68,9˚	9,6	66,9˚	67,97	13,8
4.№ 6389	74,8˚	10,6	64,8˚	69,56	14,8
5.№ 779	72,4˚	9,6	68,8˚	72,92	13,2
Average value M ± m	74,1˚ ± 3,4˚	9,7 ± 0,3	67,1˚ ± 0,7˚	70,0 ± 1,1	14,0 ± 0,3

4.2.2. Kocher's incision

Kocher's incision with an external wound aperture of 14.2 ± 0.2, a deep wound of 8.0 ± 0.2, with an inclination angle of the axis of the surgical action of 81.2˚ ± 0.4˚, which, with this approach, was not a good enough spatial relationship for actions of the surgeon's hands. An acute angle of inclination of the axis of the surgical action with a Kocher's incision of 81.2˚ ± 0.4˚ and with a wound depth index of 56.0 ± 0.8 and its length of 14.2 ± 0.2 naturally created unfavorable conditions for cholecystectomy (Table 4.6).

Table 4.6

The main indicators of the wound with a Kocher's incision

Experiment No:	Surgical action angle°	Wound depth in cm	Angle of inclination of the axis of surgical action˚	Wound depth index	Wound length
1.№ 34501	84,9˚	7,8	82,0˚	54,92	14,2
2.№ 54709	86,8˚	8,4	82,2˚	57,53	14,6
3.№ 78102	87,6˚	8,6	81,4˚	58,10	14,8
4. № 48934	84,4˚	7,4	80,6˚	54,41	13,6
5.№.67402	86,8˚	7,6	79,8˚	55,07	13,8
Average value M ± m	86,1˚ ± 0,6˚	8,0 ± 0,2	81,2˚ ± 0,4˚	56,0 ± 0,8	14,2 ± 0,2

As can be seen from Table 4.6, the use of the Kocher's incision in the clinic, this method provides good conditions for the work of the surgeon, since the angle of the surgical action is 86.1˚ ± 0.6˚ (close to 90˚). However, the intersection of a large array of muscles with neuromuscular - muscle bundles leads to a high traumatization of the development of postoperative hernias.

4.2.3 Intermuscular minilaparotomy approach

At the same time, intermuscular approach at a depth of 6.5 ± 0.2, with an external aperture of 6.9 ± 0.2, the angle of inclination of the axis of the surgical action is 88.7˚ ± 0.5˚, the surgical action angle is 89.6 ˚ ± 0.41˚, while the wound depth index was 94.5 ± 1.7, which provided ample opportunities for manipulation during the surgery (Table 4.7).

Table 4.7

The main indicators of the wound with oblique intermuscular minilaparotomic approach

Experiment No:	Surgical action angle°	Wound depth in cm	Angle of inclination of the axis of surgical action˚	Wound depth index	Wound length
1.№ 3467	89,5˚	6,1	88,6˚	93,58	6,7
2.№ 8906	92,4˚	6,0	86,9˚	92,93	6,4
3.№ 5437	86,5˚	7,0	89,4˚	97,54	7,0
4.№ 5632	87,2˚	7,1	89,1˚	98,88	7,2
5.№ 7654	91,4˚	6,3	89,6˚	89,47	7,4
Average value M ± m	89,4˚ ± 1,1˚	6,5 ± 0,2	88,7˚ ± 0,5˚	94,5 ± 1,7	6,9 ± 0,2

Table 4.8

The nature of spatial relationships in the wound with different approaches

(in the numerator indicators on corpses, in the denominator - in the clinic) *.

	Surgical action angle°	Wound depth in cm	Angle of inclination of the axis of surgical action°	Wound depth index	Wound length
1. Upper median incision M ± m	67,6° ± 2,5°	10,8 ± 0,4	57,0° ± 4,4°	73,7 ± 2,1	14,5 ± 0,2
	74,1° ± 1,5°	9,7 ± 0,3	67,1° ± 0,7°	70,0 ± 1,1	14,0 ± 0,3
2. Kocher's incision (M ± m)	84,0° ± 3,6°	8,1 ± 0,2	79,0° ± 0,7°	49,09 ± 1,6	16,5 ± 0,2
	86,1° ± 0,6°	8,0 ± 0,2	81,2° ± 0,4°	56,0 ± 0,8	14,2 ± 0,2
3.Intermuscular incision M ± m	87,6° ± 2,9$^{a°}$	6,8 ± 0,6$^{*, a}$	86,2° ± 3,2$^{*, a°}$	95,1 ± 4,5^{***,a}	7,1 ±0,3$^{***, a}$
	89,4° ± 1,1$^{*,a°}$	6,5 ±0,2^{***,a}	88,7° ± 0,5$^{***,a°}$	94,5 ± 1,7^{***,a}	6,9 ± 0,2^{***,a}
4. Pararectal incision (M ± m)	76,7° ± 1, 7$^{^°}$ -	8,8 ± 0,4$^{^^}$ -	77,2° ± 1,0$^{^^^°}$ -	64,8 ± 1,9$^{^^}$ -	13,6 ± 0,3$^{^}$ -

Note: * - reliability in comparison of the intermuscular, with Kocher's incision *-P < 0.05; ** - P < 0.01; *** - P < 0.001; a - reliability in comparison of the intermuscular, with upper median incision a - P < 0.001; ^ - reliability in comparison of the pararectal incision with the upper median incision (^-P < 0.05; ^^ - P < 0.01; ^^^ - P < 0.001). In the numerator there are indicators on corpses, in the denominator - in the clinic.

As can be seen from Table 4.8, the best surgical action angle both on the corpse and in the clinic: available with minilaparotomic intermuscular "migrating" approach (respectively 87.6° ± 2.9° and 89.6° ± 0.4° degrees) and Kocher's incision (respectively 84.0° ± 3.6° and 86.1° ± 0.6° degrees), the worst in the upper median (67.6° ± 2.5° and 74.0° ± 3.4° degrees) and pararectal incisions (76.7° ± 1.7° degrees), despite the largest size of the wound skin aperture in the upper median (14.5 ± 0.2 and 14.0 ± 0.3 cm) and pararectal incision (13 .6 ± 0.3 cm).

If a good angle of surgical action with a Kocher's incision is obtained due to the large size of the wound (16.5˚ ± 0.2˚ and 14.2˚ ± 0.2˚ cm), then the oblique minilaparotomic intermuscular approach proposed by us, thanks to ultrasound, the determination of the point of the smallest occurrence neck, the gallbladder, which is the middle of the incision, even with a small skin incision (7.1 ± 0.3 and 6.9 ± 0.2 cm), provided the best surgical action angle (87.6˚ ± 2.9˚ and 89.4 ˚ ± 1.1˚ degrees). The depth of the wound was the greatest at the upper median (10.8 ± 0.4 and 9.7 ± 0.3 cm) and pararectal incision (8.8 ± 0.4 cm), which created additional difficulties during cholecystectomy. A smaller wound depth in the Kocher's incision (8.1 ± 0.2 and 8.0 ± 0.2 cm) and especially in oblique intermuscular approach (6.8 ± 0.6 and 6.5 ± 0.2 cm) ensured favorable conditions for cholecystectomy.

The angle of inclination of the axis of the surgical action was the best, i.e. closer to 90 degrees, with minilaparotomic intermuscular approach (86.2˚ ± 3.2˚ and 88.7˚ ± 0.5˚ degrees), and Kocher's incision (79.0 ± 0.7˚ and 81.2 ± 0 .4˚ degrees). The sharp angle of inclination of the axis of the surgical action at the pararectal (77.2˚ ± 1.0˚ degrees), and especially the upper median incision (57.0˚ ± 4.4˚ and 67.1˚ ± 0.7˚ degrees), naturally, created the worst conditions for cholecystectomy.

The wound depth index was also the best with an oblique intermuscular incision (95.1˚ ± 4.5˚ and 94.7˚ ± 1.7˚ degrees), the other approaches (upper median, Kocher's and pararectal), in terms of the wound depth index, were significantly inferior to the oblique intermuscular approach and varied from 49.09˚ to 73.7˚ degrees.

The results of the analysis of spatial relationships in the wound with various options for traditional access to the gallbladder and biliary tract show that in isolated lesions of the biliary tract and gallbladder, it is preferable to use a minilaparotomic intermuscular approach in the right hypochondrium, which meets all standards of surgical approach criteria. In clinical conditions, ultrasound allows you to accurately navigate when choosing a rational approach, depending on the options for the location of the gallbladder neck.

The approach proposed by us is less traumatic, easy to use, can be performed with conventional instruments, allows to reduce the length of stay of patients in the hospital and quickly restore working capacity, improves the quality of life, and significantly reduces the number of postoperative hernias.

CONCLUSION

The end of the 20th century and the beginning of the 21st were marked by certain achievements in the field of hepatobiliary surgery, due to the improvement of diagnostics, examination of patients at the preclinical level, an increase in surgical activity and the widespread introduction of minimally invasive and endoscopic technologies that correct the existing interest of hepaticocholedochus.

A high level of anesthetic support - allows you to perform various methods of cholecystectomy, ranging from traditional wide laparotomies, mini-approach with conventional instruments, mini-approaches assisted by Prudkov M.I. laparoscopic cholecystectomy.

More than 125 years have passed since the first cholecystectomy (Langenbuch 1882), since then more and more new approaches have been introduced into biliary surgery to remove the gallbladder.

B.I. Alperovich (1997), analyzing a serious evolution, [4], both in indications and in the choice of approach to the gallbladder and extrahepatic bile ducts, cites 27 incisions: Aira, Askerkhanova, Avrorov, Braitsev, Biven, Hoffmann, Hagen-Torno, Holmann - Gerbode, Hans, Gasset, Kocher, Ker, Courvoisier, Kalinovskaya, Loebker, Langenbuch, Lenander, Lezhar, Mayo - Robson, Kerte, Pribram, Riedel, Rubin, Spasokukodsky and Rubayt, Satinsky; Fedorov.

According to the author [4], at the dawn of liver surgery, technical and anesthetic capabilities were incommensurable with modern ones. But over time, surgical experience was accumulated, the level of anesthetic support and technical

equipment of surgeons increased. Therefore, the physiological permissibility of surgeries on the liver increased. Extensive liver resections using thoracoabdominal approaches have become available. Some of the previously proposed approaches are now rarely used, others have undergone changes.

It was believed that the severity of the surgery is mainly due to the volume of surgical intervention directly in the abdominal cavity on its organs and tissues. Surgeons have always made an incision of such length that it would be possible to carry out a full revision of the abdominal cavity to make an accurate diagnosis and thereby, to a certain extent, compensate for the low level of preoperative examination of patients, since the main part of the diagnostic process fell on the surgery itself [124].

Due to the lack of optical devices, the impossibility of a thorough preoperative examination - traditional cholecystectomy, wide approach - remained the main condition for ensuring freedom of manipulation in hepatobiliary surgery [33, 80, 126].

Despite the large number of incisions of the anterior abdominal wall proposed for surgeries on the biliary tract, there is still no definite opinion about which of these incisions is the most convenient and provides the best access to the operated organ. Each of the proposed sections has its defenders and opponents, who justify the positive or negative aspects of access solely on subjective impressions.

However, these surgeries were not without drawbacks. The execution of incisions of great length and often without taking into account the topographic anatomical structure of the anterior abdominal wall led to the intersection of a large number of tissues, powerful muscle layers, great vessels and nerves and, as a result, to poor cosmetic results and a deterioration in the quality of life. The postoperative period was difficult: intestinal paresis, prolonged healing of postoperative wounds, violations of the ventilation function of the lungs, a very large traumatic tissue leading to hypodynamia in patients. In the postoperative period: long-term rehabilitation, temporary disability, increase in bed-days, deterioration in the quality of life of the patient, disability [47, 69, 124, 194].

As a result of denervation and violation of tissue trophism, suppuration of wounds often occurred, ending in eventration and the formation of postoperative ventral hernias [40, 47, 57, 125, 146, 170].

At the end of the 20th century, a revolution occurred in abdominal surgery, with the introduction of endovisual technology for CCY into clinical surgery.

Laparoscopic cholecystectomy, performed in 1987 for the first time in the world by the French surgeon F. Mourer, was called the “second French revolution”. Subsequently, this method of treatment exceeded the expected results. The absence of pain syndrome, cosmetic effect, the possibility of revision of the abdominal organs, low trauma, short hospital stays contributed to the further development of laparoscopy [28, 29, 64, 73, 76, 85, 152, 177, 178, 184].

Achievements in endoscopic technologies in hepatobiliary surgery have led to the fact that the endoscopic method of treatment has become an alternative to the "open" surgical method and has radically changed the principles of its treatment. In addition, with the help of laparoscopy, tasks of the diagnostic plan are solved, as well as problems associated with the treatment of seriously ill patients, especially the elderly, who have contraindications for performing a major surgery [176, 177].

However, despite the clear superiority of this intervention over other methods, many authors point to the disadvantages of the laparoscopic method of surgery [33, 96, 136, 197, 253], complications due to carboxyperitoneum, iatrogenic processes - they are forced to use LCE with caution.

At the same time, as rightly noted, M.I. Prudkov [110, 111, 113], other alternative methods are not sufficiently advertised in the literature, i.e. surgeries from minilaparotomic approach, which do not require a tense pneumoperitoneum and expensive equipment [256].

According to the authors who have improved the technique of “open” laparoscopy with the help of special instruments and under visual control, in which the abdominal wall incision does not exceed 5 cm, the “cosmetic effect” of the surgery is no less than that of laparoscopic cholecystectomy [110, 115, 256, 258].

The evolution of mini-approaches or small incisions - originates from 1976: R. Linde et al., [215], experience of surgeries with preservation of the rectus abdominis muscle, and in 1982 F. Dubois et al. [194], reports on 1500 cholecystectomies performed without any complications from a subcostal incision 3–6 cm long.

In 1988, an article was first published in Russia on mini-approach in the right hypochondrium without crossing the rectus abdominis muscles Zemsky V.S. and M.E. Shor - Chudnovsky [45], but a number of authors L.I. Nechai et al. [87,88], O.B. Milonov and A.A. Mavchun [79], called the attempt to perform cholecystectomy from small incisions “harmful”.

However, already in the 90s of the last century, many authors [185, 187, 231, 252] report good immediate and long-term results of minilaparotomy, a number of authors Nagakawa T. 1993, MeMahon A.J.1993, Ross S 1995 [191, 226] also support this is an opinion.

Foreign authors (SarakosT AntonitsP ZacharakisE TakisA 2004) conducted studies over 6 years of 1276 patients with cholelithiasis and at the same time LCE - 952 (74.6%) in patients, TCE - 210 (1.65%), minilaparotomic cholecystectomy 114 (8.8%). With LCE, conversion was in 37 patients (3.9%). Complications after LCE and open cholecystectomy were similar to (3.8%), and after minilaparotomic cholecystectomy - (0.8%). Damage to the large bile ducts during the surgery was not observed through open and minilaparotomic approach [250].

Shamiyeh A Wayad W - (2004) studied the complications of early and late character after LCE [248]. Complications resulting from the use of laparoscopic approach, in the formation of approach and problems associated with the implementation of interventions. Imposition of pneumoperitoneum (complication rate 0.2%). Leakage of bile and damage to the bile ducts with a complication rate at the level (0.2% - 0.8%). One of the specific injuries of the gallbladder during laparoscopy (up to 0.87%).

According to the authors P.S., Zubeev, A.V. Strakhova., V.P. Gradusova. – 2006 [133], fewer intraoperative complications, combined with the possibility of a comprehensive revision of the hepatobiliary system during surgery, the authors

believe that mini-approaches in the surgical treatment of chronic calculous cholecystitis are indicated for patients with a burdened history of the underlying and concomitant diseases, and to perform scheduled LCE must apply strict screening applications.

The same opinion is shared by V.I. Galyshev. And co-authors [34], the authors called this surgery “mini- approach cholecystectomy” (MACE). The surgery was performed using a set of standard instruments for surgery on the gallbladder and bile ducts of the «CAH» company (Yekaterinburg). An incision of the abdominal wall was made in the right hypochondrium pararectally or in an oblique direction. After isolation of the cystic duct and cystic artery, they were clipped or ligated. The gallbladder was removed using a monopolar electrocoagulator of the original design. The meaning of MACE for surgery in elderly and senile patients is the method of choice, the advantages of the method are the early activation of patients and the rejection of analgesics, reduction of postoperative complications (3 times) and mortality.

V.M. Timerbulatov V.M. Sibaev, R.B. Sagitov [142], (258), 2005 the criteria for optimal approaches for endovideosurgical and combined surgeries were determined, the state of microcirculation in the peritoneum was studied as an objective indicator of the degree of tissue injury during various surgical approaches. The criteria for endosurgical approaches are schematically: 1) the plane of surgical manipulation; 2) axis of laparoscopic view; 3) the axis of the surgical action of the tool; 4) surgical action angle; 5) wound depth; 5) accessibility zone.

Based on Doppler flowmetry, V.V. Sidorov and co-authors during the course of the study came to the following conclusion: the greatest decrease in microcirculation occurs during laparotomy, which leads to greater tissue injury, with minilaparotomy the average decrease in microcirculation, the minimum - with laparoscopy. [123].

The frequency of complications in cholecystectomy from mini-approach does not exceed 2.7-5.6%, mortality is not more than 0.14-0.7%, and the need for conversion occurs in 0.3-2.9% of cases [31, 111, 157, 206, 209, 224].

Interest in the development and implementation of sparing approaches for cholecystectomy is relevant and important, since oblique subcostal incisions are traumatic, and median laparotomic incisions, which are widely implemented in surgery of the gallbladder and ducts and lobbied by us until the 1990s due to a significant number of complications (suppuration of wounds, postoperative hernias), should be used in a limited number of patients (with peritonitis, cholecysto-pancreonecrotitis, the need for simultaneous interventions).

We analyzed 1328 patients with pathology of the biliary tract and gallbladder using the median laparotomy approach (820), Kocher's incision (58), right-sided intermuscular sparing minilaparotomy approach (450). Of these, women - 998 (75.1%), men - 330 (24.9%). The age of patients is from 20 to 82 years (mean age 46.6 years).

500 (37.65%) patients were operated on for chronic cholecystitis, 828 (62.34%) patients for acute cholecystitis.

We have studied the immediate and long-term results of the use of wide laparotomy incisions, intermuscular minilaparotomy approach. The most frequent complications were bleeding in 42 (3.2 ± 0.48), and in 29 (3.5 ± 0.65) patients operated on by median approach, in 2 (3.4 ± 2.43) patients with an incision of the type Kocher and in 11 (2.4 ± 0.73) with the use of intermuscular mini-approach (in 4 of them, the incision had to be expanded). Bleeding was stopped during the surgery by vessel ligation (23), suturing or coagulation of the gallbladder bed with a tampon left (18), and in 1 case, when it was impossible to stop bleeding from the bed, tachocomb was successfully used.

Damage to the choledochus was in 13 patients (1.0 ± 0.27): in 8 (1.0 ± 0.34) with a median one, in 1 (1.7 ± 1.7) with a Kocher's incision in 4 (0, 9 ± 0.44) - with intermuscular mini- approach. In 8 patients, damage to the choledochus was detected during the surgery - a correction was made: suturing the defect (5), drainage according to Kehr (2), hepaticojejunoanastomosis (1), recovery.

Thus, in a comparative assessment of intraoperative complications, we did not reveal significant frequencies of them from approaches ($P>0.05$). They are

equally found both in the group of patients operated on for an acute process and a chronic one.

In the immediate postoperative period, complications such as infiltrates, suppuration of the wound, subhepatic abscesses are noted.

Infiltrates and suppuration of wounds were in 83 (6.3 ± 0.95), and the most pronounced in patients who had undergone a median and especially a Kocher-type incision. With intermuscular approach, these complications were noticeably less, amounting to a total of 16 (3.5 ± 1.23) of them: 10 (2.2 ± 0.69) infiltrates and 6 (1.3 ± 0.54) suppurations.

Subhepatic abscesses occurred equally 4 (0.5 ± 0.24) with a median of 2 (0.4 ± 0.31) and with intermuscular approach.

Relaparotomies were performed in 31 (2.3 ± 0.41) patients: in 22 (2.7 ± 0.56) after a median incision, in 2 (3.4 ± 2.4) with a Kocher's incision, and with an intermuscular approach in 7 (1.6 ± 0.58) patients.

Relaparotomy for bleeding was: in 19 (1.4 ± 0.33): after median approach in 14 (1.7 ± 0.45), Kocher's incision - in 1 (1.7 ± 1.7), miinilaparotomic intermuscular approach in 4 (0.9±0.44) patients. Causes of bleeding from a.cysticus - 14, from the gallbladder bed - 5, additional ligation of vessels, stitching of the bed, sanitation of the abdominal cavity.

Damage to the choledochus was the reason for relaparotomy in 12 (0.9 ± 0.26). At the same time, in 8 (0.9%) patients with a median approach, in 3 (0.7 ± 0.38) - with an intermuscular one, and in 1 (1.7 ± 1.7) with a Kocher's incision. In 4 patients, ligatures were removed, in 5 (with parietal damage) drainage according to Kehr (2), defect suturing (3). With complete intersection, hepaticojejunostomy was performed in 3 patients.

In a retrospective analysis of 786 case histories of patients operated from 1994 to 2008. regarding POVH, the following was revealed: after cholecystectomy there were 288 (36.6%), after gynecological surgeries - 172 (21.8%), recurrent umbilical hernias - 112 (14.2%) and a small number of hernias after other surgeries.

Thus, the largest number of patients with incisional hernias (36.6%) are those who underwent cholecystectomy, with the majority (92%) using the median approach.

Abdominal wall defect was sutured in 103 (38.9 %) patients: creation of a duplication of the muscular aponeurotic layer according to the Sapezhko type, Championier - in 106 (40.1 %), Yanov - 21 (7.9 %), simple dissection of the pinching ring in one an extremely severe patient with a giant strangulated hernia (recovery). In recent years, encouraging results have been obtained with the use of a polypropylene mesh (35 patients).

The duration of herniation in this contingent of patients played an extremely significant role in the outcome of surgical treatment: the longer POVH existed, the more often unfavorable conditions were created for the body's adaptation to increased intra-abdominal pressure in the early postoperative period.

According to the dry numbers of hernias after cholecystectomy, the difficult fate of patients suffering from cosmetic, physical, functional, and moral disorders lies. Determining the risk of repeated anesthesia, technical complications, surgeries with various plastics, damage to internal organs, syndrome of a small abdomen (postoperative paresis, pulmonary-cardiac, thromboembolic complications), high lethality - forces one to reconsider the tactics of surgical approach in cases of open cholecystectomy.

The development of gentle minimally traumatic incisions and, accordingly, interventions is a priority direction of modern surgery.

Since 1993, we an intermuscular migrating sparing minilaparotomy approach was developed and applied in the clinic in 450 patients (women – 302, men – 148), with acute cholecystitis – 278, with chronic – 172. Cholecystectomy from the neck – in 322, from the fundus – 80 patients, combined 48 patients. Approach expansion was made in 25 cases (5.6%). Usual instruments are used, plus illumination from the laparoscope (if necessary, a clipper).

For a rational choice of incision on the anterior abdominal wall, during ultrasound, we mark on the skin the projection of the neck of the gallbladder in the place of its smallest location - this is the center of an oblique or transverse incision

of 6-8 cm along the fold of the skin. Bluntly diverting adipose tissue and vascular-nervous bundles, we open the aponeurosis of the external oblique muscle of the abdomen along the course of each wound, and the internal oblique and transverse muscles of the abdomen are bluntly separated along the course of their fibers and the wound is opened with hooks.

The rectus abdominis muscle is removed medially to the midline without dissection (or, if necessary, with dissection of the anterior and posterior walls of the vagina);

The fundus and body of the gallbladder after emptying the latter are removed laterally, the neck of the gallbladder, artery and duct are distinguished. The latter is clipped or bandaged, the gallbladder is removed, and the subhepatic space is drained through a contraperture. (Rationalization proposal No. 489 dated 10.04.06, patent for inventions No. 03922 dated 27.10.2006).

To study the spatial relations in the wound, an experiment was conducted on 20 cadavers: the most common approaches were studied: upper - median laparotomy (5 on cadaver material, 5 in the clinic), Kocher's incision (5 on cadaver material, 5 - in the clinic), pararectal (5 on cadaver material), oblique intermuscular migrating approach (5 on cadaver material, 5 - in the clinic), in a comparative aspect (pararectal incisions were not used in the clinic).

At the same time, we came to the following conclusions that on cadaver material, the best angle of operative action is available with oblique intermuscular approach (87.6 ± 2.9) and the Kocher's incision (8.4 ± 1.5), the worst with the upper - median (67 .6 ± 2.5) and pararectal incision (76.7 ± 1.7), despite the largest sizes of the wound skin aperture at the upper median (14.5 ± 0.2) and pararectal incision (13.6 ± 0.3).

If a good surgical actions angle with the Kocher's incision is obtained due to the large size of each aperture (16.5 ± 0.2), then with the oblique intermuscular approach we proposed (thanks to ultrasound studies), even a small skin incision (7.1 ± 0.3) provided the best surgical action angle (87.6 ± 2.9).

The depth of the wound was greatest in the upper median incision (10.7 ± 0.4) and pararectal incision (8.8 ± 0.4), which created additional difficulties during

cholecystectomy. The smaller depth of the wound with the Kocher's incision (8.1 ± 0.2) and especially with the oblique intermuscular approach (6.8 ± 0.6) created favorable conditions for cholecystectomy.

The data of the angle of inclination of the axis of surgical action were the best, i.e. closer to 90˚ with oblique intermuscular approach (86.2˚ ± 3.2˚) and the Kocher's incision (79.0˚ ± 0.7˚). The sharp angle of inclination of the axis of surgical action at the pararectal incision (77.2˚ ± 1.0˚) and especially the upper - median one (57.0˚ ± 4.4˚) - naturally created worse conditions for cholecystectomy.

The index of the depth of the wound was also the best with an oblique intermuscular incision (95.1 ± 4.5), and all other approaches (upper median, Kocher's and pararectal) in terms of the index of the depth of the wound were significantly inferior to the oblique intermuscular approach and varied from 49.09˚ to 73 ,7˚ degrees.

Studies of spatial relationships in the wound on 15 patients during the analysis of intermuscular, Kocher's incision, upper median approaches: the criteria of the surgical action angle, the angle of inclination of the axis of surgical action, wound depth, wound depth index, and wound length were studied. At the same time, intermuscular approach at a depth of 6.8 ± 0.2, at an external aperture of 7.1 ± 0.2, the angle of inclination of the axis of the surgical action is 88.8˚ ± 0.5˚, the surgical action angle is 89.6˚ ± 0.4˚ at the same time, the wound depth index is 95.8 ± 2.0, which during the surgery gave a spacious effect for the surgeon's hands. These data make it possible to operate with the smallest wound depth of 6.8 ± 0.2. With an intermuscular approach, it is possible to operate with a wound depth index of 95.8 ± 2.0, which became a fairly good spatial relationship for the action of the surgeon's hands with this approach, since the use of approach in the clinic under general anesthesia gives a good relaxation of muscle tissue, which limits the upper - median approach only for surgeries with complications in the hepatobiliary zone.

In comparison with the upper-median approach, the sufficient dimensions of the external aperture, with a relatively large wound depth of 9.7 ± 0.3, with an external aperture of 14.0 ± 0.3, gave a small surgical action angle of 74.0˚ ± 1.5˚ ,

equal to the average angle of inclination of the axis of the surgical action 67.1˚ ± 0.7˚ - at the same time, the index of the depth of the wound is 68.4 □ 1.9, which characterizes the upper - median approach from the negative side as not providing good, stable conditions in the wound, which became with this approach not a good enough spatial relationship for the action of the surgeon's hands.

Kocher's incision with an external wound aperture of 14.2 ± 0.2, a wound depth of 8.0 ± 0.2, with an angle of inclination of the surgical action axis of 81.2˚ ± 0.4˚, which was not a sufficiently good spatial relationship with this approach for the action of the surgeon's hands.

The study and development of intermuscular approach on cadaveric material and in the clinic showed the parameters of the spatial relationship, the minilaparotomy intermuscular incision with the length of the wound from (7.1 ± 0.3, and 7.1 ± 0.2) and the angle of inclination of the surgical action axis from (86.2˚ ± 3.2˚ and 88.8˚ ± 0.5˚) and the surgical action angle (87.6˚ ± 2.9˚ and 89.6˚ ± 0.4˚) can be freely manipulated in hepatobiliary zone, and the depth of the wound (6.9 ± 0.2 and 7.1 ± 0.2) allows surgeons to remove the gallbladder from the neck without technical difficulties.

Thus, the widespread introduction of preoperative diagnostics with the help of ultrasound, mandatory EGD (to exclude pathology of the stomach, 12 - colon), endobiliary diagnostics and correction of pathology of the biliodigestive system, if necessary, laparoscopic verification, put before the surgeon a simplified task: cholecystectomy, which allows to avoid in case of open CCY, from traumatic median laparotomies (incision of uncertainty), wide subcostal oblique incisions, and to switch to gentle minilaparotomy approaches.

SUMMARY

1. Modern possibilities of preoperative diagnosis and correction of pathology of the biliary system allows the surgeon in cholecystitis to limit himself to cholecystectomy with sparing methods, including an oblique intermuscular mini-approach in the right hypochondrium.

2. Ultrasound determination of the syntopia of the gallbladder and its neck allows for an intermuscular mini-approach with preservation of the vascular and nervous structures formed in such a way that the center of the incision falls on the marked point of the smallest location of the gallbladder neck.

3. The study of spatial relations in the clinic and on cadaver material showed that with intermuscular minilaparotomy approach, these parameters are not inferior, but in a number of indicators (the smallest depth of the wound, and its index, surgical action angle) are superior to Kocher's incisions and median laparotomy.

4 The introduction of the developed intermuscular approach in patients with cholecystitis made it possible to reduce the traumatic nature of the surgery, the number of intra- and early postoperative complications, the time of stay in the clinic (more than twice), early rehabilitation, sharply reduce the number of postoperative ventral hernias, and improve the quality of life of patients.

PRACTICAL RECOMMENDATIONS

1. To reduce intra- and early postoperative complications, the traumatic nature of the surgical intervention, as well as to reduce postoperative ventral hernias after cholecystectomy, we recommend an intermuscular sparing minilaparotomy approach in the right hypochondrium (oblique or costolumbar).

2. In order to optimize approach, it is necessary to mark on the skin the point of the lowest location of the gallbladder neck, which will be the center of the incision.

3. Visually controlled preservation of subcutaneous vascular-nervous formations and blunt thinning of muscles along the course of their fibers make it possible to easily restore the structure and sharply reduce the number of postoperative ventral hernias.

4. Median approach can be used for biliary peritonitis, cholecysto-pancreatitis, as well as the need for simultaneous surgeries.

REFERENCES

1. Альперович Б.И. Хирургия печени и желчных путей. - Томск, 1997.- 605 с.
2. Амбросовский М.Ф. О рациональных разрезах брюшной стенки // Хирургия. - 1948. - № 10. - С. 21 - 28.
3. *Кустов А.Е, Хрупкин В.И, Горбачева И.В, Воротынцев А.С, Емельянов А.Ю. Радикальное лечение осложненной желчнокаменной болезни у пациентов старческого возраста: описание трех клинических случаев. 2019.*
4. *Аванесян Р. Г., Королев М. П., Федотов Л. Е., Турянчик М. М., Сабри С. Н. Осложнения чрескожных миниинвазивных эндобилиарных операций // Анналы хирургической гепатологии. 2019. Т. 24, № 2. С. 88-99. https://doi.org/10.16931/1995-5464.2019288-99.*
5. Аманов Г.А. Анатомо-физиологическая оценка хирургических разрезов передней брюшной стенки // Здравоохр. Туркменистана. - 2017. - № 5. - С. 13 - 17.
6. *Кустов А.Е, Хрупкин В.И, Горбачева И.В. - Сеченовский, 2021 - cyberleninka.ru. [HTML] Радикальное лечение осложненной желчнокаменной болезни у пациентов старческого возраста: описание трех клинических случаев.*
7. *Акбаров М.М., Саатов Р.Р., Туракулов У.Н. Струсский Л.П., Хакимов Ю.У. Малоинвазивная хирургическая коррекция ятрогенных повреждений внепеченочных желчных протоков и наружных желчных свищей. Бюл. ассоц. врачей Узбекистана. 2016; 1: 8–10. Алиев Ю.Г., Чиников М.А., Пантелева И.С., Курбанов Ф.С., Попович Б.К., Сушко А.Н. и др. Результаты хирургического лечения желчнокаменной болезни из лапаротомного и миниинвазивных доступов. Хирургия. Журнал имени Н.И. Пирогова 2015; 7: 21–25*
8. *Алиев Ю.Г., Чиников М.А., Пантелева И.С., Курбанов Ф.С., Попович Б.К., Сушко А.Н. и др. Результаты хирургического лечения*

желчнокаменной болезни из лапаротомного и миниинвазивных доступов. Хирургия. Журн им. Н.И. Пирогова 2015; 7: 21-25.

9. *Лапец А.С, Шевякова Д.В. - 2017 - rep.bsmu.by Лечение холедохолитиаза с применением операций с лапаротомным доступом, а также миниинвазивных и эндоскопических операций.*
10. Боровков С.А. Выбор доступа к внепеченочным желечным путям // Клиническая хирургия – 1968. - № 2 – С. 13 – 16.
11. Бородин И.Ф., Скобей Е.В., Акулиу В.П. Хирургия послеоперационных грыж живота. - М., 1986. - С. 18 - 19.
12. Буянов В.М., Козлова Л.В. Доступы к внепеченочным желчным путям // Клин. хир. - 1981. - № 11. - С. 64 - 69.
13. *Белеков Ж.О., Джапиев У.Х. Хирургическая тактика при ятрогенных повреждениях и рубцовых стриктурах внепеченочных желчных протоков // Вестник Алматинского государственного института усовершенствования врачей, 2015. №. 1-2.*
14. *Белеков Ж.О., Джапиев У.Х. Хирургическая тактика при ятрогенных повреждениях и рубцовых стриктурах внепеченочных желчных протоков // Вестник Алматинского государственного института усовершенствования врачей, 2015. №. 1-2.*
15. Брискин Б.С., Ломидзе О.В. Медико-экономическая оценка различных способов выполнения холецистэктомии // Хирургия им. Н.И. Пирогова. - 2015. - № 6. - С. 24 - 30.
16. Быков А.В., Орешкин А.Ю. Профилактика повреждений желчных путей при выполнении малоинвазивных холецистэктомий // Анналы хир. гепатол. - 2016. - Т. 5 - № 2.- С. 101 - 148.
17. *Вестник новых медицинских технологий. электронное издание – 2020 – n 1 journal of new medical technologies, eedition – 2020 – n 1 удк: 61 doi: 10.24411/2075-4094-2020-16584 современные возможности индивидуального подхода к лечению пациентов с холангиолитиазом Марийко В.А, Малафеев И.В, Демченко И.Н, Горбач Ю.М, Марийко*

А.В. фгбоу во Тульский государственный университет, Медицинский институт, ул. Болдина, д. 128, г. Тула, 300012, Россия С.18-21

18. *Вестник новых медицинских технологий. Электронное издание – 2020 – n 1 journal of new medical technologies, eEdition – 2020 – N 1*

19. Выбор хирургического доступа при операциях на желчных внепеченочных путях / М.И. Шалаев, Л.Б. Дуберман, А.И. Петриченко и др. // Хирургия. - 1977. - № 9. - С. 67 - 70.

20. *Вестник Совета молодых учёных и специалистов Челябинской области №4 (15) Т. 3 2016. С 82-88*

21. *Выбор оптимального варианта эндоскопического лечения пациентов с холедохолитиазом. вестник современной клинической медицины 2021 Том 14, вып. 6 С. 58-67*

22. Возможности минилапаротомии с элементами «открытой» лапароскопии в хирургическом лечении холецистохоледохолитиаза / А.М. Шулутко, А.И. Данилов, М.О. Чантурия и др. // Эндоскоп. хир. - 2016. - № 1. -С. 19 - 23.

23. Галышев В.И., Зотиков С.Д., Глянцев С.П. Холецистэктомия из минидоступа у лиц пожилого и старческого возраста // Хирургия. - 2015. - № 3. - С. 15 - 18.

24. *ГБУЗ «Госпиталь для ветеранов войн № 2» Департамента здравоохранения г. Москвы Волгоградский пр-т, д. 168, г. Москва, 109472, Россия 2 ФГАОУ ВО «Первый Московский государственный медицинский университет им. И.М. Сеченова» Минздрава России (Сеченовский университет) ул. Трубецкая, д. 8, стр. 2, г. Москва, 119991, Россия.*

25. Гейлер Л.И. Непосредственные и отдаленные результаты применения поперечного разреза передней брюшной стенки // Хирургия. - 1952. - № 2. - С. 56 - 64.

26. *Давлатов С.С., Хидиров З.Э., Насимов А.М. Дифференцированный подход к лечению больных с синдромом Мириззи //Academy, 2017. № 2. С. 95-98.*
27. *Давлатов С.С. Дифференцированный подход к лечению больных острым холангитом, осложненным билиарным сепсисом //Вісник наукових досліджень. 2017. №. 1. С. 72-76.*
28. *Давлатов С.С. и др. Эффективность миниинвазивных методов хирургического лечения больных с острым деструктивным холециститом // Academy, 2017. № 7. С. 92-94.*
29. *Давлатов С.С., Хидиров З.Э., Насимов А.М. Дифференцированный подход к лечению больных с синдромом Мириззи //Academy, 2017. № 2. С. 95-98.*
30. *Данилов М.В., Зурабиани В.Г., Карпова Н.Б. Осложнения минимально инвазивной хирургии. (Хирургическое лечение осложнений минимально инвазивных вмешательств на желчных путях и поджелудочной железе, Научное издание). М.: Бином, 2015; 304.*
31. *ДВ Захаров, АП Уханов, ГИ Чуваков… - Актуальные вопросы …, 2018 - elibrary.ru. Опыт использования гибридных миниинвазивных вмешательств при лечении больных с холедохолитиазом и холангитом.*
32. *Диагностика и лечение острых хирургических заболеваний органов брюшной полости в учреждениях здравоохранения Москвы. Под ред. А. В. Шабунина. 2-е изд., доп. М.: Московские учебники, 2019. 64 с. ISBN 978-5-7853-1542-6.*
33. *Ермолов А.С., Иванов П.А., Благовестнов Д.А. и др. Тактика лечения острого холецистита, осложненного холедохолитиазом. Хирургия. Журн. им. Н.И. Пирогова. 2017; 1: 10–14.*
34. Егиев В.И. Ненатяжная герниопластика. - М.: Медпрактика, 2002. - 148 с.
35. *Жураева Ф.Ф. , Юсупалиева К.Б. Давлатов С.С., Жураева Ф.Ф., Юсупалиева К.Б. Эффективность Миниинвазивных методов*

хирургического лечения больных с острым деструктивным холециститом Ташкентский государственный стоматологический институт, г. Ташкент, Республика Узбекистан.

36. Земсков В.С., Шор-Чудновский М.Е. Некоторые вопросы хирургии внепеченочных желчных протоков // Вестн. хирургия. им. И.И. Грекова.- 2018. - № 8. - С. 36 - 41.
37. **Золотарева Т.В. О разрезах на передней брюшной стенки // Вестн. хир. - 1956. - № 4. - С. 53 - 58.**
38. Измайлов С.Г., Бодров А.А. Способ ушивания срединных лапаротомных ран // Хирургия. - 2015. - № 7. - С. 28 - 32.
39. Калиновская А.М. Оперативные доступы к желчным путям // Хирургия. - 1948. - № 7. - С. 32 - 38.
40. Качество жизни пациентов после холецистэктомии из минидоступа с элементами открытой лапароскопической техники / А.М. Шулутко, П.С. Ветшев, К.Е. Чилингариди и др. // 7-я международная конференция хирургов-гепатологов России и стран СНГ: Тез. докл. - Смоленск, 2019. – С. 56.
41. *Карпов О. Э., Ветшев П. С., Бруслик С. В., Маады А. С., Левчук А. Л., Свиридова Т. И. Сочетанное применение миниинвазивных технологий в лечении механической желтухи // Анналы хирургической гепатологии. 2019. Т. 24, № 2. С. 100-104. https://doi.org/10.16931/1995-5464.20192100-104.*
42. *Колобов С.В., Шевченко В.П., Зинатулин Д.Р., Налетов В.В., Погодин С.Ю., Скрыпник Ю.Л., Умяров Р.Х., Редькина М.А., Куприянова А.С., Сизова А.Н., Светашов В.С. Баллонная холангиопластика рубцовых поражений желчных протоков и холангиоеюнальных соустьев // Хирург. 2016. №3. С. 19–25*
43. *Королёв М.П., Федотов Л.Е., Аванесян Р.Г., Федотов Б.Л., Лепехин Г.М. Комбинированное анте- и ретроградное восстановление непрерывности общего печеночного протока после сочетанного*

ятрогенного повреждения. Вестн. хир. им. И.И. Грекова 2016; 175(2): 105–107.

44. *Королёв М.П., Федотов Л.Е., Аванесян Р.Г., Федотов Б.Л., Лепехин Г.М., Комбинированное анте- и ретроградное восстановление непрерывности общего печеночного протока после сочетанного ятрогенного повреждения. Вестн хир им. И.И.Грекова 2016; 175(2): 105-107.*
45. *Колесников С.А., Пахлеванян В.Г., Копылов А.А., Жарко С.В., Захаров О.В., Чайкин Р.С., Kolesnikov S.A., Pakhlevanyan V.G., Kopylov A.A., Zharko S.V., Zakharov O.B., Chaykin R.S.*
46. *Курбаниязов З.Б., Арзиев И.А. Проблемы диагностики и лечения желчеистечения в раннем послеоперационном периоде после холецистэктомии // Проблемы биологии и медицины, 2019. № 4. Том. 113. С. 208-212.*
47. Ким В.Л. Малоинвазивные методы в лечении желчнокаменной болезни и ее осложнений: Автореф. дис. ... д-ра мед. наук. - Ташкент, 2018. -34 с.
48. Кирик В.М. Клинико-анатомическое обоснование некоторых оперативных доступов к желчным путям и червеобразному отростку: Автореф. дис. … канд. мед. наук. - Харьков, 2017. - 23 с.
49. Колесов В.И., Колесов Е.В. Верхняя расширенная поперечная лапаротомия // Вестн. хир. - 1962. -Т. 88, № 4. - С. 3 - 10.
50. Майстеренко Н.А., Ткаченко А.Н. Негативные последствия хирургического лечения послеоперационных вентральных грыж. Возможность прогноза и пути профилактики // Вестн. хир. - 1998. - № 4. - С. 130 - 136.
51. Майстеренко Н.А., Нечая А.И. Гепатобилиарная хирургия./ Ст – Петербург. - 1999. 268 с
52. *Максимова К.А Малоинвазивные технологии в лечении больных калькулезным холециститом. - Международный журнал прикладных и фундаментальных исследований, 2017 - s.applied-research.ru*

53. *Макоед Л.Г, Сулима Я.А. - 2018 - rep.bsmu.by Сравнительная характеристика отдаленных результатов лечения холедохолитиаза с использованием методов эндоскопической, лапоротомной и лапароскопии.*
54. *Майстренко Н.А., Ромащенко П.Н., Алиев А.К., Емельянов А.А., Феклюнин А.А. Хирургическое лечение ятрогенного повреждения желчевыводящих протоков. Вестн. хир. им. И.И.Грекова 2016; 175(3): 83–85.*
55. *Михин И.В., Воробьев А.А., Доронин М.Б., Косивцов О.А., Абрамян Е.И., Рясков Л.А. О целесообразности уменьшения доступа при операциях по поводу желчнокаменной болезни. Эндоскоп. хир., 2016; 22(5): 11–16// Малоинвазивные технологии в лечении больных с острым деструктивным холециститом.*
56. *Малоинвазивные технологии в лечении больных с острым деструктивным холециститом Назаров З.Н.1, Юсупалиева Д.Б.2 , Тилавова Ю.М.3 Назаров З.Н., Юсупалиева Д.Б., Тилавова Ю.М. Малоинвазивные технологии в лечении больных с острым деструктивным холециститом г. Ташкент; Республика Узбекистан*
57. *Меджидов Р.Т., Курбанова А.Р., Султанова Р.С., Скороваров А.С., Абдулаева А.З., Магомедов М.М., Исмаилова К.А. Миниинвазивные эндобилиарные вмешательства в сложных для эндоскопического пособия случаях холелитиаза. Вестник хирургии имени И.И. Грекова. 2023;182(3):54-60. https://doi.org/10.24884/0042-4625-2023-182-3-*
58. *Методы лечения холедохолитиаза / Н.В. Мерзликин, В.Ф. Подгорнов, Е.В. Семичев [и др.] // Бюллетень сибирской медицины. – 2015. – № 4. – С.99–109. DOI: 10.20538/1682-0363-2015-4-99-109.*
59. *Миниинвазивные методы лечения больных с острым деструктивным холециститом Шамсиев Ж. З, Анарбаев С.А. Миниинвазивные методы лечения больных с острым деструктивным холециститом Самаркандский государственный медицинский институт, г. Самарканд, Республика Узбекистан С.92-94 2019.*

60. *Меджидов Р.Т., Курбанова А.Р., Султанова Р.С., Скороваров А.С., Абдулаева А.З., Магомедов М.М., Исмаилова К.А. Миниинвазивные эндобилиарные вмешательства в сложных для эндоскопического пособия случаях холелитиаза. Вестник хирургии имени И.И. Грекова. 2023;182(3):54-60.*

61. Милонов О.Б., Мовчун А.А.О выявлении поражений желчных протоков // Вестн. хир. им. И.И. Грекова. - 1990. - № 6. - С. 59 - 60.

62. *Михайличенко В.Ю., Кисляков В.В., Резниченко А.М. и др. Современные аспекты хирургического лечения синдрома механическеой желтухи //Современные проблемы науки и образования. -2019. №3.*

63. *Михин И.В., Воробьев А.А., Доронин М.Б., Косивцов О.А., Абрамян Е.И., Рясков Л.А. О целесообразно- 10 Вестник экстренной медицины, 2019, XII (5) Уменьшения доступа при операциях по поводу желчнокаменной болезни. Эндоскопии хир 2016; 22(5): 11-16.*

64. *Мусабоев Н.Х., Имантаев Е.М., Ибрагимов Ш.К. и др. Тактика оперативных технологий при остром холецистите //Вестник КазНМУ. 2015. №1. –с.248-253.*

65. *Назаров З.Н., Юсупалиева Д.Б., Тилавова Ю.М. Назаров З.Н., Юсупалиева Д.Б., Тилавова Ю.М. Малоинвазивные технологии в лечении больных с острым деструктивным холециститом Самаркандский государственный медицинский институт, г. Самарканд, Республика Узбекистан С-82-86* cyberleninka.ru

66. *Назыров Ф.Г., Акбаров М.М., Икрамов А.И., Омонов О.А. Современная стратегия лечения ятрогенных повреждений внепеченочных желчных путей и наружных желчных свищей: науч. изд. Хир. Узбекистана, 2014; 63(3): 41.*

67. *Назыров Ф.Г., Акбаров М.М., Икрамов А.И., Омонов О.А. Современная стратегия лечения ятрогенных повреждений внепеченочных желчных путей и наружных желчных свищей: научное издание. Хир Узбекистана 2014; 63(3): 41.*

68. *Новые технологии Шестилетний опыт лечения больных острым холециститом, оперированных из минидоступа A.M. Alekseev, A.I. Baranov, G.A. Pugachev. 2020*

69. *Орипов Д.Ю, Мирзараимова С.С., Курбанкулова У.М. Выбор способа дренирования желчных протоков при механической желтухе опухолевого генеза. Вестник ТМА. 2016; 1: 88–91.*

70. *Особенности холецистэктомия из модифицированного минидоступа при желчекаменной болезни и ее осложнениях Солижонов З.Б., Ботиров А.К, Отакузиев А.З Андижанский государственный медицинский институт С.291-292 2022 - api.scienceweb.uz*

71. Осложнения острого холецистита у пожилых / М.Х. Хаджибаев, Р.М. Нурмухамедов, А.Е. Аталиев и др. - Ташкент, 2000. - 172 с.

72. *Подлужный В.И. Механическая желтуха: Принципы диагностики и современного хирургического лечения //Фундаментальная и клиническая медицина. 2018. Том. 3, №2. –с.82-92.*

73. Прудков М.И., Нишневич Е.В., Кармацких А.Ю. Вмешательства на холедохе из минилапаротомного доступа при остром холецистите // Анналы хир. гепатол. - 1998. - Т. 3, № 3. - С. 94 - 95.

74. Прудков М.И. Минилапаротомия и «открытые» лапароскопические операции в лечении больных желчекаменной болезнью // Хирургия им. Н.И. Пирогова. - 1997. - № 1. - С. 32 - 35.

75. Прудков М.И., Власов А.А. Реабилитация больных желчнокаменной болезнью после минимально инвазивного хирургического лечения. - Екатеринбург, 2001.- 36 с.

76. Петровский Б.В., Почечуев Е.А. О новом доступе к органам гепато-панкрео-дуоденальной зоны // Вестн. хир. - 1969. - № 6. - С. 25 - 32.

77. Показания к вмешательствам из минилапаротомного доступа при желчнокаменной болезни /А.Л. Шестаков А.В. Юрасов, В.А. Мовчун и др. // Анналы хир. - 1996. - № 2. - С. 43 - 47.

78. Пушкин С.Ю. Хирургическое лечение послеоперационных вентральных грыж и патогенетическое обоснование пластик

комбинированным способом: Автореф. дис. … канд. мед. наук. - Самара, 1999. - 46 с.

79. *Подлужный В.И. Осложнения желчнокаменной болезни //Фундаментальная и клиническая медицина. -2017. -.2., №1. –с.102-104.*

80. *Праздников Э.Н., Баронов Г.А., Зинатулин Д.Р., Умяров Р.Х., Шевченко В.П., Николаев Н.М. Возможности антеградного доступа в лечении холангиолитиаза, осложненного синдромом механической желтухи // Хирургия. Журнал им. Н.И. Пирогова. 2018. №1. С. 21–25.*

81. *Разновидности холецистэктомии Сухарева М.В., Фгбоу во юугму минздрава России, г. Челябинск, Россия А.О. Самаркина, фгбоу во юугму Минздрава России, г. Челябинск, Россия А.А. Семагин, Фгбу "фцссх" Минздрава России, г. Челябинск, Россия*

82. *Рахманов К.Э, Давлатов С.С, Шербеков У.А, Сайдуллаев З.Я. Рахманов К.Э., Давлатов С.С., Шербеков У.А., Сайдуллаев З.Я. Причины и пути предупреждения ранних билиарных осложнений после холецистэктомии / Rakhmanov K.E., Davlatov S.S., Sherbekov U.A С.93-97*

83. *Ринчинов, В.Б. Оценка эффективности различных эндоскопических транспапиллярных вмешательств по поводу крупного холедохолитиаза / В.Б. Ринчинов, А.Н. Плеханов, Е.Ю. Лудупова // Хирургия. Журнал им. Н.И. Пирогова. – 2019. – № 6. – С.60–64. DOI: 10.17116/hirurgia201906160.*

84. Ратнер Г.Л. Принципы выбора хирургического доступа // Хирургия. - 1988. - № 11. - С. 92 - 96.

85. Результаты лечения больных с послеоперационной вентральной грыжей / Ю.Р. Мирзабекян, М.П. Иванов, В.К. Попович, С.Р. Добровольский // Хирургия. - 2008. - № 5. - С. 52 - 54.

86. Ратнер Г.Л. Принципы выбора хирургического доступа // Хирургия. - 1988. - № 11. - С. 92 - 96.

87. *Сажин В.П., Юдин В.А., Сажин И.В., Нуждихин А.В., Осипов В.В., Подъяблонская И.А. Операционные риски и их профилактика при лапароскопической холецистэктомии. Хирургия. Журн. им. Н.И. Пирогова, 2015; 6: 17–20.*

88. *С.А Быстров, В.О Бизярин - Хирургия Беларуси на современном этапе, 2018 - Причины и пути предупреждения ранних билиарных осложнений после холецистэктомии. Миниинвазивная хирургия жкб у лиц пожилого и старческого возраста.*

89. *Серикбайулы, Д. Современные технологии лечения холедохолитиаза / Д. Серикбайулы, М.Ж. Аймагамбетов // Клиническая медицина Казахстана. – 2017. – Т. 43, № 1. – С.15–19. DOI: 10.23950/1812-2892-JCMK-00379.*

90. Сидоров В.В. Двухканальный способ лазерного зондирования ткани – развития метода ЛДФ.// Материалы IY Всероссийского симпозиума «Применение лазерной доплеровской флоуметрии в медицинской практике» Пущино. 2002. - С. 25.

91. Слесаренко С.С., Федоров А.В., Коссович М.А. Эволюция операционного доступа в абдоминальной хирургии // Хирургия им. Н.И. Пирогова. - 1999. - № 5. - С. 31 - 33.

92. Смирнов Н.Н. Расхождение краев брюшной послеоперационной раны // Хирургия. - 1952. - № 7. - С. 69 - 72.

93. Соколов А.М. О расстройствах функции мышц брюшного пресса после некоторых лапаротомических разрезов // Вестн. хир. - 1956. - № 4. - С. 58 - 64.

94. Созон-Ярошевич А.Ю. Анатомо-клинические обоснования хирургических доступов к внутренним органам.-Л.: Медгиз, 1954. - 179 с.

95. *Совцов С.А. Безопасная холецистэктомия //Учебное пособие. Челябинск. 2019. -40С. "Экономика и социум" №5(96)-2 2022 www.iupr.ru 941*

96. *Тимербулатов М.В. Хирургическое лечение больных с острым холециститом / М. В. Тимербулатов, Ш. В. Тимербулатов, А. М. Саргсян //Анналы хирургии. -2017. -Т. 22. -№ 1. -С. 20-24.*

97. Тимербулатов В.М., Сибаев В.М., Сагитов Р.Б. Анатомо-клиническое обоснование лапароскопических и комбинированных операций // Хирургия им. Н.И. Пирогова. - 2005. - № 5. - С. 43 - 46.

98. Тимошин А.Д., Юрасов А.В., Шестаков А.Л. Хирургическое лечения паховых и послеоперационных грыж брюшной стенки. - М: Триада - Х, 2003. - 144 с.

99. *Турбин М.В. Опыт выполнения лапароскопической холецистэктомии при осложненных формах острого холецистита /Турбин М.В. [и др.] //Современные проблемы науки и образования. -2018. -№ 5. -С. 58.*

100. *Хирургическая тактика при повреждениях внепеченочных и магистральных внутрипеченочных желчных протоков в результате малоинвазивных холецистэктомий С.39-43*

101. Холецистэктомия с использованием минимального доступа / А.А. Шалимов, В.М. Копчак, А.И. Аронов и др. // Клин. хир. - 1994. - № 1 - 2. - С. 3 - 4.

102. Холецистэктомія из мінідоступ при госрому холециститі / О.С. Бобров, В.І. Бучнев, М.А. Мендель, Ю.С. Семенюк // Науков. вісн. Ужгор. Універ - ту. (Медицина). - 2001. - Вип. 14. - С. 94 - 95.

103. Шайн М. Здравый смысл в неотложной абдоминальной хирургии. – М.: ГЭОТАР Мед, 2003. – 272 с.

104. *Шестилетний опыт лечения больных острым холециститом, оперированных из минидоступа A.M. Alekseev, A.I. Baranov, G.A. Pugachev С.25-28*

105. Шестаков А.Л., Юрасов А.В., Мовчун В.А. Показания к вмешательствам из минилапаротомного доступа при желчнокаменной болезни // Анналы хир. - 1996. - № 2. - С. 43 - 47.

106. *Шоназаров И.Ш, Мизамов Ф.О., Хурсанов Ё.Э., Ачилов М.Т. и др. Диагностика и хирургическая коррекция синдрома Мириззи //Re-health journal. – 2020. – №. 2-2 (6). – С. 111-113.Эффективность приоритетного использования миниинвазивных вмешательств в хирургическом лечении осложненных форм острого холецистита*

107. *Эффективность миниинвазивных методов хирургического лечения больных с острым деструктивным холециститом. СС Давлатов, ФФ Жураева, КБК Юсупалиева - Academy, 2017 - cyberleninka.ru*

108. Эффективность герниопластики с использованием полипропиленового сетчатого имплантата в лечении послеоперационных вентральных грыж / В.М Седов., С.Д. Тарбаев., А.А. Гостевской., А.С. Горелов // Вестник хирургии. - 2015. - № 3. – Т. - 164, С. 5 - 8.

109. Янов В.Н. Аутодермальная пластика больших и гигантских послеоперационных и пупочных грыж: Дис. … д - ра мед. наук. - М., 1978. -320 с.

На английском языке:

110. A populationbasedcohort studj covparing laparoscopie cholecystectomy and open cholecystectomy / S.L. Zacks, R.S. Sandller, R Rutlegre, R.S. Brown //Amer. J. castroenterol. - 2002. - Vol. 97, № 2. - P. 334 -340.

111. *Acute calculous cholecystitis: Review of current best practices. Sartelli M, Abu-Zidan FM, Catena F, Griffiths EA, Di Saverio S, Coimbra R, Ordoñez CA, Leppaniemi A, Fraga GP, Coccolini F, et al. Global validation of the WSES Sepsis Severity Score for patients with complicated intra-abdominal infections: a prospective multicentre study (WISS Study) World J Emerg Surg. 2015;10:61. [PMC free article] [PubMed] [Google Scholar]*

112. *Adler, D.; Kamal, F.; Khan, M.; Lee-Smith, W.; Sharma, S.; Acharya, A.; Farooq, U.; Aziz, M.; Kouanda, A.; Dai, S.-C.; et al. Efficacy and safety of EUS-guided gallbladder drainage for rescue treatment of malignant*

biliary obstruction: A systematic review and meta-analysis. Endosc. Ultrasound 2023, 12, 8–15. [Google Scholar]

113. *Agarwal N., Sharma B.C., Garg S. et al. Endoscopic management of postoperative bile leaks. Hepatobiliary-Pancreat-Dis-Int 2016; 5(2): 273–277.*

114. *Akinori Maruta, Takuji Iwashita , Shinya Uemura et al. Comparison of late adverse events after endoscopic sphincterotomy versus endoscopic papillary large balloon dilation for common bile duct stones: A propensity score-based cohort analysis. Gastroenterological Endoscopy March. 2019; 61 (3): 309-318. DOI:10.11280/ gee.61.309.*

115. *Anderloni, A.; Troncone, E.; Fugazza, A.; Cappello, A.; Blanco, G.D.V.; Monteleone, G.; Repici, A. Lumen-apposing metal stents for malignant biliary obstruction: Is this the ultimate horizon of our experience? World J. Gastroenterol. 2019, 25, 3857–3869. [Google Scholar] [CrossRef]*

116. *Assaban M., Aube C., Lebigot J. et al. Mangafodipir trisodium-enhanced magnetic resonance cholangiography for detection of bile leaks. J Radiol 2016; 87(1): 41–47.*

117. Assalia A., Kopelman D., Hashmonai M. Emergency minilaparotomy cholecystectomy for acute cholecystitis: prospective randomized trial — implications for the laparoscopic era // Wld J. Surg. - 2007. - Vol 21, № 5. - P. 534 - 539.

118. Bass E.B., Pitt H.A., Lillemeo K.D. Cost-effectiveness of laparoscopic cholecystectomy versus open cholecystectomy // Amer. J. Surg. - 2003. - Vol. 165. - P. 466 - 471.

119. *Baiu I, Hawn MT. Choledocholithiasis. JAMA. 2018; 320 (14): 1506. DOI:10.1001/jama.2018.11812.*

120. *Barreras Gonzalez J.E., Torres Pena R., Torres J., Martinez Alfonso M.A., Brizuela Quintanilla, Morera Peuez M. Endoscopic versus laparocopic treatment for choledocholithiasis: a prospective random-ized*

cjntrolled tril // Endscopy International Open. 2016. № 4(11). E. 1188–1193.

121. *Becker B.A., Chin E., Mervis E., Anderson C.L., Oshita M.H., Fox J.C. Emergency biliary sonography: utility of common bile duct measurement in the diagnosis of cholecystitis and choledocholithiasis. J Emerg Med 2014; 46(1): 54-60.*

122. *Beliaev AM, Zyul'korneeva S, Rowbotham D, Bergin CJ. Screening acute cholangitis patients for sepsis. ANZ J Surg. 2019; 89 (11): 1457-1461. DOI:10.1111/ans.15432.*

123. *Bencini L., Tommasi C., Manetti R., Farsi M. Modern approach to cholecysto-choledocholithiasis. World J Gastrointest Endosc. 2014 Feb 16; 6(2): 32–40. https://doi.org/10.4253/wjge.v6.i2.32. PMID: 24567790*

124. *Bougard M, Barbier L, Godart B, et al. Management of biliary acute pancreatitis. Visc Surg. 2019; 156 (2): 113- 125. DOI: 10.1016/j.jviscsurg.2018.08.002.*

125. *Bradley A., Sami S., Hemadasa N., et al. Decision analysis of minimally invasive management options for cholecysto-choledocholithiasis. Surg Endosc. 2020 Dec; 34(12): 5211–5222. https://doi.org/10.1007/s00464-020-07816-w. Epub 2020 Jul 24. PMID: 32710213*

126. *Buxbaum JL, Abbas Fehmi SM, Sultan S, et al. ASGE guideline on the role of endoscopy in the evaluation and management of choledocholithiasis. Gastrointest Endosc. 2019; 89 (6): 1075-1105. DOI: 10.1016/j. gie.2018.10.001*

127. *Chen H., Siwo E.A., Khu M., Tian Y. Current trends in the management of Mirizzi syndrome: A review of literature. Medicine (Baltimore). 2018 Jan; 97(4): e9691. https://doi.org/10.1097/ MD.0000000000009691. PMID: 29369192*

128. *Chen M, Wang L, Wang Y, Wei W, et al. Risk factor analysis of post-ERCP cholangitis: A single-center experience. Hepatobiliary Pancreat Dis Int. 2018; 17 (1): 55-58. DOI: 10.1016/j.hbpd.2018.01.002*

129. *Chhoda A, Mukewar SS, Mahadev S. Managing Gallstone Disease in the Elderly. Clin Geriatr Med. 2021;37(1):43–69.*

130. *Choledocholithiasis / I. Baiu, M.T. Hawn // JAMA. – 2018. – Vol. 320 (14). – P.1506. DOI: 10.1001/jama.2018.11812.*

131. Cholecystectomy: laparoscopic or mini-laparotomy / H. Cebeci, A.H. Ozabal, F. Sirin et al. // Abstracts of the European Congress of the International Hepato-Pancreato - Bilary Association. - Город, 2007. - P. 36.

132. Cholecystectomy by minilaparatomy without muscle section: a short-stay procedure / E.P. Pellissier, D. Blum, J.M. Meyer, J.F. Girard // Hepatogastroenterology. - 1992. - Vol. 39, № 4. - P. 294 - 295.

133. Cholecystectomy using median minilaparotomy. A new method / N.F. Safatle, J.da Costa Filho, D.V. Ciasca, A.V. Ribeiro // Arq. Gastroenterol. - 1991. -Vol. 28, № 4. - P. 119 - 123.

134.

135. *Choudhury SR, Gupta P, Garg S, Kalra N, Kang M, Sandhu MS. Image-guided percutaneous cholecystostomy: a comprehensive review. Ir J Med Sci. 2022;191(2):727–38.*

136. *Coccolini F., Catene F., Pisane M., et al. Open versus laporoscopic cholecystectomic in acute Cholecystititis. Systematic Rewiew and metaanalysis //Int. J. Surg. 2015; 18: 196. 204C.*

137. *Comparison of late adverse events after endoscopic sphincterotomy versus endoscopic papillary large balloon dilation for common bile duct stones: A propensity scorebased cohort analysis / Akinori Maruta, Takuji Iwashita, Shinya Uemura [et al.] // Gastroenterological Endoscopy March. – 2019. – Vol. 61 (3). – P.309–318. DOI:10.11280/ gee.61.309*

138. Comparison of metabolic responses to laparoscopic and minilaparatomy cholecystecystectomy / A.J. McMahon, P.J. O`Dwyer, A.M. Cruikshank et al. // Brit. J. Surg. - 1993. - Vol. 80, № 10. - P. 1255 - 1258.

139. *Costanzo ML, D'Andrea V, Lauro A, Bellini MI. Acute cholecystitis from biliary lithiasis: diagnosis, management and treatment. Antibiot (Basel). 2023;12(3):482.*

140. *Costi R., Gnocchi A., Di Mario F., Sarli L. Diagnosis and management of choledocholithiasis in the golden age of imaging, endoscopy and laparoscopy. World J Gastroenterol. 2014 Oct 7; 20(37): 13382–13401. https://doi.org/10.3748/wjg.v20.i37.13382. PMID: 25309071*

141. *Cucchetti, A.; Binda, C.; Dajti, E.; Sbrancia, M.; Ercolani, G.; Fabbri, C. Trial sequential analysis of EUS-guided gallbladder drainage versus percutaneous cholecystostomy in patients with acute cholecystitis. Gastrointest. Endosc. 2022, 95, 399–406. [Google Scholar] [CrossRef]*

142. *Davlatov S.S., Askarov P.A. Rezultaty lecheniya bolnykh s zhelcheistecheniyem posle kholetsistektomii [Results of treatment of patients with bile cystitis after cholecystectomy] // Molodoy organizator zdravookhra neniya: sb. nauch. st. studentov– The young organizer of public health, 2013.*

143. *Davlatov S.S., Kasimov S.Z. Extracorporal technologies in the treatment of cholemic intoxication in patients with suppurative cholangitis // The First European Conference on Biology and Medical Sciences, 2014. C. 175-179.*

144. *Di Mitri, R.; Amata, M.; Mocciaro, F.; Conte, E.; Bonaccorso, A.; Scrivo, B.; Scimeca, D. EUS-guided biliary drainage with LAMS for distal malignant biliary obstruction when ERCP fails: Single-center retrospective study and maldeployment management. Surg. Endosc. 2022, 36, 4553–4569. [Google Scholar] [CrossRef]*

145. *Digestive and Liver Disease. Volume 55, Issue 9, September 2023, Pages 1169-1177. H.C. Alexander Reporting of complications after laparoscopic cholecystectomy: a systematic review HPB (2018) Volume 20, Issue 9, September 2018, Pages 786-794*

146. *DiMaio, C.; Kakked, G.; Salameh, H.; Cheesman, A.; Kumta, N.; Nagula, S. Primary EUS-guided biliary drainage versus ERCP drainage for the management of malignant biliary obstruction: A systematic review and*

meta-analysis. Endosc. Ultrasound 2020, 9, 298–307. [Google Scholar] [CrossRef]

147. *Duan, F.; Cui, L.; Bai, Y.; Li, X.; Yan, J.; Liu, X. Comparison of efficacy and complications of endoscopic and percutaneous biliary drainage in malignant obstructive jaundice: A systematic review and meta-analysis. Cancer Imaging 2017, 17, 27. [Google Scholar] [CrossRef] [PubMed]*

148. *E. Aguayo et al. National trends and outcomes of inpatient robotic-assisted versus laparoscopic cholecystectomy. Volume 169, Issue 4, April 2021, Surgery. (2020). Pages 859-867.*

149. *Endo R.T. Saline Solution Irrigation of the Bile Duct after Stone Removal Reduces the Recurrence of Common Bile Duct Stones / R.T. Endo, A. Satoh, Y. Tanaka et al. // Tohoku J Exp Med. — 2020. — 250(3). — p. 173-179. — DOI: 10.1620/tjem.250.173.*

150. *Endoscopic retrograde cholangiopancreatography (ERCP) in critically ill patients is safe and effective when performed in the endoscopy suite /*

151. *EUS-guided gallbladder drainage using a lumen-apposing metal stent as rescue treatment for malignant distal biliary obstruction: a large multicenter experience. 2023, Gastrointestinal Endoscopy*

152. *Farina DA, Komanduri S, Aadam AA, Keswani RN. Endoscopic retrograde cholangiopancreatography (ERCP) in critically ill patients is safe and effective when performed in the endoscopy suite. Endosc Int Open. 2020; 8 (9): 1165-1172. DOI: 10.1055/a-1194-4049.*

153. *Feng X, Dong J. Surgical management for bile duct injury. Biosci Trends. 2017; 11(4): 399-405.*

154. *Fugazza, A.; Troncone, E.; Amato, A.; Tarantino, I.; Iannone, A.; Donato, G.; D'Amico, F.; Mogavero, G.; Amata, M.; Fabbri, C.; et al. Difficult biliary cannulation in patients with distal malignant biliary obstruction: An underestimated problem? Dig. Liver Dis. 2022, 54, 529–536. [Google Scholar] [CrossRef] [PubMed]*

155. *Gallaher JR, Charles A. Acute Cholecystitis: a review. JAMA. 2022;327(10):965–75. Borzellino G, Massimiliano Motton AP, Minniti F, Montemezzi S, Tomezzoli A, Genna M. Sonographic diagnosis of acute cholecystitis in patients with symptomatic gallstones. J Clin Ultrasound. 2016;44(3):152–8.*

156. *Ganta N, Alnabwani D, Shah V, Imtiaz A, Bommu VJL, Cheriyath P. A rare case of Acute Calculous Cholecystitis with Gallbladder Hydrops. Cureus. 2022;14(2):e22230.*

157. *Gastrointestinal Endoscopy. Volume 98, Issue 5, November 2023, Pages 765-773*

158. Go P.M., van Elp W.F. Onterechte twijfel aan de laparoscopische cholecystectomy // Ned. Tijdschr. Geneeskd. - 1997. - Vol. 141, № 14. - P. 667 -668.

159. Hashizume M., Sugimachi K., MacFadyen B.V. The clinical management and results of surgery for acute cholecystitis // Semin. Laparosc. Surg. - 1998. - Vol. 5, № 2. - P. 69 - 80

160. *H.C. Alexander. Reporting of complications after laparoscopic cholecystectomy: a systematic review. Volume 12, Issue 7, July 2014, HPB (2018). Pages 712-719.*

161. *H.C. Alexander. Reporting of complications after laparoscopic cholecystectomy: a systematic review. Volume 163, Issue 4, April 2018, Pages 739-746. HPB. (2018)*

162. *He H, Tan C, Wu J, Dai N, Hu W, Zhang Y, Laine L, Scheiman J, Kim JJ. Accuracy of ASGE high-risk criteria in evaluation of patients with suspected common bile duct stones. Gastrointest Endosc. 2017;pii:S0016–5107(17)30083 [PubMed] [Google Scholar] Acute cholecystitis: Which flow-chart for the most appropriate management?*

163. *Horiuchi A. Biliary stenting as alternative therapy to stone clearance in elderly patients with bile duct stones / A. Horiuchi, M. Kajiyama, Y. Ichise et al. // Acta Gastroenterol Belg. — 2014. — 77(3). — p. 297-301.*

164. *Hormati A. Consequences of Stenting and Endoscopic Papillary Balloon Dilatation in Treatment of Large and Multiple Common Bile Duct Stones / A. Hormati, M.R. Ghadir, D.A. Hasanpour et al. // Middle East J Dig Dis. — 2019. — 11(4). — p. 205-210. — DOI: 10.15171/mejdd.2019.150.*

165. *Irani, S.S.; Sharma, N.R.; Storm, A.C.; Shah, R.J.; Chahal, P.; Willingham, F.F.; Swanstrom, L.; Baron, T.H.; Shlomovitz, E.; Kozarek, R.A.; et al. Endoscopic Ultrasound-guided Transluminal Gallbladder Drainage in Patients With Acute Cholecystitis. Ann. Surg. 2022, 278, e556–e562. [Google Scholar] [CrossRef]*

166. *Issa, D.; Irani, S.; Law, R.; Shah, S.; Bhalla, S.; Mahadev, S.; Hajifathalian, K.; Sampath, K.; Mukewar, S.; Carr-Locke, D.L.; et al. Endoscopic ultrasound-guided gallbladder drainage as a rescue therapy for unresectable malignant biliary obstruction: A multicenter experience. Endoscopy 2021, 53, 827–831. [Google Scholar] [CrossRef]*

167. *JAMA Surg. 2015;150(2):159-168. doi:10.1001/jamasurg.2014.1219. F. Dip et al. Does near-infrared fluorescent cholangiography with indocyanine green reduce bile duct injuries and conversions to open surgery during laparoscopic or robotic cholecystectomy? — A meta-analysis. (2021) Surgery*

168. *Jang D.K. Factors associated with complete clearance of difficult common bile duct stones at the second endoscopic retrograde cholangiopancreatography after a temporary biliary stenting: a multicenter, retrospective, cohort study / D.K. Jang, S.H. Lee, D.W. Ahn et al. // Endoscopy. — 2020. — 27. — DOI: 10.1055/a-1117-3393.*

169. *Katsinelos P., Lazaraki G., Chatzimavroudis G. et al. Risk factors for therapeutic ERCP-related complications: an analysis of 2,715 cases performed by a single endoscopis. Ann Gastroenterol 2014; 27(1): 65–72.*

170. *Khashab, M.; Jovani, M.; Ichkhanian, Y.; Vosoughi, K. EUS-guided biliary drainage for postsurgical anatomy. Endosc. Ultrasound 2019, 8 (Suppl. 1), S57–S66. [Google Scholar] [CrossRef]*

171. *Kim SH, Jung D, Ahn JH, Kim KS. Differentiation between gallbladder cancer with acute cholecystitis: considerations for surgeons during emergency cholecystectomy, a cohort study. Int J Surg. 2017;45:1–7.*

172. Kobayashi N., Ishii S. Postoperative nausea, vomiting and pain in laparoscopic cholecystectomy: a comparison with minilaparotomy-cholecystectomy // Masui. - 2005. - Vol. 45, № 4. - P. 474 - 478.

173. *Kolkin Ya.G. Sovremennyie aspektyi diagnostiki i hirurgicheskogo lecheniya holedoholitiaza (nauchnyiy obzor). Ukr. Zhurnal hirurgiyi. 2014; 2 (25):133.*

174. *Kolobov SV, Shevchenko VP, Zinatulin DR, Naletov VV, Pogodin SJu, Skrypnik JuL, Umjarov RH, Red'kina MA, Kuprijanova AS, Sizova AN, Svetashov BC. Ballonnaja holangio-plastika rubcovyh porazhenij zhelchnyh protokov i holangioejunal'nyh soust'ev [Balloon cholangio-plastic surgery of cicatricial lesions of the bile ducts and cholangioeunal anastomoses]. Hirurg. 2016;3:19-25. Russian.*

175. *Kriplani A, Pandit S, Chawla A, de la Rosette JJMCH, Laguna P, Jayadeva Reddy S, et al. Neutrophil-lymphocyte ratio (NLR), platelet-lymphocyte ratio (PLR) and lymphocyte-monocyte ratio (LMR) in predicting systemic inflammatory response syndrome (SIRS) and sepsis after percutaneous nephrolithotomy (PNL). Urolithiasis. 2022;50(3):341–8.*

176. *Kurbaniyazov Z.B., Saidmuradov K.B., Rakhmanov K.E. Результати хірургічного лікування хворих з посттравматичними рубцевими стриктурами магістральних жовчних протоків та біліодігестивних анастомозів // Клінічна анатомія та оперативна хірургія, 2014. Т. 13. № 4.*

177. *Kurbaniyazov Z.B., Saidmuradov K.B., Rakhmanov K.E. Результати хірургічного лікування хворих з посттравматичними рубцевими стриктурами магістральних жовчних протоків та біліодігестивних анастомозів // Клінічна анатомія та оперативна хірургія, 2014. Т. 13. № 4.*

178. *Kurihara H, Binda C, Cimino MM, Manta R, Manfredi G, Anderloni A. Acute cholecystitis: which flow-chart for the most appropriate management? Dig Liver Dis. 2023;55(9):1169–77.*

179. *Kurihara, H.; Bunino, F.M.; Fugazza, A.; Marrano, E.; Mauri, G.; Ceolin, M.; Lanza, E.; Colombo, M.; Facciorusso, A.; Repici, A.; et al. Endosonography-Guided Versus Percutaneous Gallbladder Drainage Versus Cholecystectomy in Fragile Patients with Acute Cholecystitis—A High-Volume Center Study. Medicina 2022, 58, 164-7. [Google Scholar] [CrossRef] [PubMed]*

180. *Late Complications After Endoscopic Sphincterotomy / M. Oliveira-Cunha, A.R. Dennison, G. Garcea // Surgical Laparoscopy, Endoscopy & Percutaneous Techniques. – 2016. – Vol. 26 (1). – P.1–5. DOI: 10.1097/ SLE.0000000000000226.*

181. *Late Complications After Endoscopic Sphincterotomy / M. Oliveira-Cunha, A.R. Dennison, G. Garcea // Surgical Laparoscopy, Endoscopy & Percutaneous Techniques. – 2016. – Vol. 26 (1). – P.1–5. DOI: 10.1097/ SLE.0000000000000226*

182. Laparoscopic and minilaparotomy cholecystectomy: a randomized trial comparing postoperative pain and pulmonary function / A.J. McMahon, I.T. Russell, G.Ramsay et al. // Surgery. - 2004. - Vol. 115, № 5. - P.533 - 539.

183. *Lau H., Lo C. Y., Patil N. G. et al. Early versus delayed-interval laparoscopic cholecystectomy for acute cholecystitis. A metaanalysis. Surg Endosc 2006; 20: 82–87.*

184. *Littlefield A., Lenahan C. Cholelithiasis: Presentation and Management //Journal of Midwifery & Women's Health. -2019. -Vol. 64. – № 3. -P. 289-297.*

185. Long operation and the risk of complications from laparoscopic cholecystectomy / S.P. Dexter, I.G. Martin, J. Marton, M.J. McMahon // Brit. J. Surg. - 1997. - Vol. 84, № 4. - P. 464 - 466.

186. Lindell P., Hedenstiern G. Ventilatilon efficiency after different incisions for cholecystectomy //Acta Chir. Scand. - 1976. - Vol. 142, № 8. - P. 561 - 565.

187. *M. Hernandez Validation of the AAST EGS acute cholecystitis grade and comparison with the Tokyo guidelines. Volume 20, Issue 9, September 2018, Surgery (2018). Pages 786-794.*

188. *M. Hernandez.Validation of the AAST EGS acute cholecystitis grade and comparison with the Tokyo guidelines. Surgery (2018). Volume 163, Issue 4, April 2018, Pages 739-746*

189. *Maddu K, Phadke S, Hoff C. Complications of cholecystitis: a comprehensive contemporary imaging review. Emerg Radiol. 2021;28(5):1011–27.*

190. *Management of biliary acute pancreatitis / M. Bougard, L. Barbier, B. Godart [et al.] // Visc. Surg. – 2019. – Vol. 156 (2). – P.113–125. DOI: 10.1016/j. jviscsurg.2018.08.002.*

191. *Manes G, Paspatis G, Aabakken L, et al. Endoscopic management of common bile duct stones: European Society of Gastrointestinal Endoscopy (ESGE) guideline. Endoscopy. 2019; 51 (5): 472-491. DOI: 10.1055/a-0862- 0346. ВЕСТНИК СОВРЕМЕННОЙ КЛИНИЧЕСКОЙ МЕДИЦИНЫ 2021 Том 14, вып. 6 ОРИГИНАЛЬНЫЕ ИССЛЕДОВАНИЯ 67*

192. *Medina VJ, Martial AM, Chatterjee T. Asymptomatic gangrenous Acute Cholecystitis: a life-threatening Condition. Cureus. 2023;15(3):e366-72.*

193. *Melissa Oliveira-Cunha, Ashley R Dennison, Giuseppe Garcea Late Complications After Endoscopic Sphincterotomy. Surgical Laparoscopy, Endoscopy & Percutaneous Techniques. 2016; 26 (1): 1-5. DOI: 10.1097/ SLE.0000000000000226.*

194. *Merzlikin NV, Podgornov VF, Semichev YeV, et al. Metody lecheniya kholedokholitiaza [The methods of choledocholithiasis treatment].*

Byulleten' sibirskoy meditsiny [Bulletin of Siberian Medicine]. 2015; 14 (4): 99-109. DOI: 10.20538/1682-0363-2015-4-99-109.

195. Minilaparotomy. Per colecistectomia / A. Gaetini, M. Camandona, M, De Simone, M. Giaccone // Minerva Chir. - 1997. - Vol. 52, № 1 - 2. - P. 13 - 16.

196. *Mukai S, Itoi T. Requirement of drainage strategy for acute cholecystitis in patients with high surgical risk. Dig Endosc. 2023;35(5):668–9.*

197. Micro- end modern minilaparotomiaban vegzett cholecystectomiaral / I. Rozsos, J. Ferenczy, D. Afshin, T. Rozsos // Orv. Hetil. - 1995. - 136, № 9. - P. 475 - 481.

198. *Mukhitdinovich S.A., Tashtemirovna R.D. Comprehensive approach to the problem of rehabilitation of infants submitted sepsis // Voprosi nauki i obrazovaniya, 2017. № 10 (11). 18. Saydullayev Z.Y. et al. Evaluating the effectiveness of minimally invasive surgical treatment of patients with acute destructive cholecystitis // The First European Conference on Biology and Medical Sciences, 2014. C. 101-107.*

199. *Mukhitdinovich S.A., Tashtemirovna R.D. Comprehensive approach to the problem of rehabilitation of infants submitted sepsis // Voprosi nauki i obrazovaniya, 2017. № 10 (11).*

200. *Nakai, Y.; Hamada, T.; Isayama, H.; Itoi, T.; Koike, K. Endoscopic management of combined malignant biliary and gastric outlet obstruction. Dig. Endosc. 2017, 29, 16–25. [Google Scholar] [CrossRef] [PubMed]*

201. *Nakai, Y.; Matsubara, S.; Isayama, H.; Koike, K. Cystic duct patency in EUS-guided gallbladder drainage as a rescue treatment for malignant biliary obstruction. Gastrointest. Endosc. 2016, 83, 1302–1303. [Google Scholar] [CrossRef] [PubMed]*

202. Nagakawa T. Biliary surgery via minilaparatomya limited procedure for biliary lithiasis // Hepatobiliar. Surg. - 1993. - Vol. 6, № 4. - P. 245 - 254.

203. *Neuhaus H. Choledocholithiasis in pregnancy: When and how to perform ERCP? Endosc Int Open. 2020; 8 (10): 1508-1510. DOI: 10.1055/a-1196-1683.*

204. *Neuhaus, H. Choledocholithiasis in pregnancy: When and how to perform ERCP? / H. Ne*

205. *O. Aziz. Laparoscopic ultrasonography versus intra-operative cholangiogram for the detection of common bile duct stones during laparoscopic cholecystectomy: a meta-analysis of diagnostic accuracy. Int J Surg (2014) International Journal of Surgery*

206. *Okuda N. Is complete stone removal for choledocholithiasis always necessary in extremely elderly patients? / N. Okuda, S. Sugimoto, H. Nakamura // JGH Open. — 2019. — 4(1). — p. 16-21. — DOI: 10.1002/jgh3.12198.*

207. *Palermo M., Fendrich I., Ronchi A., et al. Laparoscopic common bile duct exploration using a single-operator cholangioscope. J Laparoendosc Adv Surg Tech A. 2020 Sep; 30(9): 989–992. https://doi.org/10.1089/lap.2020.0534. Epub 2020 Jul 20. PMID: 32707008*

208. *Peery A.F., Crockett S.D., Murphy C.C., et al. Burden and cost of gastrointestinal, liver, and pancreatic diseases in the United States: Update 2018. Gastroenterology. 2019 Jan; 156(1): 254– 272.e11. https://doi.org/10.1053/j.gastro.2018.08.063. Epub 2018 Oct 10. Erratum in: Gastroenterology. 2019 May; 156(6): 1936. PMID: 30315778*

209. Pellissier E.P. Une technique de cholecystectomie par minilaparotomie sans section musculaire // Ann.Chir. - 1990. - Vol. 44, № 7. - P. 521 - 523.

210. Pellissier E.P. A technique of cholecystectomy by minilaparotomy without cutting muscles // Ann. Chir. - 1998. - Vol. 44, № 7. - P. 521 - 523.

211. *Peksöz R, Karaıslı S, Erözkan K, Ağırman E. The role of basic blood parameters in determining the viability of intestinal tissue in incarcerated hernias. Int J Clin Pract. 2021;75(10): e146-64.*

212. *Pereira Lima JC, Arciniegas Sanmartin ID, Latrônico Palma B, Oliveira Dos Santos CE. Risk Factors for Success, Complications, and*

Death after Endoscopic Sp hincterotomy for Bile Duct Stones: A 17-Year Experience with 2,137 Cases. Dig Dis. 2020; 38 (6): 534-541. DOI: 10.1159/000507321.

213. *Prazdnikov JeN, Baronov GA, Zinatulin DR, Umjarov RH, Shevchenko VP, Nikolaev NM. Vozmozhnosti antegradnogo dostupa v lechenii holangiolitiaza, oslozhnennogo sindromom mehanicheskoj zheltuhi [antegrade access Possibilities in the treatment of cholangiolithiasis complicated by mechanical jaundice syndrome]. Hirurgija. Zhurnal im. N.I. Pirogova. 2018;1:21-5. Russian*

214. Prospective analysis of 192 consecutive cholecystectomies: a comparative study between laparoscopy and laparotomy / E. Constant, P. Janssen, J.M. Nys et al. // Acta Chir. Belg. - 2005. - Vol. 95, № 6. - P. 254 - 260.

215. *Qian Y., Xie J., Jiang P., et al. Laparoendoscopic rendezvous versus ERCP followed by laparoscopic cholecystectomy for the management of cholecysto-choledocholithiasis: a retrospectively cohort study. Surg Endosc. 2020 Jun; 34(6): 2483–2489. https://doi.org/10.1007/s00464-019-07051-y. Epub 2019 Aug 19. PMID: 31428853*

216. *Rimbaş, M.; Crinò, S.F.; Rizzatti, G.; Larghi, A. Endoscopic ultrasound-guided gallbladder drainage: A backdoor for biliary decompression? Endoscopy 2021, 53, 87-3. [Google Scholar] [CrossRef]*

217. *Rinchinov VB, Plekhanov AN, Ludupova EY. Otsenka effektivnosti razlichnykh endoskopicheskikh transpapillyarnykh vmeshatel'stv po povodu krupnogo kholedokholitiaza [Evaluation of the effectiveness of various endoscopic transpapillary interventions for large choledocholithiasis]. Khirurgiya: Zhurnal imeni NI Pirogova [Surgery: Journal named after NI Pirogov]. 2019; 6: 60-64. DOI: 10.17116/hirurgia201906160.*

218. *Risk factor analysis of post-ERCP cholangitis: A singlecenter experience / M. Chen, L. Wang, Y. Wang [et al.] // Hepatobiliary Pancreat. Dis. Int. – 2018. – Vol. 17, № 1. – P.55–58. DOI: 10.1016/j.hbpd.2018.01.002.*

219. *Risk factors for recurrence of common bile duct stones after endoscopic biliary sphincterotomy / Sujuan Li, Bing Zhong Su, Ping Chen, Jianyu Hao // J. Int. Med. Res. – 2018. – Vol. 46 (7). – P.2595–2605. DOI: 10.1177 / 0300060518765605.*

220. *Risk Factors for Success, Complications, and Death after Endoscopic Sphincterotomy for Bile Duct Stones: A 17-Year Experience with 2,137 Cases. / J.C. Pereira Lima, I.D. Arciniegas Sanmartin, B. Latrônico Palma, C.E. Oliveira Dos Santos // Dig. Dis. – 2020. – Vol. 38 (6). – P.534–541. DOI: 10.1159/000507321.*

221. Rozsos I., Rozsos T. Micro- and modern minilaparotomy cholecystectomy // Acta Chir. Hung. - 1994. - Vol. 34, № 1 - 2. -P. 11 - 16.

222. Rozsos I. Fibroma okozta ilealis intussusceptio microlaparotomiaban vegzett cholecystectomia utan // Orv. Hetil. - 1994. - 135, № 30. - P. 1645 - 1647.

223. *Saito H, Kadono Y, Kamikawa K, Urata A, et al. The Incidence of Complications in Single-stage Endoscopic Stone Removal for Patients with Common Bile Duct Stones: A Propensity Score Analysis. Intern Med. 2018; 57 (4): 469- 477. DOI: 10.2169/internalmedicine.9123-17*

224. *Sasahira, N.; Hamada, T.; Togawa, O.; Yamamoto, R.; Iwai, T.; Tamada, K.; Kawaguchi, Y.; Shimura, K.; Koike, T.; Yoshida, Y.; et al. Multicenter study of endoscopic preoperative biliary drainage for malignant distal biliary obstruction. World J. Gastroenterol. 2016, 22, 3793–3802. [Google Scholar] [CrossRef] [PubMed]*

225. *Saydullayev Z.Y. et al. Evaluating the effectiveness of minimally invasive surgical treatment of patients with acute destructive cholecystitis / /The First European Conference on Biology and Medical Sciences, 2014. C. 101-107.*

226. *Screening acute cholangitis patients for sepsis / A.M. Beliaev, S. Zyul'korneeva, D. Rowbotham, C.J. Bergin // ANZ J. Surg. – 2019. – Vol. 89 (11). – P.1457–1461. DOI: 10.1111/ans.15432.*

227. *Serikbaiuly D, Aimagambetov M. Sovremennyye tekhnologii lecheniya kholedokholitiaza [Modern technologies of treatment of choledocholithiasis]. Klinicheskaya meditsina Kazakhstana [Journal of Clinical Medicine of Kazakhstan]. 2017; 43 (1): 15-19. DOI: 10.23950/1812-2892-JCMK-00379*

228. *Shamsiyev A., Davlatov S. A differentiated approach to the treatment of patients with acute cholangitis //International Journal of Medical and Health Research, 2017. C. 80-83.*

229. *Sharaiha, R.Z.; Khan, M.A.; Kamal, F.; Tyberg, A.; Tombazzi, C.R.; Ali, B.; Kahaleh, M. Efficacy and safety of EUS-guided biliary drainage in comparison with percutaneous biliary drainage when ERCP fails: A systematic review and meta-analysis. Gastrointest. Endosc. 2017, 85, 904–914. [Google Scholar] [CrossRef]*

230. *Singh A.N, Kilambi R. Single-stage laparoscopic common bile duct exploration and cholecystectomy versus two-stage endoscopic stone extraction followed by laparoscopic cholecystectomy for patients with gallbladder stones with common bile duct stones: systematic review and meta-analysis of randomized trials with trial sequential analysis. Surg Endosc. 2018 Sep; 32(9): 3763–3776. https://doi.org/10.1007/s00464-018-6170-8. Epub 2018 Mar 30. PMID: 29603004*

231. *Singh N, Baby D, Rajguru JP, Patil PB, Thakkannavar SS, Pujari VB. Inflammation and cancer. Ann Afr Med. 2019;18(3):121–6.*

232. Systematic evaluation of different approaches for minimizing hemadynamic changes during pneumoperitoneum / Junghans T, Modersohn D, Dormer F, et al.// Surg . Endossc. - 2016 № 20. - P 763 – 769.

233. *Sohn S.H. Complications and management of forgotten long-term biliary stents / S.H. Sohn, J.H. Park, K.H. Kim // World J Gastroenterol. — 2017. — 23(4). — p. 622-628. — DOI: 10.3748/wjg.v23.i4.622.*

234. *Sugrue M, Sahebally SM, Ansaloni L, Zielinski MD. Grading operative findings at laparoscopic cholecystectomy- a new scoring*

system. World J Emerg Surg. 2015;10:14. [PMC free article] [PubMed] [Google Scholar]

235. *Sujuan Li, Bing zhong Su, Ping Chen, Jianyu Hao. Risk factors for recurrence of common bile duct stones after endoscopic biliary sphincterotomy. J Int Med Res. 2018; 46 (7): 2595-2605. DOI: 10.1177/0300060518765605*

236. *Surgery. Volume 168, Issue 4, October 2020, Pages 625-630. J.P. Kamiński et al. Robotic versus laparoscopic cholecystectomy inpatient analysis: does the end justify the means? J Gastrointest Surg. (2014). Journal of Gastrointestinal Surgery.Volume 18, Issue 12, December 2014, Pages 2116-2122*

237. Sumptomatic outcome 1 year after laparoscopic and minilaparotomy cholecystectomy: a randomized trial / A.J. McMahon, S. Ross, J.N. Baxter et al. // Brit. J. Surg. - 2015. - Vol. 82, № 10. - P. 1378 - 1382.

238. *Tartaglia D, Coccolini F, Cremonini C, Strambi S, Musetti S, Cicuttin E, et al. Laparoscopic cholecystectomy for acute calculous cholecystitis in elderly. More complex but equally safe and effective. Ann Ital Chir. 2022;93:550–6.*

239. *Teoh, A.Y.B. EUS-guided gallbladder drainage: Is it so easy? Endosc. Int. Open 2020, 8, E97–E98. [Google Scholar] [CrossRef] [PubMed]*

240. *Teoh, A.Y.B.; Kitano, M.; Itoi, T.; Pérez-Miranda, M.; Ogura, T.; Chan, S.M.; Serna-Higuera, C.; Omoto, S.; Torres-Yuste, R.; Tsuichiya, T.; et al. Endosonography-guided gallbladder drainage versus percutaneous cholecystostomy in very high-risk surgical patients with acute cholecystitis: An international randomised multicentre controlled superiority trial (DRAC 1). Gut 2020, 69, 1085–1091. [Google Scholar] [CrossRef]*

241. *The Incidence of Complications in Single-stage Endoscopic Stone Removal for Patients with Common Bile Duct Stones: A Propensity Score Analysis / H. Saito, Y, Kadono, K. Kamikawa [et al.] // Intern. Med. – 2018. – Vol. 57, № 4. – P.469–477. DOI: 10.2169/internalmedicine.9123-17.*

242. *Tohda G. Efficacy and safety of emergency endoscopic retrograde cholangiopancreatography for acute cholangitis in the elderly / G. Tohda, M. Ohtani, M. Dochin // World J Gastroenterol. — 2016. — 22(37). — p. 8382-8388.*

243. *Tohda G. Management of endoscopic biliary stenting for choledocholithiasis: Evaluation of stent-exchange intervals / G. Tohda, M. Dochin // World J Gastrointest Endosc. — 2018. — 10(1). — p. 45-50. — DOI: 10.4253/wjge.v10.i1.45.*

244. *Tran A, Hoff C, Polireddy K, Neymotin A, Maddu K. Beyond acute cholecystitis-gallstone-related Complications and what the emergency radiologist should know. Emerg Radiol. 2022;29(1):173–86.*

245. *Turan, A.S.; Jenniskens, S.; Martens, J.M.; Rutten, M.J.C.M.; Yo, L.S.F.; van Strijen, M.J.L.; Drenth, J.P.H.; Siersema, P.D.; van Geenen, E.J.M. Complications of percutaneous transhepatic cholangiography and biliary drainage, a multicenter observational study. Abdom. Imaging 2022, 47, 3338–3344. [Google Scholar] [CrossRef] [PubMed]*

246. *Uhaus // Endosc Int. Open. – 2020.– Vol. 8 (10). – P.1508–1510. DOI: 10.1055/a-1196-1683.*

247. *Volume 20, Issue 9, September 2018, Subtotal cholecystectomy for "difficult gallbladders": systematic review and meta-analysis. Pages 786-794.*

248. Vallance S. Minilaparotomy cholecystectomy // J. R. Coll Surg. Edinb. - 2020. - Vol. 39, № 1. - P. 62.

249. *Walczak-Galezewska MK, Skrypnik D, Szulinska M, Skrypnik K, Bogdanski P. Conservative management of acute calculous cholecystitis complicated by Pancreatitis in an elderly woman: a case report. Med (Baltim). 2018;97(25):e11200.*

250. *Ye X. Effectiveness and safety of biliary stenting in the management of difficult common bile duct stones in elderly patients / X. Ye, J. Huai, X. Sun // Turk J Gastroenterol. — 2016. — 27(1). — p. 30-36. — DOI: 10.5152/tjg.2015.150305.*

251. *Yokoe M, Hata J, Takada T, Strasberg SM, Asbun HJ, Wakabayashi G, et al. Tokyo guidelines 2018: diagnostic criteria and severity grading of acute cholecystitis (with videos). J Hepatobiliary Pancreat Sci. 2018;25(1):41–54.*

252. *Zhou Y., Wu X.D., Zha W.Z., et al. Three modalities on common bile duct exploration. Z Gastroenterol. 2017 Sep; 55(9): 856–860 (In English). https://doi.org/10.1055/s-0043-112655. Epub 2017 Aug 1. PMID: 28763814.*

253. Wallace D.H., Odwyer P.J. Clinical experience with open laparoscopy // J. Laparoendosc. Adv. Surg. Tech. A. - 2017. - Vol. 7, № 5. - P. 285 - 288.