

## **NEW DATA ON THE PATHOGENESIS AND TREATMENT OF INGUINAL HERNIAS (LITERATURE REVIEW)**

**Khujamov O.B. (Republic of Uzbekistan)**

*Khujamov Olim Bakhritdinovich – researcher,  
DEPARTMENT OF FACULTY AND HOSPITAL SURGERY,  
BUKHARA STATE MEDICAL INSTITUTE,  
BUKHARA, REPUBLIC OF UZBEKISTAN*

**Abstract:** *the problem of inguinal hernia is of great medical and social significance. An inguinal hernia is a fairly common pathology, observed in 3-7% of the working-age male population. This article presents modern data on the surgical treatment of inguinal hernias, describes the most common methods of alloplasty, their advantages and disadvantages, presents the experience of domestic and foreign researchers. A study of the literature has shown that further study of the results of alloplastic methods in the long-term postoperative periods is necessary, conducting randomized controlled trials with the aim of developing detailed indications and studying endoprosthesis-associated complications, as well as improving techniques. In addition, it is necessary to continue the search for new biocompatible materials for endoprosthetics.*

**Keywords:** *inguinal hernia, alloplasty, mesh endoprosthesis.*

## **НОВЫЕ ДАННЫЕ О ПАТОГЕНЕЗЕ И ЛЕЧЕНИИ ПАХОВЫХ ГРЫЖ (ОБЗОР ЛИТЕРАТУРЫ)**

**Хужамов О.Б. (Республика Узбекистан)**

*Хужамов Олим Бахритдинович – соискатель,  
кафедра факультетской и госпитальной хирургии,  
Бухарский государственный медицинский институт,  
г. Бухара, Республика Узбекистан*

**Аннотация:** *проблема паховой грыжи имеет большую медико-социальную значимость. Паховая грыжа является довольно часто встречаемой патологией, наблюдается у 3-7% трудоспособного мужского населения. В данной статье представлены современные данные по хирургическому лечению паховых грыж, описаны наиболее распространенные методы аллопластики, их достоинства и недостатки, представлен опыт отечественных и зарубежных исследователей. Изучение литературы показало, что необходимо дальнейшее изучение результатов аллопластических методов в отдаленные периоды после операции, проведение рандомизированных контролируемых исследований с целью разработки детальных показаний и изучения эндопротез-ассоциированных осложнений, а также улучшения методик. Кроме того, необходимо*

*продолжать поиск новых биосовместимых материалов для эндопротезирования.*

**Ключевые слова:** паховая грыжа, аллопластика, сетчатый эндопротез.

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The problem of inguinal hernia is of great medical and social significance. An inguinal hernia is a fairly common pathology, observed in 3-7% of the working-age male population. Hernia repair is the most frequently performed elective surgery in abdominal surgery. At the same time, classical surgical treatment is accompanied by a high percentage of relapses, long periods of temporary disability and, in turn, significant costs [3, 10, 26].

Over the more than a century history of studying the issue, many different methods of surgical treatment of inguinal hernias have been proposed, consisting in restoring the integrity of the abdominal wall of the inguinal region, strengthening the anterior and posterior walls of the inguinal canal by stitching local tissues. To date, the methods of strengthening the anterior wall of the inguinal canal (methods of Girard, Martynov, Kimbarovsky) have finally been abandoned due to their pathogenetic unreasonableness and high frequency of relapses. Methods for strengthening the posterior wall of the inguinal canal, for example, Bassini plastic, were more acceptable in this respect, since it was proved that it is the destruction of the posterior wall structures that is the leading factor in the occurrence of any inguinal hernia [2, 8, 15, 28].

Such well-known modifications of Bassini plastics, as the methods of Kukudzhanov, Shouldice, McVay, and others, allow not only to strengthen the destroyed structures of the posterior wall of the inguinal canal, but also to some extent restore the valve function of the structures that form the inguinal gap. These plastics are physiological, exclude an adverse effect on the function of the male reproductive gland. Due to this, they have been the "gold standard" for a long time, and are quite widely used to this day, which is justified in young patients with a small height of the inguinal gap and insignificant destruction of anatomical structures. In patients with a pronounced deficiency of local tissues, age-related changes in them, these methods do not allow to exclude cases of relapse [9].

Dissatisfaction with the results served as a trigger for the development at the UDI pial new approaches. And since the main reason for failures is the deficit of one's own tissues, the use of synthetic tissue flaps (mesh endoprotheses) was proposed. The idea was put forward by Billroth, but the search for materials with the required properties continued until the second half of the 20th century, when polyester, polypropylene, polytetrafluoroethylene and other polymeric materials used in modern surgery were synthesized [5, 11, 20, 29].

Currently, a number of tension-free methods of plastic surgery of the inguinal canal using mesh endoprotheses have been proposed, the high efficiency of

which has been proven by randomized studies. The use of mesh endoprostheses allows avoiding tissue tension, somewhat simplifying the surgical technique, reducing intraoperative tissue trauma and, therefore, reducing the intensity of pain in the early postoperative period, reducing the patient's stay in the hospital, as well as reducing the number of relapses and improving the patient's quality of life.

In this regard, the methods of hernioplasty with the use of own tissues - tension methods, are gradually being replaced by modern tension-free alloplasty methods. In this article, I would like to dwell in more detail on the tension-free techniques most often used in a modern surgical hospital [6, 13, 18].

All tension-free methods can be divided into several types. At the location of mesh endoprostheses relative to the transverse fascia, anterior (Lichtenstein, Trabucco, Rutkov-Robbins methods) and preperitoneal (TAPB, TEP, Stopp method) are distinguished, according to the method of intervention - open and endoscopic techniques (TAPB, TEP). According to the type of fixation of the mesh endoprosthesis, there are methods with fixation with sutures (Lichtenstein, PHS, Rutkov-Robbins) and seamless (Trabucco).

During operations, access to the posterior wall of the inguinal canal can be carried out directly through the inguinal canal (Lichtenstein, Trabucco, PHS methods) or from the retroperitoneal space (endoscopic techniques, Stoppa method). The most commonly used tension-free repairs give a recurrence rate of 0.1-0.5% in patients with primary hernias [3, 8, 14, 22, 28].

The method was proposed I of Lichtenstein in 1989 and suggests the use of soft polypropylene or lightweight combined mesh endoprostheses. The essence of this alloplasty is as follows: after restoring the deep inguinal ring or suturing the defect of the transverse fascia with a continuous suture (with a straight inguinal hernia), a 6 x 12 cm flap is cut out of the polypropylene mesh, the upper medial angle of which is rounded in the shape of the inguinal gap. Then the flap is placed under the spermatic cord, and the medial angle is fixed to the sheath of the rectus abdominis muscle, pubic tubercle, Cooper's ligament, then the lower edge of the prosthesis with a continuous twisted suture (for example, Prolene 3-0) connects to the inguinal ligament. The lateral edge of the prosthesis is cut in the longitudinal direction in order to form a hole for the spermatic cord, after passing the cord, the flaps are fixed to each other behind it with an interrupted suture. The upper edge of the prosthesis is placed over the combined aponeurosis of the internal oblique and transverse muscles and is fixed to the external oblique muscle with separate interrupted sutures. The aponeurosis of the external oblique muscle is sutured over the prosthesis and the spermatic cord with separate interrupted sutures without creating duplication. Some authors propose to fix the endoprosthesis with titanium clips, or to glue it to the tissues with glue (butyl-2-cyanoacrylate), while, according to the studies, there is a simplification and shortening of surgery, a decrease in pain in the early postoperative period. It is important that the authors do not note a decrease in

the reliability of the method (an increase in the frequency of relapses, as a result of displacement of endoprostheses) [16, 23].

The Liechtenstein Method is relatively simple and can be performed by novice surgeons in general surgery departments. In most cases, the operation is performed under local anesthesia, does not require such a thorough preparation of tissues as tension techniques (for example, Shouldice plastic), takes less time. As a result, the trauma of plastics decreases, which, together with the absence of tissue tension, leads to a decrease in the severity of pain in the early postoperative period, the need for anesthesia, and a decrease in hospitalization time. All this allows one day to be treated in hospitals. The period of rehabilitation is also reduced, patients quickly return to their lifestyle, begin their work faster, which undoubtedly gives a positive economic effect [19]. Less invasiveness of plastics makes it possible to perform simultaneous operations for bilateral inguinal hernias.

Liechtenstein alloplasty can also be used for strangulated hernias, despite the high probability of infection. This is confirmed by independent operation in which there is a low frequency of CRC onyx complications from the surgical wound with adequate antibiotic therapy, the possibility of knocking over the past without removing the implant and no recurrence unlike stretch techniques in terms of monitoring up to 20 months. and more [5, 10, 29].

However, in addition to advantages, the use of a polymer endoprosthesis also has disadvantages. In connection with such a phenomenon as a chronic immune reaction to foreign material of the endoprosthesis, some difficulties arise, for example, relapses resulting from shrinkage of the mesh endoprosthesis [9]. The surgeon exploring the polypropylene mesh should take this into account and, following the technique, overlap the recurrence zones by 1.5-2 cm (pubic tubercle, lateral edge of the inner inguinal ring, as well as the lower edge of the internal oblique and transverse muscles) [15, 21]. Also, cases of fistula formation are described in the literature, seromas, hematomas occur quite often, infectious complications from the wound, infiltrates, and suppuration are observed. Due to the close contact of the endoprosthesis with the spermatic cord, possible fibrotic changes in the latter with the development of various complications up to testicular atrophy and infertility. It also causes difficulties in the isolation of the spermatic cord during surgery for recurrence, which is often accompanied by the castration of the patient. Cases of chronic pain and foreign body sensation in the groin area are not uncommon.

To avoid chronic pain in the groin area after hernia repair, the ilio-inguinal, ilio-hypogastric, and femoral-genital nerves should be identified during the operation and should not be damaged [6].

In general, Liechtenstein hernioplasty is an anatomically and pathogenetically justified operation that provides a low recurrence rate, which is confirmed by the results of numerous studies in the literature [13].

Later, Liechtenstein proposed a second method, which consists in introducing

a special obturator into the hernial orifice ("plug" - a plug from a mesh prosthesis rolled into a roll). The obturator is fixed to the surrounding tissues with separate interrupted sutures and prevents the hernia from emerging. The recurrence rate after this operation, according to different researchers, varies from 0 to 1.4% [12, 19].

Similar methods were proposed by other authors, their essence also lies in the introduction and fixation of a mesh obturator in the hernial orifice, these methods differ only in the design features of the obturator and access to the hernial orifice. The literature provides both evidence of good results of techniques using "plug", and describes the cases of relapses and dangerous complications associated with the migration of the obturator, for example, perforation of the small intestine, large intestine, bladder prosthesis [5, 16, 27].

Therefore, it seems safer and more reliable to apply this approach within the framework of the "plug & patch" concept, that is, the combined use of a conventional mesh prosthesis and an obturator, with the latter being fixed to the mesh (variants of the Rutkov-Robbins, Trabucco methods, or the use of the PHS system. This plastic, proposed by E. Trabbuko, is seamless and is performed using special rigid or semi-rigid mesh prostheses. The meshes are made of polypropylene according to a certain technology, have a shape memory, quickly germinate with tissues, do not wrinkle or twist, give less shrinkage, have the necessary anatomical shape and a hole for the spermatic cord.

According to this technique, the hernial sacs of small oblique and straight inguinal hernias are isolated and immersed in the abdominal cavity without ligation and cutting off, defects in the transverse fascia are sutured with a continuous suture, with oblique hernias, the inner inguinal ring is similarly narrowed. M. cremaster stands out and overlaps. Further, a pocket is formed in a blunt way under the aponeurosis of the external oblique muscle according to the size of the endoprosthesis for its subsequent placement. A spermatic cord is inserted into the hole in the prosthesis, the prosthesis is placed in the formed bed so that the medial end extends 1.5-2 cm beyond the pubic tubercle, the prosthesis flaps are fixed to each other behind the spermatic cord with an interrupted suture. The aponeurosis of the external oblique muscle is sutured with separate interrupted sutures above the prosthesis and under the spermatic cord in such a way that the latter is in the subcutaneous tissue.

With large oblique and direct hernias Trabucco has suggested that an additional prosthesis pre-peritoneal space, also without fixing the latter to the surrounding tissues. Additional strengthening of the posterior wall of the inguinal canal by the preperitoneal method significantly increases the reliability of the plasty [10, 18].

The advantage of the Trabucco technique lies in the absence of the need to fix the endoprosthesis and, accordingly, to tension the tissues, which, along with preserving the hernial sac, further reduces the trauma and operation time, as well as the severity of pain in the postoperative period. Patients require fewer

analgesics. Due to the low trauma and properties of the rigid endoprosthesis (it does not wrinkle, it adheres tightly to the tissues), the number of complications from the wound (seroma, hematoma) decreases, the prosthesis grows with connective tissue more quickly, and the terms of hospitalization and rehabilitation of patients decrease accordingly. The operation can be performed on an outpatient basis, in one-day hospitals [16].

As a result of stitching the edges of the aponeurosis of the external oblique muscle under the spermatic cord, a more reliable fixation of the endoprosthesis and strengthening of the medial part of the posterior wall of the inguinal canal is achieved, but this is also a disadvantage of the operation since the placement of the spermatic cord in the subcutaneous tissue is not physiological and contributes to the trauma of the latter.

A.A. Chistyakov et al. In the period 2005-2008. Hernioplasty according to Trabucco was performed in 245 patients with inguinal hernias. In 23 patients

- for bilateral inguinal hernias. There were no cases of suppuration requiring removal of the endoprosthesis. There were no relapses with follow-up periods up to 3 years from the moment of surgery [6, 29].

M. Cucci et al from 1994 to 2001 performed 948 Trabucco hernioplasty. In this small complications (hematoma, seroma, pain in the groin area) were observed in 42 (5.1%) cases, infe CRC onnyh complications from the surgical wound was not. During the observation period, the authors revealed 3 relapses (0.36%), which is a relatively acceptable indicator [15]. According to various studies, the recurrence rate after Trabucco plastic surgery ranges from 0 to 1.8%.

When using Trabucco plastics, many authors note a reduction in the time of surgery, the length of hospital stay, rehabilitation, and a decrease in pain syndrome in comparison with the Lichtenstein plasty method []. Cases of patients returning to work on the 2nd day after surgery are described.

Plastic surgery using the PHS- system is tension-free and is performed using the "Prolene Hernia System" - a mesh endoprosthesis having a three-dimensional configuration and consisting of three components: the outer and inner mesh parts and the central cylindrical part connecting them.

The technique of the operation is as follows: after processing the hernial sac, a bed is formed in the preperitoneal space, where the inner mesh of the prosthesis is folded through the inner inguinal ring (or the hernial ring with a direct inguinal hernia) in a folded form, then it is straightened and left without fixation with sutures. Further, the external mesh of the prosthesis is laid over the transverse fascia and the internal oblique and transverse muscles, so that the medial part goes beyond the pubic tubercle by 1.5-2 cm, and is fixed with separate interrupted sutures. The holes for the spermatic cord in the mesh of the prosthesis are formed similarly to the Lichtenstein technique, the resulting flaps are sutured with an overlap. Further, the edges of the aponeurosis of the external oblique muscle are sutured over the outer part of the prosthesis and the spermatic cord with separate interrupted sutures without creating duplication.

The central part of the prosthesis, while in the hernial ring, performs the role of obturator and fixes the inner foil to the outside, not letting her move in pre-peritoneal constant tissue.

The internal flap is located in the preperitoneal space and is additionally fixed by intra-abdominal pressure to the transverse fascia, which results in a two-layer restoration of the posterior wall of the inguinal canal and closure of the risk zones of recurrent herniation from the abdominal cavity [11].

The literature describes cases adhesive intestinal obstruction and bowel perforation as a result of careless installation in the inner grid endoprosthesis pre-peritoneal space with damage Bru integrity shi us and migration of the prosthesis inside the abdominal cavity [13].

This alloplasty, if performed correctly, prevents the development of relapses in the femoral and inguinal (overlaps the muscle-scallop opening) areas, specific complications in the early and late period, is more reliable. This is confirmed by the results of randomized controlled trials conducted in recent years. The authors of many works note a lower, in comparison with the Lichtenstein method, the frequency of relapses, "tending" to 0 in the treatment of primary inguinal hernias, as well as a lower frequency of early (seromas, hematomas, infectious complications from the wound) and late complications, for example, after PHS explanation, there are significantly fewer cases of chronic groin pain, etc. [17, 24].

CS Huang et al. the effectiveness of this technique is shown on the example of 234 hernia repairs in 218 patients, with follow-up periods from 5 to 41 months, not a single relapse was detected, such a complication as chronic groin pain was observed in 2.8% of cases [4, 8]. At the same time, S. Hasegawa et al. with long-term follow-up (up to 55 months, on average 20 months), after 395 hernia repairs, 367 patients had 7 relapses (1.8%), early complications were found in 20 cases (5.1%), including 1 case of suppuration postoperative wound. In a more distant follow-up period, such complications as chronic groin pain and moderate discomfort were identified in 1.9% and 0.8% of cases, respectively [19].

Some researchers note a statistically significant reduction in the time of surgery and the time it takes for patients to return to their normal lifestyle in comparison with the Lichtenstein technique [22]. Surgical intervention can be performed under local anesthesia, in a one-day hospital setting, according to studies by M. Farrakhan et al. conversion to general anesthesia is required in only 3% of cases [10], which is definitely an advantage of this method.

In view of its high reliability, this method is indicated for the treatment of not only large primary, but also multiple recurrent inguinal hernias [4].

Thus, today in the arsenal of a surgeon dealing with the treatment of inguinal hernias, there are many reliable methods of hernioplasty that give good results in various types of hernias.

The Lichtenstein alloplasty method can be used both for primary and for

recurrent and restrained inguinal hernias, is relatively simple, can be performed under local anesthesia, by specialists in general surgical departments and on an outpatient basis, in particular in one-day hospitals, due to which it is deservedly considered "gold standard" of modern herniology.

However, a number of problems remain unresolved. For example, there are still no clear indications for the use of one method or another. The problem of complications associated with a chronic immune response to foreign material of the endoprosthesis has not been resolved. In some clinics, surgeons, in view of conservatism, fear of specific complications of alloplasty, continue to use "usual" tension techniques, even in cases of complete destruction of the structures of the posterior wall of the inguinal canal.

In this regard, it is necessary to further study the results of alloplastic methods in the long-term periods after surgery, conduct randomized controlled trials in order to develop detailed indications and study endoprosthesis-associated complications, as well as improve methods. In addition, it is necessary to continue the search for new biocompatible materials for endoprosthesis.

### *References / Список литературы*

1. *Egamberdiyev A.A., Usarov SH.N., Suyarova Z.S.* Hernioabdominoplastics of postoperative ventral hernia in patients with obesity of III-IV degree // International scientific review, 2017. № 6 (37).
2. *Davlatov S.S., Yunusov O.T., Suyarova Z.S., Azzamov J.A.* Non-tension hernia plastic with inguinal hernia. // Problems of modern science and education, 2017. 24 (106). P. 58-62.
3. *Davlatov S.S., Rakhmanov K.E.* Optimizatsiya gernioalloplastiki pakhovykh gryzh. Sbornik tezisov dokladov Respublikanskoy nauchno-prakticheskoy konferentsii molodykh uchenykh. Tashkent. 22 dekabrya, 2015. P. 257-259.
4. *Davlatov S.S., Rakhmanov K.E.* Optimizatsiya gernioalloplastiki pakhovykh gryzh XI Mezhdunarodnaya Pirogovskaya nauchnaya konferentsiya, Moskva, 2016. P. 389.
5. *Egamberdiyev A.A., Rakhmanov K.E., Davlatov S.S.* Nenatyazhnaya gernioalloplastika u bol'nykh s pakhovoy gryzhey // III Mezhdunarodnyy mediko-farmatsevticheskiy kongress. Chernivtsi, 2016. P. 631.
6. *Egamberdiyev A.A., Khuzhamov O.B., Kan S.A., Rakhmanov K.E., Davlatov S.S.* Optimizatsiya nenatyazhnoy gernioplastiki u bol'nykh pakhovoy gryzhey // «KHYST» Vseukrainskiy zhurnal studentov i molodykh uchenykh, 2014. Vypusk 16.
7. *Egamberdiyev A.A., Davlatov S.S., Suyarova Z.S., Yakubova L.I.* Kombinirovannaya atenzionnaya gernioplastika pri naruzhnykh pakhovykh gryzhakh // Meditsinskiy vestnik yuga Rossii, 2017. № 2. P. 129-130.
8. *Egamberdiyev A.A., Davlatov S.S., Rakhmanov K.E., Abduraimov Z.A., Usarov Sh.N.* Uovershenstvovannyy metod nenatyazhnoy gernioalloplastiki



- pri pakhovykh gryzhakh// Materialy XX Yubileynoy Vserossiyskoy nauchno-prakticheskoy konferentsii g. Leninsk-Kuznetskiy, 19 maya, 2017. P. 213-214.
9. *Kurbaniyazov Z.B., Davlatov S.S., Rakhmanov K.E., Egamberdiev A.A., Amonov M.M.* Pull hernioplastics in patients with inguinal hernia// Materials of a scientific-practical conference with international participation. Problems of biology and medicine, 2016. № 4,1 (92). P. 131-142.
  10. *Kurbaniyazov Z., Rakhmonov K.E., Davlatov S.S., Saidmurodov K.B., Daminov F.A.* Sposob nenatyazhnoy gernioalloplastiki u bol'nykh pakhovoy gryzhey // Ofitsial'nyy byulleten', 2014. 6 (158) S. 7-8.
  11. *Kurbaniyazov Z., Rakhmonov K.E., Davlatov S.S., Saidmurodov K.B., Daminov F.A.* Sposob nenatyazhnoy gernioalloplastiki u bol'nykh pakhovoy gryzhey // Ofitsial'nyy byulleten', 2014, 6 (158) S. 7-8.
  12. *Kurbaniyazov Z.B., Davlatov S.S., Rakhmanov K. E., Egamberdiyev A.A.* Uovershenstvovannyy metod nenatyazhnoy gernioalloplastiki pri pakhovykh gryzhakh // Shpital'na khirurgiya. Zhurnal imeni L. YA. Koval'chuka, 2017. № 1. P. 71-74.
  13. *Mardonov B.A., Sherbekov U.A., Vokhidov ZH.ZH.* Sovremennyye podkhody k lecheniyu patsiyentov s ventral'nymi gryzhami simul'tannymi patologiyami //Klinichna ta yeksperimental'na patologiya, 2018. № 17, № 3. S. 118-125.
  14. *Makhmudova S.E., Agababyan L.R.* The rehabilitation of patients, suffering vulvovaginal candidiasis (vvk), taking combined oral contraceptives (COCS) // Natsional'naya Assotsiatsiya Uchenykh, 2016. № 5. S. 32-32.
  15. *Djalilova Z.O., Davlatov S.S.* Physical activity and its impact on human health and longevity // Achievements of science and education, 2022. P. 120-126.
  16. *Kasimov A. et al.* Features of diagnosis and clinic of post-traumatic epilepsy against the background of concomitant somatic diseases // International Journal of Pharmaceutical Research, 2020. T. 12. № 3. P. 1788-1792.
  17. *Nazyrov F.G. et al.* Age-related structural changes in aponeuroses of the rectus abdominal muscles in patients with postoperative ventral hernias // Клінічна та експериментальна патологія, 2018. № 17. № 3. P. 74-79.
  18. *Rakhmanov K.E., Davlatov S.S.* Novyy sposob gernioplastiki pakhovykh gryzh // Sbornik trudov XV-oy nauchno-prakticheskoy konferentsii studentov i molodykh uchenykh s mezhdunarodnym uchastiyem «Molodezh' i meditsinskaya nauka v XXI veke» Kirov 16-18 aprel'. S. 587-589.
  19. *Rakhmanov K.E., Kurbaniyazov Z.B., Davlatov S.S., Egamberdiyev A.A.* Uovershenstvovannyy metod nenatyazhnoy gernioalloplastiki pri pakhovykh gryzhakh// Vestnik Tashkentskoy meditsinskoy akademii. № 1, 2015. P. 68-70.

20. *Rakhmanov K.E., Davlatov S.S., Daminov F.A., Kan S.A.* Optimizatsiya gernoaloplastiki pakhovykh gryzh // Materialy 78-y itogovoy studencheskoy nauchno-prakticheskoy konferentsii s mezhdunarodnym uchastiyem. Krasnoyarsk, 22-25 aprelya 2014.
21. *Rakhmanov K.E., Kurbaniyazov Z.B., Davlatov S.S.* Optimizatsiya nenatyazhnoy gernoaloplastiki pri pakhovykh gryzhakh // Problemy biologii i meditsiny, 2014. № 2. (78). S. 38-41.
22. *Rakhmanov K.E., Kurbaniyazov Z.B., Davlatov S.S., Egamberdiyev A.A.* Novyy sposob nenatyazhnoy gernoaloplastiki pri pakhovykh gryzhakh // Meditsinskiy zhurnal Uzbekistana. №1, 2015. P. 41-43
23. *Shamsiyev A.M. i dr.* Taktika khirurgicheskogo lecheniya ushchemlennykh gryzh u detey // BBK 57.3 ya431 I66, 2016. S. 115.
24. *Shamsiev A.M., Davlatov S.S., Saydullaev Z.Y.* Optimization of treatment of patients with postoperative ventral hernia // Nauka, tekhnika i obrazovaniye, 2017. № 10. S. 94-99.
25. *Shamsiyev A.M., Aliyev B.* Sovershenstvovaniye diagnostiki i lecheniya spinnomozgovykh gryzh u novorozhdennykh // Uchenyye zapiski Orlovskogo gosudarstvennogo universiteta. Seriya: Yestestvennyye, tekhnicheskiye i meditsinskiye nauki, 2014. T. 2. № 7. S. 108-109.
26. *Ruhullaevich T.O. et al.* Improved results of treatment of purulent wounds with complex use of photodynamic therapy and CO2 laser in the experiment // European science review, 2016. № 3-4. P. 185-189.
27. *Sayinayev F. K. et al.* Laparoscopic treatment of incisional ventral hernias // 湖南大学学报 (自然科学版), 2021. T. 48. № 7. P. 143-149.
28. *Shamsiev A.M., Davlatov S.S., Saydullaev Z.Y.* Optimization of treatment of patients with postoperative ventral hernia // Science, technology and education, 2017. № 10. P. 94-99.
29. *Xirurgik kasalliklar [Matn]: darslik / Z.B. Kurbaniyazov, S.S. Davlatov, Q.E. Raxmanov, A.F. Zayniyev.* Buxoro: "Sadridin Salim Buxoriy" Durdona, 2022. 676 b.