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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

COMPARATIVE EVALUATION OF THE SURGICAL METHODS FOR THE TREATMENT OF ANAL PROLAPSE

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THE ACTUALITY OF THE SUBJECT

Anal prolapse or protrusion of mucosal anal canal can be observed both as a sole case, as well can manifest with the 4th stage hemorrhoid. The The term "prolapse ani" is found in the scientific works of some foreign authors of the late XIX - early XX century (Macfarlane "Practical Observation in Surgery" 1829; Mc. Cormac "Dublin jurnal" 1852; McKelvey B. 1916). There is a direct relationship between the duration of the disease and the frequency of prolapse of internal hemorrhoids and anal mucosa. With a disease duration of more than ten years, the number of patients complaining of prolapsed nodes is almost twice the number of patients whose main concern is bleeding.

The initial violation of the elasticity and structure of the supporting tissues of the anal canal, according to W. Thomson (1975) is one of the main causes of the development of hemorrhoids and anal prolapse. Muscular and fibroelastic tissues that hold the hemorrhoids in the anal canal, under the influence of adverse factors, are prone to degenerative changes, which leads to "slipping" and displacement of the internal hemorrhoids in the distal direction.

This is most likely with chronic constipation or prolonged attempts during bowel movements, pregnancy, prolonged forced position, sedentary lifestyle, which causes weakening and rupture of the Treitz muscle. Then there is a rupture of the Parks ligament, which fixes the mucous membrane of the anal canal to its muscular frame.

In the last stage, hemorrhoids are constantly outside with the impossibility of their reverse reduction even with the use of manual assistance (fixed prolapse). The development of the disease leads, as a rule, to the occurrence of anal prolapse, which is not limited to the prolapse of hemorrhoids and is characterized by protrusion of the mucous membrane of the anal canal and the lower ampullar rectum from the anus. This obstruction prevents normal defecation, patients have to push even harder, a vicious circle is formed.

The constant maceration of the prolapsed mucous and anoderm, ulceration of epithelium, mucous, regular and often bleeding significantly worsen the life of patients. Prolapse of the mucous membrane of the anal canal and lower ampullary segment of

the rectum is one of the cases conditioning the formation of anorectal obstruction, which prevents normal bowel movements.

According to the international Classification of Diseases ICD-10 the pathology occurs under the code K-62. Other diseases of the intestines, K62.2 Prolapse of the anus.

In our country, the number of the 4th stage hemorrhoid patients suffering from anal prolapse visiting proctologist is greater than the patients in initial stages of hemorrhoid. Until now, in all stages of hemorrhoid, as well as in the 4th stage with manifesting anal prolapse, classic open operation by Milligan-Morgan and closed operation by Fergisson, aimed at eliminating three core hemorrhoidal collectors have been used. [1,2]Both open and close hemorrhoidectomy among the frequent relapses of prolapse are associated with the significant post-surgery complications: bleeding in early resection with ligature of inflammed tissues of wide vasculars, early detachment of ligature, stricture of the anal canal (2-4%), expressed pain syndrome due to extensive collection of tissus(23-33%). Reflex urinary retention, most often associated with pain, occurs in 14-27% of cases, wound suppuration or early bleeding - in 4-6% of patients.

In the long term after these operations, there is a risk of developing strictures of the anal canal, insufficiency of the anal sphincter, as well as a relapse of the disease. The number of these complications over the years remains stable and ranges from 2 to 4% in different authors[3],[4]. In

[1] Paul M Cavallaro et al. The Contributions of Internal Intussusception, Irritable Bowel Syndrome and Pelvic Floor Dyssynergia to Obstructed Defecation Syndrome// Dis Colon Rectum. 2019 Jan; 62(1):56-62. doi: 10.1097/DCR.0000000000001250

[2] Шелыгин Ю.А., Титов А.Ю., Шехтер А.Б. и соав. Характер гормонального и морфологического статуса у женщин с синдромом опущения промежности. Колопроктология. 2011.3:3-13.

[3] Boccasanta P., Carpetti P.G., Venturi M., Cioffl U., De Simone M., Salamina G. Randomized controlled trial between stapled circumferential mucosectomy and conventional circular hemorrhoidectomy in advanced hemorrhoids with external mucosal prolapse. //Am. J. Surg. -2001, Vo l.182, № 1. - p . 64-68

[4] Onur Gülseren M[1], Dinc T, Özer V, Yildiz B,Cete M,Coskun F.//Randomized Controlled Trial Comparing the Effects of Vessel Sealing Device and Milligan Morgan Technique on Postoperative Pain Perception after Hemorrhoidectomy.// Dig Surg.2015;32(4):258-61.

addition, the presence of stumps of hemorrhoids, protruding into the lumen of the rectum of those injured at the time of defecation, is also the cause of pain and bleeding. These shortcomings inherent in this method of surgery lead to the increase in the number of days patient stays in the hospital and lengthening the time-period of disability.

The operation according to the Whitehead method, which is performed for circularly located hemorrhoids with concomitant anal prolapse, is not only technically difficult, but complications such as fecal incontinence, stricture of the anal canal, necrosis and retraction of the reduced mucosal area, violation of sensory properties of the anal canal. Wolf B. and Culp C. modified the Whitehead method when, instead of circular excision of the rectal mucosa, the authors excised three to four oval sections of the rectal mucosa along with hemorrhoids, leaving sections of the rectal mucosa. Then the edges of the excised mucous membrane were brought down and sutured to the anal canal. In 10% of patients, failure of the sutures and recurrence of the disease were observed.

A. Touppet also proposed a modification of the Whitehead method, but its implementation requires excellent training in the field of anorectal surgery and modern equipment, which is not available in every hospital.

The other technique which is also applicable in case of anal prolapse is the hemorrhoidopexy with a circular stapler according to the method of Longo[5],[6]. The method is relatively new. There are number of controversial views regarding the current surgery and the long-term results require the further detailed study of the method.[7],[8]

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[5] Русинович В.М. Метод Лонго как альтернатива традиционной геморроидэктомии. // Актуальные вопросы колопроктологии: Тезисы докладов I съезда колопроктологов России с международным участием. - Самара: ГП ≪Перспектива≫, СамГМУ, 2003, -с. 118-121.

[6] Molloy R., Kingsmore D. Life threatening pelvic sepsis after stapled haemorroidectomy. // The Lancet. - 2000. - vol. 355, № 4. - p. 810.

[7] Palimento D., Picenio M., Attanasio U., Lombardi A., Bambini C, Renda A. Stapled and open hemorrhoidectomy: randomized controlled trial of early results. // World Journal of Surgery. - 2003, Vol.2, № 2. -p. 203-207.

[8] article in Japanese) Okumoto S, Ohyanagi H et al.Ryoikibetsu Shokogun Shirzu. Anal prolapse. Japanese, 1994 dec;(6):866-8 PMID:7736238

The essential advantages of the circular stapler resection of the rectum in the treatment of hemorrhoids and prolapse noted by the authors are the painless postoperation period, short bed-day and comparatively short rehabiilitation period. However, the method includes the possibility of postoperative bleeding. The existing literature notes frequent relapses, as well as life-threatening complications such as intestinal perforation, development of the pelvic peritonitis, injuring vaginal wall, prostate. Despite the positive feedbacks regarding the use of linear stapler, the method has not been widely distributed and has not been recommended as an option for surgery in the treatment of hemorrhoidal disease.

Foreign literature has limited information regarding the disease of anal prolapse [9],[10]. Comparative analysis regarding the applying of different methods of surgery in the treatment of anal prolapse, the condition of rectal obturator before and after the surgery are not available. As well as, there is no any prescription regarding the usage of the linear mechanical seam for the treatment of anal prolapse, both as an isolated case, and as accompanying the hemorrhoidal disease of the 4th stage. Prescriptions and precautions on the application of linear stapler have not been defined, technical details of the method were not disclosed, the impact of staples on the structure of the rectal wall was not studied, the data on the long-term results of the treatment of anal prolapse is not found. The issue on selection the treatment method for the extensive stage of hemorrhoids, associated with anal prolapse still require discussions. The requirement for development of new methods, which are expected effectively influence on the main pathogenetic factors, be basically technical, well accepted by the patients, not accompanied by the pain syndrome, relapse of the disease and long rehabilitation period. The risk of complications should be minimal.

[9] Козубенко М.Ю. Удаление внутренних геморроидальных узлов при помощи аппаратов для наложения механического шва. Автореферат дисс. к.м.н. Харьков, 1991, 20 с.

[10] (article in German) Girona J et al. Langenbecks Arch Chir “Diagnostic measure in anal and rectal prolapse“ Suppl II Verh Dtsch Ges Chir.1989;753-5; PMID:2577634

The purpose of the reserch: The aim of the stydy is to improve the results of the surgical treatment of anal prolapse and hemorrhoidal disease of the 4th stage.

Issues of the Reserch

1. Carry out comparative analysis of the technical specifications on recovery methods of anal prolapse - traditional hemorrhoidectomy, circular mucosal-submucosal resection of the rectum, resection with linear stapler.
2. To develop instructions on the usage of linear stapler in correction of anal prolapse.
3. To adapt surgical technics to be used during anal prolapse.
4. To conduct comparative analysis of the results of surgical treatment based on the criteria of the duration of intervention, bleeding, pain syndrome, radicalness, complications and on the life quality.
5. To conduct analysis of long-term results of the treatment.

General provision for issued defence

- Usage of linear stapler in surgical treatment of anal prolapse and hemorrhoidal disease of the 4th stage is radical, technically convenient and safe method for the recovery.
- The method of using linear stapler during anal prolapse and hemorrhoidal disease of 4th stage is associated with minimum number of postoperation complications.
- The method of using linear stapler allows to recover both the problem of anal prolapse and hemorrhoid at the same time.
- The two-row lined seam establish reliable fixation of mucosal-submucosal layer of the lower rectal ampulla, which prevents the relapse of prolapse.

Scientific novelty of the reserch:

- The linear stapler used in the recovery of anal prolapse for the first time.

- Comparative analysis of the technical aspects and results of the surgical recovery of anal prolapse associated with the hemorrhoidal disease of the 4th stage has been carried out.
- The sharply defined notions of the "anal prolapse" have been settled.
- The early and long-term results of the anal prolapse and hemorrhoidal disease of the 4th stage have been investigated.
- For the first time, the comparative evaluation of the efficiency of three methods of recovery of anal prolapse has been carried out, they are: the method of using linear stapler, standard hemorrhoidectomy and the method of using circular stapler.

Practical importance of the research: The research results allow comprehensive diagnostics of the anal prolapse as an isolated disorder, as well as in combination with the extensive forms of hemorrhoidal disease and selection of optimum method for recovery. The usage of linear stapler allows significantly improve the results of surgical recovery of anal prolapse.

Appliance of the results of the reserch: Current method is successfully being applied in Caspian Hospital, also it was applied in Scientific Center of Surgery named after acad. M.A.Topchubashov PLE, in the clinic named N.Tusi, in the clinic named after L. Shikhlinskaya.

Aprobation of the scientific work: The results of the recovery were widely published in scientific articles, was reported during the 13th and 18th International Euroasian Congress on Surgery adn Gastroenterology (2013, 2019, Baku city), and during the 17th Turkish Colon and Rectal Surgery Congress in poster form (2019, Ankara), discussed in scientific council of Scientific Center of Surgery named after acad. M.A.Topchubashov PLE (05.11.21).

The structure and construction of dissertation: The dissertation work printed in 122 pages and contains: introduction, chapter 1. The methods of surgical recovery of anal prolapse - unresolved and disputed aspects (literature review); Chapter 2. Materials and research methods. Chapter 3. Technical specifications of surgical methods on recovery of anal prolapse and hemorrhoidal disease of 4th stage; Chapter 4. The analysis of obtained results in

retrospective study. The frequency of signs of anal prolapse, associated with hemorrhoidal disease. Chapter 5. Comparative assessment of clinical results in prospective study. Conclusion. Findings. Practical recommendations. Bibliography. The work contains of 32 tables, 27 pictures and graphics. Tables are complited with Microsoft Word-2013, graphs with Microsoft Exel-2013, Power Point-2013 programs. The pictures were taken with a digital camera and placed in the text. The bibliography covers 105 sources.

Relation of research to the problem plan of medical sciences: The subject of the dissertation is included in the plan of Scientific Reserch Center of Scientific Center of Surgery named after acad. M.A.Topchubashov PLE (State Re]iststration № 0106AZ00883)

Publications: 8 thesis and 7 articles were published on the subject of the current dissertation, 2 out of these were published in foreign literature.

MATERIAL AND METHODS

The research conducted involved 400 patients with age of 20-71, 334 (83,5%)out of them were men and 66 (16.5%) women, who were operated within time period from 2006 till 2016. The scientific work is divided into a retrospective part, which includes patients operated on from 2006 to 2016 inclusive, and a prospective part, which includes patients operated on from 2009 to 2016 inclusive. Patients from their own archival material were included in the retrospective study. The prospective study included patients who were directly under our dynamic control. The retrospective study included 200 (50.0%) patients in the age group from 20 to 67 years. The mean age was 45.0 ± 0.6 years. Among them, 184 (92.0%) men, 16 (8.0%) women. The prospective study included 200 (50.0%) patients in the age group from 22 to 71 years, the mean age was 45.0±0.8 years. Among them, 150 (75.0%) men and 50 (25.0%) women. All patients were divided into 3 groups. The main group contained 308 (77.0%) patients who passed hemorrhoidectomy with UO-40 linear stapler. Out of them, 188 (94.0%) were in retrospective and 120 (60.0%) were in prospective group. The I control group

included patients who underwent typical open hemorrhoidectomy with the help of electrocoagulation from the Carl Storz brand (Germany). The II control group included patients who underwent circular hemorrhoidopexy according to the Longo method via special device set of "PPH-01" developed and produced by Ethicon(the USA) brand. The I control group included 74 patients (18.5%) who underwent open hemorrhoidectomy surgery via electrocoagulator. 12(6.0%) out of them were in retrospective and 62(31.0%) in prospective study. The II control group included patients who underwent circular hemorrhoidopexy according to the Longo method via special device set of "PPH-01" developed and produced by Ethicon(the USA) brand- 18 patients (4.5%). All of them were included to the prospective study.

The criteria for patients in the study were patients with stage 3-4 chronic hemorrhoids with concomitant anal prolapse and patients with isolated prolapse. The criteria for exclusion of patients from the study were:

- ✓ presence of concomitant chronic somatic diseases in the decompensation phase (portal cirrhosis, severe diabetes mellitus, etc.).
- ✓ Inflammatory bowel disease (Crohn's disease, ulcerative colitis).
- ✓ Infectious diseases (intestinal tuberculosis, venereal lesions of the intestinal mucosa).
- ✓ Malignant neoplasms of the intestine
- ✓ Patients with rectal prolapse

According to the duration of the disease, patients were distributed as follows: 2-4 years - 23 patients (5.8±1.2%), 5-9 years - 78 patients (19.5±2.0%), 10 years or more - 299 patients (74, 8±2.2%).

The leading symptom was the prolapse of hemorrhoids and excess mucosa, recorded in 400 (100%) cases. Blood discharge from the rectum was noted in 388 (97.0±0.9%) patients, pain - in 119 (29.8±2.3%), perianal itching - in 34 (8.5±1.4%) patients, frequent exacerbations in the form of hemorrhoidal tissue thrombosis - 22 (5.5±1.1%) people. Accordinf to the duration of the disease, patients were distributed as follows: 2-4 years - 23 patients (5.8±1.2%), 5-9

years - 78 patients (19.5±2.0%), 10 years and more - 299 patients (74.8 ±2.2%).

According to the types of anesthesia, intensive patients were offered: spinal anesthesia was involved in 48 patients (12±1.6%), spinal anesthesia with intravenous sedation in 184 patients (46.0±2.5%), endotracheal anesthesia was induced in 168 patients (42.0±2.5%).

The main criteria for assessing the immediate results of the intervention in patients of the studied groups were: the duration of the operation; the development of intra- and postoperative complications (bleeding, thrombosis of the outer tissue, stricture of the anal canal); the severity and duration of the pain syndrome; sphincterometry data, the possibility of developing a relapse of the disease; the effectiveness of the treatment.

In the postoperative period, the following indicators were evaluated:

- patency of the anal canal
- the level of location of the formed two-row circular mechanical suture relative to the distal edge of the anal canal
- integrity and location of the linear mechanical seam, and the location of the staples
- cicatricial transformations of the anal canal

We divided the complications observed by us into early ones, detected for the first time 10 days after the operation, and late ones, manifesting themselves after 3 months and later. Early postoperative complications included: bleeding after surgery; thrombosis of external hemorrhoidal tissue; inflammatory complications.

Late postoperative complications, which were assessed as early as 3 months after surgery, included: development of anal canal stricture and/or anal sphincter insufficiency; relapse of the disease

In retrospective studies, after the distribution of patients by age categories, anal prolapse in a retrospective study occurs most often in the age category of 40-49 years - 62 (31.0%) out of 200 patients ($p<0.001$). In a prospective study, anal prolapse most often occurs in the age group 50-59 years - 44 patients (95.7%) and 25 patients (96.2%) and in the age group ≥ 60 years ($p = 0.944$).

During surgery using the Longo method, the resection of external hemorrhoidal tissue was not performed at the beginning of the study. However, after disclosing of thrombosis of external nodes after the surgery, we consider resection of external hemorrhoid mandatory. The essential criteria for the evaluation of immediate results of intervention in study groups patients were: the duration of surgery; frequency of bleeding during and after surgery; duration of pain syndrome; existence of strictures and recurrence of disease: data of sphincterometry during and after the surgery; efficiency of treatment.

The surgery using linear stapler lasted 22,9±0,4 minutes. The classical surgery according to Milligan-Morgan lasted approximately 34,9±0,8 minutes. It is approximately 52.2% long than the surgery using linear stapler($p<0,001$). The surgery using Longo method lasted averagely 29,3 ±1,2 minutes. It is 28% long than the surgery in main group ($p1<0,001$) and 15.9% less than standard hemorrhoidectomy ($p2<0,01$) .

The method of using a linear stapler is technically simple. With a standard hemorrhoidectomy, when large prolapsing areas are sutured, the lumen of the anal canal decreases. This limits the possibility of subsequent maneuvering in other areas and, if necessary, hemostasis. These circumstances significantly lengthen the operation time. During the operation according to the Longo method, the imposition of a purse-string suture takes a lot of time. To straighten the mucosa, when applying each stitch, it is necessary to pull out the anoscope and reinsert it.

Bleeding during the surgery was observed only in 11 (2,8±0,8%) patients out of 400. 3 of above-mentioned patients (1±0,6 %) underwent surgery using linear stapler, 6 patients (8,1±3,2%) standard hemorrhoidectomy and 2 patients (11,1±7,4%) underwent surgery using Longo method. As it is obvious from the results of the study, the lowest probability of blood loss observed during the surgery using linear stapler - only 1% ($p<0,01$).

As canbe seen from the results of the study, the lowest probability of blood loss during the operation was when using a linear stapler - only 1% ($p<0.01$). Hemostasis is carried out easily and quickly with the help of bipolar coagulation, since the

visualization of the staple suture is carried out without much difficulty, which allows you to quickly determine the area of bleeding, if any. During a standard hemorrhoidectomy, additional sutures were applied during bleeding, which is technically extremely difficult to implement due to the gathering of tissues after tightening the ligature. The implementation of hemostasis during the Longo operation was technically much more difficult than in the 2 previous methods. To do this, a hemostatic suture has to be applied in the depth of the intestinal lumen in the transverse direction.

As pain appeared, the patients were given painkillers. To determine the intensity of postoperative pain syndrome, an original questionnaire was used (based on the McGill pain questionnaire. Their purpose depended on the degree of pain (on a 5-point scale according to the patient).

The intensity of pain after surgery using linear stapler averagely was 4,71 ± 0,03 points; the 1st day after surgery it was 3,05 ± 0,02 points; on the 7th day after surgery it was 2,41 ± 0,03 points and 40 days after the surgery it was 0,03 ± 0,03 points.

The pain intensity after standard hemorrhoidectomy was averagely 4,89 ± 0,04 points; on the 1st day after the surgery it was 3,39 ±0,07 points, on the 7th day after the surgery it was 2,77 ±0,06 points and 40 days after the surgery it was 0,57 ± 0,09 points. The pain intensity after the surgery according to Longo method using circular stapler was averagely 4,17 ± 0,19 points; on the 1st day after the surgery it was 3,11 ± 0,2 points; on the 7th day after the surgery it was 2,39±0,18 and 40 days after the surgery it was 0,39±09,14 points. The obtained differences were statistically significant ($p<0,01$). Thus, while summarising all days using analgesics after the surgery, the least number was in main group.

When calculating, the following results were obtained: the pain syndrome in the main group, where a linear stapler was used on the day of surgery, was 15.7% less than with a standard hemorrhoidectomy (control group I) and 1.2% less than in the control group II, where a circular stapler was used. crosslinker ($p0<0.001$; $p1<0.001$). Pain at the first defecation is again less in the main group by 11.4% than in control group I ($p0<0.001$) and by 2.2% than in

control group II (p1<0.001). The advantage of the technique of stapled hemorrhoidectomy was clear in the study of patients 2 months after surgery. Pain in this group is 90.0% less than in control group I, and 30.2% less than in control group II (p0<0.001; p1<0.001). Thus, when summing up all the days after the operation, the use of analgesics is the least in the main group.

Thus, in patients operated on with a linear stapler, postoperative rehabilitation is more favorable, which is an important factor in the effectiveness of surgical intervention.

Early postsurgery complications noted in 1 patient (0,3±0,3%) who underwent surgery using linear stapler (bleeding) and in 11 patients (14.9%) who underwent surgery based on classic hemorrhoidectomy. Out of these 8 patients (10,8±3,6%) had external oedema of interstitial bridges, 3 out of them with bleeding (4,1±1.2%). 6 cases of complications in early postsurgery period who underwent surgery using Longo method, 2 patients out of 6 had postsurgery bleeding(11,1±7,4%) and 4 had external oedema (22,2±9,8%) (p<0,01).

From the control group II, when performing muco-submucosal resection with a circular stapler in the classical version (without additional hemorrhoidectomy), 4 patients (22.8±9.8%) developed edema and thrombosis of the external hemorrhoidal tissue on the next day after the operation. In view of the lack of effect from conservative measures within 3 weeks - 2 months, two patients underwent external hemorrhoidectomy. Given this circumstance, all other patients, along with the Longo operation, underwent external excision of the nodes with an electrocoagulator. This lengthened the total time of the operation, and also increased the postoperative pain syndrome. These data are statistically significant (p<0.001).

Long-term complications, such as stricture and relapse were not observed in main group 0%; however, in the I control group 18 cases were determined. 6 cases out of 18 were the relapse of the disease (8,1±3,2%) and 12 cases of stricture (16,2±4,3%,p<0,01); in the II control group it was 4 patients, which is 22.2%. 2 cases out of 4 were the relapse of the disease (11,1±7,4%) ad 2 cases of stricture (11,1±7,4%, p<0,01).

90 patients out of (45%) 200 underwent sphincterometry in prospective study before surgery, after 25-30 days from the surgery and after 3 and 6 months from the surgery (tab.1). Sphincteromrtry was performed before and after surgery 1.5 - 2 hours after the cleansing enema. To perform this technique, a latex balloon is placed in the lumen of the lower ampulla of the rectum, and 20 ml of liquid is injected through the inlet valve with a syringe. The filled balloon was inserted into the anal canal. After 5 - 7 minutes, necessary for the adaptation of the sphincter, the sensor readings were taken - the tone of the internal sphincter. Then the patient had to compress the anal canal, while the readings of the manometer indicate the degree of volitional effort of the external anal sphincter. Indicators of the normal tone of the internal sphincter μ=150.7, standard deviation σ=24.37. Willpower index μ=206.9, standard deviation of willpower σ=33.19 (Protocol No. 97, 12.09.2005)

Table 1.

Indicators of sphincteromanometry before and after the surgery in prospective study

Sphincter manometry mm.wat.c.	Before/after the surgery	Main group (n=53)	Control I (n=27)	Control II (n=10)	Normal
Internal sphincter tonus	Before	149,8±0,9	151,0±0,7	150,2±0,6	150.7
	1 month after surgery	151,9±0,4	153,5±0,5	150,2±0,6	
	3 months after surgery	150,7±0,2	152,8±0,5	150,4±0,5	
	6 months after surgery	150,6±0,3	150,0±0,4	150,1±0,3	
Conation	Before	205,0±0,2	205,7±0,4	205,0±0,3	206.9
	1 month after surgery	206,4±0,3	204,6±0,2	206,4±0,2	
	3 months after surgery	207,2±0,1	205,8±0,6	206,4±0,8	
	6 months after surgery	207,0±0,2	206,7±0,4	206,1±0,1	

One month after the operation, we observe an increase in the indicators of the tone of the internal sphincter, followed by normalization by 3-4 months in the main group. Normalization in the control group is observed by 6 months after the operation. The initial sphincterospasm is explained by the presence of a fresh wound surface. The indicators of volitional effort are lower after 1 month in all groups. This is due to the fact that the patient cannot fully compress the sphincter due to pain. Normalisation in control group observed in 6 months after the surgery. The initial sphincterospasm is explained with fresh wound surface. The indicators of conation were lower after 1 month in all groups. It is explained that patient can not fully compress the sphincter due to pain syndrome. These indicators were recovered after 3 month in main group and after 6 month in I control group. In 4 patients out of 27 who underwent standard hemorrhoidectomy that we observed anal stricture, failed to pass anal manometry after the surgery. During progressive stricture, it is impossible to insert balloon into the anal canal. After using Longo method, notwithstanding sphincterometry conducted in 10 patients (55,5%) out of 18, we consider it not informative due to the lack of elasticity in the segment of circular stapler seam. It is indicated by the data obtained during the study (indicators p1 and p2 - are not reliable).

Thus, in patients who underwent surgery with a linear stapler, normalization of indicators was found already by the 3rd month after surgery, in contrast to patients who underwent standard hemorrhoidectomy, where the normalization of indicators occurs by the 6th month after surgery.

The results of treatment efficiency were divided into good, satisfactory and unsatisfactory subgroups (Table 2).

The analysis of results obtained from the treatment of patients were based on the objective examination and subjective feelings of the patient, where we consider:

- the position of sphincteral apparatus, the level of cicatricial transformations of anal canal
- existence or non-existence of pain or discomfort during bowel movement

- existence or non-existence of intestinal secretions (blood, mucous)
- existence or non-existence of tissue prolapse during bowel movement
- existence or non-existence of difficulty during bowel movement, narrowing of fecal stream or signs of incontinence

Table 2.

The efficiency estimation of treatment results

Results of the treatment	Main	Control group I	Control group II	Total	χ^2	P
Good	102 93,6%	25 53,2%	6 46,2%	118 69,8%	23.645	<0,001
Satisfactory	6 5.5%	13 27,7%	5 38,5%	39 23,1%		
Unsatisfactory	1 0,9%	9 19,1%	3 21,4%	14 8,1%		
Interviewed patients	109 100%	47 100%	14 100%	169 100%		

The absence of pain during bowel movement, absence of secretions, absence of tissue prolapse during bowel movement, absence of signs of incontinence are considered as criteria for the good result. The absence of prolapse, presence of discomfort during bowel movement and periodic mucous flow are considered as criteria for the satisfactory results. The difficult and painful bowel movement, regular secretion of mucous and blood, signs of partial or full relapse of the prolapse, narrowing of fecal stream or signs of incontinence are considered as criteria for unsatisfactory results. Unsatisfactory results are difficult, painful defecation, regular discharge of mucus and blood, signs of partial or complete recurrence of prolapse, narrowing of the fecal stream, or signs of incontinence. At the same time, 162 patients (76.4±2.9%) who underwent surgery using a linear stapler, 26 patients (50±6.6%) who underwent open hemorrhoidectomy, and 6 patients (46.2±13, 8%) after Longo's operation ($p<0.01$).

Summary: the concept of anal prolapse is a prolapse of the anal mucosa, in which the dental line of the anal canal is everted, the prolapsed part is usually not longer than 3-4 cm. It can occur as an independent pathology, but more often accompanies stage 4 hemorrhoids.

Differential diagnosis of anal prolapse should be carried out with rectal prolapse, in which all intestinal layers fall out, the length of the prolapsing column reaches 15 cm or more, has a cylindrical shape, transverse folds of the rectum are distinguishable. In hemorrhoidal prolapse (without anal prolapse), individual hemorrhoidal pads are observed, and there is no eversion of the dentate line.

The assessment of immediate results of the treatment of anal prolapse using linear stapler showed that, the method have advantages over the resection of mucosal-submucosal layer with circular stapler and over the classical hemorrhoidectomy, which are also used during anal prolapse. The advantage is provided in the simplicity of the method (the possibility of examination of linear seam and access to the last one) and in the absence of long-term relapses. While using UKL both hemorrhoid and prolapse problems are being resolved at the same time, that, the connective-tissue skeleton, formed at the place of staples, is imitating initial connecting apparatus, the skeleton of anal canal which prevents the prolapse of mucous is being formed.

As our studies show, such a formidable complication as bleeding in the postoperative period is most often found in the group of patients operated on by classical hemorrhoidectomy. Undoubtedly, the correct management of patients in the pre- and postoperative period plays an important role. Taking an anamnesis, the nature of defecation, careful control of nutrition is the prevention of complications associated with excessive load on the wound.

The obtained results allow us to conclude that technically the method of using a mechanical stapler is easy to perform, which allows us to reduce the operation time even with severe anal prolapse and hyperplasia of the hemorrhoidal tissue. Elimination of anal prolapse using a linear stapler allows minimizing pain, the risk of bleeding during surgery and in the early postoperative period.

When studying the functional state of the sphincter apparatus in patients who underwent surgery with a linear stapler, normalization of indicators was revealed already by the 3rd month after surgery, in contrast to patients who underwent standard hemorrhoidectomy, where normalization of indicators occurs by the 6th month after surgery.

While using circular stapler in higher located seams it is possible to correct mucous prolapse, but the hemorrhoidopexy is impossible. In lower located circular seam pain syndrome is expectable and the anal canal prolapse is not resolved. However, the method is inferior to the method of Longo in having less traumas and as a result having pain syndrome considering that circular mucosal-submucosal resection is not completed with external hemorrhoidectomy. Taking into consideration all pros and cons, in case of anal prolapse it is advisable to use stapler instead of circular stapler and even more advisable than the usage of Milligan-Morgan type of surgery.

RESULTS

1. The method of correction anal prolapse with the usage of linear stapler is simple from the aspect of technical performance, which provides possibility to decrease the time spent even in surgery of anal prolapse and hyperplastic hemorrhoids (the time spent in surgery using linear stapler last 22,9±0,4 minutes which is 52.2% less than classical hemorrhoidectomy ($p<0,001$) and 28% less than the hemorrhoidopexy via the method of Longo($p1<0,001$).
2. The condition for the usage of linear stapler is anal prolapse, both as an independent disease and as anal prolapse accompanying hemorrhoidal disease of 3-4 stage.
3. The usage of linear stapler for application in organs UO-40 and UO-60 is technically acceptable for the coverage of all cavernous tissue with the main vascular trunks and excess mucous. After the resection of prolapsing tissuethe recovery of anatomic structure of the anal canal is being observed.

4. The elimination of anal prolapse via the linear stapler allows to minimize the pain syndrome. This indicator is 4,12±0,03 points during the surgery day, it is 15,7% less than during the standard hemorrhoidectomy, and 1.2% less in the 2nd control group($p0<0,001$; $p1<0,001$). Pain during the first bowel movement is 3,05±0,02 points, it is 11.4% less than in the 1st control group($p0<0,001$) and 2.2% less than in the 2nd control group ($p1<0,001$). The level of pain in the main group on the 7th day is 2,77±0,06 which is 1% more than in the 2nd control group($p1<0,001$), and 14.8% less than in the 1st control group($p0<0,001$), after 2 months from the date of surgery the pain syndrome in main group is 90.0% less than in the 1st control group and 30.2% less than in the 2nd control group ($p0<0,01$; $p1<0,001$). In linear stapler usage, the bleeding risk during surgery process (1±0,6%) and in early postsurgery period (0,3±0,3%) is minimum.
5. The usage of linear stapler allows to overcome complications such as lack of anal sphincter (0%), stricture of anal canal (0%) and relapse of the disease in the long-term postsurgery period (0%) ,it is radical method that allows achieving good results 76,4±2,9% (($p<0,01$).

PRACTICAL RECOMMENDATIONS

1. The linear stapler should be laid on proximal part of internal hemorrhoidal complex and of excessive prolapse of mucosal anal canal after the exposure and mobilization of external hemorrhoidal complex to the serrate suture. The stapler seaming of external hemorrhoids and anoderms should be avoided.
2. It is highly recommended to stop the bleeding process occuring after the resection of tissues only with the bipolar coagulation.
3. In radical correction of anal prolapse, with the purpose of eliminating the risk of narrowing the lumen of anal canal, the volume of tissue covered at one time should be constantly reviewed.
4. It is important to take into consideration the baseline state of the mucosal layer of anal canal, presence or absence of

hemorrhoidit, sphincteritis which should be corrected during surgery. Conservative treatment in the pre-hospital period decrease the number of complications in intra and post-surgery period and accelerates the period of rehabilitation.

5. In post-surgery (using the linear stapler) period, it is essential to monitor the nutrition and the frequency of the patient, and timely visiting doctor based on the determined timetable.

THE LIST OF PUBLISHED SCIENTIFIC WORK ON THE TOPIC OF DISSERTATION

1. Степлерная геморроидэктомия при лечении геморроидальной болезни IV стадии// Professor Həsən Abbas oğlu Sultanovun 80 illik yubileyinə həsr olunmuş elmi-praktik konfransın mater., Bakı, 2012, стр. 69-70 (coauthor E.Javadov A
2. Сравнительная оценка хирургических методов лечения геморроидальной болезни, сопровождающейся анальным пролапсом.// Материалы IV конгресса хирургов Казахстана с международным участием «Новые технологии в хирургии» г.Алматы, 2013, стр.17-18 (coauthor E.Javadov A.)
3. Использование линейных степлеров при лечении анального пролапса.// Əməkdar elm xadimi, tibb elmləri doktoru, prof. Zəhra Tahir qızı Quliyevanın 90 illik yubileyinə həsr edilmiş konfransın mater., Bakı, 2013., стр. 170-172 (coauthor E.Javadov A., Qas;mov R.S.)
4. Циркулярная варикэктомия при хирургическом лечении геморроидальной болезни 4 стадии.// Əməkdar elm xadimi, tibb elmləri doktoru, prof. Zəhra Tahir qızı Quliyevanın 90 illik yubileyinə həsr edilmiş konfransın mater., Bakı, 2013, səh.172-173 (coauthor E.Javadov A., Aliyeva S.A.)
5. Surgical approach in treatment of hemorroidal disease accompanied by anal prolapsus.// XIII Beynəlxalq Avrasiya Cərrahiyyə və Qastroenteroloqiya konqresinin materialları, Bakı, 2013, стр.268 (coauthor E.Javadov A.)

6. Геморроидальная болезнь, сопровождающаяся анальным пролапсом и методы ее лечения.// Хирургия им. Пирогова, 2014, № 3, стр.43-48 (coauthor E.Javadov A)
7. Using stapler hemorroidektomy technique for surgical treatment of hemorroidal disease accompanied by anal prolaosus.// Azerbaijan- Turkey days of surgery and gastroenterology, Baku,2014 p.95-96 (coauthor E.Javadov A.)
8. Сравнительная оценка результатов применеия Ligasure и линейного степлера при лечении геморроидальной болезни, сопровождающейся анальным пролапсом.// Cərrahiyyə jurnalı, № 1 (41), 2015, стр. 58-61
9. Современные хирургические методы лечения анального пролапса, сопровождающую геморроидальную болезнь 4 стадии.// Azərbaycan təbabətinin müasir naliyyətləri №4,2016, стр.16-24 (coauthor E.Javadov A.)
10. Непосредственные и отдаленные результаты лечения больных с анальным пролапсом.// Биомедицина, №4/2017, стр.23-28 (coauthor E.Javadov A.)
11. Anal prolapsus eşliğinde evre IV hemorroid.// XVII Türk kolon ve tektum cerrahisi kongresi program ve bildiri özetleri,Şubat(Mart),2019, стр. 152 (coauthor E.Javadov A)
12. Проспективные исследования больных с геморроидальной болезнью, сопровождающийся анальным пролапсом.// Sağlamlıq-2019, №1,Bakı, стр. 47-52 (coauthor E.Javadov A
13. Surgical treatment of anal prolapsed and their comparative characteristics.// Вестник Хирургии Казахстана № 2 (59), 2019, стр. 37-41(coauthor E.Javadov A.)
14. Выбор хирургического метода лечения геморроидальной болезни 4 стадии, сопровождающаяся анальным пролапсом. // Cərrahiyyə jurnalı, № 2, 2019, стр. 29-33
15. Anal prolapse and it surgical treatment.// Abstracts of the XVIII international Eurasian congress of surgery and hepatogastroenterology, 2019, Baku, p.260 (coauthor E.Javadov A.)

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