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Late results of surgery for incomplete internal fistula-in-ano

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ABSTRACT *AIM: to assess late results of surgery for incomplete internal anal fistulas.*
PATIENTS AND METHODS: the prospective cohort study included 156 patients with in complete internal anal fistulas in 2014-2017.
RESULTS: complete efficacy of the treatment was obtained in 132/147 (89.8%) patients, 106/117 (90.6%) revealed no anal incontinence (AI). Recurrence developed in 15/147 (10.2%) cases and 11/147 (7.5%) — anal incontinence. Newly developed incontinence was revealed in 7/117 (6.0%) patients: 6/117 (5.1%) had mild AI and 1/117 (0.9%) — moderate. The increase of AI degree showed 4/30 (13.3%) patients.
CONCLUSION: a differentiated approach to anal fistulas surgery made it possible to minimize risk of incontinence and recurrence.

KEYWORDS: *incomplete internal fistula in ano, incontinence, recurrence*

CONFLICT OF INTEREST: *The authors declare no conflict of interest*

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INTRODUCTION

Despite the study of the problem of surgical treatment of incomplete internal anal fistulas, there are still unresolved issues of this issue. First of all, this is due to the difficulties in diagnosing incomplete internal anal fistulas due to the absence of an external fistula opening, which often does not allow to estimate the extent of the fistula tract in relation to the anal sphincter. Currently, endoanal ultrasound and magnetic resonance imaging of the pelvis (MRI) are increasingly used in the diagnosis of anal fistulas. However, the diagnostic value of these studies is not precisely defined.
Recently, there is no single concept of surgical treatment of incomplete internal anal fistulas, and the choice of a treatment for this type of fistula remains challenging. With simple incomplete internal anal fistulas, fistulectomy by Gabriel is accompanied by a low recurrence rate (0–9%), the incidence of anal incontinence reaches 0–28% [1–5]. However, with fistulectomy anal suturing the sphincter, the recurrence rate may be 18% [6,7], and the anal incontinence reaches 40%[8]. When using the ligature method for the treatment of complex incomplete internal anal fistulas, clear indications for use have not yet been determined, a high incidence of dysfunction of anal retention remains up to 22% and recurrences up to 10.5% [9, 10]. Most studies devoted to this issue include a small number of cases, short follow-up periods and lack of evaluation of anal continence.

AIM

To evaluate late results of surgery for incomplete internal anal fistulas.

PATIENTS AND METHODS

A prospective cohort single-center study was done in September 2014 — January 2017. It included 156 patients with incomplete internal anal

fistulas. The study did not include patients with perianal complications of inflammatory bowel diseases (ulcerative colitis, Crohn's disease); fistulas of specific etiology (tuberculosis, actinomycosis, etc.); complete anal fistulas (with the presence of a external opening); fistulas after abdominal surgery on the rectum; acute inflammatory diseases of the perianal area and anal canal; severe concomitant diseases, mental illnesses, taking neuroleptics and anxiolytics.

The study included 96 (62.0%) males and 60 (38.0%) females. The mean age was 46 ± 12.3 (22–76) years.

The characteristics of patients are presented in Table 1.

The preoperative checkup included: clinical picture, examination of the perianal area, digital rectal examination, anoscopy, profilometry, sphincterometry, questionnaire on the Wexner's anal incontinence scale, endoanal ultrasound, pelvic MRI with intravenous contrast and colonoscopy. To objectify the data in the detection of the disease recurrences, a control by postoperative endoanal ultrasound was done even in cases with complete healing of the wounds of the anal canal and perianal area (not earlier than 3 months after surgery).

The assessment of the degree of the anal incontinence was carried out by sphincterometry [11,12] and Wexner's incontinence scale.

The anal incontinence was detected in 35/156 (22.4%) patients before surgery. The first stage had 15/35 (42.6%) patients, the 2nd — 18/35 (51.4%), the 3rd — 2/35 (5.7%). All patients with incontinence had previously undergone various operations on the perineum and anal canal. According to the Wexner Incontinence scale, the average score for all patients was 0.4 ± 0.9.

RESULTS

The postoperative follow-up for patients was 3–29 (4.5 months) months. At the same time, the late results were evaluated in 147/156 (93.6%) patients.

Recurrence rate was 10.2% (15/147). The average follow-up period before the detection of fistula recurrence was 4.5 months. In patients with intrasphincteric fistulas, recurrence developed in 3.7% (2/54) cases. Patients with transsphincteric fistulas developed recurrence in 6/35 (17.1%) cases. At the same time, in 4/35 (11.4%) patients a transsphincteric fistula was diagnosed with involvement of the superficial part of the sphincter, in 1/35 (2.9%) patient — with involvement of a deep part, in 2.9% (1/35) cases — with involvement of the subcutaneous part. In patients with intersphincteric fistulas with a supralevator collection and in the puborectal muscle area, recurrence was detected in 2/40 (5.0%) patients. In patients with extra sphincter location of the fistula, recurrence was diagnosed in 27.8% (5/18) of the cases.

The dependence of the incidence of the disease recurrence and surgical option was evaluated.

It was found that the most often recurrences occurred after fistulectomy with suturing the sphincter, which was diagnosed in 22.7% of the cases. After this procedure in the presence of a muscular defect of the anal sphincter at least ¼, a recurrence of the fistula was diagnosed in 33.3%. In one case, an incomplete internal extrasphincteric anal fistula with a rectovaginal septum was diagnosed. However, an intraoperative revision did not reveal an internal fistula opening, and therefore procedure was completed by opening and draining the fistula. Subsequently, a recurrence of the disease was diagnosed after 2.5 months (Table 2).

To identify possible risk factors for recurrence, a statistical analysis was performed. It included: gender, age, history of the disease, previous surgery, the presence of intersphincteric cavity, additional tracts, scars of the anal canal, MRI in the preoperative period, the complexity of the fistula, the presence of concomitant diseases, two-stage approach. The univariant analysis showed that statistically significant factors that affect recurrence are the complexity of the fistula ($p < 0.001$), previous surgery for anorectal diseases (hemorrhoids, fissure, anal fistula, fibrous polyp) ($p = 0.001$), the presence of additional cavities and tracts ($p = 0.002$) and scar changes of the anal sphincter ($p = 0.001$) (Table 3).

In order to find independent risk factors for recurrence of the disease, a logistic regression analysis was additionally carried out. As a result, it

Table 1. *Characteristics of patients*

Age	46 ± 12.3 (22–76) years
History of the disease	0.5–240 (Me = 12) months
Surgery for anus and rectum diseases	69 (44.2)
Opening and drainage of acute anal abscess	56 (35.9)
Anal fissure	31 (19.9)
Fistula type	
Intrasphincteric	54 (34.6%)
Intersphincteric	40 (25.6%)
– High additional collection (at levator level and above)	15/40 (37.5%)
– Low additional collection (at and below internal fistula opening)	25/40 (62.5%)
Transsphincteric	35 (22.4%)
– Subcutaneous part	9/35 (25.7%)
– Superficial part	14/35 (40%)
–Deep part	12/35 (34.3%)
Extrasphincteric	27 (17.3%)
– 1 — degree complexity	2/27 (7.4%)
– 3-degree complexity	3/27 (11.1%)
– 4-degree complexity	22/27 (81.5%)
Normal anal continence before surgery	121/156 (77.6%)
Anal incontinence (AI) before surgery	35/156 (22.4%)
– 1st stage of AI	15/35 (42.6%)
– 2nd stage of AI	18/35 (51.4%)
– 3d stage of ASI	2/35 (5.7%)

Table 2. *The incidence of recurrence of incomplete internal anal fistulas when assessed depending on the surgical option*

Surgery type	***n* (%)**	**Recurrence rate**
Fistulectomy with suturing sphincter	22 (15%)	5 (22.7%)
Fistulectomy into anal canal	88 (60%)	3 (3.4%)
Fistulectomy and advancement flap	15 (10.2%)	3 (20%)
Fistulectomy with marsupialization	14 (9.5%)	2 (14.3%)
Additional cavity opening (case with undiagnosed internal fistula opening)	1 (0.7%)	1 (100%)
Fistulectomy with sphincteroplasty	3 (2.0%)	1 (33.3%)
Fistulectomy with fistulous tract and internal fistula opening closure by bioplastic material “Collost”	4 (2.6%)	-
Total:	147 (100%)	15 (10.2%)

Table 3. *Univariate analysis of the influence of various factors on the recurrence rate of incomplete internal anal fistulas*

Analyzed risk factor	Recurrence (%)	OR	95% CI	*P**
Gender: Males Females	 9/92 (9.8%) 6/55 (10.9%)	5.61	0.297–2.638	1.000
Age: Before 40 years After 40 years	 6/49 (12.2%) 9/98 (9.2%)	5.00	0.461–4.126	0.573
Surgeries performed before: Yes No	 13/69 (18.8%) 2/78 (2.6%)	7.04	1.914–40.665	0.002
Disease history ⩽ 1 year > 1 year	 9/96 (9.4%) 6/51 (11.8%)	5.20	0.260–2.317	0.776
Presence of intersphincter additional cavity: Yes No	 5/44 (11.4%) 10/103 (9.7%)	4.49	0.269–2.614	0.771
Presence of additional tracts: Yes No	 13/72 (18.1%) 2/75 (2.7%)	7.35	1.745–37.057	0.002
Seton: Yes No	 4/21 (19.0%) 11/126 (8.7%)	2.14	0.703–8.603	0.232
Comorbidities: Yes No	 11/104 (9.6%) 4/33 (12.1%)	3.37	0.229–2.613	0.745
MRI before surgery: Yes No	 10/87 (11.5%) 5/60 (8.3%)	6.12	0.462–4.413	0.592
Scar changes in anal canal walls as per ultrasound: Yes No	 13/66 (19.7%) 2/81 (2.5%)	6.73	2.100–44.692	0.001
Fistula type: Simple Complex	 3/88 (3.4%) 12/59 (20.3%)	6.02	0.037–0.515	0.001

was found that independent factors that statistically significantly increase the recurrence rate are: the presence of additional cavities and tracts ($p < 0.007$) and scar changes of the anal sphincter according to ultrasound ($p < 0.016$).

The analysis of the anal sphincter function after surgery was carried out for each surgical option. After fistulectomy into the anal lumen, fistulectomy with closure of the internal fistula opening by rectal advancement flap, a statistically significant decrease in mean and maximal intra-anal pressure both at rest and with voluntary contractions after surgery was noted ($p < 0.0001$). When comparing the results of the survey by Wexner's scale before surgery and 90 days after, the mean score was 1.2 ± 2.28 and 1.8 ± 1.65, respectively, ($p = 0.306$). In patients after fistulectomy with closure of the internal fistula opening by rectal advancement flap, 2 (9.1%) 1st stage of anal incontinence was detected. In 1 (4.5%) case the 2nd stage of AI was detected.

After fistulectomy into anal canal, fistulectomy with suturing the sphincter and fistulectomy with marsupialization, no negative changes of pressure indicators at rest and with voluntary contraction before and after surgery were revealed, despite the fact that a statistically significant difference ($p = 0.001$) was found when comparing them. Based on this, it can be concluded that during these procedures, the pressure indicators in the anal canal at rest and with voluntary contractions remain within the physiological normality. When comparing the results of the questionnaire in patients after fistulectomy into anal canal, using the Wexner's scale before surgery and 90 days after, the mean score did not change significantly

Table 4. *Surgical options in patients with incomplete internal anal fistulas and postoperative anal incontinence (n = 146)*

Surgical option	Number of patients	AI after surgery
Fistulectomy into anal canal	88	1 stage — 3 2 stage — 3
Fistulectomy with suturing anal sphincter	15	-
Segmental proctoplasty	22	1 stage — 4 2 stage — 6
Sphincteroplasty	3	-
Marsupialization	14	-
"Collost"	4	-

compared to the baseline: 0.3 and 0.4, respectively ($p = 0.583$). As a result of fistulectomy into anal canal, in 3 (3.4%) cases, the anal incontinence of the 1st stage was revealed. In 3 (3.4%) patients, the previous anal incontinence of the first degree worsened to the second. After fistulectomy with suturing the sphincter, the mean score before surgery was 0.3, and after surgery 0.6 ($p = 0.07$). At the same time, 26.7% (4/15) of patients complained of aim paired continence, the scores in these patients varied from 1 to 4. When questioning patients after fistulectomy with marsupialization, only 1 (7.1%) patient complained of periodic gas incontinence with 2 points.

In patients after fistulectomy and closure of the internal fistula opening with bioplastic material "Collost", no analysis was carried out by gender due to a small sample size (different baseline indicators of sphincterometry in men and women). The average score before and after surgery did not change and amounted to 0. Thus, this surgical option does not have a negative impact on the anal continence.

Indicators of intra-anal pressure before and after surgery in a group of patients who underwent the fistulectomy with suturing the sphincter in the presence of a muscular gap of the anal sphincter of at least ¼ were reduced. When questioning patients on the anal incontinence scale before surgery, the mean score was 3, after surgery — 2.7, which indicates no negative impact of surgical option on the sphincter function.

When identifying risk factors for anal incontinence, univariant and one-dimensional multivariate analysis of variance was carried out, in which gender, age, complexity of the fistula, scar changes in the anal canal, previous surgery were evaluated. None of them had a significant effect on the postoperative incontinence.

Of the 147 patients followed up before surgery, 30 (20.4%) showed anal incontinence. Of them, 9.5% (14/147) had AI of the 1st stage, 10.2% (15/147) — the 2nd, 0.7% (1/147) — the 3rd.

Newly developed postoperative incontinence was found in 7/117 (6%) patients. Of them, 5.1% (6/117) have AI of the 1st stage, 0.9% (1/117) — the 2nd one. Among patients with initially existing anal incontinence, 4/30 (13.3%) patients showed worse function after surgery.

Thus, the anal sphincter incontinence or aggravation of preoperative AI after surgery was detected in 11/147 (7.5%) patients (Table 4).

DISCUSSION

The features and surgical options for incomplete internal anal fistulas are due to the difficulties of diagnosis, the complexity of assessing the fistula location relative to the structures of the anal sphincter. Due to the widespread implication of endoanal ultrasound and MRI into the clinical practice, the incidence of detection and localization of the internal fistula, the presence of perianal additional tracts, the location of the fistula tract in relation to the fibers of the anal sphincter and additional fistula tracts has increased. The sensitivity of the methods reaches 92% [13–16]. MRI is a relatively new method in the diagnosis of anal fistulas; therefore, there are no studies evaluating its value for incomplete internal anal fistulas. Also, there is no single universal approach for

the treatment of incomplete internal anal fistulas. In most cases, the choice of treatment option for these fistulas coincides with that for complete ones. However, with complex incomplete internal fistulas, surgical approach differs from classical options [17], which is confirmed by a small number of papers [18–21], in which the incidence of recurrences would be estimated.

At the same time, all studies are based on a small series of cases [18–20] and in some studies the anal sphincter function before and postoperatively is evaluated [21]. Despite the availability of modern diagnostic options, they were not used in all studies for incomplete internal anal fistulas [21]. Only in two papers, the use of magnetic resonance imaging and multi-stage treatment revealed no recurrences in "complex" incomplete internal anal fistulas [18,20]. New diagnostic options are promising for implementation into the practice of a coloproctologist in order to detect "complex" or "extraordinary" cases of anal fistula. In this study, a clinical and anatomical classification of incomplete internal anal fistulas has been developed and used, which allows a differentiated surgical approach. Due to this, the recurrence rate was low in "simple" incomplete internal anal fistulas and amounted to 3.4% (3/88), while with "complex" — 20.3% (12/59). For the first time, predictors of the recurrence risk were analyzed, which include previous surgery in the anorectal area (hemorrhoids, fissure, anal fistula, fibrous polyp) (p = 0.001), the complexity of the fistulous tract (p = 0.001), the presence of additional cavities and tracts (p = 0.002), scar changes in the anal sphincter (p = 0.001). Thus, the study should help to reduce the recurrence rate in "complex" incomplete internal anal fistulas and reduce postop anal incontinence. According to the sphincterometry data, only fistulectomy with suturing the sphincter, the fistulectomy with marsupialization and the fistulectomy with closure of the internal fistula opening with bioplastic material "Collost", there was no decrease in anal pressure and no anal incontinence. Other options impair the anal sphincter function. However, when analyzing the risk factors for the AI (gender, age, the fistula location in relation to the anal sphincter, scar changes in the anal canal), it turned out that none of them had a statistically significant effect. Only with one-dimensional multivariate analysis of variance, a combination of factors such as the surgical option and scar changes of the anal sphincter tended to develop AI (p = 0.067). In the study, good results of surgical treatment were obtained. Only 6% (7/117) of the patients had newly developed anal sphincter incontinence. Of them, 5.1% (6/117) had the 1st stage AI, 0.9% (1/117) — the 2nd, and 4 out of 30 (13.3%) patients with preexisting AI had a deterioration.

CONCLUSION

Recently, there is no universal concept in the approach to incomplete internal anal fistulas, which in turn makes it difficult to predict the recurrence and anal incontinence. This study is based on the developed clinical and anatomical classification of incomplete internal anal fistulas, which allowed to optimize the surgical option. Thus, the significance of the data obtained in the analysis of anal incontinence and recurrence risk made it possible to identify this group of patients.

AUTHORS CONTRIBUTION

Concept and design of the study: *Marina O. Chernozhukova, Dmitry V. Vyshegorodtsev, Alexander M. Kuzminov*

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