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THE RESULTS OF SPHINCTEROMETRY IN PATIENTS AFTER SORGIION TREATMENT OF EXTRASPHINTERY ANAL FISTULA

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Abstract

More than 30% of patients with chronic paraproctitis have complex forms. They are most often complicated by external sphincter insufficiency due to deformation of the anal canal and scarring of the sphincters. The main principle of substantiation of surgical treatment of extrasphincteric pararectal fistulas is the individual choice of method in each particular patient. It is based on a comprehensive assessment of such factors as the etiology of the fistula, its distance from the edge of the anus, the relationship of the defect or fistula with the sphincter muscles apparatus, the severity of the scarring process, the functional state of the rectum.

Aim. Evaluation of the functional state of the sphincter apparatus of the rectum in patients with extrasphincteric pararectal fistulas in the preoperative, early and late postoperative periods.

Materials and methods. To determine the average indicators of anal sphincter function, basal tone and maximal compression force were measured using a sphincterometer "Sphinctometer STM-0164-SM" in 114 healthy individuals (68 men and 46 women) of different ages (16 to 80 years) who objectively had no signs of anal incontinence. In all patients, sphincterometry was preceded by a thorough proctological examination, and

proctological pathology was excluded. Therefore, hemorrhoids or anal fissures, which lead to increased basal tone at rest, were excluded so as not to lead to falsified values.

Results. Indicators of the maximum compression force in the early postoperative period, ie the compression force of the external anal sphincter, in both groups were significantly lower than preoperative and ranged from 55 to 154 mm Hg, respectively. and from 63 to 137 mm Hg. This can be explained by the presence of a granulating wound in the pararectal tissue, edema and partial injury of the external anal sphincter during surgery.

In the late postoperative period, 6-12 months after surgery, the indicators of basal tone in both groups approached the preoperative indicators. In the main group, the study was performed in 22 patients. In these 22 patients, the tone of the internal anal sphincter did not differ significantly from the preoperative and ranged from 20 to 37 mm Hg. In the control group, in all 32 patients, the basal tone of the anal sphincter was significantly lower than before surgery - from 17 to 28 mm Hg. There were no clinical manifestations of incontinence at rest in either main or control groups.

In the late postoperative period in both groups a decrease in the maximum compression force of the external anal sphincter was revealed. In the main group the maximum compression force of the external anal sphincter varied from 71 to 186 mm Hg, and in the control group from 77 to 135 mm Hg, respectively.

Conclusion. Surgical treatment of patients with extrasphincteric pararectal fistulas significantly reduces the contractile function of the external anal sphincter in the postoperative period, regardless of the choice of surgery.

Keywords: Proctology; Rectal Fistula; Sphincterometry; Surgical treatment; Incontinence.

More than 30% of patients with chronic paraproctitis have complex forms of this pathology. They are most often complicated by external sphincter insufficiency due to deformation of the anal canal and scarring of the muscles that compress the anus.

The main principle for extrasphincteric pararectal fistulas surgical treatment substantiationis is individual choice of method for each particular patient. It is based on a comprehensive assessment of such factors as fistula etiology, its distance from the edge of an anus, relationship between the defect or fistula and muscular apparatus of the pulp, severity of the scarring process, functional state of the rectum. [1]

Goal. Assess the rectum's locking apparatus functional state for the patients with extrasphincteric pararectal fistulas in the preoperative, early and separated postoperative periods.

Prevent the insufficiency development in the rectal apparatus for the patients operated.

Materials and methods. A necessary prerequisite was the discontinuation of any drugs that affect the motor function of the intestine, at least 48 hours before the study. The study is performed in a sideways position with bent legs, in a comfortable position for the patient. A two-channel polyvinyl probe (inner channel diameter 1 mm) was used, through which the fluid injected by the microprocessor circulates at a speed of 0.5 cm / s. The contraction of the wall of the rectum deforms the meniscus of the drop of fluid, which is then transmitted to the receiving (external strain gauge) device. The recording began 15-20 minutes after insertion of the probe into the intestine to a depth of 10 cm, which eliminates the influence of possible interference.

The determination for the sensitivity threshold of of the rectum was performed by injecting the air through a probe into a rubber balloon (up to 90 ml). At the same time they determined the elasticity of the rectum by the following method: they subtracted the volume of the first sensitivity from the maximum tolerable volume; the pressure reached at the first sensitivity was subtracted from the pressure that arose at the most tolerable volume; then the difference in volume was divided by the difference in pressure.

To determine the average indicators of anal sphincter locking function, there were performed the measurements of basal tone and maximum compression with a sphincterometer "Sphinctometer STM-0164-SM" with 114 healthy individuals (68 men and 46 women) of different ages (16 to 80 years) who objectively had no signs of anal incontinence. All the patients had a thorough proctological examination with excluded proctological pathology before sphincterometry. Therefore hemorrhoids or anal fissures, which lead to increased basal tone at rest were excluded so as not to lead to falsified values. The knowledge of standard anal pressure is important for the differentiation of anal incontinence. [2]

Tables № 1 and № 2 record the measurements of anal sphincter strength for healthy women and men.

The women (n = 46) (table 1) had the values of the basal tone of the anal sphincter between 15 and 30 mm Hg, and the maximum compression force of the anal sphincter was between 54 mm Hg. and 200 mm Hg.

Table 1. The anal sphincter strength indicators for healthy women

Women			
Age	Number of patients	Basal tone	Maximum compression force
16 - 20	1	15	200
20 - 30	1	25	107
30 - 40	4	24	83
40 - 50	8	28	103
50 - 60	15	30	85
60 - 70	13	22	80
70 - 80	2	21	54
80 - 90	2	26	54
Total	46	-	-

Table 2. The anal sphincter strength indicators for healthy men

Men			
Age	Number of patients	Basal tone	Maximum compression force
16 - 20	0	0	0
20 - 30	3	29	291
30 - 40	11	37	145
40 - 50	16	39	150
50 - 60	19	32	160
60 - 70	11	37	140
70 - 80	5	38	126
80 - 90	3	30	121
Total	68	-	-

The men (n = 68) (table 2) had the values of basal tone from 29 to 39 mm Hg, and the maximum compression force showed values from 121 to 291 mm Hg.

There was determined the dependence of basal tone and maximum compression force on the sex and age of the subjects. Thus, the women's basal tone and maximum compression

force were lower than in men's. Also, both women and men over 70 years old had the maximum force of anal sphincter compression decreased, comparing to younger people of the same sex.

The results of anal sphincterometry for patients after surgical treatment of extrasphincteric pararectal fistulas.

There was completed the analysis of anal sphincterometry with determination of basal tone and maximum compression force for 46 patients operated on extrasphincteric pararectal fistulas.

Before surgery, the basal tone of the anal sphincter, denoted by ARD_0 , and the maximum compression force, denoted by AMD_0 , were measured for all 46 patients, where 0 means the initial values of inhibitory function. All indicators of sphincter compression force were expressed in mm of mercury.

2-3 weeks after surgery, depending on the condition of the postoperative anal canal wound and the time of ligature discharge (patients after Hippocratic surgery), the basal tone of the anal sphincter, denoted by ARD_p , and the maximum compression force, which was denoted, were measured in all 58 patients. AMD_p , where P - means the early postoperative period.

In the remote postoperative period, after 6-12 months, a study of anal sphincter locking function was performed only for 4 patients of the main group there emerged the recurrence and they were re-operated by ligature. In this study, the basal tone of the anal sphincter was denoted by ARD_B , and the maximum compression force was denoted by AMD_B , where B is the remote postoperative period.

The main group consisted of 14 patients operated according to the proposed method, with extrasphincteric fistulas of the first degree of complexity. The control group consisted of 32 patients operated by ligature according to Hippocrates, including 12 patients with degree I complexity and 20 patients with degree II extrasphincteric fistula.

The Indicators of basal tone of the anal sphincter for patients with extrasphincteric pararectal fistulas of I and II degrees of complexity in the main (32 patients) and in the control (14 patients) groups before surgery did not differ significantly and ranged from 23 mm Hg to 37 mm Hg

The maximum force of the anal sphincter compression for patients with extrasphincteric pararectal fistulas of I and II degrees of complexity in the main (32 patients) and in control (14 patients) groups before surgery also did not differ significantly and ranged from 73 mm Hg to 210 mm Hg

In the early postoperative period, there were changes in the basal tone of the anal sphincter in the main and control groups. Thus, basal tone for all patients of the main group, operated by the proposed method, significantly increased relative to preoperative figures up to 32 - 54 mm Hg, which can be explained by the presence of postoperative wound in the anal canal with pain and increased tone of the internal anal sphincter that was not injured during plastic surgery. At the same time, the indicators of basal tone in the control group of the patients operated by ligature according to Hippocrates, significantly decreased to 8 - 25 mm Hg, and 12 patients out of 32 complained of gas incontinence and smearing in the early postoperative period. This result can be explained by the injury of the internal anal sphincter directly during surgery, when the internal fistula with part of the circular muscle of the internal anal sphincter was removed, and the fact that the ligature passed through the muscle mass during sphincterometry had not departed.

The Indicators of the maximum compression force in the early postoperative period, ie the compression force of the external anal sphincter, in both groups, in the main and in the control one were significantly lower than preoperative and ranged from 55 to 154 mm Hg and from 63 to 137 mm Hg respectively. This can be explained by the presence of a granulating wound in the pararectal tissue, edema and partial injury of the external anal sphincter during surgery.

In the remote postoperative period, 6-12 months after surgery, the indicators of basal tone in both the main and control groups approached the preoperative indicators. In the main group, the study was performed for 22 patients because 4 patients underwent reoperation due to recurrence of pararectal fistula. For these 22 patients, the tone of the internal anal sphincter did not differ significantly from the preoperative and ranged from 20 to 37 mm Hg. In the control group, all 32 patients had the basal tone of the anal sphincter significantly lower than before surgery - from 17 to 28 mm Hg. There were no clinical manifestations of gas incontinence and smearing for the patients in either the main or control group.

In the remote postoperative period there was detected a decrease in the maximum compression force of the external anal sphincter in both the main and control group. As for the main group among 22 patients the maximum compression force of the external anal sphincter was from 71 to 186 mm Hg, and in the control group for 32 patients from 77 to 135 mm Hg respectively.

The results obtained are presented in table 3.

Table 3. The results of anal sphincterometry for patients before and after surgery

	Before the surgery		Early postoperative period		Remote postoperative period	
	ARD0	AMD0	ARDp	AMDp	ARDB	AMDB
Main group (n=26*)	23 – 35	73 – 210	32 – 54	55 – 154	20 – 39	71 – 186
Control group (n=32)	22 – 37	86 – 181	8 – 24	63 – 133	17 – 28	77 – 135

*In the remote postoperative period there were studied 22 patients of the main group

In order to objectify the results of the study, the difference in preoperative studies of the force of contraction of the anal sphincter and in the postoperative period for each patient was marked as Δ - delta, and expressed as a percentage (%) from the rate of the first study.

Δ ARDp – this is the difference between the basal tone of the internal anal sphincter for patients before surgery and in the early postoperative period. The formula for determining Δ ARDp = $100 \times \frac{ARD0 - ARDp}{ARD0}$ %. In the main group, the basal tone of the anal sphincter in the early postoperative period for all patients was higher than the preoperative index, so the formula was presented as follows: Δ ARDp = $100 \times \frac{ARDp - ARD0}{ARD0}$ %. Δ ARDp more than the basal tone of the anal sync before surgery. And in the control group Δ ARDp basal tone was significantly less than preoperative indicators by 35% - 67%.

Δ ARDB – this is the difference between the basal tone of the internal anal sphincter before surgery and in the remote postoperative period. Determine this indicator by the formula Δ ARDB = $100 \times \frac{ARD0 - ARDB}{ARD0}$ %. For 22 patients of the main group there were no reliable data on differences in basal tone of the anal sphincter before and after surgery, because Δ ARDB made $\pm 15\%$. For the control group Δ ARDB made from 15% to 24% decrease in basal tone compared to preoperative figures.

Δ AMDp –this is the difference between the maximum compression force of the external anal sphincter before surgery and in the early postoperative period. The formula for determining Δ AMDp = $100 \times \frac{AMD0 - AMDp}{AMD0}$ %. In the main group Δ AMDp made 18-26% less, in the control one 20-27% less than preoperative indicators of maximum compression force. In this case, there is no significant difference Δ AMDp between the main and control group.

ΔAMD_B –this is the difference between the maximum force of compression of the external anal sphincter for patients before surgery and in the remote postoperative period. The calculation was performed according to the formula $\Delta\text{AMD}_B = 100 \times \frac{\text{AMD}_0 - \text{AMD}_B}{\text{AMD}_0} \%$. In the main group ΔAMD_B made from 3% to 11%, in the control group 10% to 25% less than preoperative indicators. It was also found that ΔAMD_B of the main group is significantly lower than ΔAMD_B of the control group.

The results of monitoring the difference in anal sphincter, Δ - delta, before surgery and at different times after surgery in the main and control groups are presented in table 4.

Table 4. The results of monitoring the difference for anal sphincter, Δ - delta, before surgery and after surgery

	ΔARD_p	ΔARD_B	ΔAMD_p	ΔAMD_B
Main group (n=26*)	Significantly more 31% - 54%	Significantly no different $\pm 15\%$	Significantly less 18% - 26%	Significantly less 3% - 11%
Control group (n=32)	Significantly less 35% - 67%	Significantly less 15%-24%	Significantly less 20% - 27%	Significantly less 10% - 25%

* In the remote postoperative period, there were studied 22 patients in the main group

Analyzing the results of sphincterometry for patients in the preoperative and in the early and long postoperative periods for patients who underwent plastic technique according to the developed method and the classical ligature technique according to Hippocrates.

Conclusions

1. The surgical treatment for patients with extrasphincteric pararectal fistulas significantly reduces the contractile function of the external anal sphincter in the postoperative period, regardless of the choice of surgery.

2. The choice of plastic technique according to the developed method of surgical treatment for patients with extrasphincteric pararectal fistulas of I and II complexity degree has significantly less effect on the contractile function of the external anal sphincter compared to the ligature technique.

3. The locking function of the internal anal sphincter after surgical treatment for patients with extrasphincteric pararectal fistulas of the I and II complexity degree according to the developed plastic technique does not suffer. In the surgical treatment for patients with extrasphincteric pararectal fistulas of the I and II complexity degrees according to the ligature

method according to Hippocrates there is a decrease in the basal tone of the internal anal sphincter by 15-24%.

4. The reduction of the contractile force of the anal sphincter muscles by 20-25% does not significantly lead to functional insufficiency of the anal sphincter and incontinence.

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