

# The effect of anorectal manometric examination on the surgical treatment plan in chronic anal fissure



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## The effect of anorectal manometric examination on the surgical treatment plan in chronic anal fissure

**INTRODUCTION:** Although lateral internal sphincterotomy (LIS) is the most preferred surgical treatment for chronic anal fissure, In this study, we aimed to investigate the effect of preoperative anorectal manometry on surgical treatment choice in patients presenting with anal fissure.

**MATERIAL AND METHODS:** Between January-2015 and August-2017 and whose physical examination revealed chronic anal fissure findings were included in the study. Patients were divided into two groups as Group 1 LIS and Group 2 non-LIS. In addition to the demographic characteristics of the patients, anal manometry findings and its effect on surgical treatment options were examined.

**RESULTS:** 20 patients (M/F:13/7) were included in the study. The mean age was 48.3+17.4 in Group 1 and 45.25+24.45 in Group 2 ( $p:0.797$ ). In the preoperative manometric examination, resting pressure(mmHg) range was 93.2+15.9 in Group 1, and 44+11.2 in Group 2 (30-57) ( $p:0.001$ ). Endurance to squeezing time was shorter in Group 2 ( $p:0.0138$ ). There were no differences between the groups in terms of mean squeezing pressure, rectal sensation, and rectoanal inhibitor reflex ( $p>0.05$ ). Of the four patients with low sphincter pressures, 3 underwent botulinum toxin injection and 1 underwent advancement flap instead of LIS. There was no significant difference between preoperative and postoperative CCFI scores in the LIS group ( $0.6\pm 1.8$  vs.  $1.2\pm 1.85$ ,  $p>0.05$ ).

**CONCLUSION:** In the treatment of chronic anal fissure, non-LIS methods were selected in 20% of the patients with the help of preoperative anal manometric examination. Manometric examination is important to minimize the risk of incontinence and to determine the choice of treatment correctly.

**KEY WORDS:** Anal fissure, Anal incontinence, Anal manometry

### Introduction

Anal fissure is defined as a longitudinal ulcer extending to the distal mucocutaneous region in the squamous epithelium of the anus. It is most commonly seen in the posterior midline. Although it is seen equally in both sexes, it is usually a young adult disease<sup>1-3</sup>.

There are 3 main factors that play a role in the development of anal fissure; trauma, ischemia and elevated anal canal pressure. It is thought by various researchers that ischemia plays a role in the etiology of fissure by showing that there is decreased blood flow in the posterior anoderm in chronic anal fissure patients. Anal fissure was initially thought to be due to internal sphincter hypertension, in other words, its spasm. The reason for this was shown to be the longer high-pressure region in the anal canal of the patients<sup>4,5</sup>. However, this was insufficient to explain why fissure develops in patients without anal sphincter spasms<sup>6,7</sup>.

There are consistent views about the relationship between anal fissures and a hypertonic anal canal. Several studies have reported an association between high resting pressures in the anal canal and anal fissures of the posterior midline<sup>8,9</sup>. Therefore, Lateral internal sphincterotomy

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(LIS) has become the most preferred surgical treatment for chronic anal fissures <sup>10</sup>.

However, in patients with chronic anal fissures, normal pressures of the anal canal may also be present and hypotonia may develop when LIS is performed <sup>11,12</sup>. Previously Lin, J. K et al. found that sphincter resting pressures were high by manometric examination in anal fissure <sup>13</sup>. Rosa et al. evaluated the anal manometry of the patients before LIS. A more accurate surgical treatment plan can be made with anorectal manometric examination which is generally not preferred before LIS. <sup>14</sup>. In this study, we aimed to investigate the effect of preoperative anorectal manometry on surgical treatment choice in patients presenting with anal fissure.

### Methodology

Anorectal manometry patients who presented to the General Surgery Coloproctology Unit of Çukurova University between January-2015 and August-2017 and whose physical examination revealed chronic anal fissure findings were included in the study.

Patients were divided into two groups as LIS and non-LIS. The data of the patients were retrospectively reviewed from files and electronic records. Patients who did not have any preoperative anorectal manometry were excluded from the study.

Demographic characteristics, fissure location, history of previous fissure surgery, mean resting pressure, mean squeezing pressure, endurance to squeezing duration, rectal sensation, and rectoanal inhibitory reflex were analyzed.

Preoperative and postoperative 6th month CCFI scores were calculated in the LIS group <sup>15</sup>.

Anal manometry measurements were performed in the anorectal physiology laboratory of our clinic. For the manometric examination of the anorectal region, a 4-channel linear balloon catheter device placed at 6 cm from the anal verge, while the patient is in the left lateral position after fleet enema application, with the thigh at 90 degrees flexion, the Solar GI model (LABORIE Medical Technologies Medical Measurement Systems "MMS" 6415 Northwest Drive, Unit 11 Mississauga, ON, Canada, L4V 1x1), which is perfused with 4-channel air,

can be filled with air at the end, with a balloon and a transducer was used. The data obtained were transferred to computer by MMS (Medical Management Systems BV, Enschede, Holland) program and evaluated.

### Statistical Analysis

Data were analyzed using IBM SPSS Statistics for Windows, version 24 (IBM Corp., Armonk, N.Y., USA). Categorical measurements were summarized as numbers and percentages, and continuous measurements were summarized as mean and standard deviation (median and minimum-maximum where necessary). Chi Fisher test statistic was used to compare categorical variables. Kruskal Wallis test was used to compare the mean values between groups, Student T test was used for parameters showing normal distribution according to the number of variables, and Mann Whitney U test was used for parameters not showing normal distribution. Statistical significance was taken as 0.05 in all tests.

### Results

20 patients were included in our study. Group 1 had 16 patients; Group 2 had 4 patients. The mean age was 48.3+17.4 in Group 1, and 45.25 +24.45 in Group 2 (p:0.797). There was no statistically significant difference between the groups in terms of sex, fissure placement and previous fissure surgery (p<0.05) (Table I).

In the preoperative manometric examination, resting pressure range was 93.2+15.9 in Group 1, and 44+11.2 in Group 2 (30-57) (p:0.001).

Endurance to squeezing duration was shorter in the non-LIS group (p:0.0138). There was no statistically significant difference between the groups in terms of mean squeezing pressure, rectal sensation, and rectoanal inhibitory reflex (p>0.05) (Table II)

In the non-LIS group, 3 patients underwent botox and one patient underwent advancement flap.

There was no significant difference between preoperative and postoperative CCFI scores in the LIS group (0.6±1.8 vs. 1.2±1.85, p>0.05).

TABLE I - Demographic characteristics

Variable	No. of patients (n=20)	LIS (n=16) n (%)	Non-LIS (n=4) n (%)	p value
Age (min-max)		48.3+17.4(21-69)	45,25 24,45 (14-68)	0,797
Sex				
Male	13	10 (62,5)	3(75,0)	>0,05
Female	7	6 (37,5)	1(25)	
Fissure localization				>0,05
Posterior	18	14(86,5)	4(100)	
Anterior	2	2(13,5)	0(0,0)	
Previous Fissure surgery	0	0(0,0)	0(0,0)	

TABLE II - Manometric findings (mean) + standard deviation (min-max)

Variable	No. of patients (n=20)	LIS (n=16) n (%)	Non-LIS (n=4) n (%)	p value
Resting pressure range (mmHg)		93.2±15.9 (65-120)	44±11.2(30-57)	0,001
Squeezing pressure distribution range (mmHg)		210.5±71.7(115-320)	178.7±71.5(130-285)	0,51
Endurance to squeezing time (sec)		26,5 +6,3 (15-30)	18,25+3,5 (13-20)	0,0138
First sensation (ml)		40.9+ 16,9(10-65)	35+37,8(10-90)	0,786
First sensation of the need defacation (ml)		128.1+ 54,9(50-280)	67,5+37,4(30-120)	0,13
Maximum tolerated volume (ML)		246.8+ 78,1(120-360)	175+54,4(110-220)	0,25
Rectoanal inhibitor reflex (Rair)				>0,05
Yes	19	18(94,7)	1(25,0)	>0,05
No	1	1 (5,3)	0(0,0)	

## Discussion

In the literature, high sphincter pressures have been recorded in patients with anal fissures and have been reported to be associated with excessive activity of the internal sphincter muscle. It has been proposed that the increase in basal pressure is due to the overactivity of the sphincter muscle itself and may play an important role in the etiology of the fissure rather than as a result of the fissure. The study of Lin, J. K. et al found that the resting pressure in the anal fissure was  $87.4 \pm 38.8$  mmHg, and the squeezing pressure was  $162.1 \pm 64.5$ <sup>13,16</sup>. In our series, the resting pressure was  $93.2 \pm 15.9$  and the squeezing pressure was  $210.5 \pm 71.7$  in the LIS group.

However, not all anal fissures have hypertonic anal sphincters. Anterior and lateral fissures are not associated with hypertonia<sup>17</sup>. In a study in the literature, resting sphincter pressure was found to be normal in only 50-55% of patients<sup>18</sup>. In our series, sphincter pressures were found to be within normal limits or low in 20% of the patients.

Therapeutic approaches to chronic anal fissure (CAF) management should be made based on the etiopathogenesis. In the scope of 2009 ASCRS application parameters, it is stated that conservative approach is safe and appropriate in the initial phase for all fissure patients. Botulinum toxin has similar results compared with topical therapies as first-line therapy for chronic anal fissures, and modest improvement in healing rates as second-line therapy following treatment with topical therapies. Grade of Recommendation: Strong recommendation based on low- and very-low-quality evidence, 1C<sup>19</sup>. The majority of published studies evaluating the use of botulinum toxin involve comparisons with topical agents such as nitroglycerin. From these studies, botulinum toxin is associated with a modest (37%–43%), but consistently reported improvement in healing rates of anal fissures, which is almost uniformly defined in the literature as resolution of anal pain<sup>20-22</sup>. Cochrane analysis showed that botulinum toxin was marginally superior to placebo only, but had fewer adverse treatment-related events<sup>23</sup>.

Botulinum Toxin A causes a paresis that lasts for several weeks in IAS and reduces the anal canal pressure in this process, allowing fissure healing. In 34 prospective studies involving 1577 patients where the efficacy of botox treatment was evaluated, the success rates were between 33-96% and the success rate and incontinence risk was independent of dose and number of applications<sup>16</sup>.

Surgical options should be considered in patients with failure of medical treatment or recurrence. The aim of the surgical treatment is to reduce the internal sphincter activity if the problem is hyperactive internal sphincter and healing the fissure base with a better skin circulation flap if the problem is ischemia. Internal sphincterotomy began to be used in the treatment of anal fissure in the 1950s. The aim of the operation is to reduce the pressure of the internal sphincter. The success of internal sphincterotomy is evaluated by the rate of unhealed or relapsed fissure, wound-related problems and incontinence rates.

Tailored sphincterotomy is defined as a sphincterotomy whose length is adjusted by assessing the condition of each patient to reduce minor incontinence after LIS<sup>1</sup>. The most controversial issue of sphincterotomy is the high probability of fecal incontinence, especially when performed in women. Garcia-Aguilar et al. demonstrated the extent to which the sphincter was cut directly in the development of postoperative anal incontinence<sup>11</sup>. In their study, Menteş et al found that for the sphincterotomy performed to the apex of the fissure, the recovery is slower, incontinence risk is less and it was more likely to relapse, while for the sphincterotomy done to the dentate line has a faster recovery, is more likely to have a higher incidence of incontinence and less recurrence<sup>24</sup>.

Pescatori et al. emphasized the importance of sphincterotomy related to sphincter spasm and validated the use of tailored sphincterotomy on a manometric basis. Tailored sphincterotomy, devised to reduce the amount of sphincter division, reduces the anal resting pressure by 30%–35% and produces significantly lower incontinence rates. The extent to which the internal sphincter

should be dissected is still not standardized, and more importantly, the extent to which sphincterotomy is performed in many patients cannot be measured<sup>12</sup>. In the study of Rosa et al., it was emphasized that the strength of sphincter tone and the anatomical sphincter length should be evaluated together in determining the level of sphincterotomy<sup>(14)</sup>. In the same study, patients were stratified according to the preoperative manometric findings and it was recommended that 25% of IAS was cut for patients with preoperative anal resting pressures 40 mmHg, 40% of IAS to be cut for patients with 40-60 mmHg, and 60% of IAS was cut for patients with 60mmHg and above. In the end, they found 97.6% complete recovery and 3.8% incontinence rate<sup>14</sup>.

In conclusion, it is a fact that sphincter level should be kept limited while performing sphincterotomy, but more accurately, sphincterotomy should be determined according to each patient. Internal anal sphincter tone may be normal or hypotonic in chronic anal fissure. In particular, in patients with HIV, Tbc, Crohn, sexual causes, perianal surgery, postpartum, elderly, diabetic and chronic diarrhea, it is not associated with increased internal anal sphincter tone. This group is a candidate for incontinence after surgical intervention. These patients should be distinguished from those with hypertonic tone of IAS. Rectal digital examination has low sensitivity and specificity in the assessment of anal canal pressures. It is a subjective assessment of the examiner. The overall sensitivity of the rectal digital examination to determine the sphincter tone is 75% and the inconsistency with manometric findings is more pronounced in patients with low sphincter tone. In their study, Jones et al. investigated the sensitivity of the rectal digital examination to determine sphincter tone compared to manometry in patients with chronic anal fissure, and found the specificity of rectal touch to be at a high 93% at high sphincter pressures, and sensitivity to be 16% at low and normal pressures. In the clinical evaluation of the sphincter tone, the positive predictive value was 40% and the negative predictive value was 80%<sup>25,26</sup>.

Anorectal manometry should be performed before the operation, especially in women who have had multiple deliveries and/or difficult births, a history of previous anorectal intervention, recurrence or atypical localized fissure, and neurological disease history. It is important for the patient to be identified with low pressure or normal pressure anal fissure. If possible, preventive approaches such as flap application should be recommended. It is recommended that flap applications should be used in cases where sphincter tone is low or sphincterotomy should be avoided, such as recurrent virtual fissure.

Anorectal manometry can provide objective information about the functional status of the sphincter and play an important role in the selection of treatment in anal fissure. In our study, non-LIS methods were selected in 20% of patients with the help of preoperative anal manometric examination in the treatment of chronic anal fis-

sure. Manometric examination is important to minimize the risk of incontinence and to determine the choice of treatment correctly.

## Riassunto

Sebbene la sfinterotomia interna laterale (LIS) sia il trattamento chirurgico più preferito per la ragade anale cronica, In questo studio, abbiamo mirato a studiare l'effetto della manometria anorettale preoperatoria sulla scelta del trattamento chirurgico in pazienti che presentano ragade anale.

Tra gennaio-2015 e agosto-2017 sono stati studiati 20 pazienti il cui esame fisico ha rivelato esiti cronici di ragade anale. I pazienti sono stati divisi in due gruppi: gruppo 1 trattati con sfinterotomia laterale interna (LIS) e gruppo 2 non trattati con LIS. Oltre alle caratteristiche demografiche dei pazienti, sono stati esaminati i risultati della manometria anale e il suo effetto sulle opzioni del trattamento chirurgico.

Risultati: L'età media dei 20 pazienti (M / F: 13/7) era di 48.3 + 17.4 nel Gruppo 1 e 45.25 +24.45 nel Gruppo 2 (p: 0.797). Nell'esame manometrico preoperatorio, l'intervallo della pressione a riposo (mmHg) era 93,2 + 15,9 nel gruppo 1 e 44+11,2 nel gruppo 2 (30-57) (p: 0,001). La resistenza al tempo di compressione è stata più breve nel gruppo 2 (p: 0,0138). Non ci sono state differenze tra i gruppi in termini di pressione di compressione media, sensazione rettale e riflesso dell'inibitore del rectoanale (p> 0,05). Dei quattro pazienti con basse pressioni dello sfintere, 3 sono stati sottoposti a iniezione di tossina botulinica e 1 ha subito un lembo di avanzamento anziché LIS. Non vi era alcuna differenza significativa tra i punteggi CCFI preoperatori e postoperatori nel gruppo LIS (0,6 ± 1,8 contro 1,2±1,85, p> 0,05). Conclusione: nel trattamento della ragade anale cronica, nel 20% dei pazienti sono stati selezionati metodi non LIS con l'aiuto dell'esame manometrico anale preoperatorio. L'esame manometrico è importante per ridurre al minimo il rischio di incontinenza e determinare correttamente la scelta del trattamento.

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