

# MANOMETRIC STUDIES, ENDORECTAL ULTRASOUND AND INCONTINENCE SCORE AFTER CLOSED LATERAL CONVENTIONAL AND TAILORED SPHINCTEROTOMY: A RANDOMIZED PROSPECTIVE STUDY

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**Purpose:** *this prospective study was undertaken to compare lateral conventional (CLIS) versus tailored lateral sphincterotomy (TLIS) in treatment of chronic anal fissure as regards manometric studies, patient acceptance, healing, recurrence and continence disorders.*

**Methods:** *In the period from July 2001 to March 2002, this study included 42 patients suffering from chronic anal fissure. They were randomized into Group (A) that included 22 patients who were subjected to (CLIS) and Group (B) that included 20 patients who were subjected to (TLIS). Preoperative anorectal manometric studies and endoanal ultrasound (EAUS) were done. Patients were followed up for a period of 3- 12 months.*

**Results:** *Healing of anal fissures had occurred within 4-6 weeks in almost all patients. 15% in group B developed recurrence of the fissure within two months . 31.8% in group A, reported diminished ability to differentiate between flatus and liquid stool. This was transient in 18.2% but continued in 13.6%. In group B, 10% suffered transient soiling. Postoperative manometric evaluation revealed significant decrease in both maximum resting and maximum squeeze pressures and significant increase in the resting CV following both CLIS and TLIS. Also, Ultrasound evaluation have confirmed the competence of sphincterotomy in 39/42 patients (92.9%).*

**Conclusion:** *incontinence is directly related to the extent of muscle division at internal sphincterotomy and that the success rate of TLIS closely approximates that of CLIS with preservation of more anal sphincter muscle and physiology.*

**Keywords:** *chronic anal fissure, lateral sphincterotomy, Conventional Vs Tailored lateral sphincterotomy.*

## INTRODUCTION

Chronic anal fissure presents a common anorectal malady affecting all ages and are often associated with underlying hypertonia of the internal anal sphincter.<sup>(1)</sup>

Lateral internal sphincterotomy is preferable to posterior sphincterotomy since it was found that the later takes longer time to heal is more likely to become infected and may form a Keyhole deformity in up to 28% of cases leading to imperfect closure of the anal canal, trapping of fecal matter and soiling.<sup>(2)</sup>

Lateral internal sphincterotomy has been widely accepted as the operation of choice for chronic anal fissure.<sup>(3)</sup> However, the traditional division of the internal sphincter

up to the dentate line is some - times followed by minor degrees of incontinence.<sup>(4)</sup>

Tailored lateral internal sphincterotomy, described by Little John and Newstead,<sup>(5)</sup> is a technique adjusting the sphincterotomy height to the length of the fissure produces clinically significant reduction in incontinence rates and has recognized unquoted conservative practice of many surgeons.

The aim of this study is to compare lateral conventional sphincterotomy versus tailored lateral sphincterotomy as regards manometric studies, patient acceptance, healing, recurrence and continence disorders.

## PATIENTS AND METHODS

In the period from July 2001 to March 2002, this prospective randomized study included 42 patients suffering from chronic anal fissure. They were admitted to the Colorectal Surgery Unit, Mansoura university Hospital. Patients included in the study were presented with chronic anal fissure, defined by presence of a sentinel pile, hypertrophied anal papilla, fibrosis, induration or exposed internal fibers in the fissure base.

The duration of their symptoms ranged between 4 to 41 months (mean 12.09 + 6.27 months). Patients with past history of other anorectal disorders, IBD, recent obstetric delivery or surgical trauma were excluded. Patients were informed about the options of operations that would be carried out and all of them agreed and signed an informed consent.

Patients were randomized using closed envelope method into two groups:

**Group (A):** included 22 patients, 16 males and 6 females . This group underwent conventional lateral internal sphincterotomy dividing the internal sphincter up to 1-2 mm above the dentate line on the right lateral position using the closed method<sup>(3,4)</sup>

**Group (B):** included 20 patients, 12 females and 8 males . This group underwent tailored lateral internal sphincterotomy dividing the internal sphincter up to the proximal level of the fissure 1-2 mm below the dentate line on the right lateral position using also the closed method.<sup>(5)</sup>

All patients were subjected to careful history taking and clinical and laboratory investigations including mainly anorectal manometric studies. Manometry was performed with the patients lying on the left side using a water-perfused catheter applying a continuous and a stepwise pull-through technique (SANDHIL BIOLAB CENTRAL UNIT MANOMETRY).

Preoperative preparation in the form of shaving the perineal area, and double enema, the last one is two hours before surgery were carried out. Prophylactic antibiotics in the form of two grams of third generation cephalosporine were administered two hours preoperatively and continued every 12 hours postoperatively for two days.

With the patients under general anesthesia and in the lithotomy position, the procedures were carried out after excision of the thickened edges of the fissure and the apical sentinel tag (if present). Hemostasis was achieved thereafter using diathermy coagulation.

In group A, Closed lateral internal sphincterotomy was performed by inserting number 11 blade just lateral to the rolled edge of the internal sphincter, turning the blade and incising the muscle under the operator's finger. This resulted in 50-60 percent of muscle length being incised.

In group B, the same procedures were followed but the length of sphincter to be divided was tailored exactly to the height of the fissure. In most cases, the vertical divided sphincter length was between 5 and 10 mm.

Digital pressure was applied for hemostasis with the use of local anesthetic cream (5% percent lignocaine) into the fissure base.

While patients were hospitalized, their wounds were examined daily and sitz baths were started on the second day after the operation. Patients were instructed how to take care of their wounds at home.

All patients were followed up every week in the outpatient clinic until their wounds have healed and then every month for a period of 3- 12 months (mean: 6.52 + 1.9 months). It included clinical evaluation for the patient satisfaction, healing, recurrence or incontinence using Pescatori scoring system for anal incontinence.<sup>(6)</sup> Manometric evaluation, measuring maximum resting pressure (MRP), maximum squeeze pressure (MSP) in both the upper and lower anal canal<sup>(1)</sup> and resting co-efficient of variation (CV) at 1cm from the anal verge. It represents the specific segmental manometric defect in the quadrant in which sphincterotomy is carried out and it can be calculated by the following equation:

$$CV = \frac{\text{standard deviation}}{\text{Mean}} \times 100$$

Also, endoanal ultrasound (EAUS) was studied after about 6 weeks when almost complete healing of the fissure had occurred.<sup>(8)</sup>

All results were recorded using a computerized recording device. Statistical analysis was performed using non-parametric test for comparison. For qualitative data, Chi-square test was used. For quantitative data, Wilcoxon's signed Rank test (two samples, paired) with correction for ties was used. Two sided values  $\leq 0.05$  were considered significant.

## RESULTS

The present study included 42 patients presented with chronic anal fissure. They were classified into two groups, A & B.

Group A included 22 patients with a mean age of 25.95 + 3.94 years. They were treated by fissurectomy and conventional lateral internal sphincterotomy. Group B included 20 patients with a mean age of 36.55 + 3.39 years. They were treated by fissurectomy and tailored lateral internal sphincterotomy.

There were no mortality, morbidity or anesthetic complications in our series. Review occurred every week up to 4 to 6 weeks by which time almost all wounds had healed, then every month for a mean period of 6.52 + 1.9 months.

**Healing:** all patients in group A, had complete healing of the fissure within 4-6 weeks which was characterized by re-epithelialization of the anal canal with no further episodes of pain or bleeding. In group B, 17/20 patients (85%) reported complete healing while 3/20 patients (15%) suffered persistence of fissures and symptoms within 2 months. This was considered as recurrence and the three patients were investigated and subjected to the same procedure on the opposite side Table 1.

**Continence:** in group A, seven patients (31.8%) reported diminished ability to differentiate between flatus and liquid stool. This was transient in four patients (18.2%) but continued in the last three patients (13.6%).

In group B, only two patients (10%) suffered transient soiling, which was completely improved after complete healing of the wound Table 2.

On manometric evaluation, there were significant decrease in both mean maximum resting and mean maximum squeeze pressures following both conventional and tailored lateral sphincterotomy Table 3. Also, there was a significant increase in the resting CV at 1cm. from the anal verge in both groups Table 3.

Ultrasound evaluations of the anal sphincter mechanism have confirmed the competence of sphincterotomy in 39/42 patients (92.9%) by evident gaping in the circumference of the internal sphincter at the site of the sphincterotomy. It was noticed also that gaping was wider in the conventional than tailored sphincterotomy Table 4.

**Table 1. postoperative recurrence.**

|      | No. of patients |
|------|-----------------|
| CLIS | 0 (0%)          |
| TLIS | 3 (15%)         |

**Table 2. Postoperative incontinence score according to Pescatori scoring system in our patients.**

|       | Score | Early      | Late       | P-value |
|-------|-------|------------|------------|---------|
| CLIS  | 0     | 15 (68.2%) | 19 (86.4%) | 0.007   |
|       | B1    | 5 (22.7%)  | 3 (13.6%)  |         |
|       | B2    | 2 (9.1%)   | --         |         |
| TOTAL |       | 22 (100%)  | 22 (100%)  |         |
| TLIS  | 0     | 18 (90%)   | 20 (100%)  | 0.000   |
|       | B1    | 2 (10%)    | --         |         |
|       | B2    |            |            |         |
| TOTAL |       | 20(100%)   | 20 (100%)  |         |

P-value is considered significant if < 0.05, (CLIS): Conventional lateral internal sphincterotomy, (TLIS): Tailored lateral internal sphincterotomy, (score 0): continent, (score B1): incontinent to fluid stool <once/week, (score B2): incontinent to fluid stool at least once/week.

**Table 3. Manometric studies in mm Hg.**

|             | CLIS           |                | TLIS           |                |
|-------------|----------------|----------------|----------------|----------------|
|             | Pre            | Post           | Pre            | Post           |
| MRP (upper) | 95.50 + 21.36  | 78.18 + 10.52  | 99.40 + 13.12  | 86.70 + 9.75   |
| P-value     | 0.000          |                | 0.000          |                |
| MRP (lower) | 102.82 + 11.41 | 55.45 + 12.18  | 97.86 + 13.52  | 59.78 + 10.60  |
| P-value     | 0.000          |                | 0.000          |                |
| MSP (upper) | 232.50 + 45.68 | 220.63 + 40.81 | 240.65 + 46.04 | 231.70 + 39.26 |
| P-value     | 0.002          |                | 0.017          |                |
| MSP (lower) | 253.15 + 58.68 | 231.21 + 33.17 | 254.65 + 44.15 | 246.53 + 69.20 |
| P-value     | 0.000          |                | 0.031          |                |
| Resting CV% | 8.1 + 0.2      | 18.8 + 2.3     | 9.5 + 4.3      | 17.4 + 2.3     |
| P-value     | 0.000          |                | 0.007          |                |

P-value is considered significant if < 0.05, (CLIS): Conventional lateral internal sphincterotomy, (TLIS): Tailored lateral internal sphincterotomy, (MRP): mean resting pressure, (MSP): mean squeeze pressure, (CV %): coefficient variation.

**Table 4. Post sphincterotomy internal sphincter defect gap (mm) among the studied groups as detected by EAUS.**

|       | No.       | complete      | incomplete   | P-value |
|-------|-----------|---------------|--------------|---------|
| CLIS  | 22 (100%) | 16.5 + 1.0 mm |              |         |
| TOTAL | 22 (100%) |               |              |         |
| TLIS  | 17 (85%)  | 14.8 + 0.2 mm | 1.4 + 0.2 mm | 0.000   |
| TOTAL | 3 (15%)   |               |              |         |
|       | 20 (100%) |               |              |         |

P-value is considered significant if < 0.05. (CLIS):Conventional lateral internal sphincterotomy(TLIS): Tailored lateral internal sphincterotomy

## DISCUSSION

The pathogenesis of anal fissures is still unclear. In patients with chronic anal fissure, it has been found that there is an increased resting anal canal pressure that is associated with abnormalities in the internal anal sphincter. It is generally accepted that an injury occurs to the anal mucosa, which then causes spasm of the internal anal sphincter as a protective mechanism.<sup>(9)</sup> However, it has been demonstrated that there is decreased mucosal blood flow in the posterior midline with increasing anal tone.<sup>(10)</sup> Thus, mucosal ischemia, due to sphincteric spasm, may be a factor in fissure chronicity or even in development of a fissure.

Operations for fissure-in-ano had been designed to decrease the resting tone of the internal anal sphincter. In the past, this was usually accomplished by anal dilation, but since its description by Eisenhammer in 1959, internal sphincterotomy has been considered the procedure of choice for chronic anal fissure.<sup>(11)</sup>

Soon after introduction of internal sphincterotomy, it became obvious that division of the internal anal sphincter was not innocuous and that a significant number of patients were left with minor defect in continence.<sup>(12)</sup>

To avoid these complications, internal sphincterotomy evolved from midline to lateral and from conventional to tailored. However, controversies remain over the benefits and complications of each method.<sup>(13)</sup>

Our challenge was to find an operation that decreases the resting tone in anal sphincter without causing fecal incontinence

Abcarian (1980) reported that lateral sphincterotomy is superior to posterior division which takes longer time to heal and is more likely to become infected and may form a keyhole deformity in up to 28% of cases, possibly, leading

to imperfect closure of the anal canal or trapping of feces and soiling.<sup>(14)</sup>

By extending sphincterotomy to the dentate line, reported postoperative incontinence ranges from 0 to 35%, success rate for fissure healing ranges from 93 to 100 percent, and recurrence of fissure ranges from 0 to 25 percent, thus raising the question; is it necessary to divide so much anal sphincter with the knowledge that postoperative anal incontinence is directly related to the length of sphincterotomy?<sup>(5,13)</sup>

Some authors advised tailoring of sphincterotomy to the length of fissure.<sup>(13)</sup> However, this may increase the risk of fissure recurrence. To overcome this undesired effect, Pescatori suggested planning of the extent of internal sphincterotomy on the basis of preoperative anal resting tone at manometry.<sup>(15)</sup>

Moreover, preoperative endosonographic assessment revealed that sphincterotomy was often more extensive than appreciated at the time of operation, particularly in female patients. In order to avoid such complications, especially those with postpartum significant damage to the anal sphincter, it is prudent to assess the integrity of the anal sphincter using anal manometry and anorectal ultrasound prior to surgical intervention.<sup>(16)</sup>

Our patients were subjected to sphincterotomy after preoperative assessment of the integrity of the anal sphincter using anal manometry and endoanal ultrasound in order to decrease the risk of incontinence and recurrence.

As regards manometric findings in our series, conventional sphincterotomy was found to produce a highly significant decrease in both resting upper and lower anal pressure, while, tailored sphincterotomy was found to produce a highly significantly decrease in resting lower but mild decrease in resting upper anal pressures.

We found that the fall in the resting pressures following conventional sphincterotomy was greater than that following tailored sphincterotomy and this produced a highly significant statistical difference. From this we can conclude that the reduction in resting pressure goes with length of sphincterotomy. These results are in agree with Prohn and Bonner, 1995.<sup>(17)</sup>

We found also that the drop in resting pressure is more pronounced in patients who developed incontinence. These results again are in agree with Zbar et al. 2001<sup>(18)</sup> and contradict the observation by Melange et al. 1992<sup>(19)</sup> and Garia-Augilar et al. (1998) who failed to demonstrate any correlation between the decrease in anal resting pressure and the postoperative disturbance of anal continence.<sup>(13)</sup>

On the other hand, sphincterotomy produces a significant increase in the resting coefficient of variation at 1cm from the anal verge and this increase was significant in conventional than tailored sphincterotomy and in incontinent than continent patients. These results cope with that reported by Williams et al. 1995.<sup>(20)</sup>

Internal sphincterotomy leaves a defect in the internal sphincter that is easily identified by anal endosonography. In our series, the defect was wider in conventional than tailored sphincterotomy and in incontinent than continent patients, and this difference was statistically significant. This means that the gap produced by internal sphincterotomy goes with the length of sphincterotomy and with the development of postoperative anal incontinence. These nearly are similar to that reported by Garcia-Augilar et al. (1998).<sup>(13)</sup>

In most series, incontinence rate ranges from zero to 35 percent, being higher in the immediate postoperative period and tends to improve with time. Also, lack of control of flatus is the most common complaint, followed by soiling of underclothing and accidental bowel movements.<sup>(5,21)</sup>

In our series, the risk of anal incontinence is 31.8 percent with lateral conventional versus 10 percent with lateral tailored sphincterotomy. After 6 months, the risk of incontinence decreased to 13.6 percent with lateral conventional and 0 percent with lateral tailored sphincterotomy.

In our patients, the incidence of recurrence was 0% and 15% in patients in group A, and B respectively. Usatoff and Polgase (1995) reported a recurrence rate of 20 percent following internal sphincterotomy for fissure-in-ano. Garcia-Aguilar et al. (1996) reported a recurrence rate of 10.9 percent with open lateral sphincterotomy and 11.7 percent with subcutaneous lateral sphincterotomy.<sup>(22,23)</sup> Nyam and Pemberton (1999) reported a recurrence rate of 8 percent after lateral internal sphincterotomy. The relatively lower incidence of recurrence seems to be related to proper choice of the extent of muscle division in each patient after preoperative manometric assessment of resting anal pressure.<sup>(24)</sup>

We noticed also that there is a significant association between the recurrence and the presence of incomplete division of the internal sphincter on endoanal ultrasound examination. This is in agree with Farouk et al. (1997) who reported that the failure of fissure to heal after sphincterotomy relates to limited or incomplete internal sphincterotomy or failure to divide internal sphincter.<sup>(8)</sup>

From the above data, we can conclude that incontinence is directly related to the extent of muscle division at internal

sphincterotomy and that the success rate of tailored lateral sphincterotomy closely approximates that of conventional lateral sphincterotomy with preservation of more anal sphincter and anal physiology, being the surgical treatment of choice in patients with chronic anal fissure as it is safe and effective procedure in terms of fissure healing and less incidence of continence disorders.

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