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Comparative Study Between Lateral Internal Sphincterotomy Versus Botulinum Toxin Injection in the Treatment of Chronic Anal Fissure

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Abstract

Background: Anal fissure is one of the most public proctologic illnesses. Breaking the vicious cycle of spasm, ischemia, and pain in CAF is accomplished with surgical or medical procedures. Surgical procedures, such as anal dilatation, posterior midline sphincterotomy, and lateral internal sphincterotomy (LIS), have been the gold standard treatment for anal fissure. Botulinum toxin injection seems to be an optimal non-operative therapy with similar healing rates but lowest rate of recurrence.

Patients and methods: This is a prospective observational trial was carried out at Department of general Surgery, Faculty of Medicine, Al-Azhar University hospitals. This study was conducted on 50 individuals with chronic anal fissure divided into 2 groups: Group (A): 25 patients was treated with lateral internal sphincterotomy, Group (B): 25 individuals will be treated with botulinum toxin injection.

Results: There was a significant correlation between Time of healing of fissures and duration of symptoms and between the time of healing of fissures and duration of symptoms. There was statistically insignificant variance among the groups regarding Maximal Squeeze Pressure (mmHg) and among the groups After 6 weeks. There was a statistically insignificant change among the groups regarding age or sex.

Conclusion: In individuals with simple chronic anal fissure, injection of botulinum toxin had approximately the same outcomes as lateral internal sphincterotomy in terms of postoperative pain recovery, bleeding, fissure healing, incontinence and fissure relapse.

Keywords: Botulinum toxin, Chronic anal fissure, Lateral internal sphincterotomy

1. Introduction

Anal fissure is still a prevalent proctologic issue that can cause considerable discomfort during bowel movements and even bleeding in rare cases. The pain associated with chronic anal fissure (CAF) leads to proportionate worsening of quality of life and tends not to heal without intervention.1

Breaking the vicious cycle of spasm, ischemia and pain in CAF is accomplished with surgical or medical procedures. Lateral internal sphincterotomy, posterior midline sphincterotomy and anal dilatation are some of the medical procedures used to treat anal fissure.2

Major postoperative problems such pain, bleeding, incontinence, and recurrence are a possibility with every surgical method. Participants who had lateral internal sphincterotomy saw more symptom treatment and required less time in the hospital as a result.3

Today, lateral internal sphincterotomy continues to be the gold standard for management of chronic anal fissure. This operation has been successful in more than 90% of cases and has rates of recurrence <10%.4

Also, it carries the risk of permanent complications like fecal incontinence in > thirty percent of patients.5
Because of this, several non-conventional medical therapies, such as botulinum toxin injections and organic nitrate preparations, have been investigated and put into practice. Botulinum toxin injection stands out as the non-invasive treatment with the best balance between speed of recovery and risk of recurrence.6

It has been proposed that high anal testing pressure is a fundamental pathophysiologic element of chronic anal fissure. The most common method for treating CAF, known as lateral internal sphincterotomy, needs general or local anesthesia but is successful in more than 90% of cases.7

Stomach gas, mucus, or feces incontinence can be a chronic side effect of this procedure and it has also been linked to abscesses and anal deformities in as many as 30% of patients.8

Topical nitrates, botulinum toxin injection (Botox) and calcium antagonists are among of the newer, less intrusive therapeutic approaches that have been presented.9

Intrasphincteric injection of botulinum toxin is a reliable and successful new option in the management of uncomplicated CAF. This method has been described initially by Jost and Schmrigk. The use of botulinum toxin for chemical sphincterotomy (CS) has been linked to a reduced risk of complications and a shorter recovery time.10

2. Aim of the work

Assessment of botulinum toxin injection performance against lateral internal sphincterotomy for the treatment of chronic anal fissure.

3. Patients and methods

Fifty participants participated in this prospective, observational research with chronic anal fissure who were selected from attendee of general surgery clinics of Al-Azhar University Hospitals. Samples were collected by the systematic random method.

There were 2 groups of patients: Group (A): Fifty five patients were treated with lateral internal sphincterotomy and Group (B): Fifty five participants were treated with botulinum toxin injection.

The Inclusion criteria were: All the patients diagnosed by medical history (pain and/or bleeding during or after defecation for at least 3 months) and a thorough medical history and physical, including an anoscopy or digital genital exam Conservative treatments (analgesics, warm sitz baths and high-residue diet) have failed in these individuals, therefore more invasive measures are needed. With the following characteristics, we may say that the individuals has a CAF: The presence of a sentinel tag of skin, indurations at the margins and exposed internal sphincter fibres indicative of a posterior or anterior confined ulcer.

The Exclusion criteria were: Complex fissure (stenosis, abcess, fistula and symptomatic hemorrhoids), great sentinel pile, related illness (malignancy, inflammatory bowel disease, prior pelvic radiotherapy, tuberculosis and any immunosuppressive condition), Individuals have a history of anal canal surgery or an allergy to local anaesthetics.

3.1. Methods

The research participants were exposed to a detailed history taking and Careful clinical examination.

3.2. Surgical technique

Preoperative, intraoperative and postoperative measures were all included of the analysis.

3.2.1. Ethical consideration

Official approval was acquired from the Al-Azhar University School of Medicine’s Department of General Surgery’s Ethical Committee. Institutional Review Board (IRB) approval, faculty of medicine (IRB) ethics committee approval and every individual provided informed and written permission after they were told of the study’s aims, methodology and related objectives were all secured.

3.3. Data management and statistical analysis

Version 20 of SPSS was employed for input of data, processing and statistical analysis (Statistical Package for the Social Sciences). Kruskal-Wallis, Chi square, logistic regression analysis, Wilcoxon’s and Spearman’s correlation were utilized as significant tests. According to the kind of information (parametric and nonparametric) collected for each parameter, the appropriate analysis was performed on the supplied data. P values below 0.05 (5%) were regarded as statistically significant.

4. Results

Table 1.

This table shows: demographic characteristics amongst the 2 studied groups. In group A, the mean
age was 39.5 ± 3.8, there were 80% male, 20% female. In group B, the mean age was 40.4 ± 3.7, 84% were male, 16% were female. There was statistically insignificant change among the groups regarding age or sex (Table 2).

The Table shows Maximal Resting Pressure (mmHg), Maximal Squeeze Pressure (mmHg) and Duration of symptoms (mo). In group A, the mean Duration of symptoms (mo) was 11 ± 5, the mean Maximal Resting Pressure (mmHg) was 105 ± 20, the mean Maximal Squeeze Pressure (mmHg) was 115 ± 65. In group B, the mean Duration of symptoms (mo) was 10 ± 4, the mean Maximal Resting Pressure (mmHg) was 102 ± 22, the mean Maximal Squeeze Pressure (mmHg) was 72 ± 25.

There was statistically insignificant variance among the groups regarding Maximal Squeeze Pressure (mmHg) (Fig. 1, Table 3).

This table shows: Time of healing of fissures in each of the study groups. In group A, 5 cases After 2 weeks, 5 cases After 4 weeks, 14 After 6 weeks, 1 had No healing after 3 months. In group B, 8 cases After 2 weeks, 8 cases After 4 weeks, 7 After 6 weeks, 2 had No healing after 3 months (Table 4).

There was statistically insignificant variance among the groups After 6 weeks.

This table shows: The recurrence rate for Group A is 1 out of 25, or 4%. The recurrence rate for Group B is 2 out of 25, or 8%. The test value, 0.354, is the change in recurrence rates amongst the two groups (Table 5).

This table shows: In Univariate correlation regression there were significant Correlation amongst Time of healing of fissures and Duration of symptoms, mo and Maximal Resting Pressure (mmHg) (Table 6).

This table shows: In Multivariate correlation regression there were significant Correlation among Time of healing of fissures and Duration of symptoms, mo and Maximal Resting Pressure (mmHg).

<table>
<thead>
<tr>
<th>Table 1. Demographic characteristics among the studied groups.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group A</strong></td>
</tr>
<tr>
<td>(n = 25)</td>
</tr>
<tr>
<td>Age (years)</td>
</tr>
<tr>
<td>Mean ± SD</td>
</tr>
<tr>
<td>Min.-Max.</td>
</tr>
<tr>
<td>Sex</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td><em>P</em> value less than 0.05 is significant, <em>P</em> value &lt; 0.01 is highly significant.</td>
</tr>
<tr>
<td>SD, Standard deviation.</td>
</tr>
<tr>
<td>Student t-test.</td>
</tr>
<tr>
<td>X², Chi-Square test.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2. Maximal resting pressure (mmHg), maximal squeeze pressure (mmHg) and duration of symptoms, mo among the studied groups.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group A</strong></td>
</tr>
<tr>
<td>(n = 25)</td>
</tr>
<tr>
<td>Duration of symptoms, mo</td>
</tr>
<tr>
<td>Mean ± SD</td>
</tr>
<tr>
<td>Min.-Max.</td>
</tr>
<tr>
<td>Maximal Resting Pressure (mmHg)</td>
</tr>
<tr>
<td>Mean ± SD</td>
</tr>
<tr>
<td>Min.-Max.</td>
</tr>
<tr>
<td>Maximal Squeeze Pressure (mmHg)</td>
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</tr>
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<td>Min.-Max.</td>
</tr>
<tr>
<td>Student t-test.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 3. Time of healing of fissures in each of the study groups.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group A</strong></td>
</tr>
<tr>
<td>(n = 25)</td>
</tr>
<tr>
<td>After 2 weeks</td>
</tr>
<tr>
<td>After 4 weeks</td>
</tr>
<tr>
<td>After 6 weeks</td>
</tr>
<tr>
<td>No healing after 3 months</td>
</tr>
</tbody>
</table>

Fig. 1. Duration of symptoms among examined groups.
Case presentation

CASE 1

Botulinum toxin injection

Fig. (1.1): A picture shows a case of chronic anal fissure (posterior fissure)

Fig. (1.2): A picture shows the intersphincteric groove (the site of injection)

Fig. (1.3): Palpation of the internal anal sphincter then Injection of Botulinum toxin on both sides of the anterior midline in a case of posterior fissure.
5. Discussion

When the anoderm sustains a linear lesion distal to the dentate line, it is known as a fissure or an anal fissure.11

Table 4. Rate of recurrence of the study groups.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group A (n = 25)</th>
<th>Group B (n = 25)</th>
<th>Test value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrence</td>
<td>1 (4%)</td>
<td>2 (8%)</td>
<td>0.354</td>
<td>0.5515</td>
</tr>
</tbody>
</table>

Table 5. Univariate Correlation between Time of healing of fissures also a wide variety of danger factors amongst the groups.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGAL</td>
<td></td>
</tr>
<tr>
<td>Duration of symptoms, mo</td>
<td>Correlation</td>
</tr>
<tr>
<td>Maximal Resting Pressure (mmHg)</td>
<td>Correlation</td>
</tr>
</tbody>
</table>

Table 6. Multivariate correlation between time of healing of fissures and different risk factors among the researched groups.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of symptoms, mo</td>
<td>Correlation</td>
</tr>
<tr>
<td>Maximal Resting Pressure (mmHg)</td>
<td>Correlation</td>
</tr>
</tbody>
</table>

**CASE 2**

**Botulinum toxin injection**

![Fig. (2.1): A picture shows a case of chronic anal fissure (posterior fissure)](image)

![Fig. (2.2): Palpation of the internal anal sphincter then Injection of Botulinum toxin on both sides of the anterior midline in a case of posterior fissure.](image)
The passage of hard stools or prolonged diarrhea is thought to play a role in the pathophysiolo-
y of an anal fissure.\textsuperscript{12}

The internal anal sphincter tightens in response to a
tear in the anoderm, causing discomfort, greater
tearing, and a reduction in blood flow to the area. As
a result of this loop, a poorly healing wound de-
velops into a chronic fissure.\textsuperscript{13}

The main results of this study were as follows:

We discovered, with regards to the demographics
of the sampled communities, in group A, the mean
age was 39.5 $\pm$ 3.8, there were 80% male, 20% fe-
male. In group B, the mean age was 40.4 $\pm$ 3.7, 84% were male, 16% were female. There was statistically
insignificant alteration among the groups regarding
age or sex.

Gandomkar et al.,\textsuperscript{14} who sought to estimate the
efficacy and difficulties of a combined topical dilti-
azar cream and botulinum toxin, provide support
for the current investigation. In chronic cases of anal
fissure, an injection is used instead of a partial
lateral internal sphincterotomy. There were no dis-
tinguishing factors related to age or gender.

The current study shows Maximal Resting Pres-
sure (mmHg), Maximal Squeeze Pressure (mmHg)
and time span of symptoms (mo). In group A, the mean
Duration of symptoms, mo, was 11 $\pm$ 5, the mean Maximal Resting Pressure (mmHg) was
105 $\pm$ 20, the mean Maximal Squeeze Pressure
(mmHg) was 115 $\pm$ 65. In group B, the mean Dura-
tion of symptoms, mo, was 10 $\pm$ 4, the mean
Maximal Resting Pressure (mmHg) was 102 $\pm$ 22,
the mean Maximal Squeeze Pressure (mmHg) was
72 $\pm$ 25. There was a statistically significant alter-
ation amongst groups in terms of Maximal Squeeze
Pressure (mmHg), however there was no statisti-
cally significant change between groups in terms of
Maximal Resting Pressure (mmHg) and Duration of
symptoms.

The current investigation is backed by Leo et al.,\textsuperscript{15}
Maximal Squeeze Pressure (mmHg) was statistically
different across groups, although Maximal Resting Pressure (mmHg) and Duration of
symptoms were statistically insignificantly different.

The current study shows Time of healing of fis-
sures in each of the study groups. In group A, 5
cases (20%) After 2 weeks, 5 cases (20%) After 4
weeks, 14 (56%) After 6 weeks, 1 (4%) had No
healing after 3 months. In group B, 8 cases (32%)
After 2 weeks, 8 cases (32%) After 4 weeks, 7 (28%)
After 6 weeks, 2 (8%) had No healing after 3 months.
There was statistically significant distinction among
the groups After 6 weeks ($P = 0.044$).

The present study can be supported by Gan-
domkar et al.\textsuperscript{14} They found that the healing rates at
one week, as well as at one-, two-, six- and twelve-
month intervals. During twelve months of follow-
up, the overall healing rates in the BD and PLIS
groups were 65 % and 94 %, respectively ($P$ less than
0.001).

The current study shows that the recurrence rate
for Group A is 1 out of 25, or 4%. The recurrence
rate for Group B is 2 out of 25, or 8%. The test value,
0.354, is the difference in recurrence rates amongst
the 2 groups. There was statistically insignificant
variance among the groups regarding the recur-
rence rate.

Ravindra,\textsuperscript{16} who sought to evaluate the efficacy of
botulinum toxin injection into the anal sphincter vs
the conventional therapy for chronic fissure in ano-
lateral internal sphincterotomy, provides support
for the current investigation. Two of the sixty pa-
tients (one each in the test and control groups) were
found to have a recurrence of anal fissure following
treatment with either approach, for a total incidence
of recurrence post-procedure of three percent.

The current study shows Correlation between
Time of healing of fissures and variable risks among
the groups analyzed. There was significant correla-
tion between Time of healing of fissures and Dura-
tion of symptoms, mo and Maximal Resting Pressure (mmHg). In Univariate correlation regres-
sion There were significant Correlation between
Time of healing of fissures and Duration of symp-
toms, mo and Maximal Resting Pressure (mmHg).
In Multivariate correlation regression There were
significant Correlation between Time of healing of fissures and Duration of symptoms, mo and
Maximal Resting Pressure (mmHg).

Anal fissures can take longer to heal if the
symptoms have been present for an extended
period of time. This is because chronic fissures can
cause the formation of scar tissue, which can make
the fissure more difficult to heal. Additionally,
chronic fissures can also lead to the development of
anal stenosis, or a narrowing of the anus, which can
further delay healing (Gilani and Tierney).\textsuperscript{17}

Our findings corroborated those of Soltany et al.,\textsuperscript{6}
who found that the rate of recovery was greater in
females and in individuals whose symptoms had
been present for a shorter period of time.

5.1. Conclusion

In our research, we contrast botulinum toxin in-
jection with lateral internal sphincterotomy for
the management of the persistent and fissure. For
postoperative pain relief, fissure healing, inconti-
nence, bleeding control and fissure relapse in in-
dividuals with uncomplicated chronic anal fissure,
botulinum toxin injection was almost as effective as lateral internal sphincterotomy.

Authorship

All authors have a substantial contribution to the article.

Disclosure

The authors have no financial interest to declare in relation to the content of this article.

Conflicts of interest

The authors declared that there were NO conflicts of Interest.

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