Effectiveness of Local Botulinum Toxin Injection for Perianal Pain after Hemorrhoidectomy

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Abstract

Background:
Hemorrhoidectomy is commonly associated with post-operative perianal pain. Local botulinum toxin injection by relaxing the smooth muscles of the perianal sphincter and reducing anal pressure can be effective in decreasing post-operative pain. This study evaluates the effectiveness of local botulinum toxin injection in controlling pain after hemorrhoidectomy.

Methods:
This study was a double-blind, randomized clinical trial. A total of 40 patients undergoing hemorrhoidectomy who were referred to Shariati Hospital in 2019-2020 were enrolled as participants and divided into two groups. In one group, injection of botulinum toxin was done in intersphincteric area, and in the other group, there was no intervention after hemorrhoidectomy. SPSS software version 24 was used to analyze the data.

Results:
Local botulinum toxin injection (MASPORT® 500) significantly reduced post-operative perianal pain on the first, third, fifth, and seventh days after the operation compared with the second group ($P<0.05$). The mean pain scores in the first, third, fifth, and seventh days in the first and second groups were 7.60 (±0.88) versus 8.25 (±1.16), 40.5 (±0.88) versus 6.05 (±0.99), 2.45 (±0.51) versus 3.05 (±0.68), and 2.05 (±0.39) versus 1.70 (±0.57), respectively. Furthermore, pain during defecation was significantly lower for the experimental group ($P<0.05$).

Conclusion:
Local botulinum toxin injection effectively improves post-operative pain after hemorrhoidectomy. Further studies are needed to prove the clinical value of local botulinum toxin injection.

Keywords:
Hemorrhoidectomy, Post-operative perianal pain, Local botulinum toxin injection, MASPORT®.

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Introduction

While exact statistics regarding the prevalence of hemorrhoids worldwide are not available, various studies have reported this number to be between 5%-39% of the population, with significant differences among different age groups.[1-5] Hemorrhoidectomy is the preferred method for treating high-grade hemorrhoids.[6,7] The most common complication after this operation is perianal pain, afflicting thousands of patients throughout the world.[8,9] Similarly, perianal pain can delay the release of patients from

the hospital, increasing the personal and societal costs of providing treatment.[10]

The factors causing perianal pain include the spasm of the anal sphincter, the anesthetic method, delayed wound healing, surgical techniques, the post-operative analgesic treatment, the use of laxatives, and the patient's threshold. Post-operative treatment of pain after hemorrhoidectomy has been a subject of discussion for a long time.[8,11]

The spasm of the internal anal sphincter can be one of the factors causing perianal pain that can reduce the resting anal pressure of the patient, causing the smooth muscle of the gastrointestinal tract to loosen.[12,13]

Local botulinum toxin injection for treating perianal pain of fissure and its complications has been extensively studied by multiple groups worldwide, but after hemorrhoidectomy, such use has resulted in conflicting recommendations from different researchers.[14] Furthermore, there are no domestic studies in Iran to look at this method. As a result, this study was conducted to assess local botulinum toxin injection's effect on post-hemorrhoidectomy perianal pain.

Materials and Methods

The study was a double-blind, randomized clinical trial. The studied population was the hemorrhoidectomy candidates referred to Shariati Hospital in 2019-2020. Participants were chosen after a clinical examination. Patients with cardiovascular comorbidities were not part of the study.

Randomisation was used to divide the 40 participants into two equal-sized groups: the experimental group (botulinum toxin injection - MASPORT®) and the control group (no injection group). Before the operation, participants' demographic data were recorded using a questionnaire. In addition to the standard demographic items, this questionnaire was also used after the operation to ask patients about the pain they were normally experiencing during defecation. These variables were evaluated again on the third, fifth, and seventh days after the operation by a surgeon. All patients underwent Milligan-Morgan's hemorrhoidectomy technique. The injection of botulinum toxin was done immediately after the operation with 150 IU at the left and right lateral area of inter sphincteric fossa under general anesthesia. All patients participated for the full length of the study. The visual analog scale (VAS) was used to operationalize pain intensity. The VAS allows each patient to rank the pain intensity from 0 to 10. The prevalence of gas incontinence could not be evaluated as a complication of botulinum injection because, firstly, the incidence of this complication is very rare, and secondly, in case of occurrence, it is not possible to differentiate whether it was due to botulinum injection or hemorrhoidectomy.

The data were analyzed using SPSS software version 24. Quantitative variables were described using means and standard deviations. Qualitative variables were described using numbers and percentages.

The Kolmogorov-Smirnov test was used to determine which variables were normally distributed and which ones were not. Appropriate parametric and non-parametric tests were chosen for evaluating different variables. The quantitative variables were compared using independent t-tests and Mann-Whitney U tests. The repeated measures test was used to compare pain levels on different days. A significant difference was defined as a P value < 0.05.

Results

The 40 participants included 21 women (52.5%) and 19 men (47.5%). The control group included equal numbers of men and women, while the experimental group had 11 women and 9 men. As is clear from the information in Table 1, there was a significant difference in pain levels between the two groups on the first, third, fifth, and seventh days after the operation. The mean pain scores on the first day were 7.60 (±0.88) for the experimental group and 8.25 (±1.16) for the control group. On the third day, the pain scores were 5.05(±0.88) compared with 6.05 (±0.99). On the fifth day, the scores were 2.45 (±0.51) compared with 3.05(±0.68). The scores were even lower on the seventh day, 2.05 (±0.39) compared with 1.70(±0.57). In every case, there was a significant difference between the experimental and control groups (Table 1). On the first, third, and fifth days after the operation, the pain was lower in the experimental group, while the control group had lower mean pain scores on the seventh day.

There was a decreasing trend for pain in both

the experimental and control groups. The repeated measures test was used to evaluate the changes between mean pain scores on the first, third, fifth, and seventh days after the operation, showing the differences were significant. In both groups, the *P* value was less than 0.05 (Figure 1).

In Table 2, the mean pain scores during defecation in both groups are displayed. In the experimental group, the mean score was 2.70 (±1.17), while in the placebo group, the mean score was 6.45 (±1.23). The difference was statistically significant. There was no significant difference in the anesthetic methods used in the two groups.

Table 1. Comparison of pain scores between two groups after the operation

	Control group Mean (±SD)	Experimental group Mean (±SD)	*P* value
First day	8.25 (±1.16)	7.60 (±0.88)	0.054
Third day	6.05 (±0.99)	4.05 (±0.88)	0.000
Fifth day	3.05 (±0.68)	2.45 (±0.51)	0.006
Seventh day	1.70 (±0.57)	2.05 (±0.39)	0.031
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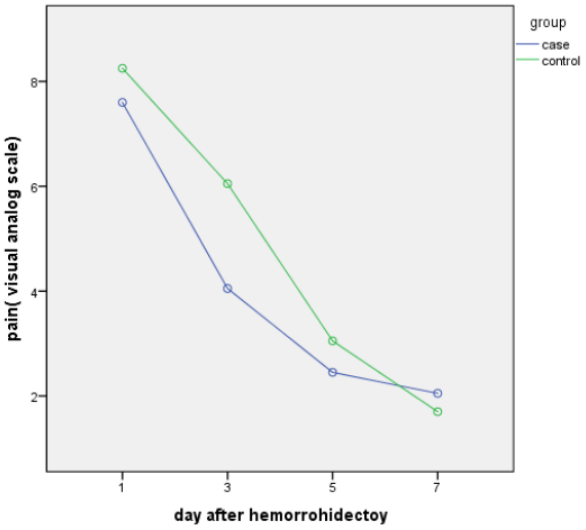

Figure 1. The decreasing trend for pain in both groups.

Discussion

Botulinum toxin injection has been used to treat many colorectal problems such as chronic anal fissure or non-relaxation of puborectalis.[14,15] The spasm of the internal sphincter is the most important factor for perianal pain and ischemia in the fissure, and the pain causes further spasms in the sphincter.[16]

Post-operative perianal pain after Milligan-Morgan hemorrhoid resection causes pain and spasm of the sphincter. Botulinum injection with blockage of the neuromuscular junctions causes relaxation of the sphincter and then diminishes the post-operative pain and better recovery from operation.[17]

In this study, there was a significant difference between the pain scores of the experimental and control groups. Furthermore, there was a significant difference between the pain experienced by patients during their first defecation after the operation. According to Davies and colleagues, post-operative pain and pain during defecation were less intense for patients in botulinum injection group, matching the current study's results.[17] In the study done by Sirikurnpiboon and Jivapaisarnpong, there was no difference in post-operative complications in the botulinum injection group, and there was a significantly lower pain score in that group on the first day after the procedure.[18]

Post-operative pain and defecation difficulty are the greatest clinical problems after hemorrhoidectomy. According to the majority of studies on the subject, using Botulinum injection can effectively reduce pain and make defecation easier. The results of a study by Sirikurnpiboon and Jivapaisarnpong show that the botulinum injection group had a shorter time in defection without pain than the control group (3 vs. 2 days, $P=0.007$) and had minimal side effects. This analysis demonstrated that the use of botulinum toxin injection is an effective way of reducing post-operative pain in the first and second 24 hours after the surgery.[18] This effect is caused by the botulinum toxin's role in

Table 2. Comparison of pain during defecation and anesthetic methods in the two groups

		Experimental group	Control group	*P* value
Pain score during **deification** mean (±SD)		2.70 (±1.17)	6.45 (±1.23)	0.000
Type of analgesia n (%)	Spinal	13 (65)	13 (65)	0.584
	Sedation	6 (30)	7 (35)	
	Local anesthesia	1 (5)	0 (0)	

loosening the internal anal sphincter tonicity. Although some studies have reported side effects such as itching around the anus, rashes, bleeding, urinary retention, and hematoma, there is no serious side effect reported for the use of botulinum perianal injection.

There is no recommended standard dosage for botulinum toxin injection in the perianal region. Lin and colleagues reported a small decrease in healing rate (0.34%; 95% CI, 0-0.68; $P=0.048$) with each increase in dosage of injection, a small increase in incontinence rate (1.02 times; 95% CI, 1.0002-1.049; $P=0.048$) with each increase in dosage of injection and a small increase in recurrence rate (1.037 times; 95% CI, 1.018-1.057; $P=0.0002$) with each increase in dosage.[19] The effect of botulinum injection in inter sphincteric space on wound healing of perianal fissure has been reported by multiple researchers. However, the effect of botulinum toxin injection on healing of post-operative hemorrhoidectomy requires more research.

According to the current study's results, the use of botulinum toxin injection after hemorrhoidectomy reduced pain and made defecation easier for patients.[20] The study's main limitations are the lack of research on the effects of different doses on pain reduction and the various side effects associated with those differing doses. Consequently, there is a need for future controlled clinical studies with larger sample sizes to determine the optimal dosage for injection, the drug's side effects, and its other therapeutic effects, including the relationship between faster wound healing and botulinum toxin injection.

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Ethical Approval

Present study approved by ethical committee of Tehran University of Medical Sciences.

Conflict of Interest

The authors declare no conflict of interest related to this work.

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