

## ORIGINAL ARTICLE

## TOPICAL DILTIAZEM OINTMENT FOR POST-HEMORRHOIDECTOMY PAIN

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**Background:** Hemorrhoids are one of the most common anal pathology affecting millions of people around the world. Milligan-Morgan open hemorrhoidectomy is the most effective hemorrhoidectomy method used as gold standard procedure. Post-operative pain is recognized as a distressing complication of hemorrhoidectomy leading to increase hospital stay and psychological stress to both patient and surgeon. This study is designed to determine the efficacy of diltiazem gel in relieving pain after hemorrhoidectomy caused by anal muscle spasm. This will lead to decreased hospital stay and save both patient and surgeon from stress in postoperative period. **Objective:** To compare mean post-operative pain in patients undergoing hemorrhoidectomy with vs. without topical application of diltiazem gel. **Methods:** Total 80 patients who were diagnosed with third- and fourth-degree hemorrhoids and undergo hemorrhoidectomy were included in the study. Patients were randomly allocated to two groups using opaque sealed envelope method. Group A and B both have 40 patients in each group. Pain score was measured on visual analogue scale (VAS) by asking the patients to fill a questionnaire or by the help of the doctor. **Results:** The patient's average age was  $39.98 \pm 7.98$  years. At 24 hours, mean pain score was significantly high in group B than group A [ $7.23 \pm 0.95$  vs.  $5.38 \pm 1.06$ ;  $p=0.0005$ ]. At 3<sup>rd</sup> post-operative day, mean pain score was significantly high in group B than group A [ $5 \pm 0.78$  vs.  $3.08 \pm 0.99$ ;  $p=0.0005$ ]. Seventy percent cases were observed in group B which required rescue analgesia. **Conclusion:** It is concluded that application of diltiazem ointment at perianal area with standard treatment considerably decreases pain after haemorrhoidectomy.

**Keywords:** Hemorrhoids; Hemorrhoidectomy; Diltiazem gel

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## INTRODUCTION

Hemorrhoids are one of the most common anal pathology affecting millions of people around the world. It is defined as “symptomatic enlargement and distal displacement of anal cushions”.<sup>1</sup> While grade 1 and 2 hemorrhoids are treated conservatively; surgical treatment is advised for 3<sup>rd</sup> and 4<sup>th</sup> degree hemorrhoids.<sup>1,2</sup> Milligan-Morgan open hemorrhoidectomy is the most effective hemorrhoidectomy method used as gold standard procedure.<sup>3,4</sup>

Post-operative pain is recognized as the most common and distressing complication of hemorrhoidectomy leading to increase hospital stay and psychological stress to patient and surgeon both.<sup>5</sup> It has been reported that 12% of the patients experienced severe pain post hemorrhoidectomy.<sup>4</sup> Studies reveal that patients require at least 4 to 16 days returning to normal activities after surgery mostly because of pain. Difficulty in controlling pain also leads to extra analgesic need, post-operative nausea and vomiting, retention of urine and more chances of readmissions.<sup>6</sup> Internal anal sphincter spasm after hemorrhoidectomy is one of the likely reasons in literature for post-operative pain.<sup>7</sup>

Different methods have been tried in addition to standard post-operative regimen; which include warm sits bath, stool softeners and systemic analgesics to relieve post-operative pain and speed up recovery, with all having their own advantages and disadvantages.<sup>5,6</sup> Chemical methods like injectable and oral non-steroidal anti-inflammatory drugs NSAIDS<sup>1</sup>, topical application of nitroglycerine,<sup>8</sup> botulinum toxin has limited use<sup>9</sup>. Long term uses of NSAIDS have known gastrointestinal effects like gastritis and ulcers, GTN causes severe headache as side effect.<sup>10</sup> Surgical methods like anal dilatation and internal anal sphincterotomy though significantly reduce pain but are invasive and cause complications like flatus and fecal incontinence.<sup>11</sup> Diltiazem, a calcium channel blocker works by inhibiting uptake of calcium by myocytes. It is thus, known to be effective in causing smooth muscle relaxation.<sup>12</sup> This leads to decrease anal sphincter spasm, causing less pain at rest as well as during defecation postoperatively.

The aim of our study is to determine the efficacy of diltiazem gel in relieving post hemorrhoidectomy pain caused by anal muscle spasm. This will lead to decreased hospital stay and save both patient and surgeon from stress in postoperative period.

It will also reduce commonly observed fear of surgery among patients, thus making hemorrhoidectomy a safer and more cost-effective procedure which can be carried out as a day care surgery.

**MATERIAL AND METHODS**

This randomized controlled trial was done in Dow University Hospital Karachi (Ojha campus) for a period of six months from December 2017 to June 2018. Total 80 patients were included in this study. All patients of both genders of age between 25–65 years admitted to surgery department of Dow University Hospital were included in the study. Patients with 3<sup>rd</sup> and 4<sup>th</sup> degree hemorrhoids clinically for more than one week were selected for surgery. A written consent was taken from all patients. Those patients who were allergic to drug on past history, with any history of cardiac disease, on calcium channel blockers, history of orthostatic hypotension, having pregnancy and those who had any other anal pathology in combination with hemorrhoids like fissure, fistula, complicated hemorrhoids or previous anal surgery were excluded from the study. Standard Milligan Morgan Hemorrhoidectomy was done.

Random allocation of patients was done into two groups using opaque sealed envelope method. Group A patients were given diltiazem plus standard regimen and group B patients were given only standard regimen post operatively. The standard regimen included oral analgesics and antibiotics for 5 days. After removing bandage and sits bath on the first post-operative day, Group A patients were advised to use topical ointment thrice a day by squeezing approximately 1 cm gel on finger and applying on perianal area after sits bath. Patients and assessors were blinded to the group allocated. Pain score was measured on VAS from 0 to 10 with 0 as no pain, 1 to 4 mild pain, 5 to 8 moderate pain and above 8 severe pain on third post-operative day. Pain was scored by asking the patients to fill a questionnaire himself or with the help of a junior doctor. Any additional use of analgesics and hospital stay more than one post-operative day was noted. Patients were discharged on first post-operative day with advised treatment of antibiotics, sitz bath, stool softeners, oral analgesics and diltiazem gel for local application. Pain score was again measured on 3<sup>rd</sup> post-operative day in outpatient department.

Statistical analysis was done with SPSS software version 22. Mean and standard deviation were calculated for age, BMI, duration of complain and pain scores at 24 hours and 3<sup>rd</sup> post-operative day. Frequency and percentage were calculated for DM, HTN, smoker and degree of hemorrhoid. Unpaired T-test was used to compare post-operative

pain in both groups. Stratification with respect to age, gender, BMI, comorbid conditions such as diabetes and hypertension and smokers, duration of complain, analgesia used was performed. Post stratification Unpaired T- test was applied. *p*-Value ≤0.05 was considered as significant.

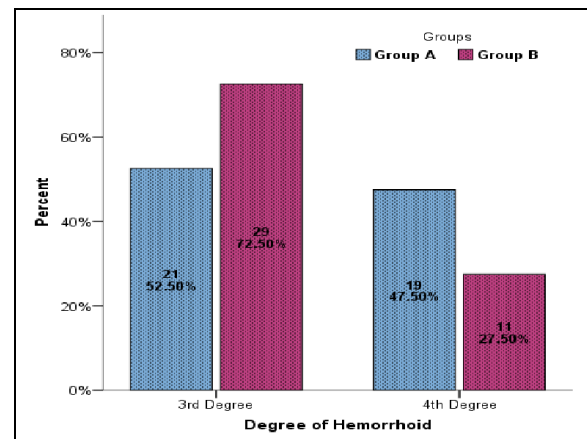
**RESULTS**

Patient’s average age was 39.98±7.98 years. There were 53 (66.3%) male and 27 (33.8%) females. Demographic characteristics with respect to groups are shown in table-1. Out of 80 cases, 3<sup>rd</sup> degree hemorrhoid was 50 (62.5%) and 4<sup>th</sup> degree was 30 (37.5%) as shown in figure-1. Comparison of postoperative mean pain score is shown in figure 2 and 3. At 24 hours, mean pain score was considerably high in group B than group A [7.23±0.95 vs. 5.38±1.06; *p*=0.0005]. Similarly, at 3<sup>rd</sup> post-operative day, mean pain score was significantly high in group B than group A [5±0.78 vs. 3.08±0.99; *p*=0.0005]. There were 70% cases observed in group B which required rescue analgesia as shown in figure-4.

Stratification analysis was performed to control the effect of age, gender, BMI, duration of hemorrhoid, degree of hemorrhoid, diabetic, hypertension and smoking status but it was observed that mean pain score was significantly high in group B than group A.

**Table-1: Demographic characteristics with respect to groups**

Variables	Group A n=40		Group B n=40	
	Mean	SD	Mean	SD
Age (Years)	40.23	7.97	37.73	7.90
BMI	27.73	2.68	27.48	2.80
Duration of Hemorrhoid (months)	12.75	3.60	12.28	3.55



**Figure-1: Degree of hemorrhoid with respect to groups. n=80**

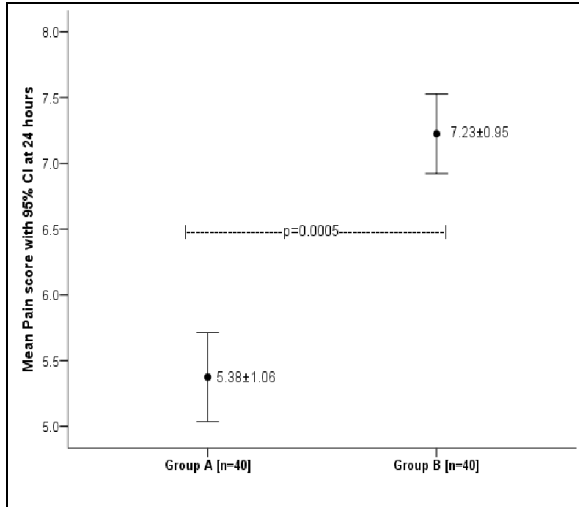


Figure-2: Comparison of postoperative mean pain score between groups at 24 hours

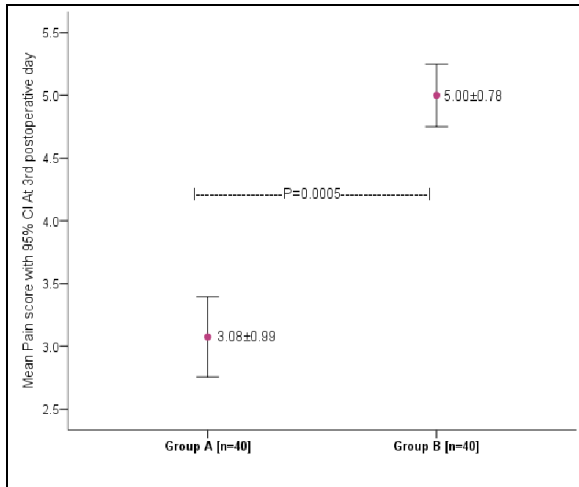


Figure-3: comparison of mean pain score between groups at 3<sup>rd</sup> post-operative day

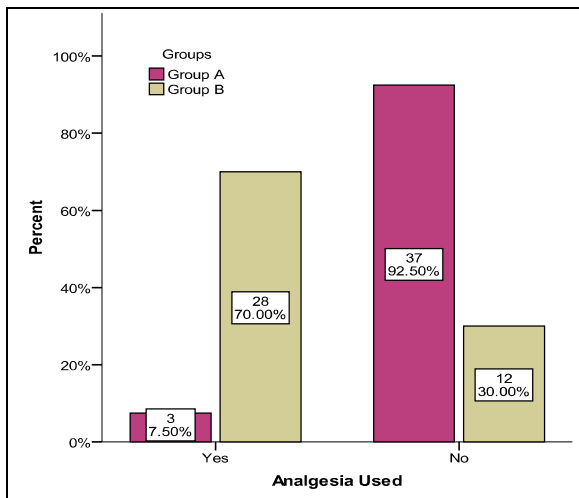


Figure-4: Analgesic Used n= 80

## DISCUSSION

Hemorrhoid is one of the commonest problems among the perianal pathological conditions. Approximately 50–66% of general population sometime in their lives develops hemorrhoid.<sup>11,12</sup> The age most commonly affected is between 45 and 65 years.<sup>13</sup> There is a wide variation in gender prevalence in many studies. They are more common in male as indicated by Goligher<sup>14</sup> who reported male to female ratio of 2: 1. Khoury *et al*<sup>15</sup> said that male to female ratio is 1.2: 1. In our study, out of 80 patients there were 66.3% male and 33.8% female. Malik and co-workers<sup>16</sup> reported a male to female ratio of 3: 1, which is closely similar to our study.

Hemorrhoidectomy still stands as the most effective treatment for high grade hemorrhoids. Postoperative acute pain as an expected result of hemorrhoidectomy has been experienced by thousands of patients all over the world, becoming one of the causes of delayed patient discharge.<sup>17</sup> The reason for delayed patient discharge after hemorrhoidectomy is significant because it implicates both budget and community issues in terms of work burden in hospital and interruption in the usual work of the patients. The main cause of post-hemorrhoidectomy pain is painful spasm of the internal anal sphincter which causes high pressure area in anal canal.<sup>18,19</sup> Medical alternatives using pharmacological agents like glyceryl trinitrate, and calcium channel blockers (Diltiazem) have shown to relieve the spasm of internal sphincter thus relieving pain.<sup>20</sup> Due to fewer side effects, diltiazem is replacing glyceryl trinitrate for the relieve of the sphincteric spasm.<sup>21</sup>

In this study we found Topical application of diltiazem effectively relieves pain after hemorrhoidectomy. Comparing two groups at 24 hours, mean pain score was significantly high in group B than group A [7.23±0.95 vs. 5.38±1.06;  $p=0.0005$ ]. At 3<sup>rd</sup> post-operative day, mean pain score was significantly high in group B than group A [5±0.78 vs. 3.08±0.99;  $p=0.0005$ ]. There were 70% cases observed in group B which required rescue analgesia. These results are supported by many others.

Amoli and associates prospectively assessed an effect of topical diltiazem application after hemorrhoidectomy and stated that local application of diltiazem cream after hemorrhoidectomy significantly reduces postoperative pain and is considered as advantageous with no change in morbidity.<sup>21</sup> Silverman *et al* studied the outcomes of topical diltiazem in decreasing postoperative pain after hemorrhoidectomy, concluded that by using 2% diltiazem ointment after surgery suggestively decreases postoperative pain and is perceived as

beneficial, with no increase in associated morbidity.<sup>22</sup> In a more recent randomized and prospective study Chauhan *et al*<sup>10</sup> did a randomized control trial randomized on 108 patients of third and fourth degree hemorrhoids and evaluated the efficacy of internal sphincterotomy and compared it to topical application of 2% diltiazem ointment after hemorrhoidectomy for pain relief. They encountered no significant difference in mean pain scores on second postoperative day. There may or may not be some complications of the use of diltiazem<sup>23</sup> which should have been observed and that is the main limitation of the study. Further large studies and meta-analysis considering the effects of 2% diltiazem ointment on post-hemorrhoidectomy patients, either alone or in combination as a solitary topical agent, are required to support its value in medical practice.<sup>24</sup>

## CONCLUSION

Overall results are in support of hypothesis that there is a difference in mean post-operative pain scores in patients undergoing hemorrhoidectomy with vs. without topical application of diltiazem. We conclude that application of diltiazem ointment at perianal area with standard treatment considerably decreases pain after haemorrhoidectomy. So, this treatment approach can be used as an addition for patient after haemorrhoidectomy along with standard treatment.

## AUTHORS' CONTRIBUTION

NB, SSA: Literature search, conceptualization of study, write-up. SA, AAK: Data collection, analysis and interpretation. NB, SA, AAK: Proof reading.

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