



Comparison of Milligan Morgan Hemorrhoidectomy and direct current electrotherapy for the treatment of Hemorrhoidal disease

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Author's contribution to the manuscript

Mehmet Kadir Bartın: He made a significant contribution for surgery design. He has made contribution to acquisition of data analysis and drafting of the manuscript. He helped to prepare the manuscript.

Arzu Esen Tekeli: She has made a substantial contribution to interpretation of data and revising the manuscript for intellectual content. She was responsible for patient's anesthesia and evaluation of VAS. She prepared the anesthesia and analgesia part of the manuscript

Esra Eker: She has made contribution to acquisition of data analysis and drafting of the manuscript.

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Conflict of interest

All authors read and approved the final manuscript. Also the authors declare that they have no conflicts of interest.

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General Note

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ABSTRACT

Background: It is aimed to compare Milligan Morgan hemorrhoidectomy and direct current electrotherapy for the treatment of grade 2 and grade 3 internal hemorrhoids.

Material and Methods: Patients with symptomatic grade 2 or 3 internal hemorrhoids which is refractory to medical treatment were enrolled in this retrospective study. In the galvanization group, hemorrhoidal columns were coagulated using electrotherapy by a 2mA to 16mA current probe. And the Milligan Morgan hemorrhoidectomy was applied routinely as an open surgical procedure. Operative time, postoperative pain, hospitalization duration, clinical stage was measured. Patients were followed up for 3 months for healing, late complications and the recurrence.

Results: The operative time and the hospitalization duration were significantly more in Milligan Morgan group ($p < 0.05$). The relapse occurred in 3 patients in Milligan Morgan group and in 1 patient in galvanization group. The relaps rate was statistically less in galvanization group ($p < 0.05$). Postoperative pain scores were similar in two groups at seventh day of the surgery ($p = 0.326$). But at the first and third day of surgery the VAS values were higher in Milligan Morgan group ($p = 0.032$).

Conclusion: Hemorrhoidal coagulation with galvanic electrotherapy reduces the operation time and hospitalization duration. Also the relaps rate and the postoperative pain which is scored by the VAS values are less in this procedure according to the Milligan

Morgan open surgery. However the late complications and late postoperative pain violence may be equivalent between these two surgery types.

Keywords: Hemorrhoid, galvanic electrotherapy, milligan Morgan, VAS

1. INTRODUCTION

Hemorrhoids are our body's natural structures which are formed of mucosa, submucosal fibroelastic connective tissue, smooth muscle and blood vessels.¹ They help enable liquid, solid and gas continence. It has been determined that 50 % of the society consults doctors because of hemorrhoidal disease during their life, most of them have medical treatment.² 5-10 % of these patients are treated through surgery.³

There are 3 groups of hemorrhoidal diseases which are internal, external and mixed.⁴ Treatment of the internal hemorrhoid, subject of this study, is done according to the degree of the disease.⁵ While the treatment is done through changing life habits, proper diet, medical treatments and minimal invasive procedures (such as sclerotherapy, rubber band ligation) for the 1st degree hemorrhoidal diseases; surgical procedures are preferred for the treatment of 2nd and 3rd degree hemorrhoids.⁶ Treatment of hemorrhoid disease through direct current (d.c) electrotherapy represents an alternative therapeutic approach. This method was first used in 1867. A comprehensive study on this topic was published by Wilbur E. Keesey M.D. in 1934. However this approach of hemorrhoid treatment hasn't improved or hasn't attracted attention from the medical community.⁷

In our study, it was aimed to compare Milligan Morgan method and direct current electrotherapy or galvanization method for the treatment of 2nd or 3rd degree hemorrhoid patients who exhibit clinical symptoms.

2. MATERIAL AND METHODS

2.1. Study Sample

30 patients with 2nd or 3rd degree hemorrhoid disease who applied to our general surgical polyclinic between January 2014 and June 2016 were included in the study. After their written consents were taken, our patients were randomly put into two groups. Numbered according to the order of admission to the hospital, patients with odd numbers (Group 1, 16 patients) were treated through electrotherapy method, patients with even numbers (group 2, 14 patients) through Milligan Morgan method. Groups were evaluated in terms of age, gender, procedure duration, postoperative pain, hospitalization duration and recurrence. Bowel cleanse was done through Fleet Phospho Soda Enema 12 hours before the surgical procedure.

2.2. Anesthesia Management

Surgical procedures were applied to patients under spinal anesthesia. Blood pressure measurements were taken and peripheral oxygenation was evaluated by pulse oximetry. 1 mg iv midazolam was administered to the patient for preoperative sedation. All patients were monitored in the operation room. 10 mg heavy bupivacaine was administered to the right lateral position with spinal anesthesia. Intraoperative 1 mg iv midazolam and 3 L /dk oxygen were applied. Tenoxicam 25 gr was administered intravenously to all patients in the recovery room. Postoperative pain assessment was done through VAS (visual analogue scale). Pain degree was graded from 0 (no pain) to 10 (unbearable pain). Analgesic requirements and highest pain scores were recorded.

2.3. Surgical Technique

Patients were administered a dose of cefazolin sodium 1 gr of flakon intravenously before the operations. Galvanization or direct current electrotherapy was done with ULTROID KITTM (Microvasive Inc. Watertown MA.) Positive electrode was placed under the hip while the patient was in lithotomy position. The tip of the probe was placed on the control holder. Hemorrhoid which would be treated was isolated within the anoscope placed for the application. The tip of the probe was placed on top of the hemorrhoid with an acute angle and lengthwise axis of the vessel. Then the current was given and increased to 2 mA. Tip of the probe was pushed 0.5 cm forward into the hemorrhoid vessel. The current was increased to maximum 16 mA or to a proper degree according to patient's tolerance for 1-2 minutes. After the treatment, current was gradually decreased to zero in a controlled manner and probe and anoscope was taken out. Open hemorrhoidectomy was done through standard Milligan Morgan method. Hemorrhoid nodes were moved 1-2 cm above the dentate line with the mucosa on hemorrhoidal tissue by leaving anoderm cushions of 1-1,5 cm in a way that won't cause anal stricture. Patients were discharged with the suggestion of iodized warm sitz bath, laxative and diclofenac

sodium as analgesic. The patients were called for monitoring 1, 3 and 7 days and 3 months after the operation. For the 3-month monitoring, rectoscopic examination was performed on all patients.

2.4. Statistical Analysis

Analysis of the data was done through SPSS 11.5 (Statistical Package for Social Science). Convenience of the distribution of continuous variables according to normal distribution was examined through Shapiro Wilk. Descriptive statics was defined as average \pm standard deviation for continuous variables; and as number of patients and percentage for categorical variable. Average of age was researched through Student's t test; operation duration and hospitalization duration was researched through Mann Whitney's U test. For the categorical comparisons, Pearson's chi square test or Fisher's Exact Probability Test was used. Results were considered statistically meaningful when $p < 0.05$.

2.5. Ethical Considerations

This study was retrospectively performed on 30 patients who applied to our polyclinic between January 2014 and January 2016 at Van Training and Research Hospital.

3. RESULTS

12 female and 18 male patients were included in the study. Distribution of the patients according to age and gender is shown in Table 1. Any statistical difference in terms of age and gender between the two groups couldn't be determined ($p=0.326$)

Table 1 Distribution of the Patients According to Age and Gender

GROUPS	FEMALE	MALE	AVERAGE AGE
GROUP 1 (n=16)	7	9	43,1
GROUP 2 (n=14)	5	9	42,6

Correlation between operation duration and surgical method is shown in Table 2. Operation durations were determined to be average 36 minutes for Milligan Morgan method and 25 minutes for galvanization method. This difference was found to be statistically meaningful ($p < 0.05$).

Hospitalization periods were shown in Table 2. Patients in the first grouped were discharged after 1.3 days on average and patients in the group 2 after 2.1 days. This difference was also found to be meaningful ($p < 0.05$).

In the third month after operation, rectoscopy was performed on all patients. As a result of the endoscopy and physical examination, patients with 2nd and 3rd degree hemorrhoid were regarded as relapse. As shown in Table 2, relapse rate is 6% for Direct Current Electrotherapy and 18% for Milligan Morgan method; and the difference was found to be statistically meaningful ($p < 0.05$).

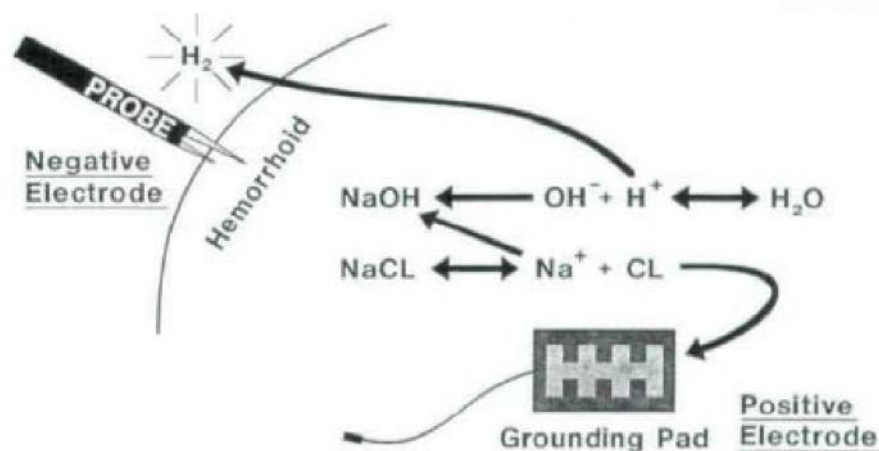
Table 2 Effect of Surgical Method, Operation Duration, and Hospitalization Duration on Relapse

GROUPS	OPERATION DURATION	HOSPITALIZATION DURATION	RELAPSE
GROUP 1 (n=16)	25,3 \pm 6,09 (20-35) min	1,3 \pm 0,5 (1-2) days	%6,2 (1 patient)
GROUP 2 (n=14)	36,2 \pm 6,53 (33-45) min	2,1 \pm 0,69 (1-3) days	%18,7 (3 patients)

Average VAS values in galvanization group after-surgery period were VAS1=2,56, VAS3=2,56 and VAS7=1,75. They were VAS1=4,5, VAS3=4,92 and VAS7=2,71 for Milligan Morgan group. VAS values on the first and third day after surgery was found to be statistically meaningful. VAS values on the seventh day after surgery was not statistically meaningful ($p=0,032$, $p=0,032$ and $p=0,326$ respectively). In Table 3 VAS values and results according to the groups are given.

Table 3 Vas Values of Groups

VAS VALUES	GALVANIZATION	MILLIGAN MORGAN	P VALUE
VAS 1	2.56	4.50	0.032
VAS 3	2.56	4.92	0.032
VAS 7	1.75	2.71	0.326

**Figure 1** Action Mechanism

4. DISCUSSION

Hemorrhoids are vessel cushions that cause the anus close completely by accumulating blood within when the person does not contract the muscles that control anus.⁸ In this way, they help control defecation. Especially during sleep and rest, they prevent defecation. Hemorrhoidal diseases can be spoken of when these cushions change places for certain reasons and start to cause certain clinical symptoms.⁹ Stool accumulated in the rectum is thrown out through anal canal by self induced sphincter contractions during defecation. In certain cases that increase intra-abdominal pressure such as constipation, sitting for long periods, diarrhea, pregnancy, ascites and when the person's fiber intake is inadequate, congestion occurs on these cushions because of strain; these developments are responsible for the occurrence of hemorrhoidal diseases. And also the inflammation of vascular wall in hemorrhoidal structure causes the complications such as ischemia, thrombosis and the ulceration of the mucosa.¹⁰ For the ambulatory treatment of the internal type of hemorrhoid which has three types, galvanization method is defined as an efficient, safe and generally painless. However, quantity of the scientific data related to this method is limited in the literature. Another purpose of this study is to contribute to the literature in this regard. The probe used in this study is easily used and applied thanks to its physical structure. It is a single-use sterile probe that can be used with a single hand; that has an information screen on it; and whose holder can be rotated. Patients themselves who are generally treated in right lateral position can help with the application by holding the anoscope. While using anoscope during application, anal canal was separated into 6 areas; and direct current treatment was performed on 75 hemorrhoidal disease area for 15 patients out of 30. Hemorrhoid node with the highest degree was first treated in both direct current electrotherapy and Milligan Morgan method. Performing galvanization more than once was required for 25% of the patients and these were the ones who couldn't tolerate the first application because of the pain. However, most of the patients (75%) recovered after the first treatment. Not much complication was observed during treatment through galvanization. The most important complication was vasovagal syncope observed in two patients. Some patients felt a pain that couldn't be localized during high-ampere applications but this pain was removed by decreasing ampere. Eventually, treatment through galvanization can be defined as painless. Because the area it is applied is above dentate line and insusceptible to pain. In addition to this, patients are asked whether they feel the probe or not; if they do, the probe is placed again. And the current is increased

gradually starting from 2 ampere. Because of all these reasons, feeling pain is minimal. Ampere and duration of the direct current is directly related to the degree of the disease. Occurrence of thrombosis; that is, infuscation of the color of hemorrhoid segment or the fact that blood flow stops or that crackle sounds from the tip of the probe end are regarded as signs that show the treatment is successful. Although physiological action mechanism of direct current on treating hemorrhoidal disease is not completely clear, views on this subject are as follows. Tissue exfoliation will occur as a result of the thrombosis that is caused when the tip of the probe with negative electrode of direct current is applied to the diseased hemorrhoidal area. Additionally, the fact that probe will cause direct trauma on hemorrhoid vascular network will result in tissue exfoliation. In addition to this, direct current may result in spasm of the hemorrhoid vascular network or vasa vasorum and this will cause ischemia and tissue exfoliation. Finally, resulting biochemical reaction is one that produces water and free chlorine gas, that is desiccant and thrombogenic, and that causes tissue contraction.

5. CONCLUSION

It can be seen that direct current electrocoagulation treatment which is successfully used for treating internal hemorrhoids rules out many complications and drawbacks that is observed in other treatment modalities. When correctly applied, pain is minimal. It doesn't require bowel preparation or premedication. Patients can return to their daily life after the treatment. Minor complications observed rarely show the reliability of the procedure. Patient tolerance was observed to be close to perfect. Successful results were generally achieved with a single session.

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