

## TREATMENT OF INTERNAL HEMORRHOIDS UTILIZING DIRECT CURRENT ELECTRICITY

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### ABSTRACT

Hemorrhoids is one of the most common diseases of mankind. There are different methods of treatment, but many problems and complications are associated with the use these modalities. DC electrotherapy of hemorrhoids is an alternative method which offsets many of these conditions. Two hundred and ten patients with 426 hemorrhoidal tags of different grades underwent DC electrotherapy by a DC generator which was designed and made by our department. We used 18 mA current for 100 patients who underwent operation under anesthesia and for 30 patients without anesthesia. The other 80 patients were operated on under anesthesia by using 22 mA DC electrotherapy. Success rate was 94% when we applied 18 mA and 97.3% with 22 mA, with no major complications. The therapeutic time period for a tag correlated to the severity and grade of the tags and the amount of current used; it was  $6.2 \pm 1.82$  min when 22 mA current was used.

DC electrotherapy is safe, effective, easy to use and cheap and can be used in patients with or without anesthesia.

**Keywords:** Hemorrhoid, Electrotherapy, Direct current

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### INTRODUCTION

Hemorrhoids is one of the most common diseases of mankind. As such, about 80% of both sexes show symptoms related to it someday in their lives.<sup>1</sup>

Internal hemorrhoids are the most common cause of lower GI bleeding,<sup>2,3,7</sup> and are defined as conglomerates of submucosal blood vessels and supporting tissues in the anorectal area. Depending on their severity they are classified into four grades, I, II, III and IV.<sup>9</sup> There are different therapeutic modalities for hemorrhoids,<sup>6</sup> but hemorrhoidectomy is the most commonly performed operation. Other modalities such as rubber band ligation, photocoagulation and sclerotherapy are also used today.<sup>9,10</sup>

Patients who are to undergo hemorrhoidectomy should be admitted and operated with anesthesia. These patients have severe postoperative pain for 2-3 weeks and are not

able to resume normal activities in this period of time. Using DC for treatment of hemorrhoids was suggested in 1876,<sup>4,8</sup> but was not taken seriously or used widely by the medical community. Centers which used this method reported different successful treatment rates.

We designed and made a DC generator with some modifications from conventional devices and used it for treatment of hemorrhoids in 210 patients with 426 hemorrhoidal tags.

### MATERIAL AND METHODS

Two hundred and ten consecutive patients who had not responded to standard medical therapy and referred with hemorrhoids completed DC electrotherapy. Fifteen patients (7%) had previously undergone hemorrhoidectomy. All

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patients underwent digital and visual examination. To avoid the effect of any factors on the results of this research, we did the operation under general or spinal anesthesia in the lithotomy position in the first 180 patients while in the final 30 patients we did the operation without any anesthesia in the left up lateral decubitus position. No bowel preparation, anal or parenteral medication was advised. During the operation, the speculum was inserted such that only one hemorrhoidal tag was exposed to the surgeon, and then repositioned for the other tags. The grounding pad was placed under the patient's buttock. We inserted the single probe tip into the base of the hemorrhoid about 1 to 1.5 cm in the longitudinal axis of the tag and at a slight angle to the anal canal. The current was then initiated and increased over a period of 30 seconds to the maximum mA required and kept for 3 to 10 minutes according to the size of tags. In those patients who were conscious, a rapid increase in current would sometimes be sensed as a dull ache which can often be avoided by a more gradual increase (over a period of 1-2 minutes). Individuals noting discomfort at less than 18 mA were treated by a lower milliamperage.

Upon completion of treatment, the current was slowly decreased to zero and the probe was removed. One to three hemorrhoid tags were treated per visit.

We applied 18 mA DC electricity in the first 100 patients (group 1) and 22 mA in the next 80 patients (group 2). In 30 patients who underwent operation without anesthesia (group 3), the current was applied according to the patient's toleration, which was 18 mA at maximum.

When current was applied to the tag, it became swollen and a whitish foam would extrude adjacent to the probe tip.

Patients who underwent treatment with anesthesia were discharged when fully conscious.

Patients returned for evaluation after 2, 7, and 14 days and again after 3 months. We did digital examination and anoscopy in all of them. Completion of treatment was defined when the hemorrhoid tag was reduced to grade zero. If not, additional treatment was applied and the data would be incorporated into that tag. Asymptomatic patients did not undergo repeated anoscopy at follow-ups later than 3 months.

### Direct current electrotherapy instrument

Our generator provides smooth DC, maximum 22 mA, from a 220 V AC source. The delivery of DC to the hemorrhoid is by a probe handle and a sterile disposable single probe tip. A control for initiation and cessation and increase or decrease of current flow to the probe tip is incorporated in the handle. A milliamper display and a timer are improvised on the generator box. The probe is the negative electrode whereas the grounding pad forms the positive one.

## RESULTS

Two hundred and ten patients (116 male and 94 female), mean age 41 (22-70) years, with a mean duration of symptoms of 32 (6 to 96) months, underwent evaluation for symptomatic hemorrhoid disease, and treatment utilizing direct current electrotherapy.

These patients had 426 hemorrhoid tags (2.03 per patient) of different grades which were treated (Table I). The most common symptom was rectal bleeding (94%) followed by protrusion of the internal hemorrhoid through the anal canal (44%) (Table II). The mean electrotherapy time required for relief of each of these symptoms is summarized in Table II. Patients who were treated by 22 mA current responded in a shorter period of time compared to the other two groups.

**Table I. Hemorrhoid disease grade (G) in 210 patients with 426 tags, divided to 3 groups (Gr).**

Hemorrhoid disease	Patients			Tags		
	Gr1	Gr2	Gr3	Gr1	Gr2	Gr3
G1	10	4	6	40	12	15
G2	48	24	7	116	78	30
G3	42	26	17	62	50	17
G4	0	6	0	0	6	0
Total	100	80	30	218	146	62

**Table II. Symptoms and mean time period (minutes) of DC electrotherapy for relief.**

	Bleeding			Protrusion			Anal itching			Pain		
	Gr1	Gr2	Gr3	Gr1	Gr2	Gr3	Gr1	Gr2	Gr3	Gr1	Gr2	Gr3
% of Patients	94	92	87	44	39	36	15	15	9	6	10	0
Mean time	16.7	13	16.6	18.18	14.2	18.43	16.5	11.5	16.72	24	18.8	—

**Table III.** Mean time period (min) of DC electrotherapy for resolution of a tag of hemorrhoid disease according to grade and rate of recurrent bleeding in 3 groups (Gr).

Hemorrhoid grades	mean time period±SD* (min) to resolution			%of tags with recurrent bleeding		
	Gr1	Gr2	Gr3	Gr1	Gr2	Gr3
G1	5.82±2.14	4.1±1.1	5.9±2.16	0	0	0
G2	8.4±2.12	6.2±1.82	8.7±1.93	0	1.5	3.3
G3	9.1±1.02	6.35±0.9	9.18±1.22	16	4	17
G4	—	9.2±1.120	—	—	—	—
Total	8.6±4.5	6.1±2.14	8.74±4.2	6	2.7	6.4

0: Because the number of G4 tags was small, we omitted them in our calculations.

\*: SD= Standard deviation

The mean duration of DC application electrotherapy needed for successful therapeutic resolution of hemorrhoid tags is directly correlated with their grade and severity (Table III;  $p < 0.005$ ). Student's t-test was used for statistical evaluation of data. These data reveal that the success rate in groups 1 and 3, in which we applied 18 mA current, is 94% with a mean time period of 8.6 and 8.7 minutes per tag respectively, but in group 2 is 97.3% with a mean time period of 6.1 minutes per tag.

DC electrotherapy was reapplied in patients with recurrence of any symptom until all were treated completely. All patients who were successfully treated became symptom-free with a mean application duration of 10 (3-14) minutes.

No major complications such as anal stricture and anal incontinence to gas or stool occurred. Fifteen patients experienced mild pain following treatment which was relieved with sitz baths. One patient developed an ulcer at the site of a treated tag which healed with conservative therapy.

## DISCUSSION

Electrotherapy of hemorrhoids by a DC generator which can generate up to 22 mA current is a safe, effective and painless procedure which can be used in patients with or without anesthesia. Patients are free of post-op pain and are able to resume normal activities very soon, compared to operative hemorrhoidectomy which is very painful, such that patients cannot resume normal activity for 2-3 weeks.

The success rate of this treatment modality has been reported to be 66 to 88% with its first application.<sup>2,3,4,5</sup> They used a generator with a maximum of 16 mA current, and the mean number of retreatments of hemorrhoid segments in their patients was 2.22, 2.42, 2.76 and 3.44 for grades 1, 2, 3 and 4, respectively.<sup>4</sup> But the first application success rate in our experiment was 97.3%, with a longer treatment time

period when using 18 mA. We suggest that in conscious patients 18 mA DC can be used, but it is not feasible for all presenting tags to be treated in one visit in such patients; only one tag should be treated in each visit. In anesthetized patients 22 mA DC can be used which increases the success rate significantly with the first application of treatment (up to 97.3%) in a short period of time (6.1 min) and can be applied to all tags in a single visit.

The symptoms of all patients that we treated resolved about 24 hours after treatment in 90% of patients and within a week in all of them. Larger tags required a longer time of treatment application ( $p < 0.005$ , comparing each grade to another). The therapeutic response of a tag is related to the amount of current applied and the time period of therapy. If we increase the current (mA), a tag needs a shorter time period to resolve, and no increase is observed in the incidence of complications. Indicators for successful treatment in our experiment at the time of operation were swelling and stiffening of the treated tag, or cessation of the popping sounds of gas release at the probe tip which indicate blood flow cessation at the treatment position.

Direct current can cause vascular thrombosis theoretically by the negative pole when applied to hemorrhoid tissue by several mechanisms,<sup>1,7</sup> but the precise mechanism of action is not known.

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