

Research Article

Hemorrhoidectomy: Per- and Post-Operative Pain Status and Patient Comfort After the Administration of Two Different Techniques

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Abstract: Hemorrhoids are a normal part of human anatomy, consisting of mucosa, submucosal fibroelastic connective tissue, smooth muscles and blood vessels. Hemorrhoidal disease typically manifests with severe symptoms and requires surgery in 10-20% of the patients. The study included 50 patients with grade III and IV internal Hemorrhoidal disease that presented to our General Surgery department. After obtaining a written informed consent from each patient, the 50 patients were randomly divided into 2 groups on even or odd numbers according to the order of hospitalization: Group I (n = 25) included the patients with odd numbers that underwent electrotherapy and Group II (n = 25) included the patients with even numbers that underwent Ferguson hemorrhoidectomy. Spinal block was performed. Patients were assessed with VAS (visual analogue scale). The results of the study were statistically significant (p<0.05) in terms of operation time, duration of hospital stay, recurrence development and pain score in Group I. We believe that electrocoagulation therapy with direct current is highly successful in the treatment of internal hemorrhoids, reduces hospitalization time and recurrence rate, provides less pain and more patient comfort.

Keywords: Analgesia, electrocoagulation therapy, hemorrhoids, spinal block

INTRODUCTION

Hemorrhoids are a normal part of human anatomy, consisting of mucosa, submucosal fibroelastic connective tissue, smooth muscles and blood vessels (Bartın *et al.*, 2018). Hemorrhoidal Disease (HD) is a commonly seen anorectal disease affecting 5% of the general population. HD typically manifests with severe symptoms and requires surgery in 10-20% of the patients (Nikshoar *et al.*, 2018). Although its exact pathophysiology remains unclear, HD is considered to be caused by the protrusion of the rectal wall out of the anal mucosa as a result of the dilatation of the venous plexus and the loosening of the connective tissues caused by impaired venous drainage. Hemorrhoids are classified as internal and external depending on whether they are localized above or below the dentate line. Internal hemorrhoids are graded from I to IV based on the degree of prolapsed (Mott *et al.*, 2018).

Hemorrhoidectomy is the method of choice in cases of treatment failure or intolerance, patients with grade III or IV HD and patients accompanied by skin diseases. A previous meta-analysis reviewed 18 randomized prospective studies that compared hemorrhoidectomy and medical treatment and revealed

that hemorrhoidectomy was reported as the most effective method for the treatment of patients with grade III or IV HD (Davis *et al.*, 2018). However, although excisional hemorrhoidectomy remains the mainstay treatment for advanced-stage HD that leads to a high risk of complications, a number of minimally invasive techniques such as ligasure hemorrhoidectomy, doppler-guided hemorrhoidal artery ligation and stapled hemorrhoidopexy have been suggested for the prevention of post-hemorrhoidectomy pain (Lohsiriwat, 2015).

In this study, we compared Ferguson hemorrhoidectomy (also known as closed hemorrhoidectomy) and direct-current electrotherapy (also known as galvanization) in terms of pain threshold and analgesic requirement in patients with clinical symptoms of grade III and IV internal HD in order to identify the most ideal minimally invasive technique that leads to maximum patient comfort.

MATERIALS AND METHODS

Literature search strategy and study selection

criteria: The study included 50 patients with grade III and IV internal HD that presented to our General

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Surgery department between July 2014 and August 2017. Exclusion criteria included history of surgery, fecal incontinence, anal fissure with concurrent anal fistula and systemic and chronic diseases. After obtaining a written informed consent from each patient, the 50 patients were randomly divided into 2 groups on even or odd numbers according to the order of hospitalization: Group I (n = 25) included the patients with odd numbers that underwent electrotherapy and Group II (n = 25) included the patients with even numbers that underwent Ferguson hemorrhoidectomy. Age, gender, clinical staging of HD, duration of surgery, hemodynamic changes, postoperative pain, hospital stay and recurrence were recorded for each patient. Bowel cleaning was performed using Fleet Phospho-Soda Enema 12 h prior to the surgery. All the surgical procedures were performed under spinal anesthesia with the patient in the lithotomy position.

Anesthetic management: A pre-anesthesia assessment was performed in each patient 24 h before the surgery. All patients were informed about spinal anesthesia and signed an informed consent. Prior to the surgery, the patient was transferred to the premedication room for routine monitoring including electrocardiography, pulse oximetry and noninvasive blood pressure. After the administration of midazolam 0.05 mg/kg, the patient was transferred to the operating room. Under routine monitoring, spinal anesthesia was induced with the patient in the right lateral position. The patient was then placed in the supine position after administering subarachnoid 7.5 mg bupivacaine +25 µg fentanyl. After the evaluation of motor and sensory blocks, the surgical procedure was started. Intraoperatively, supplemental oxygen was administered at 3 L/min and midazolam 1 mg was added at the 20th min of the procedure. Throughout the procedure, noninvasive blood pressure was recorded every 5 min. After the surgery, the patient was transferred to the postoperative recovery unit and was administered paracetamol 20 mg/kg (i.v.). In the inpatient clinic, utmost care was taken to avoid the use of analgesics in our patients unless needed. About 6 h after the surgery, pain status was scored in each patients using Visual Analogue Score (VAS). This scoring system includes a 0-10 scale, whereby 0 indicates 'no pain' and 10 indicates 'intolerable pain'. The patients with the highest VAS scores and the greatest analgesic requirements were noted. The pain scores were reassessed at postoperative day 7.

Prior to the operations, cefazolin sodium was administered intravenously at a dose of 1 g in each patient. Both galvanization and direct-current electrotherapy were performed using ULTROID KIT™ (Microvasive Inc. Watertown MA.). The electrotherapy procedure was initiated by placing the positive electrode under the hip with the patient in the lithotomy position. The tip of the probe was placed on the control holder. The hemorrhoids to be treated were isolated in

the anoscope. The tip of the probe was placed on top of the hemorrhoid by forming a narrow angle in the anal canal, lengthwise along the long axis of the target vessel. Subsequently, the current was delivered and was increased to 2 mA. The tip of the probe was advanced 0.5 cm forward into the target vessel. For 1 or 2 min, the current was elevated to the maximum 16 mA or to a suitable level according to the tolerance of the patient. At the end of the treatment, the current was gradually decreased to 0 in a controlled manner and then the probe and the anoscope were removed. On the other hand, closed hemorrhoidectomy was performed with using 3/0 polyglactin (Bhatti *et al.*, 2016). Literature shows that pain has a major role in HD since it triggers the fear of defecation, aggravates constipation and deteriorates the symptoms caused by HD (Nikooiyan *et al.*, 2016). The patient was discharged from the hospital with the advice of sitz bath with iodine warm water, laxatives and diclofenac sodium as analgesics. All the patients were called for a control visit at postoperative day 7 and at months 1, 2 and 3. At the 3rd month visit, a retroscopic examination was performed in each patient.

Statistical analysis: Data were analyzed using SPSS 11.5 for Windows (SPSS Inc. Co., Chicago, IL, USA). Continuous variables were evaluated for normal distribution using the Shapiro-Wilk test. Descriptive statistics were expressed as mean±Standard Deviation (S.D.), minimum and maximum for continuous variables and as frequencies and percentages for categorical variables. Mean age of the patients was evaluated by Student's t-test and duration surgery and hospital stay were evaluated using Mann-Whitney U test. Categorical variables were compared using Pearson's chi-square test or Fisher's Exact Test. A p value of <0.05 was considered significant.

RESULTS

The 50 patients included 36 (72%) women and 14 (28%) men. Table 1 presents the distribution of the patients according to gender, mean age and the clinical staging of HD in both groups. The results indicated that there was no significant difference between the two groups with regards to gender and mean age (p>0.05) (Table 1).

Table 2 presents the mean duration of surgery in both groups. Accordingly, mean duration of surgery was 40 min in the Ferguson group and 26 min in the galvanization group and a significant difference was found between the 2 groups (p<0.05). In addition, Table 2 also presents the mean hospital stay in both groups, whereby mean hospital stay was 1.4 days in the galvanization group as compared to 2.3 days in the Ferguson group and a significant difference was also established between the two groups (p<0.05). At the 3rd month visit, recurrence was accepted as the presence of grade II or III HD detected in rectoscopic and physical

Table 1: Distribution of the patients according to gender, mean age and the clinical staging of HD in both groups

Group	Female	Male	Mean age (Years)	Grade II HD	Grade III HD
Group 1 (n = 25)	19	6	43.1	8 (32%)	17 (68%)
Group 2 (n = 25)	17	8	42.6	11 (44%)	14 (56%)

Table 2: Duration of surgery, hospital stay and recurrence in both groups

Group	Duration of surgery (Mean±S.D.) (min)	Hospital stay (days)	Recurrence
Group 1 (n = 25)	26.3±6.09 (20-45)	1.4±0.50 (1-2)	Recurrence
Group 2 (n = 25)	40.2±6.53 (33-50)	2.3±0.69 (1-3)	Recurrence

Table 3: Postoperative VAS scores in both groups

Day	VAS score	Galvanization HD (n = 25)	Ferguson HD (n = 25)
Day 0	1-4	12 (48%)	22 (88%)
	4-6	2 (8%)	10 (40%)
	6-10	1 (4%)	3 (12%)
Day 7	1-4	11 (44%)	23 (92%)
	4-6	2 (8%)	8 (32%)
	6-10	0 (0%)	6 (24%)

examinations. As seen in Table 2, recurrence occurred in 1 (4%) patient in the galvanization group as opposed to 4 (16%) patients in the Ferguson group ($p < 0.05$).

Table 3 presents the VAS scores assessed on the day of the surgery (day 0) and at postoperative (day 7). The results indicated that a VAS score of 1-4 was assessed in 48% of the patients in the galvanization group and in 88% of the patients in the Ferguson group on day 0 as compared to 44 and 92% on day 7, respectively. Similarly, a VAS score of 4-6 was detected in 8 and 40% of the patients in the galvanization and Ferguson groups on day 0 and in 8 and 32% of the patients on day 7, respectively. On the other hand, a VAS score of 6-10 that indicates intolerable pain was present in 4 and 12% of the patients in both groups on day 0 as compared to 0 and 24% on day 7, respectively. The results also indicated that all the VAS scores were statistically significant for the galvanization group ($p < 0.05$).

DISCUSSION

Although its exact incidence and prevalence remain unknown, Hemorrhoidal Disease (HD) is known to affect millions of people around the world. HD may typically remain asymptomatic or may manifest with initial symptoms including swelling, itching and discomfort around the anus and may lead to further problems including poor perianal hygiene, mucosal prolapse, strangulation, ulceration and thrombosis as a result of severe hemorrhage. However, the most common presenting symptoms include hemorrhage, itching, pain and mucosal prolapse. Hemorrhoids, which are key structures of the anatomy of the anorectal region, consist of fibrovascular and connective tissues that perform direct arteriovenous communications between the terminal branches of the superior rectal and superior hemorrhoidal arteries. About 5 decades ago, hemorrhoids were termed 'vascular cushions' that referred to a sense of rectal blockage and a relative increase in anal canal pressure (Jacobs, 2018).

Accordingly, hemorrhoids are cushions of tissues that involve blood vessels and keep the anal canal closed via the engorgement of the vessels, thereby preventing stool leakage during sleep and rest with the help of sphincters. On the other hand, HD occurs when these cushions are displaced distally due to various reasons, thereby causing various symptoms. In addition, HD may also occur secondary to the congestion of blood in the cushions in the presence of eating habits such as low intake of dietary fiber and as a result of a restraining in the cushions caused by a number of conditions that increase intra abdominal pressure such as constipation, prolonged sitting, diarrhea, pregnancy and acid regurgitation.

Galvanization has been shown to be an effective, safe and mostly painless technique in the outpatient treatment of internal HD. However, there is limited documentation of this technique. Therefore, one of the goals of this study was to contribute to the literature by investigating the effectivity of galvanization in the treatment of HD. The probe used in the galvanization technique is a single-use, practical, easy-to-use and sterile probe that can be operated by a single hand and is equipped with an in-built information screen and a rotating holder. In this technique, the patient is often placed in the right lateral position and can help with the procedure by holding the anoscope. In our study, under the guidance of an anoscope, the anal canal was divided into 6 segments and direct-current therapy was performed in a total of 90 HD segments in 25 out of 50 patients. In both direct-current electrotherapy and Ferguson hemorrhoidectomy, the nodes with the highest HD grade were treated first. Galvanization was performed for more than once in 25% of the patients who could not tolerate the first application due to severe pain. However, 75% of the patients recovered after the first application. The galvanization procedure resulted in very few complications, among which vasovagal syncope was the most serious complication occurring in only 2 patients. On the other hand, some patients experienced a pain that could not be localized during high-ampere applications and the pain was eliminated after the reduction of the ampere. Due to these results, galvanization appears to be a painless technique, mainly because the region where galvanization is performed is above the dentate line and insensitive to pain. Moreover, in this technique, the patients are queried as to whether they feel the touching sensation in the location where the tip of the probe is

placed and if they do, the probe is placed on the same location, which is another factor that improves patient comfort. In addition, the direct current used in this technique is increased gradually, starting from 2 mA. On the other hand, the ampere of the direct current and the duration of application are closely associated with the severity of the disease. The indicators of a successful treatment include the formation of a thrombus (which manifests as discoloration and cessation of blood flow in the affected hemorrhoidal segment) and the termination of the crunching sounds emitted by the tip of the probe. Moreover, although the exact physiological action mechanism of direct-current in the treatment of HD remains unclear, a number of hypotheses have been generated:

- Since the probe acts as the negative electrode, the administration of the tip of the probe in the target area results in a thrombus, thereby leading to tissue exfoliation and the administration of the tip of the probe induces direct trauma in hemorrhoidal vascular bundles, also leading to tissue exfoliation.
- The administration of direct current results in the spasm of hemorrhoidal vascular bundles or vasa vasorum, thereby leading to ischemia and tissue exfoliation.
- The resulting biochemical reaction is a desiccant and thrombogenic reaction that produces water and free chlorine gas and causes tissue contraction (Olatoke *et al.*, 2014).

In conclusion, the direct-current electrocoagulation therapy appears to be a useful technique for the treatment of internal HD since it rules out the complications and risks caused by other treatment modalities. Moreover, spinal anesthesia was the ideal technique for our patients with regards to pre- and post-operative patient comfort and hemodynamic stability. In addition, this technique leads to a mild sensation of pain and, when administered properly, it causes no pain and requires no bowel preparation or premedication, thus allowing the patients to return to their normal daily-life activities immediately after the treatment. Furthermore, this technique is highly reliable since it rarely causes even minor complications, leads to near-

excellent patient tolerance and often leads to successful outcomes at a single session.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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