The New Technique in Hemorrhoid Disease: A Combination of Laser Hemorrhoidoplasty and Ferguson Hemorrhoidectomy

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Research Article

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Abstract

Purpose

This study aimed to evaluate the early and long-term results of the three surgical methods (Ferguson hemorrhoidectomy, laser hemorrhoidoplasty, and combined method) of hemorrhoidal disease.

Methods

Between January 2018 and January 2020, 154 consecutive patients diagnosed with symptomatic grade II-III hemorrhoid disease were treated with Ferguson hemorrhoidectomy (FH group), laser hemorrhoidoplasty (LHP group), or combined (FH + LHP group) method. Patients were evaluated in terms of duration of surgery, recovery time of symptoms, postoperative pain, early and late complications, and recurrence.

Results

Postoperative pain scores on the 6th, 12th, 24th hours, and 7th day were significantly lower in the LHP group compared to other groups (p < 0.001). Upon development of postoperative perianal thrombosis in 2 patients of the LHP group, one patient underwent thrombectomy and the other patient underwent medical treatment. In the FH group, reoperation and hemostasis are done for bleeding on the postoperative 6th day in 1 patient, and a foley catheter was applied due to urinary retention in 1 patient. Two anal fissures were seen in postoperative one month in the FH group and recovered with medical treatment and sitz bath. There were two hemorrhoid disease recurrences the median follow-up period of 24 (12–36) months in the LHP group only.

Conclusion

In patients with multiple hemorrhoid packages with both grade 2 and also grade 3 disease, the combined method can be better used safely and effectively, despite relatively higher pain scores, and prolonged operation time compared to the LHP method but considering rare complications and recurrences.

Background

The prevalence of hemorrhoid disease is about 5% in the population and it is an important reason for admission to outpatient clinics. The disease symptoms (pain, bleeding, prolapses etc.) negatively affect the patients’ quality of life, and surgery is required for approximately 10–20% of the patients [1]. Hemorrhoid disease is also one of the most common one day surgery indications of general surgery practice. Milligan-Morgan and Ferguson hemorrhoidectomy (FH) are commonly used procedures in the surgical treatment. Since hemorrhoid surgery treatment is quite painful in the postoperative period,
different techniques have been used to reduce operative time, blood loss, and postoperative analgesic requirement. Stenosis is another important problem if multiple hemorrhoid pake exicion is done. The application of laser treatment has become widespread in recent years in order to increase the quality of life at postoperative period and shorten the period of returning to normal daily life [2, 3].

In this prospective observational study, we aim to evaluate the early and long-term results of the three surgical methods (Ferguson hemorrhoidectomy, laser hemorrhoidoplasty and combined method).

Methods

Between January 2018 and January 2020, 154 consecutive patients who were operated on at the Liv Hospital Ulus with a diagnosis of grade 2–3 hemorrhoid disease, operated with the Ferguson hemorrhoidectomy, laser hemorrhoidoplasty or combined method were included in the study. Patients under the age of 18 and over 75 years, previously operated for hemorrhoid disease, grade 1 and 4 hemorrhoid disease, thrombosed hemorrhoid diseases, accompanied by inflammatory bowel disease and excluded from the study. Hemorrhoids were graded by using the Golighter classification [4]. Preoperatively, rectoscopy was performed to rule out other pathologies in patients older than 45 years, rectal bleeding history, and family history of colorectal malignancy.

Demographic features, symptoms, and duration of these symptoms, number of packages, surgical technique, duration of surgery, time to discharge, time to return to routine daily work, pain score at 6th, 12th, 24th hour, and 7th day, early and late complications were prospectively evaluated. This study was approved by the ethical committee of İstinye University Medical Faculty, to which our hospital is affiliated.

Operative Technique:

An enema was applied 2 hours before the procedure with sodium dihydrogen phosphate, disodium hydrogen phosphate. Antibiotic prophylaxis was given to all patients with ampicillin sulbactam (2 g i.v.) 30 minutes before the procedure or ciprofloxacin if allergy. All surgical procedures were performed while the patients on the lithotomy position under general anesthesia. A bilateral pudendal nerve block with 0.25% bupivacaine was applied to all patients at the end of surgery. A retractor was used to expose the hemorrhoids. Hemorrhoid package excisions were performed according to the standard Ferguson hemorrhoidectomy technique [5]. The laser was applied to the patients using a 1470 nm diode laser (neoV® Munster, Germany) in LHP and the combined method. All surgeries were performed by the same surgeon experienced in coloproctology accompanied by the assistants of different surgeons. No patients dropped out during the follow-up. In the combined method, we removed 1 or 2 dominant and prolapsed hemorrhoid packages with the Ferguson technique and applied laser hemorrhoidoplasty to the smallest one or two packages, we removed maximum three packages in a patient in all groups. After the end of the operation, 0.2% nitrofurazone ointment was applied to the outer part of the anal canal and it was dressed with gauze. There was no local hemostatic agent used during surgery. Diosmin plus hesperidin treatment
was started in all patients on the first postoperative day and patient used 2 weeks non-steroidal anti-inflammatory and paracetamol.

**Statistical Analysis**

SPSS 21.0 (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.) was used for statistical analysis. Continuous variables were expressed as means and standard deviations. For comparison of continuous variables, we used the Kruskal Wallis H test, and for comparison of categorical variables, chi-square, and One-way ANOVA tests were used. A p-value of < 0.05 was considered as significant.

**Results**

There were 154 consecutive patients enrolled in the study; 36 patients in the LHP group, 86 patients in the FH group, and 32 patients in the combined group. The median age of the patients in the LHP group was 42.5 (21–74), in the FH group was 43 (24–73), and in the combined group was 39.5(34–67). The demographic features of the patients are shown in Table 1. The mean operative time for the LHP group was 12.3 ± 3.4 minutes (7–15), for the FH group was 32.1 ± 7.6 minutes (20–45) and for the combined group was 20.7 ± 5.2 minutes (15–35). The duration of pre-treatment symptoms for the LHP group was median 3 months, for the FH group was 1 month, and for the combined group was 2 months (1–12 months).

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Demographic and clinical features of the patients.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Laser alone (n = 36)</td>
</tr>
<tr>
<td><strong>Age mean ± SD</strong></td>
<td>44.94 ± 14.86</td>
</tr>
<tr>
<td><strong>median (min-max)</strong></td>
<td>42.5(21–74)</td>
</tr>
<tr>
<td><strong>Gender (Male/Female)</strong></td>
<td>21 (%58.3)/15 (%41.7)</td>
</tr>
<tr>
<td><strong>Follow-up (month) median (min-max)</strong></td>
<td>24 (12–36)</td>
</tr>
<tr>
<td><strong>Duration of surgery (min) mean ± SD (min-max)</strong></td>
<td>12.3 ± 3.4 (7–15)</td>
</tr>
<tr>
<td><strong>Postoperative hospital stay (hour) median ± SD (min-max)</strong></td>
<td>10 (6–18)</td>
</tr>
<tr>
<td><strong>Duration of symptoms before surgery (month) median ± SD (min-max)</strong></td>
<td>3 (1–12)</td>
</tr>
</tbody>
</table>
There was no relationship found between the age of the patients and the pain scores at 6th, 12th and 24th hours and 7th day (p = 0.320, p = 0.315, p = 0.639 and p = 0.632, respectively), also there was no relationship found between the gender of the patients and the pain scores at 6th, 12th and 24th hours and 7th day (p = 0.629, p = 0.839, p = 0.649 and p = 0.535, respectively).

There was a statistically significant correlation between the pain scores and surgical methods at all of the 6th, 12th, 24th hour, and 7th day scores (p < 0.001). The LHP method had the lowest pain levels, when compared to the Ferguson and the combined method. The combined method had significantly lower pain scores than that of Ferguson method in all periods after the surgery (Fig. 1 and Table 2).

### Table 2
Postoperative pain scores of patients in three groups.

<table>
<thead>
<tr>
<th>Pain score</th>
<th>Laser alone</th>
<th>Combined</th>
<th>Ferguson only</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>6th hour mean ± SD (min-max)</td>
<td>1.1 ± 0.7 (0–2)</td>
<td>2.3 ± 0.9 (1–5)</td>
<td>2.7 ± 1.2 (1–6)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>12th hour mean ± SD (min-max)</td>
<td>1.2 ± 0.8 (0–4)</td>
<td>3.5 ± 1.3 (1–6)</td>
<td>4.1 ± 1.1 (2–7)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>24th hour mean ± SD (min-max)</td>
<td>0.3 ± 0.6 (0–2)</td>
<td>2.5 ± 1.3 (0–5)</td>
<td>3.9 ± 0.9 (1–7)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>7th day mean ± SD (min-max)</td>
<td>0.1 ± 0.2 (0–1)</td>
<td>2 ± 0.9 (0–3)</td>
<td>2.7 ± 1.1 (1–7)</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

Upon development of postoperative perianal thrombosis in 2 patients of the LHP group, one patient underwent thrombectomy and the other patient underwent medical treatment. In the FH group, hemorrhage was detected on the 6th day in 1 patient, and a foley catheter was applied due to urinary retention in 1 patient and was removed after 24 hours. There were two hemorrhoid disease recurrences observed during the median follow-up period of 24 (12–36) months in LHP group, there was no recurrence detected in FH and combined groups during the follow-up. In 2 patients, anal fissure was detected in FH group and treated with medical treatment and sitz bath (Table 3).

### Table 3
Postoperative complications and recurrences of the patients in three groups.

<table>
<thead>
<tr>
<th></th>
<th>Laser alone</th>
<th>Combined</th>
<th>Ferguson only</th>
</tr>
</thead>
<tbody>
<tr>
<td>n = 36</td>
<td>n = 32</td>
<td>n = 86</td>
<td></td>
</tr>
<tr>
<td>Urinary retention</td>
<td>0</td>
<td>0</td>
<td>1 (1.2%)</td>
</tr>
<tr>
<td>Postoperative bleeding</td>
<td>0</td>
<td>0</td>
<td>1 (1.2%)</td>
</tr>
<tr>
<td>Postoperative thrombosis</td>
<td>2 (5.5%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Recurrence</td>
<td>2 (5.5%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Anal fissure</td>
<td>0</td>
<td>0</td>
<td>2 (2.3%)</td>
</tr>
</tbody>
</table>
Discussion

In chronic grade 2 disease LHP can be a treatment of choice, and it is very effective for long-term results and also, sclerotherapy and rubber band ligation are the other alternatives as a treatment method. However, the problem is in grade 3 disease, in this group, laser treatment is not preferred because it requires more shots and gives much energy to put out the package, on the other hand, if you don’t apply enough shots, the treatment is not effective. You can use open surgery to all packages, however, this also increases postoperative pain, recovery time and could be cause anal stenosis. Then, do we have to use a single method in patients with multiple hemorrhoid packages with both grade 2 and 3 diseases?

The most important outcome in the surgical treatment of hemorrhoid disease is less pain after surgery and rapid return to daily life, and low recurrence rates.

Patients with symptomatic grade 3 and 4 hemorrhoid diseases, Milligan - Morgan (open) or Ferguson (closed) hemorrhoidectomy techniques are still considered as the gold standard, mainly in patients with fourth-degree hemorrhoids [6]. The recurrence rate is low in these techniques however, discomfort and postoperative pain decrease the quality of life of the patients after surgery and returning the routine daily work is getting longer [7, 8]. Additionally, potential morbidity including anal canal stenosis and iatrogenic incontinence should not be forgotten [9, 10]. On the other hand, in some conditions, patients with severe pain, long standing swelling and bleeding with grade 2 disease when the surgery is indicated, these techniques are unnecessarily extended and the other methods should be preferred [11]. When you compare the postoperative early and mid-term pain levels of the patients, also the results of this study showed that patients treated with Ferguson technique had the most severe pain scores after surgery in all time periods (postoperative 6th, 12th, 24th hour, and 1st-week) than the other techniques (LHP and combined method).

Laser hemorrhoidopexy is a new method recently used in the treatment of hemorrhoid disease and is a revolutionary approach in the treatment of hemorrhoids [12, 13]. Laser hemorrhoidopexy does not cause any changes in the anatomy of the anal canal and improves the symptoms by not disrupting the physiological functions of the hemorrhoidal plexus in the anus [12]. In addition, LHP has lesser postoperative pain than the other conventional methods [13]. Several prospective randomized studies were comparing LHP procedure with other techniques found that postoperative pain was lower in the LHP group than in all other procedures [13, 14]. Postoperative comfort is the most important point in the choice of surgical modality for patients [15]. For that reason, most patients want to get LHP for their disease. However, the recurrence rate after LHP in the long term period, is more than the conventional surgery [16]. While offering the method to the patient, according to the symptoms severity and grade of hemorrhoid disease, this point should be discussed with patient carefully. According to the results of the randomized controlled study conducted in 2020, the rates of needing treatment due to recurrent symptoms in hemorrhoid disease and the rates of recurrent prolapse are higher in LHP, though the total mean time without complaints after surgery is shorter in LHP than open techniques [17]. In this study, the postoperative pain scores of all time periods (postoperative 6th, 12th, 24th hour, and 1st-week) in LHP
group were lesser than the other techniques (FH and FH + LHP) statistically. However, in two patients postoperative thrombosis were detected in LHP group and also in a follow up period in two patients recurrent disease were detected at postoperative 6 and 13 mounts.

Postoperative pain is important factor for early return to normal daily life and work. The relationship between LHP and postoperative pain has been investigated in many studies [1, 2, 18]. In a prospective study conducted by Brusciano et al [18], On 50 patients with stage 2–3 hemorrhoids treated with a laser; postoperative pain and the time to return to daily activity were evaluated. All patients returned to their daily activities after 2 days. The postoperative pain score (at 12, 18, and 24 hours postoperatively), assessed by the visual analog scale, was quite low (mean value 2). Similarly, in this study, the postoperative pain score of the patients (at postoperative 6, 12, and 24 hours) in the LHP group was lower (mean value of 1.1-1.2-0.3 respectively), and all our patients returned to their daily activities after 1 day after LHP. In the FH group, the postoperative hospital stay was longer and the return to normal daily life was also longer than the other groups. There was one bleeding on the 6th day and there was one urinary retention occured in the FH group, a foley catheter was applied and was removed after 24 hours.

Nonetheless, not all patients are suitable for laser treatment only. In a group of patients, there are many hemorrhoid packages and some of them are large and prolapsed while others may be small and limited in the anal canal. In these patients, to perform conventional methods to all packages will be resulted in much pain and long time discomfort after surgery. The comfort of the patients will be so harmful. However, if you want to apply laser to all packages, in big packs (grade 3 and 4), it is not preferred because the number of laser shots and given energy will be high in large packs, so that, will require more energy, if it exceeds the upper energy limit, it may cause tissue damage. As a result, laser treatment alone may not be sufficient in large packs and can cause higher postoperative edema and necrosis after surgery [19]. For that reason, we thought to use the combined method in patients who have more than 2 packs and not all of them are suitable for laser. In our knowledge, there is no study found in the literature that use the combination of LHP and FH.

In this study, we performed combined method to patients with grade 2–3 hemorrhoid disease with more packages of both small and large ones including. The reason for choosing the combined method was that when we applied the Ferguson only to all packages, the postoperative pain was more and the complication rate was more also. However, since we performed the LHP alone, we will not provide a complete cure in patients with large packages, so that we have started to use this combined method in this group of patients.

The strength of this study is that, it is the first study in the literature that was comparing the results of conventional method, laser and combined method. The weakness of this study is, it was conducted in a single center, the patient's number is low in each group and the symptoms were measured according to the information received from the patients.

As a conclusion, combined method of FH and LHP can be safely preferred for patients with multiple hemorrhoid packages with both grade 2 and 3 symptomatic disease. Thus, postoperative pain becomes
less and recurrence rate remains low.

**Declarations**

**Funding:** No funding was received for conducting this study.

**Author contributions:** All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Fatih Yanar. Aykhan Abbasov, Burak Ilhan and Beyza Ozcınar. The first draft of the manuscript was written by Fatih Yanar and author Hakan Yanar managed the last review process. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

**Conflict of interest:** The authors declare no competing interests

**References**


Figures
Figure 1

Pain scores of three surgical modalities at 6th, 12th, 24th hours and 7th day of surgery.