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POREĐENJE HEMOROIDEKTOMIJE LASEROM I HEMOROIDEKTOMIJE METODOM MILLIGAN-MORGAN – KRATKOROČNI REZULTATI

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LASER HEMORRHOIDOPLASTY VERSUS MILLIGAN-MORGAN HEMORRHOIDECTION – SHORT TERM OUTCOME

Poređenje hemoroidektomije laserom i hemoroidektomije metodom Milligan-Morgan – kratkoročni rezultati

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Laser hemorrhoidoplasty versus Morgan-Milligan hemorrhoidectomy
**Apstrakt**

**Uvod.** Prema “vaskularnoj” teoriji arterijski priliv u gornjoj hemoroidalnoj arteriji dovodi do dilatacije hemoroidalnog venskog pleksusa. Laser hemoroidoplastika (LHP) je novi postupak primenjen u ambulantnom lečenju hemoroida u kojem se hemoroidalni arterijski protok krvi koji ishranjuje hemoroidalni pleksus zaustavlja laserskom koagulacijom. **Cilj** ove studije je poređenje između grupama pacijenata lečenih sa dve različite metode, laserom (LHP) i sa otvorenom hirurškom metodom- Milligan Morgan.

**Metode.** Starost pacijenata u ovoj studiji je bio iznad 18 godina, uključujući 200 pacijenata sa hemoroidima trećeg stepena, od kojih je 100 pacijenata tretirano sa LHP, dok su ostali 100 pacijenata tretirani sa Milligan-Morgan hemoroidi-ectomiom. Parametri koji se koriste za poređenje dve prijavljene hirurške metode su: dužina hospitalizacije, postoperativni bol, prisustvo krvarenja i vreme koje je potrebno da se vrate normalnom životu. **Rezultati.** Otkrivaju statistički značajnu razliku između metodama. Nivo postoperativne boli je manja kod pacijenata u grupi lečenih LHP u odnosu na grupu pacijenata lečenih Milligan-Morgan metodom (P <0,0001). Grupa tretirana LHP metodom manifestira sa manje krvarenje u odnosu na grupu koja je tretirana sa Otvorenom hirurškom metodom. Trajanje operacije kao i dužina hospitalizacije su bili znatno niži u grupi sa hemoroidoplastikom ( LHP) u odnosu na grupu sa hemoroidektomijom( M.M.metodom). **Zaključak.** Dobijeni rezultati upućuju na znacajne prednosti tretmana procedure laserskom korakom -hemoroidoplastika u odnosu na otvorenu hemoroidektomiju metodom Morgan Milligan.

**Ključne reči:** laser hemoroidoplastika, Morgan-Milligan, otvorena hirurška metoda, postoperativna bol.
Abstract

**Background.** According to the "vascular" theory, arterial inflow into the upper hemorrhoidal artery leads to venous dilatation of the hemorrhoidal plexus. Laser hemorrhoidoplasty (LHP) is a new treatment applied to outpatient cases where hemorrhoid arterial blood flow is coagulated (nourishes by hemorrhoid plexus) by laser.

The aim of this study is the comparison between two groups of patients treated by two different methods, by laser (LHP) and with open surgical procedures of the Milligan Morgan method. **Methods.** Patients age in this study was older than 18 including 200 patients with grade 3 hemorrhoid, out of whom 100 patients were treated by LHP, while the other 100 patients by the Milligan-Morgan hemorrhoid-ectomy method. Parameters used to compare the applied surgical methods were: duration of hospitalization, postoperative pain, the presence of bleeding and the time needed to return to normal life.

**Results.** Reveal the statistical difference between the methods. The level of postoperative pain is lower in patients group treated by LHP compared to the group of patients treated by Milligan-Morgan method (P<0.0001). The group treated by LHP manifest less bleeding compare to group treated by Open surgical method. Length of hospitalization, duration of surgery was significantly lower in the group with hemorrhoidoplasty (LHP) compared to the group with hemorrhoidectomy (M.M.) method.

**Conclusion.** From description above, it is clear that LHP method has lot of advantages compared to Milligan-Morgan- hemorrhoidectomy method.

**Keywords:** Laser hemorrhoidoplasty, Milligan-Morgan, open surgery, post-operative pain.
INTRODUCTION

Hemorrhoidal disease ranks first among the rectum and colon diseases. Today the presence of hemorrhoidal disease is evaluated between 2.9% - 27.9% among the worldwide population from were 4% are symptomatic. One-third of the total number ask a medical advice.

From Gauss method is concluded highest disease incidence among patients aged between 45 and 65, were the incidence disease level decrease after the age of 65. Men are more often affected than women.

Anorectum vascular cushions together with the internal anal sphincter are essential in maintaining continence by supporting the soft tissue in the closure of the anal canal. Different options for the treatment of symptomatic hemorrhoids varied over the time. The measures include a variety of conservative medical procedures, non-surgical treatment and various surgical methods. Various non-surgical procedures include rubber band ligation (RBL), sclerosing injection, cryotherapy, infrared coagulation, laser therapy and coagulation by diathermy: therapeutic procedure that can be applied without anesthesia. The above non-surgical methods are considered the primary option in the treatment of hemorrhoids from I-III level. If conservative methods don’t manifest success in treatment, patients are treated surgically. Significant factors in setting the indications for surgical treatment are: papilla hypertrophy, associated fissure, thrombotic enlargements and recurrent symptoms after RBL. Milligan Morgan hemorrhoidectomy is the gold standard and often-applied procedure in the United Kingdom.

Hemorrhoidectomy is an extremely painful procedure. Pain is caused by damage to the tissue of the anal region richly innervated by the nerve endings. Postoperative pain is the most common problem in surgical treatment.

The aim of this study is comparison of postoperative results: Pain, bleeding, infection, recidive, urinary retention, hospitalization period, back to return to normal life activities, patients satisfaction after treatment with both methods, treatment duration of both methods (LHP) and MM hemorrhoidectomy, between two patients groups treated by two different
methods, by laser (LHP) and with open surgical procedures of the Milligan Morgan method.

**Methods**

This comparative and prospective study includes 200 patients with grade 3 hemorrhoid disease, out of whom 100 patients were treated by LHP, while the other 100 patients by the Milligan-Morgan hemorrhoidectomy method. Study was done at the Surgical Clinic ALOKA, Pristina, during the period June 2014 - May 2015. The patients control and follow up has been done during: 1, 2, 3, 4 week, after 8 weeks (60 days).

All operations were performed by one surgeon. General anesthesia was applied in case of patients request. Preoperative treatment such as: proctoscopy and sigmoidoscopy followed the laser procedure using Bio-Litec equipment were included in all cases.

Excluded criteria: This study did not include patients younger than 18, as well as patients who had hemorrhoids and another condition in the anus (fissure, fistula, perianal abscess).

The perianal area is shaved and cleansed for both groups with (at 9 AM with dulcolax supp. 1x2, following with two cleansed at 11AM and 13PM). Patient is treated in gynecological positioned, anoscop applied following the laser procedure using Bio-Litec equipment. The laser equipment was BioLitec with a diode (Bonn Germany) (LHP), which operates at a wavelength of 980 nm +/- 30 with optical power of 8-15W (Pulse Mode) that is sufficient for the denaturation and reduction of hemorrhoid plexus (Figure 1).
Laser (LHP) Technique: The energy created by the laser is transmitted to the place we want to treat through the optical fiber. LEDs can help determine the diameter of the shape and the length of treatment as well as the duration of treatment. First we provide a small skin incision in about 1 to 1.5 cm distance from the anal edge concentrically for about 4 to 5 millimeters and have the perianal skin/anodermis tunneled with the scissors to the edge of the internus. The pointed laser probe is then quickly driven subanodermally/ submucosally until it has reached the area underneath the distal rectal mucosa. This is followed by about six pulses (adjusted to respective dimensions of the piles) of approx. 30 Joule per node; half of which highly submucosal, the other half high intra-nodal. The tissue’s response can be clearly discerned by the light reduction: contraction is occasionally observed immediately(Figure2).Aa. Hemorrhoidale are not treated with this method LHP, since the method is applied only to the hemorrhoidal plexus, without ligature or any other procedure.
Milligan and Morgan Technique: In the M&M technique all patients are operated in the lithotomy (prone) position and General anesthesia.

A V-shaped incision by the scalpel in the skin around the base of the hemorrhoid is followed by scissors dissection in the submucous space to strip the entire hemorrhoid from its bed (Figure 3). The dissection is carried cranially to the pedicle, which is ligated with strong catgut and the distal part excised. Other hemorrhoids are similarly treated, leaving a skin bridge in-between to avoid stenosis. (Figure 3). The wound is left open and a hemostatic gauze pad left in the anal canal.

Postoperative pain, bleeding, delayed healing and acute urine retention are common complications.

Fig. 3 - a) Hemorrhoids before the operation, b) hemorrhoids during the operation, c) hemorrhoids after the operation.

Both LHP and MM hemorrhoidectomy were performed under general anesthesia.
**Assessment of postoperative pain**

Postoperative pain was evaluated using the visual analogue scale (VAS 0-10) where (0-1) represents no pain, (1.1-3) less pain intensity, (3.1-7) pain of medium intensity, (7.1-9) pain of high intensity. (9.1-10) strong unbearable pain. The VAS protocol was performed on the days 1, 7, 14, 21, 30, and 60.

All the patients were administered to analgesics: diclofen ampoules and 75 mg 2 x 1 iv if needed. In case of persisting pain, trodon ampoules 50mg 3x1 i.v. were used as needed. Control of the patients for bleeding was carried out in the week 1, 2, 3 and 4, and during the following first and second month, as well as at any time in case of major bleeding. Obtained data are presented through the graphics.

Statistical analyses include, parameters of the structure of index, arithmetic mean, mean deviation, minimal and maximal values. Qualitative examination of the data were performed by \( \chi^2 \) test, Mann-Whitney test.

**RESULTS**

This prospective study is based on 200 patients from which 121(≈60%) male and 79 (≈40%) female, using two different methods LHP and MM hemorrhoidectomy. From overall number of patients (200) with grade 3 hemorrhoid, half (100) were treated with LHP method. The average age of the patients was 47 ± 12.6 years (range 24-70 years). The procedure was performed in 57 male and 43 female. MM procedure was applied on other 100 patients, from which were 64 Male and 36 Female. Using Mann-Whitney U test we found the results of homogeneity were the \( p \)-value was equal to 0.43%, which pointed regarding age (47 ± 12.6 years in the group with LHP procedures and 49 ±12.3 years in the
group with OH). Also, we found homogeneity in the groups regarding gender where we got thorough \( X^2 \) test 0.88 value.
Illustration No.4 shows in detail the results of postoperative pain development in two groups treated with two different methods: LHP and MM.
As we can see, after hemorrhoidal intervention with LHP method, the intermediate level of postoperative pain on day one is: from (VAS 0-10) the average = 2.2 (SD ± 0.3) (min.1 to max. 3). On the other hand after hemorrhoidal intervention with MM method average is 4.5 (SD ± 0.8) (min3 max 6.8). 30-th day, in the LHP group, the average rate was 0.2 (SD ± 0.1) (min 0.1, max 0.2), while in the MM group it was 0.8 (± 0.2 SD) (min.0.3 to max.1.2). The same values resulted in a period of 60 days. Postoperative pain was significantly lower in the group with LHP compared with the MM group (P < 0.0001).

Fig.4-Results of postoperative pain in the groups LHP and MM according to (Mean VAS 0-10) at time intervals (P <0.0001).
Within the first days after the intervention, the 13% of the patients in the LHP group and 77.0% of the patients in the MM group had small scale bleeding, were was statistically significant difference (P <0.0001). Bleeding were present with statistically significant difference (P <0.001) on the day 7 were 10% of the patients in the LHP group and 33% of the patients in the MM group.

On the day 60 after the intervention there was no bleeding in any of groups. (Figure 5).

Using Mann-Whitney test we got a statistically significant difference in length of hospitalization by the groups (U = 2545.0, P <0.0001) (Table 1).
Table 1. The duration of the hospitalisations by the groups

<table>
<thead>
<tr>
<th>Hospitalization days</th>
<th>LHP</th>
<th>OH</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Mean</td>
<td>1.0</td>
<td>2.07</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>0.0</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Min</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Max</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Mann-Whitney test U' = 2545.0, P < 0.0001

The average recovery time for the patients treated with LHP procedure was 17.2 days (SD ± 4.9 days), range from 5 to 30 days. Comparing with the average of 19.2 days (SD ± 2.9 days), the range from 14 to 35 days, for the patients treated with MM haemorrhoidectomy. Mann-Whitney test shows a statistically significant difference with respect to time to return to a normal life of patients per group (U = 1829.4, P < 0.003).

<table>
<thead>
<tr>
<th>Duration of recovery (Min)</th>
<th>Time</th>
<th>LHP</th>
<th>OH</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>100</td>
<td>100</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>17.2</td>
<td>19.2</td>
<td>18.2</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>4.9</td>
<td>2.9</td>
<td>7.8</td>
<td></td>
</tr>
<tr>
<td>Min</td>
<td>5</td>
<td>14</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Max</td>
<td>30</td>
<td>35</td>
<td>35</td>
<td></td>
</tr>
</tbody>
</table>

Mann-Whitney test U' = 1829.4, P < 0.0001

The average duration of hemorrhoidectomy with LHP was 15.9 minutes (SD±1.9 minutes), the range 10-20 minutes and with MM procedure was 27.2 minutes (SD ± 6.5 minutes), the range 12-60 minutes. The results presents statistically significant difference in the duration of surgery by the groups were P< 0.0001. (Table 2).
Table 2. The duration of the operation by the groups

<table>
<thead>
<tr>
<th>Duration of operation</th>
<th>LHP</th>
<th>OH</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Min) N</td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Mean</td>
<td>16.5</td>
<td>27.2</td>
<td>21.8</td>
</tr>
<tr>
<td>SD</td>
<td>1.9</td>
<td>6.5</td>
<td>7.4</td>
</tr>
<tr>
<td>Min</td>
<td>10</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Max</td>
<td>20</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Mann-Whitney test</td>
<td>$U' = 2462.4$, $P &lt; 0.0001$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The costs of the treatment with LHP were higher than the initial ones because of the use of fiber optic LEDs only once, which is required for this type of treatment.

DISCUSSION

LHP is used for delicate treatment of advanced hemorrhoids, in conditions of adequate anesthesia, where endoluminal laser coagulation ("welding") in hemorrhoidal vessels. Since the energy of the laser beam is applied solely only in hemorrhoidal vessels, no damage in anoderm and mucosa (the surrounding healthy tissue)\(^{12,13}\) Treatment with this method does not use any foreign materials (buckles and surgical sutures), which greatly contributes to the absence of postoperative pain and without risk of postoperative stenosis (narrowing) of the anal canal\(^{14,15}\). Healing and recovery are excellent and fast, practically imperceptible, due to the absence of cuts, open wounds and stitches.\(^{17,19,27,28}\)

Following MM hemorrhoidectomy, patients typically remain in the hospital for 3-5 days and leave in considerable discomfort\(^{16}\). After treatment with LHP hemorrhoidectomy, the typical patient will return home the same day, by 3 or 4 days they are moving their bowels without undue pain or difficulty, and they can return to their normal routine by 7-10 days post-operatively\(^{20}\). Simply, painless hemorrhoidectomy results in satisfaction of both; patients and the surgeons\(^{18,25,31}\). Open surgical hemorrhoidectomy is the most widely used procedure in the surgical management of hemorrhoids. However, MM is associated with
considerable complications including pain, bleeding and infection which can result in longer hospitalization\textsuperscript{16-19}. The results of analysis show significantly lower pain in the group with LHP than in the group with MM. Postoperative pain is the most important complication that bothers patients and makes them reluctant to surgical treatment. Our study shows that postoperative pain in the first month after both procedures was significantly lower at LHP compared with open hemorrhoidectomy. (P <0.0001) which means the same results\textsuperscript{17,18,27,28}. We found that LHP procedure causes minor bleeding, which stops in a much shorter period of time compared with hemorrhage in MM methods\textsuperscript{31}. According to the literature\textsuperscript{25} (71\%) of the cases had bleeding in less than a week. None of the patients required surgical intervention as well as blood transfusions which is identical to our results\textsuperscript{25,31}. According to the literature\textsuperscript{26} infection is present in 5-15\% of patients, and 5-30\% relapse\textsuperscript{19,25,26,29,30}. Not a single case of urinary retention was registered, as well as the need to set a urinary catheter compared with the literature showing 0-16\% of cases with urinary retention and catheterization\textsuperscript{22,25}. Average hospitalizations was 2.1 days for the MM and 1 day for the LHP. According to Voigtsberger et all.\textsuperscript{21} hospitalization was 3 days. Financial costs were higher for the LHP treatment than MM procedure\textsuperscript{24}. Crea et al.\textsuperscript{19} suggest that ambulatory treatment lowers the cost of anesthesia and allows application in hospitals which have no equipment required for general anesthesia\textsuperscript{24}. According to our analysis of the cases in both groups none of the patients accepted treatment in local anesthesia, means general anesthesia was preferred. This confirms the fact that patients chose a painless method.
Figure 6. Algorithm for hemorrhoidectomy with two different methods (LHP and open surgery M&M)

**LHP**
- Local anesthesia without hospitalization
  - Disadvantage: 1. May cause fibrosis to the tissue after cutting with risks for fissure in future (sec. complications). 2. Laser is very costly.

**M&M technique**
- General anesthesia with one day of hospitalization
  - Advantages: 1. Safe, simple and cost-effective
  - Disadvantage: 1. Risks for patients with hearts or lung conditions. 2. Post-surgery, slow recovery and difficulty in eliminating wastes. 3. This leads to more medication (narcotics). 4. Major issue is urinary retention. 5. More pain and bleeding 6. Delayed healing
CONCLUSION

Our results show that LHP as minimally invasive method is more preferable as compared with the MM procedure because of significantly lower postoperative pain, bleeding, and the duration of surgery. In the same time, this amount of analysed patients is also the representative sample since it coincides with the data of modern literature.

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