



Comparison of the reliability and efficacy of LigaSure hemorrhoidectomy and a conventional Milligan-Morgan hemorrhoidectomy in the surgical treatment of grade 3 and 4 hemorrhoids

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ABSTRACT

Objective: The aim of this study was to compare the clinical results of LigaSure-assisted hemorrhoidectomy and Milligan-Morgan hemorrhoidectomy as a conventional method in our clinic.

Materials and Methods: Patients who underwent LigaSure-assisted hemorrhoidectomy or conventional hemorrhoidectomy for grade 3 and 4 hemorrhoids in our clinic between 2009 and 2014 were included in this study. The patient data were reviewed by screening records. Gender, age, preoperative hemoglobin and hematocrit levels, operation time, presence of thrombosis, number of packages, hospitalization time, early and late postoperative complications, prolonged pain presence, and follow-up period were recorded.

Results: In this period, surgical interventions were performed on 365 patients diagnosed with hemorrhoids. Among these, 159 underwent LigaSure-assisted operations, while 206 were operated on by conventional methods. One hundred forty-four (39.5%) cases were female, while 221 (60.5%) cases were male. The median age of the patients was 40 (19-82) years in the LigaSure group and 41 (16-78) years in the conventional method group. The operation time was 15 (4-60) min in the LigaSure group and 20 (6-40) min in the conventional method group. Postoperative analgesics were given to the 182 (88.3%) cases in the conventional group and 107 (67.3%) cases in the LigaSure group. The time required for returning to normal daily activity was 6 (1-15) days in the LigaSure group and 7 (1-30) days in the conventional method group.

Conclusion: In this study, LigaSure was determined to be superior to a conventional method in terms of operation time, hospitalization period, postoperative analgesic requirements, time required for returning to normal daily activity, and postoperative bleeding.

Keywords: Hemorrhoids, hemorrhoidectomy, LigaSure, milligan-morgan hemorrhoidectomy

INTRODUCTION

Hemorrhoids are submucosal beds containing venules, arterial and smooth muscle fibers that are located on the anal canal. Hemorrhoidal disease is reported in approximately 5% of the general population, especially after 40 years of age (1, 2). Because hemorrhoids are normal anatomical components of the anal canal, treatment is indicated in only symptomatic cases. These symptoms include bleeding, thrombosis, and hemorrhoidal prolapses (3). Various methods are used in the treatment of hemorrhoids, including medical treatment, rubber band ligation, infrared photocoagulation, sclerotherapy, open hemorrhoidectomy, closed hemorrhoidectomy, whitehead hemorrhoidectomy, and stapler hemorrhoidectomy.

Conservative medical treatment is generally effective for grade 1 and 2 hemorrhoids; however, grade 3 and 4 hemorrhoids require surgical intervention. There are two especially well known surgical modalities for hemorrhoidectomy: open (Milligan-Morgan) (4) and closed (Ferguson) (5). These two methods have similar complications, such as blood loss and postoperative pain. Hospitalization time and time to return to work or normal daily activities are similar (6). LigaSure-assisted hemorrhoidectomy is an alternative to open hemorrhoidectomy in the treatment of grade 3 and 4 hemorrhoids (7). The LigaSure vessel sealing system (Covidien AS, Baltimore, US), is a hemostatic device that seals vessels by an optimized combination of radiofrequency ablation and pressure (8). LigaSure provides complete closure of arteries and veins with diameters of up to 7 mm. This method has some advantages, it is a fast procedure, easy to learn and providing excellent bleeding control, minimal tissue damage, low postoperative pain, and short time to return to normal daily activity (9-11).

In this study, we aimed to compare the clinical results of LigaSure-assisted hemorrhoidectomy and Milligan-Morgan hemorrhoidectomy in our clinic.

MATERIAL AND METHODS

All patients read and signed a procedural consent form before the operation. Patients who underwent

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LigaSure-assisted hemorrhoidectomy or conventional hemorrhoidectomy for grade 3 and 4 hemorrhoids in our clinic in between January 2009 and January 2014 were included in this study. The patient data were reviewed retrospectively by screening patient records and by telephone calls. Patients of both genders with grade 3 and 4 bleeding hemorrhoids were included in the study. The age range was 16-82 years. Patients with liver cirrhosis, uncontrolled diabetes mellitus, accompanying perianal disease, inflammatory bowel disease, pregnancy, or bleeding diathesis were excluded from the study. Colonoscopy was performed on all patients older than 50 years of age to exclude colon cancer. Anticoagulant or aspirin treatments were terminated five days before the treatment.

Patients underwent surgery under general or spinal anesthesia in the jackknife or lithotomy position. In the LigaSure group, the vessel of the package was sealed with LigaSure and the flaw was left open. In the other group who underwent surgery with the Milligan-Morgan method, the package was excised with cauter; the pedicle of the package was sutured, and the flaw was left open.

Gender, age, preoperative and postoperative 7th day hemoglobin and hematocrit levels, operation time, presence of thrombosis, number of packages, residual disease (untreated residual packages due to anal stenosis risk in patients with more than three packages), hospitalization time, early and late postoperative complications, presence of prolonged pain, follow-up period and time to return to normal daily activity or

work were recorded. Postoperative analgesia (a nonsteroidal anti-inflammatory drug) was provided only for patients with pain. Patients were contacted by telephone and asked about the presence of pain 30 days after hemorrhoidectomy in their follow-ups.

Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences 20.0 for Windows (IBM Corp.; Armonk, NY, USA). Results were given as percentages, mean and standard deviation, or median and range. Quantitative variables were compared with Student's t-test or the Mann-Whitney U test, and qualitative variables were compared with chi-square (Pearson's or Fischer's exact) tests. A p value less than 0.05 was considered to be significant.

RESULTS

In this period, surgical interventions were performed in 365 patients diagnosed with hemorrhoids. Thirty-one (8.5%) cases could not be reached by telephone. Among those 365 cases, 159 underwent LigaSure-assisted operations, while 206 underwent operations by a conventional method. One hundred forty-four (39.5%) cases were female, while 221 (60.5%) cases were male. The median age of all the cases was 41 (16-82) years. Preoperative hemoglobin and hematocrit levels were 13.5 (7.2-17.2) and 39.4±5.9, respectively, in the conventional method group and 13.9 (5.2-18.0) and 40.1±6.0 in the LigaSure group. All patients were asked to return for follow-up on the 7th day after operation in our clinic. The hemoglobin and hemato-

Table 1. Demographic features of patients

Feature	Milligan-Morgan hemorrhoidectomy	LigaSure-assisted hemorrhoidectomy	p
Patient number	206	159	
Median age (years)	41	40	0.615
Gender (%)			
Male	122	99	0.556
Female	84	60	
Preoperative hemoglobin (g/dL)	13.5 (7.2-17.2)	13.9 (5.2-18.0)	0.242
Preoperative hematocrit (%)	39.4±5.9	40.1±6.0	0.279
Postoperative 7 th day hemoglobin (g/dL)	13.1±1.9 (n=119)	13.4±1.9 (n=87)	0.334
Postoperative 7 th day hematocrit (%)	39.2±5.2 (n=119)	39.7±5.1 (n=87)	0.57

Table 2. Features of LigaSure and conventional method

Feature	Milligan-Morgan hemorrhoidectomy	LigaSure hemorrhoidectomy	p
Operation time [mean (range) min]	20 (6-40)	15 (4-30)	<0.05
Number of packages	2 (1-4)	2 (1-4)	0.5
Analgesic requirement n (%)	182 (88.3)	107 (67.3)	<0.05
Thrombosed hemorrhoids	10 (4.9)	13 (8.2)	0.195
Hospitalization time (days)	1 (1-16)	1 (1-2)	<0.05
Re-operation n (%)	3 (1.6)	4 (2.7)	0.704
Return to normal daily activity [mean (range) days]	7 (1-30)	6 (1-15)	<0.05
Prolonged pain n (%)	27 (14.7)	10 (6.8)	<0.05
Follow-up (months)	28.3±15.7	25.9±15.6	0.176

Table 3. Complications

Complication	Milligan-Morgan hemorrhoidectomy	LigaSure hemorrhoidectomy	p
Bleeding	24 (12.9)	7 (4.7)	<0.05
Necrosis	1 (0.5)	0	0.999
Edema	1 (0.5)	1 (0.7)	0.999
Residual disease	10 (5.4)	5 (3.4)	0.370
Anal stenosis	1 (0.5)	4 (2.7)	0.175

Datas were presented as n (%)

crit levels in the first follow-up on the 7th day were 13.1±1.9 and 39.2±5.2, respectively, in the conventional method group and 13.4±1.9 and 39.7±5.1, respectively, in the LigaSure group (Table 1). There was no statistically significant difference between the groups regarding age, gender, preoperative hemogram level, or postoperative 7th day hemogram level. The number of packages treated with surgery was similar in the two groups in our study. The operation time was 15 (4-60) min in the LigaSure group and 20 (6-40) min in the conventional method group. Operation time was statistically significantly shorter in the LigaSure group.

Analgesia is not routinely provided to all hemorrhoidectomy cases after surgery in our clinic; it is reserved for patients who complain of pain. Postoperative analgesics were required in 182 (88.3%) cases in the conventional group and in 107 (67.3%) cases in the LigaSure group; the difference was statistically significant ($p<0.05$). Thrombosis was present in 10 (4.9%) patients in the conventional method group and in 13 (8.2%) cases in the LigaSure group ($p=0.195$). Re-operation was required because of bleeding in two (1%) patients in the conventional method group and in four (2.7%) patients in the LigaSure group ($p<0.05$). In one case in the conventional method group, re-operation was required due to necrosis. All patients were discharged in good health after the re-operations.

The median hospitalization time was 1 (1 to 2) day in the LigaSure group and 1 (1-16) day in the conventional method group ($p<0.05$). The time to return to normal daily activity was 6 (1-15) days in the LigaSure group and 7 (1-30) days in the conventional method group ($p<0.05$). The follow-up period was 25.9±15.6 months in the LigaSure group and 28.3±15.7 months in the conventional method group ($p<0.05$). In this study, patients were asked about the presence of pain in the first 30 days after hemorrhoidectomy. Ten (6.8%) of the cases who underwent operations with LigaSure and 27(14.7%) of the cases who underwent operations with a conventional method stated that they had pain ($p<0.05$) (Table 2). Bleeding was reported in 31 cases in the first seven days. Among these, 24 underwent operations with a conventional method and 7 underwent LigaSure-assisted operations; the difference was statistically significant ($p<0.05$). Two of the 24 and 4 of the 7 patients underwent re-operations for bleeding. Bleeding stopped spontaneously in the other cases. Regarding early complications, necrosis that was re-operated and then discharged on the 16th day of hospitalization and edema was present in one patient in the conventional method group. In the LigaSure group edema was reported in one case. However edema was spontaneously resorbed in both group. Residual

disease was determined in 10 (4.9%) cases in the conventional method group and in 5 (3.1%) cases in the LigaSure group ($p=0.370$). Gas incontinence was reported in eight cases in the conventional method group and in two cases in the LigaSure group ($p=0.195$). Anal stenosis was reported in one case in the conventional method group and four cases in the LigaSure group ($p=0.175$). These five cases were treated with an anal dilatator without any further complications (Table 3).

DISCUSSION

Conventional methods have been used as surgical treatment modalities for grade 3 and 4 hemorrhoids for more than half a century (7). LigaSure is a device used in hemorrhoidectomy that coagulates vessels with diameters of up to 7 mm, with thermal damage to the adjacent tissue of up to 2 mm. This advantage enables rapid dissection of hemorrhoids without blood. Comparative studies of LigaSure with conventional methods can be found in the literature (7, 12).

According to a study by Peker et al., (12) in the LigaSure group, operation and return to work times were shorter than in the conventional group, while hospitalization and complication rates were similar. In a meta-analysis by Mastakov et al. (11) on 11 studies with 1,046 patients, in patients who underwent LigaSure operations, almost all outcome parameters were better than those of the conventional group except complications. In many studies included in the meta-analysis by Mastakov et al. (11), postoperative analgesic requirements were reported to be statistically significantly lower in the LigaSure group. Similarly, in our study, postoperative analgesic requirements were significantly lower in the LigaSure group (107 versus 182 patients). This significant difference is believed to be due to the transfixion suture on the vessel pedicle used in conventional methods. In many studies, the operation time was determined to be significantly shorter in LigaSure-assisted hemorrhoidectomy (12.5 vs. 29) (7), [22.3 vs. 27.4] (13), [9.4 vs.18.2] (14). Similarly, in our study with LigaSure, an easily applicable and trainable method, the operation time was significantly shorter than in the conventional method (15 versus 20 min). In a study by Khanna et al. (7), the hospitalization period after operation (1.4 versus 3.2 days) was significantly shorter in the LigaSure group; however, in a study by Gentile et al. (13), the hospitalization periods of 24±2 h were similar in the two groups. In our study, the median hospitalization period was one day in both groups.

Rapid healing of the injury site accelerates return to normal daily activity. Patients who underwent LigaSure operations returned to their normal daily activities in a significantly

shorter time than patients in the conventional group (6 versus 7; $p < 0.05$). Chung and Wu (15) did not report any difference in these parameters; however, similar to our results. Milito et al. (9) and Sayfan et al. (16) (7.4 versus 18.6 days) defined shorter time periods for returning to normal daily activities in their LigaSure groups. While the postoperative bleeding ratio was 4.7% with LigaSure in our study, this ratio was 3.5% in the study by Khan et al. (7). The postoperative bleeding ratio was 12.9% with the conventional method in our study, whereas this ratio was similar in the study by Khan et al. (10.0%) (7). The incidence of residual hemorrhoid in the study by Khan et al. (7) was lower in the LigaSure group (3.5% versus 5%); similarly, in our study, this ratio was determined to be lower in the LigaSure group (3.4% versus 5.4%). However, in both the literature and in our study, these differences were not statistically significant. Development of anal stenosis due to thermal damage from LigaSure usage has been described in many recent studies. Filingeri et al. (17) reported anal stenosis in 4 of 203 LigaSure-treated patients, Wang (18) determined it in 1 of 42 cases, and Gentile et al. (13) reported it in 1 of 25 patients. In our study, the results for anal stenosis were similar to the literature (2.7%) (9, 11). We treated five cases of anal stenosis with an anal dilator. The key point to prevent development of anal stenosis is to preserve mucosal bridging and the anoderm.

CONCLUSION

This retrospective study demonstrates the advantages of LigaSure compared with a conventional method in the treatment of grade 3 and 4 hemorrhoids. In this study, LigaSure was determined to be superior to a conventional method in terms of operation time, hospitalization period, postoperative analgesic requirements, time to return to normal daily activity, and postoperative bleeding.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects" (amended in October 2013).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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