

## LASER Haemorrhoidectomy for 2<sup>nd</sup> and 3<sup>rd</sup> Degree Piles

HAMDY A.M. FARAG, M.D.

*The Department of General Surgery, Faculty of Medicine, Al-Azhar University*

### Abstract

**Background:** According to the "vascular" theory, arterial overflow in the superior hemorrhoidal arteries would lead to dilatation of the hemorrhoidal venous plexus. Hemorrhoid LASER procedure (He-LP) is a new laser procedure for outpatient treatment of hemorrhoids in which hemorrhoidal arterial flow feeding the hemorrhoidal plexus is stopped by laser coagulation.

**Aim of Study:** The aim of our study was to assess the outcome of hemorrhoidal dearterialisation by a laser energy device.

**Patients and Methods:** From November 2018 to November 2019, 51 patients with second-or third-degree hemorrhoids were studied. The aim was a decrease in the bleeding rate and decrease post-operative complications, reduction in pain and prolapse, resolution of symptoms, and degree of patient's perception of improvement. The rate and degree of symptoms was evaluated with a four-point verbal rating scale. The rate of subjective symptomatic improvement was also assessed with the Patient Global Improvement (PGI) Scale.

**Results:** Mean bleeding and pain scores at baseline were 2 and 0.57. All the patients were discharged on the day of surgery. Post-operative complications were bleeding and external hemorrhoidal thrombosis. Mean bleeding and pain scores at 1 and 3 months were reduced.

**Conclusions:** LASER procedure was effective in improving bleeding and pain symptoms in patients with grade II and III piles.

**Key Words:** Hemorrhoids – Dearterialization – Doppler guided artery ligation – HeLP – Patient Global Improvement Scale.

### Introduction

**PILES** is a common condition affecting millions of people worldwide and causing some disability. The most common symptoms include rectal bleeding, pain, anal irritation, and prolapse that may lead to an altered quality of life [1]. Despite the

fact that there are many techniques used to treat haemorrhoids, there are still conflicting opinions about the ideal procedure, i.e., the most effective with less discomfort for the patient [2,3]. Conventional hemorrhoidectomy [4,5] is an effective treatment for piles; nonetheless, severe post-operative pain is commonly experienced [6]. A non-excisional technique, defined as hemorrhoidal artery ligation, was first described in the 1990s by Morinaga et al. [7]. This technique is based on the reduction in the blood supply to the terminal branches of the hemorrhoidal arteries, by means of Doppler-guided identification and surgical ligation of the vessels. The subsequent decrease in the blood supply determines a reduction in the volume of the hemorrhoidal plexus [8,9].

### Material and Methods

This prospective study was conducted at Al-Hayat National Hospital in Gazan, Saudi Arabia from November 2018 to November 2019. Pre-operatively, a thorough medical history was taken and patients underwent routine blood tests and physical examination (digital rectal examination and anoproctoscopy). Adult patients (17-70 years old) with second-or third degree hemorrhoids, with no or only minimal mucosal prolapse, who had failed conservative treatment. Exclusion criteria were: Fourth-degree hemorrhoids, severe mucosal prolapse, previous surgery for piles, acute complications such as thrombosis, fecal incontinence, anal stenosis, concomitant anal pathology such as anal fissure or fistula, inflammatory bowel disease, written informed consent was obtained from all patients. Patients' data and procedure-related data, rates of perianal post-operative complications, pre- and post-operative symptoms were collected. Bleeding and pain were scored pre-operatively using a four-point Verbal Rating Scale (VRS) (0=none, 1=mild, 2=moderate, and 3=severe). At each post-operative visit, the presence of symptoms

**Correspondence to:** Dr. Hamdy A.M. Farag,  
The Department of General Surgery, Faculty of Medicine,  
Al-Azhar University

was recorded and scored with the same scale. Major post-operative bleeding was defined as any bleeding either causing the hemoglobin level to fall by at least 3g/dL or requiring transfusion of at least two units of red blood cells. The rate of post-operative improvement was assessed with the seven-point patients global impression of improvement (PGI-I) scale: Very much improved= 1, much improved =2, minimally improved=3, no change=4, minimally worsened=5, much worsened=6, and very much worsened=7 [12,13]. At 6-month follow-up, patients were came to our clinic. Recurrence was defined as any symptom which resolved after the surgical procedure, but which recurred during follow-up and caused discomfort. All patients were followed-up post-operatively at 1 and 4 weeks, then at 3 months with a physical examination by the main operator. 23-mm-diameter proctoscope and a 20MHZ Doppler transducer that is inserted into a

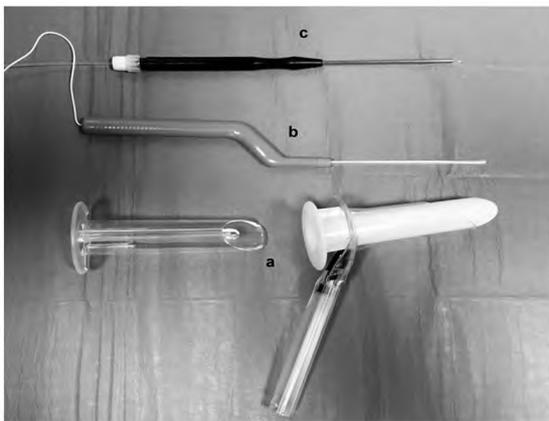


Fig. (1): The HeLP kit comprises a dedicate proctoscope (a), a Doppler probe (b), and a laser fiber probe (c).

#### Statistical analysis:

Pre-operative and post-operative outcomes were compared using the *t*-test for continuous variables and  $\chi^2$  test for categorical values. A *p*-value less than 0.05 was considered statistically significant.

#### Results

Fifty-one patients (36 males), with a median age of 44 years (range 18-70 years), were enrolled from November 2018 to November 2019. Overall, 29 patients (56.9%) had second-degree hemorrhoids and 22 (43.1 %) had third-degree hemorrhoids. The most frequently reported symptoms were bleeding 46 (92.2%) and pain 11. In 18 cases (35%). Pre-operative Verbal Rating Scale (VRS) of reported symptoms is given in (Table 1). All the procedures were performed under spinal anesthesia. Nineteen patients (37.3%) requested conscious sedation.

small separated canal of the proctoscope, with the tip ending laterally at the proctoscope's edge in order to identify the terminal branches of the superior hemorrhoidal artery, approximately 3cm above the dentate line. With the patients in lithotomy position, the proctoscope was inserted into the rectum, and the arteries were sealed by means of a 980-nm diode LASER optic fiber (five, 13W pulses of 1.2s each, with a 0.6s pause) that replaced the Doppler probe in the same canal. The actual closure of each artery was double-checked with the Doppler transducer, and a further sequence of three spots was delivered if required. Enemas (250mL were administered pre-operatively on the evening before surgery). Antibiotic prophylaxis with 500mg metronidazole was routinely given 30min before the procedure. HE-LP was performed as 1-day surgery procedure. The operations were carried out under spinal anesthesia Figs. (1,2).



Fig. (2): HeLP technique: The necrosis in the rectal mucosa, corresponding to the terminal hemorrhoidal arteries, can be clearly seen through the proctoscope.

The operations lasted a mean time of  $21.29 \pm 5.6$  min. Ten to 15 arterial branches (median 13 branches) were identified and treated with the LASER device in each patient. Minor intraoperative bleeding was observed in three patients (5.9%): One was successfully treated with further LASER coagulation and two with a reabsorbable hemostatic suture. All patients were discharged within 6 hours after the procedure. Eighteen patients (35%) required oral analgesia in the first 24h after surgery (paracetamol 1000mg every 12-8h). All patients were able to resume their normal daily activities within 3 days after surgery. In the first week, eight patients (15.7%) had moderate pain and were successfully treated with oral paracetamol. Mean follow-up time was  $10 \pm 2$  months. Data on VRS for bleeding and pain during follow-up are reported. No significant complications were noted, in particular no anal canal stenosis (Table 1).

Table (1): Pre-and post-operative symptoms.

	Pre-operative 51pt.	3 months post-operative 51pt.	<i>p</i>
• Bleeding <sup>a</sup> (VRS)/0.00001	2 (1-3)	0.18 (0-1)	<0.0001
• Pain (VRS)	0.5 (0-2)	0.1 (0-1)	.002

VRS: Verbal Rating Scale.

a : Mean value of VRS and range.

## Discussion

Our study confirms the safety and efficacy of the HeLP procedure for the treatment of hemorrhoids. Moreover, it showed that the good results are maintained in the long term and that patients felt good. Over the past few decades, several non-excisional techniques for treating haemorrhoids were developed. These surgical approaches were based on the replacement of the hemorrhoidal cushions inside the anal canal, [14,15] or in the reduction in the arterial inflow in the hemorrhoidal plexus obtained by ligation of the terminal branches of the hemorrhoidal arteries under Doppler guidance [16]. The most effective surgical procedure for haemorrhoids, namely excisional hemorrhoidectomy, is associated with moderate to severe post-operative pain that is difficult to manage at home [3,6]. An effective and painless procedure has unfortunately not yet been described. Dearterialization techniques have shown good results in the treatment of second-and third-degree hemorrhoids [16]. However, when evaluated in randomized trials, the post-operative course was not significantly different from that after the excisional procedures [17].

The literature demonstrated that this procedure is effective, with low intraoperative and post-operative morbidity, and with little postoperative pain expected. Intraoperatively, the majority of our patients experienced minor discomfort and were able to undergo surgery with only topical anesthetic ointment. This feature is in line with other studies [10,11] and represents a further advantage of the technique. Since no anesthetic was administered, the patients could be discharged a few hours after the operation. Pre-operative bleeding and pain were significantly improved post-operatively, and the benefit observed after 3 months was maintained in the long term. Interestingly, partial or total resolution of low-grade rectal mucosal prolapse was also observed in 83% of cases. The laser photocoagulation may produce a retraction of the prolapsed through the anal canal; nevertheless, this retraction is lower than that obtained with other procedures where the dearterialization process is less selective. Since a lesser curative

effect on mucosal prolapse has been previously underlined [10], we only included patients with minor prolapse. We observed a recurrence of symptoms in 11 patients, all within the first 5 post-operative months. This is comparable with short-term results of other non-excisional procedures [15]. The subjective degree of improvement perceived by the patients was remarkably good with 84.3% of patients rating their clinical condition as very much or much improved. The Patient Global Improvement (PGI-I) that we employed to assess this change was specifically designed to quantify a patient's perception of improvement or deterioration over time. Although it is commonly used in clinical research, it has never been employed to assess a patient's belief about the efficacy of treatment in the context of surgical treatment of hemorrhoids. However, it has been validated following intervention for both urinary incontinence and rectal prolapse [15], and it seems a reliable method to determine the effect of an intervention. One of the limitations of the present study is the small number of patients enrolled, which is due to strict inclusion and exclusion criteria, in particular to the exclusion of patients with concomitant anorectal disease, since we believe that a homogeneous group of patients should be studied to evaluate a novel technique. However, He-LP is associated with a shorter operative time and hospital stay than other nonexcisional procedures and little post-operative care is required. Moreover, as regards the social cost of the treatment, patients resumed normal habits and working activities earlier. The present study showed a good resolution of symptoms in the short term. The results after 12 months are as good as those after other non-excisional treatments [16]. However, studies with longer follow-up as well as controlled-randomized trials are needed to determine the accurate role of this procedure.

## Conclusions:

This study has shown that the He-LP procedure for patients with second-and third-degree hemorrhoids is effective, is associated with a short operative and recovery time, can be carried out in a day surgery setting with minor intra-and post-operative pain, and provides a significant improvement in symptoms. therefore, this procedure could be regarded as an alternative to more invasive interventions in early-stage HD. Informed consent was obtained from all individual participants included in this study.

## References

- 1- JOHANSON J.F. and SONNEMBERG A.: The prevalence of hemorrhoids and chronic constipation. An epidemiological study. *Gastroenterology*, 98: 380-6, 1990.

- 2- MADOFF R.D. and FLESHMAN J.W.: Clinical Practice Committee, American Gastroenterological Association. American Gastroenterological Association technical review on the diagnosis and treatment of hemorrhoids. Gastroenterology, 126: 1463-73, 2004.
- 3- LUMB K.J., COLQUHOUN P.H., MALTHANER R. and JAYARAMAN S.: Stapled versus conventional surgery for hemorrhoids. Cochrane Database Syst. Rev., 4: CD005393, 2006.
- 4- MILLIGAN E.T.C., MORGAN C.N., JONES L.E., et al.: Surgical anatomy of the anal canal and the operative treatment of hemorrhoids. Lancet, 230: 1119-23, 1937.
- 5- FERGUSON J.A. and HEATON J.R.: Closed hemorrhoidectomy. Dis. Colon. Rectum., 2: 176-9, 1959.
- 6- GERBERSHAGEN H.J., ADUCKATHIL S., VAN WIJCK A.J., PEELEN L.M., KALKMAN C.J. and MEISSNER W.: Pain intensity on the first day after surgery: A prospective cohort study comparing 179 surgical procedures. Anesthesiology, 118: 934-44, 2013.
- 7- MORINAGA K., HASUDA K. and IKEDA T.: A novel therapy for internal hemorrhoids: Ligation of the hemorrhoidal artery with a newly devised instrument (Moricorn) in conjunction with a Doppler flowmeter. Am. J. Gastroenterol., 90: 610-3, 1995.
- 8- SOHN N., ARONOFF J.S., COHEN F.S. and WEINSTEIN M.A.: Transanal hemorrhoidal dearterialization: Non-excisional surgery for the treatment of hemorrhoidal disease. Am. J. Surg., 182: 515-9, 2001.
- 9- AIGNER F., BODNER G., CONRAD F., MBACKA G., KRECZY A. and FRITSCH H.: The superior rectal artery and its branching pattern with regard to its clinical influence on ligation techniques for internal hemorrhoids. Am. J. Surg., 187: 102-8, 2004.
- 12- GUY W.: ECDEU assessment manual for psychopharmacology, revised. US Department of Health, Education, and Welfare, Washington, 1976.
- 13- APA: Handbook of psychiatric measures. APA, Washington, 2000.
- 14- L.M. SUTHERLAND, BURCHARD A.K., MATSUDA K., et al.: A systematic review of stapled hemorrhoidectomy. Arch. Surg., 137: 1395-406, 2002.
- 15- CORMAN M.L., GRAVIÉ J.F., HAGER T., et al.: Stapled haemorrhoidopexy: A consensus position paper by an international working party: Indications, contra-indications and technique. Colorectal. Dis., 5: 304-10, 2003.
- 16- DAL MONTE P.P., TAGARIELLO C., SARAGO M., et al.: Transanal haemorrhoidal dearterialisation: Nonexcisional surgery for the treatment of haemorrhoidal disease. Tech. Coloproctol., 11: 333-8, 2007.
- 17- De NARDI P., CAPRETTI G., CORSARO A. and STAUDACHER C.: A prospective, randomized trial comparing the short-and long-term results of Doppler-guided transanal hemorrhoid dearterialization with mucopexy versus excision hemorrhoidectomy for grade III hemorrhoids. Dis. Colon. Rectum., 57: 348-53, 2014.

## مدى نجاح عملية إستئصال البواسير من الدرجة الثانية والثالثة بالليزر

إن عملية إستئصال البواسير من العمليات الشائعة وذلك لكثرة حالاتها وتتم هذه العملية بطرق كثيرة منها الجراحة التقليدية وعملية المشروط الكهربائي وعملية حقن جدار الباسور وجميع هذه العمليات تتمتع بنسب إنجاح عالية ولكل عملية مميزاتاها وعيوبها ولكن بالنسبة لعملية إستئصال البواسير بالليزر فإنها تتميز بأنها تسمح للمريض بتناول الطعام بعد الإنتهاء من العملية بمدة لا تتجاوز ثلاث ساعات ويستطيع المريض الذهاب إلى منزله في نفس اليوم ليمارس حياته بصورة طبيعية من اليوم التالي وتقتصر فكرة البواسير بالليزر على إطلاق أشعة في صورة طاقة حرارية ترسل ذبذبات عالية التردد وكأنها مشروط جراحى يهدف إلى تهتك الأنسجة المحيطة بمنطقة العملية وبالتالي تبخير البواسير بإستخدام شعاع الليزر الغير مرئى وبعد ذلك يتم إستخدام التيار الكهربائى لوقف وصول الدم إلى البواسير وبالتالي إنكماشه الأمر الذى يؤدي وتقليل فرص النزيف إلى سرعة الشفاء ولذا فإن عملية إستئصال لبواسير بالليزر تعتبر من أفضل الطرق لإستئصال البواسير.