Comparision Of Haemorrhoidectomy With Harmonic Scalpel, Laser Haemorrhoid Surgery And Open Milligan-Morgan Technique

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ABSTRACT

Objectives: Haemorrhoids are common and frequently occurring diseases in the clinical setting, and severe haemorrhoids require surgical treatment. There have been many attempts to find less painful and less complicated surgical methods for treating hemorrhoids.

Aim: The aim of this study was to compare the efficacy of harmonic scalpel, Milligan Morgan technique and laser surgery method in patients undergoing haemorrhoidectomy. **Methods:** this cross sectional observational hospital based study was conducted in the department of surgery in a tertiary care hospital, India. A total of 90 Patients with grade III or IV hemorrhoids, divided into three groups (30 each), harmonic scalpel, Milligan Morgan technique and laser surgery method were studied. All three groups were compared with respect to Operative time, Blood loss during surgery, early postoperative complications, postoperative pain measured on a visual analog scale (VAS), hospital stay, and return to normal work.

Results: Most of the patients were 41-60 years male in all haemorrhoidectomy methods. Laser surgery, Milligan Morgan technique and Harmonic scalpel was differ significantly in terms of duration of surgery, blood loss during surgery, hospital stay, VAS score of postoperative pain and return to normal work. However, there is no significant difference in term of early post-operative complications like bleeding and urinary retention in all three groups.

Conclusion: Laser surgery can be adapted as a safe and effective alternate method as compared to Harmonic scalpel or Milligan Morgan technique for treating symptomatic haemorrhoids.

Keywords: Haemorrhoids, Haemorrhoidectomy, Harmonic scalpel, Milligan Morgan, laser surgery

INTRODUCTION

Hemorrhoid disease is a pathological condition in which the symptomatic enlargement and protrusion of normal anal cushions. Swollen and inflamed haemorrhoidal venous cushions are known as piles [1-2]. Haemorrhoidal veins are normal components of human anatomy. The disintegration of connective tissue promotes loss of the anatomic relationship with sphincter, resulting in vascular malformations such as varicosis or varicocele [3]. Haemorrhoids is very common anorectal disorder and it is the one of the commonest causes for rectal bleeding in general

population of our country, occurring in approximately 5% of the general population and more frequently in individuals who are older than 40 years [4-5]. It has been estimated that a lifetime risk of hemorrhoids could be as high as 75% in the [6]. general population Haemorrhoids were classified into four grades: Grade-I haemorrhoids was visualized on endoscopy and may swell into the lumen without prolapse underneath the dentate line.7 in grades II-IV, haemorrhoids prolapsed out of the anal canal with faecal discharge. In grade-II it reduces impulsively, grade-III requires manual reduction, and grade-IV is irreducible. The first and

second degree haemorrhoids can be managed by medical treatments. Surgical treatment is required in cases having symptomatic Grade III and Grade IV hemorrhoids. Additionally, surgery may be required when medical treatment fails or in the presence of concomitant conditions such as anal fissures or ulcers [7]. There are various techniques used in the surgical treatment of hemorrhoidal disease, varying from open or closed excision, laser therapy, ultrasonic scalpel dissection and stapled hemorrhoidectomy are used worldwide. Fear amongst the lay people due to the anatomical location of the pathology and postoperative pain are some of the reasons why surgery remains last patients option of treatment of the [8]. Conventional Milligan-Morgan (MM)open haemorrhoidectomy is still most commonly performed procedure for relapsing haemorrhoids [9]. The most significant complication of hemorrhoid surgery is postoperative pain. The reasons for postoperative pain are related to the incisions made during surgery, suturing the anal mucosa, use of cautery, and possible surgical site infection [10]. Harmonic scalpel has been used extensively in surgery procedures such general as cholecystectomy, hemorrhoidectomy and thyroidectomy; gynecological procedures such as myomectomy; and to cut internal mammary artery in thorax surgery. Currently, harmonic scalpel hemorrhoidectomy (HSH) is used as a routine technique in many centers [11]. The Milligan-Morgan operation is a classic operation for the treatment of haemorrhoids; although it can significantly improve some clinical symptoms of patients, this procedure causes greater tissue damage and more bleeding during the operation, and the incidence of complications such as wound edge oedema and pain is higher [12]. Most of studies suggest that complications are less, degree of is lower and pain amount of analgesic consumption is less with laser post-operative haemorrhoidectomy during period, and claimed that this method provides a more tolerable postoperative period for patients [13].

Aims & objectives: This study aims to compare the various hemorrhoid surgery methods like: harmonic scalpel, Milligan Morgan and laser haemorrhoidectomy in terms of Intraoperative and postoperative parameters.

MATERIAL & METHODS

This is a cross sectional observational hospital based study, conducted in the department of surgery in a tertiary care hospital, central India. All newly diagnosed symptomatic grade III and IV hemorrhoids patients that underwent haemorrhoidectomy during the study period were enrolled. A total of 90 patients were equally divided into three groups.

Group I: underwent Harmonic scalpel haemorrhoidectomy (n=30)

Group II: underwent open Milligan-Morgan technique haemorrhoidectomy (n=30)

Group III: underwent laser hemorrhoid surgery (n=30)

All three groups are compared with respect to operative time, Intra operative bleeding, postoperative pain, early postoperative complications, length of hospital stay, and time to return to normal activity. Postoperative pain was assessed using visual analogue scale

Inclusion criteria:

- Participant's age ranged 20-70 years and both gender
- Grade III and IV hemorrhoids patients
- Patients who gives written informed consent for the study

Exclusion criteria:

- Participants with age < 20 or >70 years
- Patients with thrombosed or strangulated haemorrhoids, concomitant perianal disease, history of recurrent perianal surgeries, known tendencies for bleeding
- Patients those unfit for surgery and anesthesia
- Patients who not provide consent for the study

All patients prepared for the surgery. Pre-anaesthetic fitness was taken before the surgery. Anesthesia was either general or spinal according to surgeon, anesthesiologist and patient preferences. Patients were placed in lithotomy position for surgery In harmonic scalpel haemorrhoidectomy, hemorrhoid tissue were removed using the harmonic scalpel up to its pedicle (Ethicon Endo-Surgery) and the wounds were left open. Anal pack was placed in both the techniquesIn Milligan-Morgan technique, V shaped incision is made at anoderm, internal sphincter is separated off the hemorrhoid tissue till its origin above the dentate line, haemorrhoidal plexus were removed using scalpel and pedicle was ligated with 2/0 vicryl suture, and the wound was left openIn the laser surgery group, the jaws of the handset were applied to the pedicle and the instrument was activated by the foot paddle, initiating coagulation of the mucosa and blood vessels. The duration of surgery was noted in all these technique. All patients had same kind of analgesia during the postoperative course that is opioid injection (tramadol1ml tid). All patients were discharged on the 2-3 postoperative day, unless otherwise indicated. Patients were then

followed up to four weeks in the surgical outpatient department.Data was collected using a self-generated questionnaire that recorded information, like age, gender, socio-economic status, clinical complaints and duration of haemorrhoids. Examination of haemorrhoids was done by proctoscopy.

Statistical analysis: Data was analysed using SPSS 22. Mean, standard deviation (SD) and range were calculated for continuous variables. Chi-square test was used for group comparisons of categorical

RESULTS:

at p < 0.05.

A total of 90 patients of grade III and grade IV hemorrhoids patients meet all inclusion criteria were enrolled in our study. Divided into three groups (30 patients in each group), first group operated by Harmonic scalpel method, second group by Milligan-Morgan technique and in third group Laser surgery method was performed. Majority of the patients were 41-60 years age group, predominantly male in all haemorrhoidectomy methods. Most of the patients have grade III hemorrhoids. Duration of the symptoms was more than 6 months and spinal anaesthesia was given to almost 80-90% of patients. There was no significant difference between patients subjected to Milligan-Morgan technique, harmonic scalpel and laser surgery methods in terms of age, gender, duration of symptom, hemorrhoid grade and anesthesia (p>0.05).

Variables	Harmonic scalpel method (n=30)	Milligan-Morgan technique (n=30)	Laser surgery method (n=30)	P value
		Age group		
20-40 years	6	7	9	0.658
41-60 years	14	15	16	
> 60 years	10	8	5	
		Gender		-
Male	17	16	19	0.727
Female	13	14	11	
	Hen	norrhoid grade		
Grade III	16	19	20	0.544
Grade IV	14	11	10	
	Durat	tion of symptoms		
<6 months	10	13	12	0.720
>6 months	20	17	18	
	Type of a	nesthesia		
Spinal	27	28	28	0.856
General	3	2	2	7

 Table 1: Comparison of preoperative variables among the various surgery groups

Intra operative blood loss was significantly higher in Milligan-Morgan technique as compared to Harmonic scalpel or laser surgery method (17.4 ml, 8.2 ml and 5.5 ml respectively, p<0.05). The mean operating time was significantly higher in Milligan-Morgan technique than Harmonic scalpel or laser surgery method (23.4 \pm 2.8, 20.3 \pm 2.3 and 19.2 \pm 1.9, p<0.05)

Table 2: Comparison of Intraoperative variables among the various surgery groups				
Variables	Harmonic scalpel	Milligan-Morgan	Laser surgery	

	method (mean ± SD)	technique (mean ± SD)	method (mean ± SD)	value
Operative time (min)	20.3±2.3	23.4±2.8	19.2±1.9	0.001
Blood loss (ml)	8.2±1.5	17.4±3.6	5.5±1.2	0.001

Early postoperative complications like bleeding and urinary retention were less in laser surgery than Harmonic scalpel haemorrhoidectomy and Milligan-Morgan method, but differences was not significant statistically (p>0.05). Post-operative stay in hospital was significantly longer (2.8 ± 0.7) in Milligan-Morgan method as compared to Harmonic scalpel and laser surgery method. According to VAS score, pain in the laser surgery group was significantly less as compared to harmonic scalpel and Milligan-Morgan technique group. Return to normal activity was significantly early in patients operated by laser method than Harmonic scalpel method and Milligan-Morgan method (P-value <0.05).

 Table 3: Comparison of Postoperative variables among the various surgery groups

Variables	Harmonic scalpel method	Milligan-Morgan technique	Laser surgery method	P value	
Postoperative complications					
Bleeding	2 (6.66%)	3 (10%)	1 (3.33%)	0.067	
Urinary retention	2 (6.66%)	4 (13.3%)	1 (3.33%)	0.907	
Hospital Stay (Days)	2.1±0.5	2.8±0.7	1.5±0.4	0.001	
Post-operative pain (VAS)					
Day 1	3.5±0.8	6.2±0.9	1.9±0.6	0.001	
Week 1	2.2±0.4	4.7±0.7	1.1±0.4	0.001	
Week 2	1.3±0.2	2.9±0.5	0.5±0.2	0.001	
Time to return to daily activity (d)	6.8±1.5	11.4±2.2	4.9±1.4	0.001	

DISCUSSION:

Haemorrhoidal disease is a common disorder affecting all age grouppeoples and both sexes, but common among elderly. In our study majority of the patients was 41-60 years age group, predominantly male, similar findings also reported by Pata F, et al [14] and Khanna R, et al [15]. Multiple factors have been proposed to be the etiologies of haemorrhoidal development including constipation and prolonged straining during defecation. In the present study no significant difference was seen in harmonic scalpel, milligan-morgan and laser surgery methods in terms of hemorrhoids grades, duration of symptoms and types of anaesthesia, in agreement with the Loder PB et al [16] and Lohsiriwat, V et al [17].In our study majority of the patients received spinal anaesthesia in all hemorrhoidectomy methods, concordance with the Kumar RGV, et al [18]. Surgical haemorrhoidectomy is considered to be more effective and definitive treatment for

symptomatic hemorrhoids.Present study found the mean operative time was statistically significantly higher in Milligan-Morgan method as compared to Harmonic scalpel and laser surgery method. Our results comparable with the many other researchers: Ahmed M et al [19], Choen F et al [20] and Emile K, et al [21].Current study reported that intraoperative blood loss was significantly less in laser hemorrhoid surgery as compared to Harmonic scalpel and Milligan-Morgan method, similar observation also reported by Ravi K, et al [22] and Basdanis G, et al [23].Various hemorrhoidectomy techniques was performed, they were associated with significant postoperative complications such as pain, bleeding and mucous discharge. Although a consensus on treatment of grade III and IV haemorrhoids have been established, still there is a debate for optimal technique to minimize postoperative complications [24].In this study, early post-operative complication like bleeding and retention of urine has more in MilliganMorgan technique than Harmonic scalpel or laser method, but not significant statistically (p>0.05), accordance to the Peker k, et al [25] and Lim DR, et al [26].Duration of post-operative hospital stay was significantly shorter in laser surgery as compared to harmonic scalpel and Milligan-Morgan method in the present study, consistent findings reported by a study conducted by Surahio AR et al [27]Our study found post-operative VAS pain scores at day 1, week 1 and week 2 were lesser in laser method as compared to harmonic scalpel or Milligan-Morgan method, similar results was obtained by Yu et al [28], R. Strategies et al [29] and Bilgin Y et al [30].Laser surgery method has faster healing and a more suitable and favorable environment support a faster return to daily activities. In current study overall patients of the Laser surgery group returned to work activities in a significantly shorter time than harmonic scalpel or Milligan-Morgan method haemorrhoidectomy patients, these findings correlate with the Surahio AR et al [27], Milito et al [31] and Sayfan et al [32].

The ideal hemorrhoidectomy method should combine the high safety and efficacy for treatment, yield least postoperative pain and provide comfort to the patient.Overall laser surgery methods was preferred for hemorrhoidectomy, having less operation time, less complication, low pain on VAS score and early return to normal activity.

CONCLUSION

We have concluded that, Laser haemorrhoidectomy method is associated with less operative time, less intra-operative blood loss, shorter hospital stays, minimum post-operative complications (bleeding/urinary retention), decrease postoperative pain and early return to normal activity irrespective of age, sex and grade of the haemorrhoids as compared with Harmonic scalpel or Milligan-Morgan haemorrhoidectomy technique. Hence, laser surgery method can be considered as safe and effective method in treating symptomatic haemorrhoids.

REFERENCES

- Lohsiriwat V. Hemorrhoids from basic pathophysiology to clinical management. World J Gastroenterol. 2012; 18(17):2009-17.
- 2. Margetis N. Pathophysiology of internal hemorrhoids. Ann Gastroenterol 2019; 32: 264-72.

- 3. Marques CF, Nahas SC, Nahas CS, Sobrado CW, Jr, Habr-Gama A, Kiss DR. Early results of the treatment of internal hemorrhoid disease by infrared coagulation and elastic banding: a prospec tive randomized cross-over trial. Tech Coloproctol. 2006; 10(4):312-7.
- 4. Z. Cohen; Symposium on outpatient anorectal procedures. Alternatives to surgical hemorrhoidectomy; Can J Surg, 28 (1985), pp. 230–231.
- 5. N. Arslani, L. Patrlj, Z. Rajković, D. Papeš, S. Altarac; A randomized clinical trial comparing Ligasure versus stapled hemorrhoidectomy; Surg Laparosc Endosc PercutanTech, 22 (2012), pp. 58–61.
- Lohsiriwat, V. Treatment of hemorrhoids: A coloproctologist's view. World J. Gastroenterol. 2015, 21, 9245–9252. [CrossRef].
- Riss S, Weiser FA, Schwameis K, Riss T, Mittlbock M, Steiner G, et al. The prevalence of hemorrhoids in adults.2012; (2):215-20.
- 8. Bulus H, Tas A, Coskun A, Kucukazman M. Evaluation of two hemorrhoidectomy techniques: Harmonic scalpel and Ferguson's with electrocautery. Asian Journal of Surgery. 2014 Jan 1; 37(1):20-3.
- J. Gupta P. Randomized trial comparing insitu radiofrequency ablation and Milligan-Morgan hemorrhoidectomy in prolaps- ing hemorrhoids. 2003;(5): 393-400.
- 10. Nicholson TJ, Armstrong D. Topical metronidazole (10 percent) decreases post hemorrhoidectomy pain and improves healing. Dis Colon Rectum. 2004; 47(5):711-6.
- 11. J.J. Tan, F. Seow-Choen; Prospective, randomized trial comparing diathermy and harmonic scalpel hemorrhoidectomy; Dis Colon Rectum, 44 (2001), pp. 677–679.
- 12. Liang Su, Xiaoqiang J, Weiwei C. The efficacy and safety of RPH and PPH in treatment of mixed haemorrhoids: a metaanalysis. Chinese journal of anorectal diseases. 2019; 39(3):19–24.
- Nienhuijs SW, de Hingh IH. Pain after conventional versus Ligasure haemorrhoidectomy. A meta-analysis. Int.J Surg. 2010; (4):269-73.
- 14. Pata F, Gallo G, Pellino G, Vigorita V, Podda M, Di Saverio S, D'Ambrosio Gand Sammarco G (2021) Evolution of Surgical Management of

PakHeart J2023;56(03)

Hemorrhoidal Disease: An Historical Overview. Front. Surg. 8:727059. doi: 10.3389/fsurg.2021.727059

- 15. Khanna R, Khanna S, Bhadani S, Singh S, Khanna AK. Comparison of ligasure hemorrhoidectomy with conventional Ferguson's hemorrhoid- ectomy. Indian J Surg. 2010;72(4):294–7.
- 16. Loder PB, Kamm MA, Nicholls RJ, Philips RK. Haemorrhoids: pathology, pathophysiology and aetiology. Br J Surg. 1994;81(7):946-54
- Lohsiriwat, V.; Jitmungngan, R. Strategies to Reduce Post-Hemorrhoidectomy Pain: A Systematic Review. *Medicina* 2022, 58, 418. https://doi.org/10.3390/medicina 58030418
- 18.Kumar RGV, Madhu BS, Tanga V, Reddy NKM, Pawar PM Harmonic scalpel compared with conventional open (Milligan-Morgan) method in surgical management of symptomatic haemorrhoids. Int Surg J 2017; 4:2010-3.
- 19. Muhammad Ahmed, Syed Tatheer Abbas, Amna Javaid, Naveed Arshad, Falak Shair, Comparison of harmonic scalpel versus Milligan Morgan technique in haemorrhoidectomy patients, Journal of the Pakistan Medical Association · August 2021. DOI: 10.47391/JPMA.03-1303
- 20. Seow-Choen F, Seow-En I. Technical Tips and Tricks of Hemorrhoidectomy. Hemorrhoids 2018; 2: 215-22
- 21. Emile K. Tan, Julie Cornish, Ara W. Darzi, KBE; Savas Papagrigoriadis, Paris P. Tekkis, Meta-analysis of Short-term Outcomes of Randomized Controlled Trials of LigaSure vs Conventional Hemorrhoidectomy, Arch Surg. 2007; 142(12):1209-1218
- 22. Ravi K, Madhu BS, Tanga V, Naveen K, Pawar PM. Harmonic scalpel compared with conventional open (Milligan-Morgan) method in surgical management of symptomatic haemorrhoids. Int Surg J. 2017;4(6):2010–3
- 23. Basdanis G, Papadopoulos VN, Michalopoulos A, Apostolidis S, Harlaftis N. Randomized clinical trial of stapled hemorrhoidectomy vs open with Ligasure for prolapsed piles. *Surg Endosc.* 2005; 19(2):235-239.
- Jayaraman S, Colquhoun PH, Malthaner RA. Stapled versus conventional surgery for hemorrhoids. Cochrane Database Syst Rev 2006; (4):CD005393.
- 25. Kemal Peker, Abdullah İnal, Huriye Güllü, Düriye Gül, Murat Şahin, Ayca Dumanli

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Ozcan, Kemal Kılıç, Comparison of Vessel Sealing Systems with Conventional, Iranian Red Crescent Medical Journal. 2013 June; 15(6): 488-96 Published Online 2013 June 05.

- 26. Lim DR, Cho DH, Lee JH, Moon JH. Comparison of a hemorrhoidectomy with ultrasonic scalpel versus a conventional hemorrhoidectomy. Ann Coloproctol 2016; 32: 111-6.
- 27. Surahio AR, Khan AG, Danish AA, Memon S, Khan AA, Shah Syed AA. Milligan Morgan Haemorrhoidectomy: vs LigaSure Haemorrhoidectomy: Comparative Postoperative Outcomes. Ann Pak Inst Med Sci.2020;17(1):47-51. doi. 10.48036/apims.v17i1.385
- 28. Keqiang Yu^{1,2}, Haijun Li³, Ping Xue¹, Zhidi Xie¹, Minghui $Tang^2$, Hongbo He¹ and Jing Wu^{1*}Modified ultrasound scalpel haemorrhoidectomy versus conventional haemorrhoidectomy for mixed haemorrhoids: a study protocol for a singleblind randomised controlled trial, Trials (2023) 24:140 https://doi.org /10.1186/s13063-023-07175-6
- 29. R. Strategies to Reduce Post-Hemorrhoidectomy Pain: A Systematic Review. *Medicina* 2022, 58, 418. https://doi.org/10.3390/ medicina58030418
- 30. Yusuf Bilgin¹, Semih Hot¹, İlhami Soykan Barlas¹, Arzu Akan¹, Yavuz Eryavuz' Shortand long-term results of harmonic scalpel hemorrhoidectomy versus stapler hemorrhoidopexy in treatment of hemorrhoidal disease, Asian Journal of Surgery (2015). Vol. 38
- 31. Milito G, Cadeddu F, Muzi M.G, Nigro C, and Farinon A.M. Haemorrhoidectomy with Ligasure conventional excisional vs techniques: meta-analysis of randomized controlled trials. Colorectal Disease; 2010;12(2): 85-93.
- 32.J. Sayfan, A. Becker, and L. Koltun, "Sutureless closed hemorrhoidectomy: a new technique. Annals of Surgery.2001; 234(1):21-24.

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