Journal of Rawalpindi Medical College (JRMC); 2017;21(3): 233-236

Original Article

Harmonic Scalpel Hemorrhoidectomy Vs Milligan-Morgan Hemorrhoidectomy

Muhammad Umer Fayyaz, Muhammad Salman Shafique, Jahangir Sarwar Khan, Raheel Ahmad , Sheikh Haseeb Ahmad, Naqqash Adnan

Department of Surgery, Holy Family Hospital & Rawalpindi Medical University, Rawalpindi.

Abstract

Background: To compare Harmonic Scalpel Hemorrhoidectomy (HSH) with classical Milligan Morgan Hemorrhoidectomy (MMH) in terms of operation time and post-operative pain to establish effectiveness of this novel procedure.

Methods: A total of 62 patients planned for excision hemorrhoidecotmy were randomly selected into HSH and MMH groups. Mean operation time was calculated during surgery and pain at time of first defecation was recorded on visual analog scale (VAS).

Results: Mean VAS after surgery at time of first defecation was 4.32 (SD 0.909) in HSH group and 6.97 (SD 1.426) in MMH group (p value <0.000). Mean Operation time in HSH group was 18.13 (SD 3.956) minutes and that of MMH group was 22.90 (SD 4.901) minutes (P value <0.000).

Conclusion: Harmonic Scalpel Hemorrhoidectomy is better than Milligan Morgan hemorrhoidectomy in terms of post-operative pain and operation time.

Key Words: Harmonic Scalpel®, Milligan Morgan Hemorrhoidectomy, Visual Analog Scale, Post Hemorrhoidectomy pain.

Introduction

Hemorrhoids arise from congestion of anal cushions and characteristically lie in the 3, 7 and 11 o' clock positions (with the patient in lithotomy position). Symptoms may include bright red, painless bleeding, mucus discharge and prolapse. Surgical excision of hemorrhoids still remains gold standard treatment for Grade III and IV. Harmonic Scalpel® Hemorrhoidectomy (HSH) is one of them which seems to be safe, efficient and rapid technique. Haemorrhoid is the most common anorectal disease.[1,2] Etiologic factors for hemorrhoidal disease include chronic constipation, diarrhea, prolonged straining, pregnancy, heredity, prolonged erect posture, increased intra-abdominal pressure with obstruction of venous return, aging, and internal sphincter abnormalities.[3] The most common pathological finding is the abnormal dilatation and distortion of the vascular channel, together with destructive changes in the supporting connective tissue within the anal cushion, although exact pathophysiology of hemorrhoids is poorly understood. The most widely accepted theory for its pathophysiology is called 'sliding anal canal lining'. It proposes that when the supporting tissues of the anal cushions disintegrate or deteriorate, it leads to development of hemorrhoids.[4] Haemorrhoids characteristically lie in the 3, 7 and 11 O' clock positions (with the patient in lithotomy position).[5] According to Goligher's classification they are classified into four grades based on their appearance and degree of prolapse.[1] In first-degree hemorrhoids (grade I),anal cushions bleed but do not prolapse. In second-degree hemorrhoids (grade II) the anal cushions prolapse through the anus on straining but reduce spontaneously.In third-degree hemorrhoids (grade III) ,the anal cushions prolapse through the anus on straining or exertion and require manual replacement into the anal canal. In fourth degree hemorrhoids (grade IV), prolapse stay out at all times and is irreducible. Grade III, Grade IV and those with Grade II who failed to respond to medical treatment are classically managed with excision of hemorrhoidal tissue called hemorrhoidectomy. Milligan Morgan hemorrhoidectomy is considered the gold standard procedure for hemorrhoidectomy.[2]

Major complication associated with Milligan Morgan Hemorrhoidectomy (MMH) is post-operative pain. Other complications are post-operative hemorrhage, urinary retention, soiling, stenosis and incontinence.[3] Subsequent modifications to counter complications in this procedure are the use of diathermy and Ligasure®. Harmonic Scalpel® (HS) is a new device introduced to surgery in last decade. It uses high frequency sound wave energy to cut and coagulate tissues at the same time at precise point of application. It denatures protein by using ultrasonic vibration to transfer mechanical energy sufficient to

break tertiary hydrogen bonds. The blade vibrates at 55.5 kHz over a distance of 80 µm. In different studies, authors found that HS was found to seal arteries 3.8 mm in diameter on average and veins 9.9 mm in diameter on an average. When the effect is prolonged, secondary heat is produced that seals larger vessels. Because ultrasound is the basis for Harmonic Scalpel® Technology, no electrical energy is conducted to the patient.[6]

Harmonic Scalpel® Hemorrhoidectomy (HSH) has emerged to be a safe, rapid modality, with reduced blood loss and post-operative pain. Ramadan et al demonstrated decreased operation time (13.2 [1.7] min for HSH vs. 29.6 [5.4] min for MMH [p-value 0.0001]), and less post-operative pain (pain on VAS as 4.3 [1.3] for HSH vs. 7.4 [1.6] pain score for MMH [p-value 0.0001]).[7] Multiple studies favor this technique.[8-10] There are studies with variable results.[11] The rationale for evaluating the use of the Harmonic Scalpel® for surgical hemorrhoidectomy lay in decreased lateral thermal damage with rapid coagulation of vascular cushions, resulting in reduced operating time and post-operative pain. No local data is available and locally this technique is not in practice.

Patients and Methods

This randomized controlled trial was conducted at Surgical Unit-I of Holy Family Hospital Rawalpindi from December 2013 to June 2014. 62 patients with Hemorrhoids were included in this study, and divided into Group 1 and group 2. Group 1 included 31 patients, in whom Harmonic Scalpel® Hemorrhoidectomy was used as treatment. Group 2 – included 31 patients,in whom Classical Milligan Morgan Hemorrhoidectomy was used. All patients with Grade III, Grade IV and Grade II hemorrhoids in whom conservative approaches failed were admitted through OPD on an elective basis. Both genders were aged 12 years and above, up to 80 years of age were included. Exclusions were recurrent hemorrhoids, presence of additional anorectal pathology (fistula in ano, anal fissures etc.), patients with neurological deficit, and patients with chronic pain syndrome, already on narcotics. Randomization was performed at the time of anesthesia by drawing sealed envelopes (lottery method) into group 1 and group 2. Surgery was performed under general or spinal anesthesia at the discretion of the anesthetist.Patients in Group 1 underwent Harmonic Scalpel® Hemorrhoidectomy. The power of the Harmonic Scalpel® was set at level 3. The internal and external components of each hemorrhoidal complex grasped and elevated by a tooth forceps and the hemorrhoid bundle carefully dissected off the internal anal sphincter using the Harmonic Scalpel® shears. Control of the pedicle was achieved by coagulation using the same device. Homeostasis was obtained using the Harmonic Scalpel® or electrocautery. Patients in Group 2 underwent Classical Milligan-Morgan procedure for hemorrhoidectomy. This technique used scissors to excise the three anal cushions leaving a mucosal bridge between each wound. The cranial aspect of the cushions was ligated using an absorbable suture and the wounds were left open to heal by secondary intention. Surgery was standardized in each case by same team of surgeons. Mean operation time was documented, and post-operative pain was assessed.

Results

Twenty patients were females and 42 males. The study population was in age group of 24 to 70 years with mean age of 43.76±12.49 years. Mean age in Group A was 46.65±12.26 years while it was 41.87±12.64 years in Group B. Majority were in grade III (Table 1). The mean pain score on visual analog scale (VAS) for patients undergoing Harmonic Scalpel® hemorrhoidectomy was 4.32±0.91 compared to 6.97±1.42 in those undergoing Milligan Morgan hemorrhoidectomy ($p < 0.000$) (Table 2). The mean operation time for patients undergoing Harmonic Scalpel® Hemorrhoidectomy was 18.13±3.95 minutes compared to 22.90±4.90 minutes in those undergoing Milligan Morgan Hemorrhoidecotmy with statistically significant lesser operation time in HSH group ($p < 0.000$). (Table 3)

Table 1: Distribution of patients according to the grade of Haemorrhoids

Treatment group	Grade of haemorrhoids			
	I	II	III	IV
HSH	01	06	08	16
MMH	00	07	16	08

Table 2: Mean Pain Score on VAS in both groups

Treatment Group	N	Mean Pain Score	Std. Deviation	Std. Error Mean	P-Value
HSH	31	4.32	0.909	0.163	0.000
MMH	31	6.97	1.462	0.256	

Table 3: Mean operation time in both groups

Treatment group	N	Mean	Std. Deviation	Std. Error Mean	P value
HSH	31	18.13	3.956	0.711	0.000
MMH	31	22.90	4.901	0.880	

Discussion

Haemorrhoidectomy remains the most effective and definitive treatment of choice for Grade III and IV hemorrhoids.[11] However, postoperative pain is the aftermath most dreaded by patients undergoing the procedure.[12]Therefore, various new treatment modalities have recently been developed with the aim of overcoming postoperative pain. During the past 20–30 years, the favourite operation has been the MMH because of its relatively simple technique and reliable outcomes.[13] Complication rate is relatively low in experienced hands and is simple to manage. The obvious disadvantage of MMH is the postoperative pain resulting from the surgical raw area in the sensitive peri-anal skin and the anoderm. Much of this discomfort arises from the thermal injury induced by the electrocautery. HSH possesses the unique advantage of causing very little lateral thermal injury in the tissues. A decreased lateral thermal injury (<1.5 mm) at the surgical site is translated into decreased postoperative pain.

Dejan et al compared mean pain score between MMH and HSH on first, second and seventh day after surgery.[9] They concluded that Harmonic Scalpel® hemorrhoidectomy, due to less thermal damage, statistically significantly reduced postoperative pain with better hemostasis, compared with Milligan-Morgan's method of treating hemorrhoidal disease.

Armstrong et al randomized fifty consecutive patients into two groups: Harmonic Scalpel® and electrocautery hemorrhoidectomy.[14] Pain was assessed using a visual analog scale preoperatively and on postoperative Days . Twenty-four-hour narcotic usage (Hydrocodone, 10 mg) was recorded on postoperative Days. Pain in the Harmonic Scalpel® hemorrhoidectomy group was significantly less than in electrocautery patients on each postoperative day studied. Analgesic requirements were also significantly less in the Harmonic Scalpel® group on Days 1, 2, 7, and 14. There was no correlation between postoperative pain and grade of hemorrhoid.

In another study,Armstrong et al performed 500 consecutive cases of Harmonic Scalpel® hemorrhoidectomy. He concluded that it is a safe and effective surgical modality. Although the incidence of postoperative hemorrhage compares very favorably with previous large studies, the surgical defects should be closed to minimize the risk, and postoperative Toradol® administration should be limited to 24-hour to 48-hour usage.[14]

Talha et al compared Ligasure, HS and conventional hemorrhoidectomy. The median operative time was 8 min (range, 7–18) for the Ligasure and Harmonic Scalpel® groups and 18 min (range, 15–21) for the diathermy group (P < 0.001). Throughout the first post-operative week, the daily median pain score was lower in the Ligasure and Harmonic Scalpel® groups than in the diathermy group (p <0.001). The median number of analgesic ampoules during the first 24 h postoperatively was lower in the Ligasure and Harmonic Scalpel® groups (p < 0.001).[15]

Ramadan et al compared 54 consecutive cases between Harmonic Scalpel® and Milligan Morgan Hemorrhoidectomy, in his study duration of surgery was significantly higher in the MM group (p<0.0001). Postoperative hospitalization was longer in the MM group (p<0.0001), and the pain degree was higher in MM group (p<0.0001). No significant difference was noted in the overall amount of analgesics used in the two groups at week 1, although it was significantly higher in the MM group 2 and 3 weeks after the operation.[10]

Ozer et al compared HS and classical method using open and closed hemorrhoidectomy techniques. They randomized into open HS (n= 22), closed HS (n=22), Milligan Morgan (n=22), and Ferguson (n=21) hemorrhoidectomy. Patients were evaluated for operation time, postoperative pain, bleeding, and analgesic consumption. Bleeding volume was significantly lower in Groups I-II (p<0.001). Operation time was significantly shorter in Group I (p<0.001). Postoperative pain and pain at the time of first defecation, was significantly lower in Groups I-III (p<0.001) compared with the other 2 groups and lower during days 2-6 in Group I compared to the Group III (p<0.004). Visual Analogue Scale results were similar in Groups II and IV. Analgesic consumption in Groups I-III was significantly lower than Groups II-IV (p<0.001). Oral consumption of analgesic during 2nd& 5thpostoperative days was lower in Group I than in Group III (p<0.007) and similar in closed hemorrhoidectomy group.[16]

In another study, Tsunoda et al compared a novel technique of Doppler-guided transanal hemorrhoidal dearterialization and mucopexy (THD surgery) with Harmonic Scalpel® Hemorrhoidectomy. They observed that the pain scores were significantly lower in the THD patients on days 6 and 7 after the operation. The number of analgesic tablets consumed during the first postoperative week in the THD patients was significantly lower than that in the US patients. The blood loss was significantly greater in the THD patients. The hospital stay and length of time until the first defecation after surgery were both significantly shorter in the THD patients.[1]

Conclusion

1. Harmonic Scalpel® Hemorrhoidectomy is a safe and quick procedure for Grade III and IV hemorrhoids with relatively less post-operative pain as compared to conventional Milligan Morgan procedure.
2.In comparison to recent and novel techniques like Ligasure and Doppler-guided transanal hemorrhoidal dearterialization, HS offers similar outcomes.

References

1. Lohsiriwat V. Hemorrhoids: From basic pathophysiology to clinical management. World J Gastroenterol. 2012; 18(17): 2009-17.
2. Song SG, Kim SH. Optimal treatment of symptomatic hemorrhoids.J Korean SocColoproctol. 2011 ; 27(6):277-81.
3. Li YD, Xu JH, Lin JJ, Zhu WF.Excisional hemorrhoidal surgery and its effect on anal continence.World J Gastroenterol. 2012;18(30):4059-63.
4. Haveran LA, Sturrock PR, Sun MY, McDade J. Simple harmonic scalpel hemorrhoidectomy utilizing local anesthesia combined with intravenous sedation: a safe and rapid alternative to conventional hemorrhoidectomy.Int J Colorectal Dis. 2007 ;22(7):801-06.
5. Zorcolo L, Giordano P, Zbar AP, Wexner SD, Seow-Choen F. The Italian Society of Colo-Rectal Surgery Annual Report 2010: an educational review.Tech Coloproctol. 2012 ; 16(1):9-19.
6. Gibbons CP, Bannister JJ, Read NW.Role of constipation and anal hypertonia in the pathogenesis of haemorrhoids.Br J Surg. 1988 ; 75(7):656-60.
7. Hulme-Moir M, Bartolo DC.Hemorrhoids.GastroenterolClin North Am. 2001 ; 30(1):183-97.
8. Mosley JG, Galland RB, Saunders JH, Spencer J.Haemorrhoids--objective measurement of proctoscopic appearances.Postgrad Med J. 1980 ; 56(651):30-33.
9. Ivanov D, Babović S, Selesi D, Ivanov M.Harmonic Scalpel hemorrhoidectomy: a painless procedure?Med Pregl. 2007 ; 60(9-10):421-26.
10. Ramadan E, Vishne T, Dreznik Z.Harmonic scalpel hemorrhoidectomy: preliminary results of a new alternative method.Tech Coloproctol. 2002 ; 6(2):89-92.
11. Khan S, Pawlak SE, Eggenberger JC, Lee CS.Surgical treatment of hemorrhoids: prospective, randomized trial comparing closed excisional hemorrhoidectomy and the Harmonic Scalpel technique of excisional hemorrhoidectomy.Dis Colon Rectum. 2001 ; 44(6):845-49.
12. Armstrong DN, Frankum C, Schertzer ME.Harmonic scalpel hemorrhoidectomy: five hundred consecutive cases.Dis Colon Rectum. 2002 ; 45(3):354-59.
13. Tsunoda A, Sada H, Sugimoto T, Kano N, Kawana M. Randomized controlled trial of bipolar diathermy vsultrasonic scalpel for closed hemorrhoidectomy.World J Gastrointest Surg. 2011 27; 3(10): 147-52.
14. Armstrong DN, Ambroze WL, Schertzer ME, Orangio GR.Harmonic Scalpel vs. electrocautery hemorrhoidectomy: a prospective evaluation.Dis Colon Rectum. 2001; 44(4):558-64.
15. Talha A, Bessa S, Wahab MA. Ligasure, Harmonic Scalpel versus conventional diathermy in excisional haemorrhoidectomy: a randomized controlled trial. ANZ J Surg. 2014 ;87(4): 252–56.
16. Ozer MT, Yigit T, Uzar AI, Mentes O, Harlak A. A comparison of different hemorrhoidectomy procedures.Saudi Med J. 2008; 29(9):1264-69.
17. Tsunoda A, Kiyasu Y, Fujii W, Kano N.Comparison of the early results of transanal hemorrhoidal dearterialization and hemorrhoidectomy using an ultrasonic scalpel.Surg Today. 2015 ; 45(2):175-80.