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# Harmonic scalpel haemorrhoidectomy: An alternative to conventional open Milligan Morgan method of haemorrhoidectomy

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**Abstract**
Excisional haemorrhoidectomy remains the gold standard for the management of symptomatic grade III and grade IV haemorrhoids. No standardised technique for the procedure has gained widespread acceptance due to post-operative pain. In this prospective randomised study, we aimed to compare the results of Harmonic scalpel haemorrhoidectomy with conventional open Milligan Morgan haemorrhoidectomy in the surgical treatment of symptomatic grade III and grade IV haemorrhoidal disease.
**Methods:** 72 patients with symptomatic grade III and grade IV haemorrhoids were admitted and randomised into two groups: 1. Harmonic Scalpel haemorrhoidectomy (HSH) or 2. Open Milligan-Morgan haemorrhoidectomy (MMH). The outcomes were measured on the basis of operative duration, blood lost during surgery, post-operative Visual Analog Scores (VAS) of the patient, length of hospital stay and complications, both early and late.
**Results:** Baseline patient demographics (mean age, gender-based distribution, haemorrhoidal grade and symptoms) were similar in both the groups. But the mean operative time in HSH group and MMH group was 13.12±2.67 min and 24.12±2.18 min respectively and blood lost was 14.67±2.04 mL and 38.48±5.13 mL respectively. The average VAS of the patients of the HSH group was 4.47±0.78, 3.67±0.55, 1.13±0.035 and for the MMH group was 7.3±0.77, 5.9±0.84, 1.57±0.77 on day 1, day 2, and day 14 respectively. 17 patients who developed complications were managed conservatively.
**Conclusion:** Harmonic scalpel haemorrhoidectomy is a safe, and fast alternative for the surgical management of grade III and grade IV haemorrhoids. It effectively minimises post-operative bleeding and pain and has a lesser complication rate when compared to open Milligan Morgan haemorrhoidectomy.

**Keywords:** harmonic scalpel, haemorrhoidectomy, Milligan-Morgan haemorrhoidectomy, postoperative pain

## Introduction

Many a theory have been coined regarding the etiopatho genesis of hemorrhoidal disease including impaired venous drainage, dietary patterns, behavioural factors, conditions promoting vascular cushion prolapse are commonly believed to contribute towards exacerbated symptoms. While a long list of conditions has been suggested, venous congestion with subsequent hypertrophy of the internal haemorrhoids is implicated in symptomatic disease. The patients often present with complaints of bleeding per rectum, swelling or prolapse of the rectal mucosa. Pain is often only associated with complications like infection or thrombosis of the piles.

While the exact incidence of hemorrhoidal disease is extremely difficult to accurately assess, it is estimated that in India, over 40 million people suffer from haemorrhoids Approximately 1 million new cases are reported annually, 47 per 1000, with the incidence increasing with age. The usually affected age group is 45-65 years [2, 3].

Around 5-10%, of the symptomatic patients requires a formal excision or operative hemorrhoidectomy following failed non-operative management.

Most patients only require lifestyle modifications and conservative medical management. Increased dietary fibre and fluid intake, use of bulk-forming agents, the addition of stool softeners, reduced straining while defaecating and altered toileting behaviour and use of Sitz baths have reported ameliorating symptoms in most cases. Medical therapy with phlebotonics, including calcium dobesilate have been widely studied and have greatly reduced the need for surgery in many patients with grade 2 and even grade 3 disease. Only about 5% of patients require surgical management after the failure of medical therapy and even office procedures like rubber band ligation and injection sclerotherapy.

The two most frequently utilized procedures are the closed Ferguson hemorrhoidectomy and the open Milligan-Morgan hemorrhoidectomy. Despite being the most effective treatment options, severe postoperative pain has been associated with the procedure [4]. Other complications include postoperative bleeding, anal stenosis, and incontinence.

Harmonic Scalpel is an alternative method of tissue dissection that uses ultrasonic energy to cut tissue as well as arrest bleeding. The high-frequency ultrasonic energy used disrupts the protein hydrogen bond, thus dividing the tissue. The relatively lower temperature generated results in a minimal lateral thermal injury resulting in decreased post-operative pain

and subsequent lower analgesic need and faster recovery, shorter hospital stay and faster return to work. [5] A hemorrhoidectomy using an ultrasonic scalpel several advantages, including lesser damage to the tissues, better haemostasis, less stimulation to the neuromuscular tissues, and local control of the surgical site. This study aims at presenting Harmonic Scalpel hemorrhoidectomy as a viable alternative to conventional open Milligan Morgan hemorrhoidectomy.

## Patients and Methods

A prospective study was carried out at Silchar Medical College and Hospital for a period of two years (August 2016– July 2018) following clearance from the institutional ethical committee. After obtaining informed consent, 72 patients were operated upon for symptomatic grade 3 and 4 haemorrhoids. These were randomly selected to undergo Harmonic scalpel hemorrhoidectomy or conventional open Milligan Morgan hemorrhoidectomy. All cases were done by the first author. Data was collected based on patient demographics, operative details, operative time, length of hospital stay, postoperative complications and time to return to normal activity. Patients with cirrhosis of the liver, inflammatory bowel disease, associated anal canal pathology like fissure or fistula, anal incontinence, immunosuppression, diabetes, pregnancy and those on anticoagulation were excluded from the study. Patients were followed up at 2 and 8 weeks after the operation. The measured outcomes included 1) operation time; 2) blood loss; 3) postoperative hospital stay; 4) pain score; 5) post defecation pain score; 6) postoperative complications, including anal stenosis and faecal or flatus incontinence.

## Surgical Technique

All patients underwent relevant preoperative investigations and were admitted to the hospital a day before the surgery. A glycerine enema was administered the night before the procedure and on the morning of the procedure and recommended prophylactic antibiotics were administered preoperatively.

Under spinal anaesthesia, the patients were placed in the lithotomy position. The positions of the haemorrhoids requiring management were determined using an anoscope.

Conventional open Milligan Morgan method of hemorrhoidectomy was performed by dissecting the haemorrhoid and ligating the vascular pedicle while preserving the underlying anal sphincter complex. The surgical wound was packed with a povidone iodine-soaked gauze.

Harmonic Scalpel hemorrhoidectomy was performed with the aid of a vascular forceps. The anodermal incision extending to the mucocutaneous junction was made using the harmonic scalpel. The haemorrhoidal tissue was excised from the pedicle to the apex region without damaging the internal sphincter. The haemorrhoidal mucosa and the blood vessel in the pedicle were coagulated using the ultrasonic scalpel. The surgical wound was packed using betadine-soaked gauze pack.

For postoperative pain control, each patient was administered intramuscular tramadol 50mg 2 doses 12 hours apart, followed by oral analgesics as required. The patients were advised Sitz bath three times a day and any incidences of postoperative bleeding or urinary retention were noted. The patients resting pain and the post defecation pain were recorded using a visual analogue scale (VAS). The patients were discharged the following day with oral antibiotics (Tab. Ofloxacin 200mg + Ornidazole 500mg, bd pc), analgesics (Tab. Paracetamol 500 mg sos pc) as required, and a stool softener. The patients were advised to continue Sitz baths three times a day.

The patients were followed up on the outpatient basis after 2 weeks and 8 weeks for any complaints of postoperative bleeding, the occurrence of anal abscess or gangrene, anal stenosis or stricturing, and faecal incontinence.

**Fig 1:** Instruments used for Harmonic Scalpel Haemorrhoidectomy

**Fig 2:** Excising haemorrhoids at 7 o clock position

## Data collection

The following data was collected from the patients through a preformed questionnaire and proforma after obtaining proper consent for participation in the study. Intraoperative time and intraoperative blood loss were recorded. Postoperative pain was evaluated in the immediate postoperative period every day till the day of discharge. A visual analogue scoring system was used to assess the pain score with scores of 0 to 10 representing various degrees of pain. The length of hospital stay was recorded. The patients were followed up at 2 weeks and 8 weeks in the OPD. Post-operative complications were recorded, including bleeding, urinary retention, anal itching, oedema or wound site infection.

## Observations and Results

The study was conducted in the Department of General Surgery at Silchar Medical College and Hospital, Silchar. The study included 72 patients of which 52 were male and the rest were females. Thirty nine patients underwent Harmonic scalpel hemorrhoidectomy while the rest underwent conventional hemorrhoidectomy. The gender-based ratio of patients

undergoing Harmonic scalpel hemorrhoidectomy was M: F= 31:8, and 21:12 in the conventional hemorrhoidectomy group. The baseline characteristics of both the group of patients are presented in Table 1. Most of the patients presented with complaints of bleeding per rectum (95.77%) and mass per rectum (59.15%) while painful defaecation and constipation
Were present in 21.12% and 9.85% respectively.
The average operative time for the Harmonic scalpel group and the Conventional open group was 13.12 minutes and 24.12 minutes respectively. The intraoperative blood loss was more in the case of open hemorrhoidectomy patients. The length of hospital stay was considerably longer in the open group. The postoperative pain, recorded using the VAS scale was also noted to be more in the open group. (Table 2).

**Table 1:** A comparision of the patient characteristics of both the groups.

| | HSH | MMH |
|---|---|---|
| Age | 43.21±15.57 | 46.03±13.45 |
| Sex (M:F) | 31:8 | 21:12 |
| Stage (3/4) | 20/19 | 19/14 |

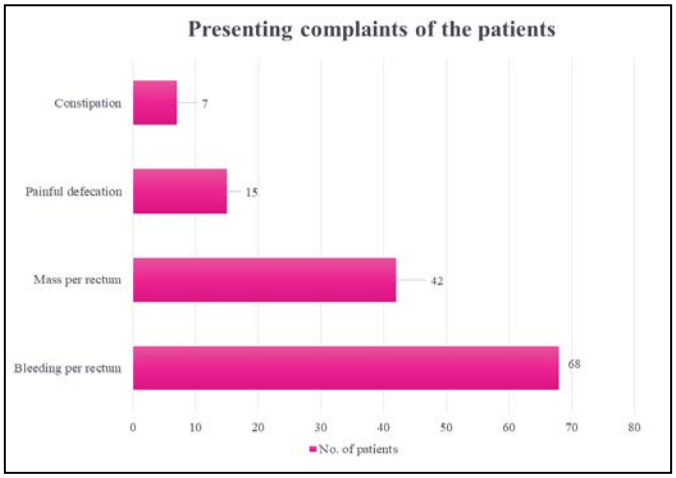


**Fig 3**

**Table 2:** A comparison of the operative timing and postoperative pain scores of both the groups

| | HSH | MMH | *p* value |
|---|---|---|---|
| OT duration | 13.12±2.67 | 24.12±2.18 | P<.00001 |
| Intraoperative blood loss | 14.67±2.04 | 38.48±5.13 | *P<.00001* |
| Length of hospital stay | 2.15±0.43 | 4.18±0.46 | P<.00001 |
| D1 | 4.47±0.78 | 7.3±0.77 | *p<0.00001* |
| D2 | 3.67±0.55 | 5.9±0.84 | *p<0.00001* |
| Post defecation | 4.43±0.5 | 6.6±0.94 | *p<0.00001* |
| D14 | 1.13±0.035 | 1.57±0.77 | *p<0.037* |

**Table 3:** A comparison of the various complications seen in both the procedures.

| | MMH | HSH | Total |
|---|---|---|---|
| Bleeding | 6 | 0 | 6 (8.45%) |
| Retention | 4 | 1 | 5 (7.04%) |
| Faecal impaction | 1 | 0 | 1(1.40%) |
| Surgical site infection | 4 | 1 | 5 (7.04%) |
| Incontinence | 1 | 0 | 1 (1.40%) |
| Delayed wound healing | 6 | 0 | 6 (8.45%) |

In the early post-operative period, 6 patients in the MMH group developed post-operative bleeding, of which only one patient required blood transfusion. Rest were minor bloods which were managed conservatively. None of the patients in the HSH group developed post-operative bleeding. Five patients developed urinary retention requiring urinary catherization, of which 4 were of the MMH group. A single patient of the MMH group required manual evacuation for faecal impaction.
On follow up at 2 weeks, 5 patients had surgical site infection, 4 of which were of the MMH group and 6 patients of the MMH group had unhealed wounds even at 2 weeks. A single patient of the HSH group developed surgical site infection.
At 8 weeks, only one patient who had undergone open Milligan Morgan haemorrhoidectomy had developed incontinence.
On further follow up, none of the patients in our study had developed anal stenosis or strictures.

## Discussion

Surgery remains the main modality of treatment for grade III and IV haemorrhoidal disease and grade II disease that is unresolved on conservative management. While a variety of surgical modalities exist for treatment, traditional excisional hemorrhoidectomy remains the gold standard procedure. While stapled hemorrhoidopexy, using a circular stapler, was associated with lesser postoperative pain and was considered less invasive, a study from Lancet demonstrated a better quality of life among the hemorrhoidectomy group due to lesser postoperative recurrence and revisits to the hospital. [7, 8] The cost-effectiveness of stapler hemorrhoidopexy has also been questioned.
Excisional hemorrhoidectomy was considered to be one of the most painful procedures in surgical practice despite being frequently performed. A traditional Milligan Morgan open hemorrhoidectomy and a Ferguson closed hemorrhoidectomy have both been described as effective for disease management. Post-operative pain and the ensuing complications were a major cause of patient dissatisfaction. Therefore, various techniques have been tried and are being developed with the sole aim of easing postoperative pain and thus easing patient discomfort. Various advancements have been made in the energy sources used to cut the tissue and to control bleeding. And these new surgery devices and developments have been applied to haemorrhoid surgery to reduce the post-operative pain [8, 9].
The Harmonic scalpel is an ultrasonically activated device that uses these high-frequency vibrations to cut and coagulate soft tissue. The wave of ultrasonic motion is transferred to the blade extension and the motion is amplified and is sometimes referred to as a harmonic wave. The activated blade can vibrate longitudinally 55,500 cycles per second. This blade vibration induces cavitation and vaporisation of the cellular fluid causing precise dissection and coaptation due to application of the jaw pressure seals tissue using mechanical friction and pressure.
The device can cut and coagulate vessels up to 7 mm while functioning at a temperature of less than 100 C. When compared to an electrosurgical cautery device, the lower temperatures generated caused minimal thermal spread (<2 mm) [10]. This limited spread reduces anal spasms which combined with the simultaneous vessel sealing action of the Harmonic scalpel also reduces the intraoperative blood loss while compared to

traditional devices like blades and scissors. This bloodless field, in turn, improves the surgical view and improves the safety of the procedure with a lowered risk of infection and faster wound healing. This combined with the less tissue charring and decreased thermal injury cause lower postoperative pain.

The findings of several previous studies were corroborated by the present study with a significantly shorter operative time (13.12 min vs 24.12 min) and intraoperative blood loss () in the harmonic scalpel group when compared to the conventional open group respectively [11, 12, 13, 14]. None of the patients in the Harmonic scalpel group experience major post-operative bleeding; but patients in the conventional open study group experience post-operative bleeding and experienced minor bleeding. Patients of the conventional open group required urinary catheterization.

Postoperative pain is the most disturbing complication of an open hemorrhoidectomy. Harmonic scalpel by decreasing the lateral thermal damage and obliterating the need for suture closure for hemostasis contributes to reduced postoperative pain and faster recovery. Though Tsunoda A *et al* [15] reported no significant difference in the postoperative pain after bipolar diathermy hemorrhoidectomy and ultrasonic hemorrhoidectomy and another study conducted by Kwok *et al* [16] demonstrated decreased postoperative pain in patients with bipolar diathermy hemorrhoidectomy than ultrasonic scalpel hemorrhoidectomy, this study demonstrated a significant reduction in both postoperative static pain and post defaecation pain among the patients studied. The reduced length of hospital stay and faster recovery can be attributed to the decreased post-operative pain among the patients. None of the patients in either group developed postoperative wound site infection.

The patients were discharged a day after the passage of bowel movement with the advice to continue regular Sitz baths three times a day and were asked to follow up after 14 days and the end of 8 weeks. While the postoperative pain score improved in both groups at POD 14, the Harmonic scalpel group still fared better than the open group of patients () at the VAS scale based pain scoring.

In the present study, none of the patients developed postoperative complications of recurrence, anal strictures or anal incontinence, perineal abscess or sepsis.

## Conclusion

The use of ultrasonic scalpel for grade 3 or 4 hemorrhoidectomy considerably reduces the operative time, intraoperative blood loss and postoperative pain when compared to an open hemorrhoidectomy. The procedure is quick, has a steeper learning curve, relatively safe without any serious complications. The duration of hospitalization was markedly reduced which in turn meant a faster return to work. To conclude, Harmonic scalpel is a safe, cost-effective, relatively painless alternative to the traditional hemorrhoidectomy methods.

## Reference


1. Dennison AR, Whiston RJ, Rooney S, Morris DL. The Management of hemorrhoids. Am J Gastroenterol. 1989; 84(5):475-81.
2. Bleday R, Pena JP, Rothenberger DA, Goldberg SM, Buls JG. Symptomatic hemorrhoids: current incidence and complications of operative therapy. Dis Colon Rectum. 1992; 35(5):477-81.
3. Yeo D, Tan KY. Hemorrhoidectomy - making sense of the surgical options. World J Gastroenterol. 2014; 20:16976-16983. [PMID: 25493010]
4. Armstrong DN, Ambroze WL, Schertzer ME, Orangio GR. Harmonic Scalpel_ vs. electrocautery hemorrhoidectomy: a prospective evaluation. Dis Colon Rectum. 2001; 44(4):558-64.
5. Chung CC, Ha JP, Tai YP. *et al*. Double-Blind, Randomized Trial Comparing Harmonic Scalpel™ Hemorrhoidectomy, Bipolar Scissors Hemorrhoidectomy, and Scissors Excision. Dis Colon Rectum. 2002; 45:789-794. https://doi.org/10.1007/s10350-004-6299-5
6. Watson AJ, Hudson J, Wood J. *et al*. Comparison of stapled haemorrhoidopexy with traditional excisional surgery for haemorrhoidal disease (eTHoS): a pragmatic, multicentre, randomised controlled trial. Lancet. 2016; 388:2375-85.
7. Lin G, Ge Q, He X, Qi H, Xu L. A novel technique for the treatment of stages III to IV hemorrhoids: Homemade anal cushion suspension clamp combined with harmonic scalpel. Medicine (Baltimore). 2017; 96(26):e7309. Doi: 10.1097/MD.0000000000007309
8. Abo-hashem AA, Sarhan A, Aly AM. Harmonic Scalpel compared with bipolar electro-cautery hemorrhoidectomy: a randomized controlled trial. Int J Surg. 2010; 8:243-7.
9. Sayfan J, Becker A, Koltun L. Sutureless closed hemorrhoidectomy: a new technique. Ann Surg. 2001; 234:21-4.
10. Jayne DG, Botterill I, Ambrose NS, Brennan TG, Guillou PJ, O' Riordain DS. *Et al*. Randomized clinical trial of Ligasure versus conventional diathermy for day-case haemorrhoidectomy. Br J Surg. 2002; 89:428-32.
11. Bulus H, Tas A, Coskun A, Kucukazman M. Evaluation of two hemorrhoidectomy techniques: harmonic scalpel and Ferguson's with electrocautery. Asian J Surg. 2014; 37:20-3.
12. Gentile M, De Rosa M, Carbone G, Pilone V, Mosella F, Forestieri P. LigaSure haemorrhoidectomy versus conventional diathermy for IV-degree haemorrhoids: is it the treatment of choice? A randomized, clinical trial. ISRN Gastroenterol. 2011; 2011:467-258.
13. Milito G, Cadeddu F, Muzi MG, Nigro C, Farinon AM. Haemorrhoidectomy with Ligasure vs conventional excisional techniques: meta-analysis of randomized controlled trials. Colorectal Dis. 2010; 12:85-93.
14. Lim DR, Cho DH, Lee JH, Moon JH. Comparison of a Hemorrhoidectomy with Ultrasonic Scalpel versus a Conventional Hemorrhoidectomy. Ann Coloproctol. 2016; 32(3):111-116. doi:10.3393/ac.2016.32.3.111
15. Tsunoda A, Sada H, Sugimoto T. *et al*. Randomized controlled trial of bipolar diathermy vs ultrasonic scalpel for closed hemorrhoidectomy. World J Gastrointest Surg. 2011; 3(10):147-152. doi:10.4240/wjgs.v3.i10.147
16. Kwok SY, Chung CC, Tsui KK, Li MK. A double-blind, randomized trial comparing Ligasure and Harmonic Scalpel hemorrhoidectomy. Dis Colon Rectum. 2005; 48:344-348.