

Comparison of Ultrasonic (Harmonic Scalpel) Hemorrhoidectomy versus Milligan-Morgan Hemorrhoidectomy for Hemorrhoidal Disease

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ABSTRACT

Background: Surgical excision using the Harmonic Scalpel is a modern technique for symptomatic third- and fourth-degree hemorrhoids. The resulting mucosal defect is then left open.

Objectives: The purpose of this study was to compare techniques of hemorrhoid excision using the Harmonic Scalpel versus the routine Milligan-Morgan technique.

Methods: From August 2017 to May 2018, 30 patients underwent surgical excision of complex grade III or grade IV hemorrhoids via the Harmonic Scalpel another 30 patients operated with the traditional Milligan-Morgan technique. Data collected about patient clinical condition and perioperative details including operative time and blood loss then post-operative acute pain and delayed pain and other complications then the quality of life after returning to routine life including degree of satisfaction of the patients were recorded in a master sheet and short form survey for documentation and statistical analysis.

Results: Both groups were comparable in terms of patient demographics and type of anesthesia. There were no late complications. Mean follow-up was 4.9 (range, 4–6) months. Conclusion: hemorrhoidectomy with Harmonic Scalpel significantly reduces perioperative time, blood loss and thus postoperative pain, without diminishing quality of life.

Keywords : Harmonic Scalpel- Milligan-Morgan- hemorrhoidectomy.

INTRODUCTION

Hemorrhoids (piles) arise from congestion of internal and/or external vascular plexuses around the anal canal. Depending on the severity, they are classified into 4 degrees. In many cases hemorrhoidal disease can be treated by dietary modifications, topical medications and soaking in warm water, which temporarily reduce symptoms of pain and swelling. Additionally, painless non-surgical methods of treatment are available to most patients as a viable alternative to a permanent hemorrhoid cure. In a certain percentage of cases, however, surgical procedures are necessary to provide satisfactory long-term relief⁽¹⁾.

Surgical hemorrhoidectomy is a notoriously painful procedure. Considerable research over the last two decades has concentrated on reducing pain following these surgical procedures. Investigators have concentrated in three areas; analgesic delivery during the postoperative period, modification of the surgical technique and the use of a variety of surgical instruments in the hope of decreasing postoperative pain⁽²⁾.

The rationale for the use of Harmonic scalpel® in hemorrhoidectomy is relatively low temperature that divides the tissues through the high frequency ultrasonic energy that disrupts protein hydrogen bonds. The relatively low temperature (80 °C) yielded results in minimal lateral thermal injury (<1.5 mm). On the contrary, both electrocautery and laser cause significant lateral thermal injury and burn several

millimeters in depth. This difference causes less postoperative pain and decreases the need for narcotic use^(3,4).

In this study we presented our experience in using Harmonic scalpel® in hemorrhoidectomy and evaluating the postoperative complications in comparison to the use of electrocautery.

METHODS

A prospective randomized trial comparing Harmonic Scalpel® hemorrhoidectomy and electrocautery sixty consecutive patients were randomized into two groups: Harmonic Scalpel® and electrocautery hemorrhoidectomy. The indications included Grade III internal hemorrhoids with external components or Grade IV disease. Patients with additional anorectal pathology as fissure or fistula were excluded, as were patients with neurologic deficits, chronic pain syndrome, and those already on narcotic analgesics. Pain was assessed using a visual analog scale preoperatively and on postoperative Days 1, 2, 7, 14, and 28. Twenty-four-hour narcotic usage was recorded on postoperative Days 1, 2, 7. Postoperative analgesia took three forms: oral, intramuscular, and topical. All patients were prescribed oral naproxen sodium 550 mg twice a day. Patients were allowed to omit the oral analgesia if not required. All patients were also offered intramuscular injections of pethidine (according to body weight) as necessary while they were still in the hospital. Patients were given 2 percent lidocaine

jelly (10 ml per tube) and were instructed to apply it topically as required. Patients were instructed to chart the average daily amount of pain for 10 days from the day of surgery. Pain was scored on an analog scale from zero to ten. Zero represented a pain-free state, whereas ten represented the worst pain the patient had ever experienced. The amount of analgesia used was also recorded for the same period of time. Patients were followed up at one and twenty weeks after surgery. The occurrence of complications such as bleeding, strictures, and excessive discharge from the wound was documented in each case.

Ethical approval

The study had been previously approved by the Research Ethics Committee of Al-Azhar University. Informed consents were obtained from all patients.

RESULTS

All results were expressed as the median and range of values. Statistical analysis was performed with the chi-squared test. Group A (diathermy hemorrhoidectomy) consisted of 30 patients whose median age was 44 (range, 20-66) years old. Group B (hemorrhoidectomy with the Harmonic Scalpel ®) comprised 30 patients with median age of 43 (range, 25-75) years old. There was no statistical difference in gender and age distributions between the two groups. The duration of surgery was 10 (range, 3-15) minutes for Group A and 10 (range, 5-25) minutes for Group B. The length of stay postoperatively was one day for both groups. The median number of pethidine injections required for both groups was zero. In group A, 22 patients required no injections, and 3 patients required 1 injection. In Group B, 27 patients required no injections, 2 patients required 1 injection, and 1 patient required 2 injections. The median number of oral naproxen sodium tablets consumed was 13 (range, 1-26) by patients in Group A and 14 (range, 2-28) by patients in Group B. There was little statistical difference in the number of analgesics taken by patients in both groups. The median

number of tubes of lidocaine jelly used was 4 (range, 0-6) by Group A and 3 (range, 1-7) by Group B patients. There was no significant difference in the amount of lidocaine jelly used by both groups. The median pain scores for both groups of patients were shown in table 1.

Table (1): Pain scores for the two groups of patients underwent hemorrhoidectomies

Day of surgery	Group A	Group B
1 st postoperative day	7	5
2 nd postoperative day	6	4
3 rd postoperative day	6	4
4 th postoperative day	6	3
5 th postoperative day	5	3
6 th postoperative day	4	2
7 th postoperative day	3	1

There was statistical difference in severity of postoperative pain between the two groups. Other postoperative complications were also reported as plotted in table 2. Incidence of postoperative bleeding was nearly comparable in both groups. Only one patient in group A had primary hemorrhage and was managed in the usual way. Post-hemorrhoidectomy urine retention was markedly less in group (B) (only 2 out of 30 patients) while in Group (A) it occurred in 5 patients that was found statistically significant (P -value < 0.05). Again, no difference was found between both groups regarding wound infection and major short-term incontinence.

Table (2): Percentage of common complications for hemorrhoidectomy

complication	Group A	Group B
Hemorrhage (Pri)	3.30%	0
Urine retention	15%	6.50%
Incontinence	0	3.30%
Fissure	6.50%	13%
Anal stenosis	10%	3.30%
Infection –fistula	0	0
recurrence	3.30%	3.30%

DISCUSSION

Surgical hemorrhoidectomy is generally reserved for symptomatic Grade III internal hemorrhoids with prominent external ones or for grade IV disease. For internal hemorrhoids alone (grade I, II and III) less invasive fixation procedures were appropriate. These include rubber band ligation, cryoablation and infra-red coagulation. Such fixation procedures can be done in the office, requiring little if any time-off work and are much less painful than surgical

procedures. If the fixation procedure is attempted in the presence of external component of hemorrhoids, the resultant venous congestion produces painful engorgement of this external component which frequently requires urgent surgical hemorrhoidectomy. Therefore, and from the start, grade III internal hemorrhoids with prominent external ones and grade IV disease are clear indications for surgical hemorrhoidectomy^(5, 6, 7). The obvious disadvantage of surgical hemorrhoidectomy is the postoperative pain resulting from the surgical raw area in the sensitive perianal skin and the anoderm. Much of this discomfort arises from the thermal injury induced by the electrocautery or laser machines⁽⁸⁾.

The Harmonic Scalpel[®] has 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⁽⁹⁾. The difference in the degree of lateral thermal damage that occurs when using either mono- or bi-polar electrocautery is due to the fact that bipolar system places the tissue between two electrodes allowing the current to pass from one electrode to the other without excessive spread laterally. This is not the case when using mono-polar system where the current has to pass from the active electrode to the ground through the ground pad causing much more lateral spread⁽¹⁰⁾.

In the current study, we avoided many potential confounders by standardizing many variables. Starting with choice of the patients, we excluded patients with other anorectal pathology and patients with neurological defects or chronic pain syndromes and those currently taking narcotic analgesics. This gave us the advantage of avoiding variation in the results of pain assessment. Also, we fixed our patient selection to those having symptomatic grade III internal hemorrhoids with prominent external ones and grade IV disease. Regarding the surgical technique we adopted the open method to avoid the debate around the effect of using the closed technique on postoperative pain perception and also we used standard technique of spinal anesthesia.

This study clearly demonstrates the superior pain control profile of Harmonic Scalpel[®] in hemorrhoidectomy and also the less need for analgesics, both narcotic and NSAIDs. **Armstrong et al.**⁽⁴⁾ published a similar study but they used both open and closed techniques in hemorrhoidectomy in their series. In our opinion, this was a potential flaw in their study, although it did not affect their final conclusion. This was the reason we standardized the technique to the open

one to avoid such flaw. The same study was done by **Armstrong et al.**⁽⁴⁾ used the narcotic analgesics (NA) for the whole period of postoperative follow up. We believed that long term use of such NA may lead to habituation or even drug addiction. So, we replaced the NA from the third day on by using diclofenac sodium (DS) for the rest of the period of postoperative follow up. In addition to the finding mentioned before regarding the significantly reduced dose of both NA and DS in the Group A (Harmonic Scalpel[®] group) in comparison to Group B (Miligian Morgan technique), it was quite adequate to use pethidine for the first three postoperative days only, then to continue after that by DS either by intramuscular injection or through the oral route for adequate pain control.

Chung et al.⁽¹¹⁾ reported that Harmonic Scalpel[®] hemorrhoidectomy was as good as bipolar scissors hemorrhoidectomy in terms of reduced blood loss. But, Harmonic Scalpel[®] hemorrhoidectomy was superior because it was associated with less postoperative pain and hence, better patient satisfaction. However, these observed benefits were small and the time-off work to regain normal activity remained similar. Also, **Tan et al.**⁽¹²⁾ mentioned that hemorrhoidectomy by Harmonic Scalpel[®] was comparable to diathermy hemorrhoidectomy in terms of postoperative pain and complications. In this study, this was not the case, as there was significantly reduced postoperative pain, better hemostasis and less analgesic consumption. These results were positively correlated with the time needed to return to work which was found to be much faster in Harmonic scalpel[®] group. This might be explained by the growing learning curve of using the Harmonic Scalpel[®] in such type of surgery and better healing rates following its use⁽¹³⁾. Meanwhile, this study yielded comparable results to those of **Ivanov et al.**⁽¹³⁾ and **Ozer et al.**⁽¹⁴⁾ who mentioned that Harmonic scalpel[®] hemorrhoidectomy statistically significantly reduced postoperative pain, induced better hemostasis and less analgesic consumption⁽¹⁴⁾.

With respect to the postoperative analgesic dose, it was clearly evident in this study that within the first three postoperative days, the mean dose of narcotic analgesia used was significantly reduced in Harmonic scalpel group. After that, from day 4 to day 14, the dose of Diclofenac Sodium used for analgesia, was much less in Harmonic scalpel[®] group also. This was considered different from those mentioned by **Ramadan et al.**⁽¹⁵⁾. They mentioned that there

was no significant difference noted in the overall amount of analgesics used in the two groups at week 1 but it was significantly lower in Harmonic Scalpel® group in the 2nd and 3rd weeks postoperatively. This difference may be attributed to the rapid rate of healing in the group of Harmonic scalpel and improvement in surgical training using such machine in hemorrhoidectomy.

Although the use of the Harmonic Scalpel® carries some disadvantages as prolonged learning curve and increased cost over the electrocautery hemorrhoidectomy. It carried several advantages. Reduced postoperative pain, reduced doses of NA and DS postoperatively, excellent hemostasis and reduced amount of vapor released during the procedure these were considered as great advantages. In addition, secondary to the reduced postoperative pain there was significantly reduced incidence of postoperative urine retention and finally reduced time-off work for patients of group A (Harmonic Scalpel hemorrhoidectomy group). So, and for all these merits we recommend using Harmonic scalpel® in hemorrhoidectomy surgery in patients with symptomatic grade III internal hemorrhoids in association with large external components and those with prolapsed, thrombosed grade IV hemorrhoids.

CONCLUSION

The study demonstrates significantly reduced postoperative pain after Harmonic Scalpel hemorrhoidectomy compared with electrocautery controls. The diminished postoperative pain in the Harmonic Scalpel group likely results from the avoidance of lateral thermal injury.

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