

Outcome of Harmonic Scalpel Hemorrhoidectomy in Comparison with Bipolar Diathermy

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ABSTRACT

Introduction: Hemorrhoidectomy using Harmonic Scalpel is another technique used for ablation of symptomatic third and fourth degree hemorrhoids. In comparison with bipolar diathermy, Harmonic Scalpel causes minimal thermal injury during hemorrhoidectomy with a minimal tissue defect after the procedure. The aim of this work is to evaluate the outcome of using Harmonic Scalpel in minimizing the incidence of postoperative complications following Hemorrhoidectomy. **Patients & Methods:** This study is a blind randomized controlled trial done at dar alshifa hospital and prince medical center, United Arab Emirates during the period from July 2014 to July 2016. 90 Patients underwent hemorrhoidectomy for grade III and IV hemorrhoids. They were divided into two groups: (A) Harmonic Scalpel Hemorrhoidectomy group and (B) Bipolar Electro-Cautery Hemorrhoidectomy group. Post-operative Pain and other postoperative complications were analyzed, informed written consent were signed by all cases involved in this study, together with approval of ethical comity. **Results:** Postoperative pain in Group (A) was markedly less than group (B) with less analgesia required and early recovery with rapid return to normal activity. There was no difference between both groups regarding other postoperative complications. **Conclusion:** Harmonic scalpel hemorrhoidectomy is a safe and effective procedure with minimal post-operative pain and rapid recovery with early return to normal activity in comparison with bipolar hemorrhoidectomy. This result occurred mostly due to minimal thermal tissue injury in comparison with bipolar hemorrhoidectomy.

Key words: Harmonic scalpel, bipolar, hemorrhoidectomy.

INTRODUCTION

Hemorrhoids is considered the most common benign condition observed by surgeons. Clinically diagnosed as painful, swollen veins in the lower portion of the rectum or anus ⁽¹⁾. Conservative management is mostly capable to cure early stages of the disease (Grade I and Grade II), late stage disease (Grade III and Grade IV) usually needs surgical intervention ⁽²⁾. Conventional hemorrhoidectomy, including open and closed techniques, is considered the gold standard for surgical treatment of hemorrhoids worldwide. Most of patients undergoing this procedure are totally minded by the post-operative morbidity commonly associated with the procedure as well as the late recovery. ⁽³⁾

Other surgical techniques using harmonic scalpel (HS) and bipolar diathermy (BD) for the hemorrhoidectomy procedure (third degree and fourth-degree) are preferred over the conventional methods ^(4,5,6).

The goal of the use of Harmonic scalpel in hemorrhoidectomy is its low produced

temperature that divides the tissues through the high frequency ultrasonic energy which disrupts the protein hydrogen bonds, it cuts and coagulates at the same time by using a frequency of 55.5 MHZ(8). The relatively low temperature (80 °C) results in minimal lateral thermal injury (1-3 mm). On the other side, both electrocautery and laser cause marked lateral thermal injury and several millimeters in depth. This difference in the size of tissue injury causes has an important role in reducing the postoperative pain and decreases the need for analgesic. ⁷ In this study, we represent our experience in using Harmonic scalpel in hemorrhoidectomy and assessing the postoperative complications in comparison to the use of bipolar electrocautery.

PATIENTS AND METHODS

In this study 90 patients were admitted complaining of 3rd and 4th degree hemorrhoids, procedures were done at Dar alshifa hospital and prince medical center, UAE, during the period of July 2014 till July 2016. Patients were

randomized in 2 groups, group (A) for the harmonic scalpel hemorrhoidectomy and group (B) is for the bipolar diathermy hemorrhoidectomy.

Inclusion criteria:

- Patients with 3rd degree hemorrhoids.
- Patients with 4th degree hemorrhoids.

The current article aims to compare the outcome of HS hemorrhoidectomy in comparison with BP hemorrhoidectomy as regards the operative time, postoperative pain, and postoperative complications such as bleeding, anal stenosis, and rate of wound infection were assessed as postoperative complications.

Patients included in this study were admitted on the same day of operation as it is considered a 1-day procedure. Patients were hospitalized for 1 day and discharged on the next day without complications after the operation. Parenteral sedation was the chosen analgesic procedure for all patients.

Technique:

Patients were placed in the lithotomy position. Anal dilatation was done and identification of the hemorrhoidal vessels was done using an anoscope. After dilatation of anal canal, identification of hemorrhoidal vessels was determined with an anoscope.

BP hemorrhoidectomy was done by bipolar forceps which started to excise hemorrhoidal vessel crossing above the fibers of the internal sphincter till we reach the pedicle of the hemorrhoids, transfixion of hemorrhoidal pedicle and approximation of mucosal edges of the wound defect using 3/0 absorbable suture.

HS hemorrhoidectomy was done by excision of hemorrhoid pedicle up to the apex site and avoid damage of the internal sphincter with the help of vascular clamp forceps which catch the hemorrhoid vessel till total excision done, no sutures needed for transfixion. Anal hemostatic pack was placed for both patient groups to ensure hemostasis.

Total analgesic needs of both patient groups were recorded after 1 day, 1 week, and 1 month. Pain was recorded on a visual analogue scale (VAS) on the same days. VAS above 40 was the maximum level for analgesics.

Operative time is defined as the time between the starting incision and complete excision of the hemorrhoid. Patients were monitored for early

and late complication during the outpatient clinic follow up visits.



Fig. 1: Third degree hemorrhoids.



Fig. 2: Third degree hemorrhoids.



Fig. 3: Harmonic scalpel hemorrhoidectomy.



Fig. 4: Surgical field after harmonic hemorrhoidectomy



Fig. 5: Bipolar hemorrhoidectomy

RESULTS

As regard the demographic data of patients, the mean age was 31.2 ± 5.4 for the HS group and 29.4 ± 6.3 for BP group. For the HS group 34 patients were males and 11 patients were females, however in the BP group 39 patients were males and 6 patients were females. The duration of

postoperative hospital stay in both groups was the same (1 day). HS patients group return back to their normal life activity earlier than those in the BP group. (8.3 ± 4.1 days vs. 13.2 ± 3.4 days)

As regard the operative time factor of the HS group vs the BP group was 17.6 ± 6.4 minutes and 21.3 ± 2.7 minutes respectively. The postoperative pain was recorded using the VAS scoring system done after 1 day, 1 week, 1-month for the HS group were 0.9 ± 0.4 , 6.2 ± 0.5 , 5.0 ± 0.6 , and for the BP group were 1.0 ± 0.7 , 7.2 ± 2.0 , 6.2 ± 2.1 ,

As regard postoperative complications recorded for both groups in the form of postoperative hemorrhage, anal abscess, anal stenosis, anal incontinence as a short term follow up after 1 week postoperatively and also after 1 month, there were no major comparable short term complications in both groups and no significant difference monitored.

	<i>HS group</i>	<i>BP Group</i>
Age	31.2 ± 5.4	29.4 ± 6.3
Male patients	34	39
Female patients	11	6
Operative time	17.6 ± 6.4 mins.	21.3 ± 2.7 mins.
Post operative hospital stay	0.8 ± 0.1	1.1 ± 0.2
Return to activity	8.3 ± 4.1	13.2 ± 3.4
Post operative pain	1 day 0.9 ± 0.4	1 ± 0.7
	1 week 6.2 ± 0.5	7.2 ± 2.0
	1 month 5.0 ± 0.6	6.2 ± 2.1

DISCUSSION

Bipolar hemorrhoidectomy is considered one of the accepted methods of surgical management of hemorrhoids, however this technique can't be considered as free of morbidity or have a shortened recovery period⁽⁹⁾

The lateral thermal effect of harmonic scalpel which is used for simultaneously cutting and coagulation ranges from 1 to 3 mm as it doesn't transfer the neuromuscular current, that's why the instrument is used over a wide range⁽¹⁰⁾. Depending on the cutting, coagulation technique, the harmonic scalpel gives an alert denoting that the surgical step is finished. however the intraoperative bleeding denoted during harmonic scalpel hemorrhoidectomy is considered minimal

and this gives a clear surgical field exposure, less operative time and minimal tissue damage with better convalescence, with minimal mucosal damage to the mucosa and faster wound healing, with less postoperative morbidity, and less pain.⁽⁸⁾

Bipolar diathermy as one of the accepted techniques for hemorrhoidectomy has a disadvantage, apart from the harmonic, in causing damage of the surrounding tissues due to remarkable current transferral, as well as insufficient vascular coagulation which leads to prolonged operative time as well as inadequate exposure of the field. however, still bipolar diathermy technique is considered more beneficial than the monopolar diathermy which is not in the consideration of this article.

In our study, in comparison with BP hemorrhoidectomy, HS hemorrhoidectomy has shorter operative time (17.6 ± 6.4 minutes and 21.3 ± 2.7 ; $p = 0.001$). as regard Postoperative complications, such as hemorrhage (1% vs. 1.2%; $p = 0.10$) and urinary retention (15.4% vs. 24.7%; $p = 0.05$), no remarkable difference between both groups, however all are a bit lower in the HS group. The postoperative hospital stays (0.8 ± 0.1 days vs. 1.1 ± 0.2 days; $p = 0.001$) was also lower in the HS group when compared with BPH group. Some other studies has demonstrated the percentage of residual piles of HS was 3.4% in comparison to 4.8% in the BPH group.⁹⁻¹¹ In our study, ratio of anal abscess, stenosis, and incontinence showed no recorded difference in both groups.

Also, at a 12 months' follow-up, no significant difference as regard recurrence between HS and BPH .Although there was no difference determined, longer term follow-up and more other patient series are needed.⁽¹²⁾

As it was recorded in other previous randomized studies, postoperative pain is felt at a maximum level in the first 24 hours and decreases later.¹² In our study not only early but also late postoperative pain was determined by VAS. The VAS pain scores at Day 0, Day 7, and Day 28 were lower in HS group (0.9 ± 0.4 , 6.2 ± 0.5 , 5.0 ± 0.6) than BPH group (1.0 ± 0.7 , 7.2 ± 2.0 , 6.2 ± 2.1) with respect to the cutting and coagulation mechanism simultaneously. Depending on these data, total analgesic use was maximum in first 24 hours and then decreased gradually, and was markedly lower in HS group than BPH group at postoperative Day 0, Day 7, and Day 28.^(12,13) As it was recorded previously, postoperative morbidity delays the wound healing time and return to normal life activity. The period for returning to work for patients who received BPH may be average 2 weeks. The Mean time of return to normal activity was shorter for the HS groups than for the BPH groups (8.3 ± 4.1 days vs. 13.2 ± 3.4 days, $p = 0.001$).⁽¹⁴⁾

CONCLUSION

HS hemorrhoidectomy is considered a preferred technique for surgical treatment of Grade III or Grade IV hemorrhoids. It is recorded to be a safe and effective method associated with minimal blood loss, less postoperative pain, and

less postoperative complications compared to BPH technique.

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