EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 6
Issue: 12
04-08
Year: 2019

COMPARISON IN OUTCOME BETWEEN HARMONIC SCALPEL AND CONVENTIONAL METHODS IN HEMORRHOIDECTOMY

[1]*Abdulaziz Abood Majeed, (M.B.Ch.B, C. A. B. S, F. I. B. M. S, D. G. S) and [2]Ziyad Tariq Abbas (M.B.Ch.B, H.D.G.S)

[1]Department of Surgery, Dhari Al Fayad Hospital, Baghdad.
[2]Department of Surgery, Al-Numan Teaching Hospital, Baghdad.

***Corresponding Author: Abdulaziz Abood Majeed**
Department of Surgery, Dhari Al Fayad Hospital, Baghdad.

Article Received on 25/08/2019 **Article Revised on 14/09/2019** **Article Accepted on 04/10/2019**

ABSTRACT

Background: Recently, efforts were made to find less painful and less complicated surgical methods for treatment of hemorrhoids. A variety of instruments used, including circular staplers, harmonic scalpels, lasers, and bipolar electrothermal devices. **Aim of study:** To compare the outcome of patients with grade III or IV disease who underwent hemorrhoidectomy using harmonic scalpel or conventional closed technique. **Patients and Methods:** Comparative prospective study included 60 patients underwent hemorrhoidectomy was conducted in the surgical unit, Department of Surgery, Al-Numan Teaching Hospital in Baghdad during a period of 18 months from 1st of Feb, 2018 – 31th Jul, 2019. They divided randomly into two equal groups: harmonic group treated by harmonic scalpel method and conventional group treated by conventional method. They were compared regarding Intra operative bleeding, operative time, postoperative pain, early postoperative complications, length of hospital stay, and duration to return to normal activity. Patients with thrombosed or strangulated hemorrhoids, with a known case of tendencies for bleeding, with concomitant perianal disease, with a history of recurrent perianal surgeries, or those unfit for surgery or anesthesia were excluded from this study. **Results:** No statistical significant differences between study groups regarding age, gender, BMI level, and grade of disease. Bleeding was significantly less than bleeding occurred in patients treated by conventional method. Postoperative pain and time to return to work and daily activities were significantly less in patients managed by harmonic scalpel method. **Conclusion:** Both of harmonic scalpel or conventional method are an effective and safe procedures in hemorrhoidectomy. Harmonic scalpel method is preferred as it reduces the postoperative pain and bleeding and duration of returning to work and daily activities compared to conventional method.

KEYWORDS: hemorrhoidectomy, harmonic scalpel, conventional, Iraq.

INTRODUCTION

Hemorrhoids are cushions of specialized, highly vascular tissue found within the anal canal, in the sub mucosal space. They contain blood vessels, elastic tissue, connective tissue, and smooth muscle.[1] They become a disease as they swollen or inflamed; the unqualified term "hemorrhoid" is often used to refer to the disease.[2] Their signs and symptoms depend on the type present. Internal hemorrhoids often result in painless, bright red rectal bleeding when defecating, while external hemorrhoids often result in pain and swelling in the area of the anus.[3] Approximately 4 of 10 patients with hemorrhoids are symptomatic.[4] It is uncertain why hemorrhoids become symptomatic. They are believed to start producing symptoms when anal cushions start their sliding down process.[5] Bleeding is the commonest symptom of internal hemorrhoids.[6] In the vast majority of cases bleeding is painless, because of the absence of pain fibers.[3] Pain is not the typical symptom, as already noted. Pain may be due to complicated internal hemorrhoids (thrombosis, ischemia, incarceration, strangulation).[7] They affect millions of people around the world, and represent a major medical and socioeconomic problem with a peak prevalence between 45 and 65 years of age[8,9] and the estimated worldwide prevalence ranges approximately from 3% to 28%, of which more than 4% are symptomatic. Approximately, 33% of these patients needs physicians for advice.[9] Many patients present late in the course of the disease due to social embarrassment.[10] Approximately 5-10% of patients with hemorrhoids fail to cope with conservative measures for symptomatic relieve, and surgical hemorrhoidectomy become the preferred option[11] and standard treatment for patients with grade III or IV internal hemorrhoids.[12] The most significant complications of hemorrhoid surgery is postoperative pain and bleeding.[13] The reasons for postoperative pain are related to the incisions made during surgery, use of

cautery, suturing the anal mucosa, and possible surgical site infection.[14] These complications increase the patient's hospitalization period, can delay the return to ordinary life and the workplace after surgery, and can increase the rate of revisits to the hospital.[12] In recent years, several pieces of surgical equipment have been developed due to advances in technology, and now hemorrhoidectomies are being performed with new devices, such as bipolar electrothermal devices, ultrasonic scalpels, and circular staplers in which have recently been reported to result in better pain relief and less bleeding postoperatively compared to hemorrhoidectomies performed using previous conventional surgical methods.[15] Harmonic scalpel uses ultrasonic vibrations at 55.5 KHz to cut and coagulate small vessels of up to 2 mm.[16] Hemorrhoidectomy performed with harmonic scalpel has several advantages, including less damage to tissues, better hemostasis, less stimulation to neuromuscular tissues, and local control of the surgical site, compared to a hemorrhoidectomy performed with surgical scissors.[17] The aim of this study is to compare the outcome of patients with grade III or IV disease who underwent hemorrhoidectomy using harmonic scalpel or conventional closed technique.

PATIENTS AND METHODS

Study Design and Setting: This is a comparative prospective study that was conducted in the surgical unit, Department of Surgery, Al-Numan Teaching Hospital in Baghdad during a period of 18 months from 1st of Feb, 2018 – 31th Jul, 2019.

Study Population and sample size: The study included 60 patients who presented to the general surgery outpatient clinic with grade III or IV hemorrhoidal disease and underwent a hemorrhoidectomy. Those patients were divided randomly into two groups (each patient assigned with a number, then patients with odd numbers were assigned as harmonic group included 30 patients treated by harmonic scalpel hemorrhoidectomy and patients with even numbers were assigned as conventional group, included 30 patients treated by conventional hemorrhoidectomy). The two groups were compared regarding Intra operative bleeding, operative time, postoperative pain, early postoperative complications, length of hospital stay, and duration to return to normal activity. Patients with thrombosed or strangulated hemorrhoids, with a known case of tendencies for bleeding, with concomitant perianal disease, with a history of recurrent perianal surgeries, or those unfit for surgery or anesthesia were excluded from this study. Detailed history was taken for age, gender, smoking and alcohol drink history, signs and symptoms. General and systemic examination and vital signs were done. All patients underwent preoperative lab tests, chest X-rays, electrocardiography, and urinalysis. All patients took a glycerin enema the night before surgery, and prophylactic antibiotics were injected before entrance to the surgical room. Verbal permission was obtained from each patient prior to collecting data, and all information's were anonymous.

Surgical procedure: Anesthesia was either general or spinal according to surgeon, anesthesiologist and patient preferences. Patients were placed in lithotomy position for surgery. Tape was attached to both sides of the buttocks to expose the anus, and an anoscope was inserted into the anal canal in order to obtain the surgical field. The hemorrhoidal stems were lifted with forceps to separate them from the anal sphincter during surgery.

- In conventional hemorroidectomy: 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 sutured.
- In harmonic scalpel hemorrhoidectomy: Hemorrhoid tissue was removed using the harmonic scalpel up to its pedicle and the wounds were left open.

Follow up: Postoperatively, each patient was prescribed acetaminophen two tablets three times a day from the first day after surgery, and sitz baths were taken at least three times a day. Follow up continued for one month (First, 3rd, and 7th day, two weeks, and one month) included.

- ✓ Postoperative pain measured on the visual analog scale at the 1st, 3rd and 7th day postoperatively. VAS score ranges from 0, indicating no pain, to 10, indicating severe pain.
- ✓ Intra operative bleeding, early postoperative complications, length of hospital stay, and time to return to normal activity were evaluated.

Statistical analysis: The data analyzed using Statistical Package for Social Sciences (SPSS) version 25. The data presented as mean, standard deviation and ranges. Categorical data presented by frequencies and percentages. Independent t-test (two tailed) was used to compare the continuous variables among study groups accordingly. Z-test was used to compare the categorical variables among study groups accordingly. Pearson's Chi–square test was used to assess statistical association between treatment options and complications. A level of P – value less than 0.05 was considered significant.

RESULTS

The mean age of total patients was 26.2 ± 6.2 years; 88.3% were males and 51.7% were overweighed; 80% diagnosed with grade III of disease. As shown in table (1), no statistical significant differences detected ($P \geq 0.05$) between study groups regarding age, gender, BMI level, and grade of disease.

Table 1: Distribution of study groups by general characteristics

Variable	Study Group		Total (%) n= 60	P - Value
	Harmonic n= 30	Conventional n= 30		
Age (Years)				
< 25	20 (66.7)	17 (56.7)	37 (61.7)	**0.425**
≥ 25	10 (33.3)	13 (43.3)	23 (38.3)	
Gender				
Male	26 (86.7)	27 (90.0)	53 (88.3)	**0.687**
Female	4 (13.3)	3 (10.0)	7 (11.7)	
BMI Level				
Normal	8 (26.7)	3 (10.0)	11 (18.3)	**0.248**
Overweight	14 (46.6)	17 (56.7)	31 (51.7)	
Obese	8 (26.7)	10 (33.3)	18 (30)	
Grade of disease				
III	23 (76.7)	25 (83.3)	48 (80.0)	**0.518**
IV	7 (23.3)	5 (16.7)	12 (20.0)	

Complications of surgery according to the treatment options is demonstrated in table (2). We noticed that no major bleeding occurred in patients treated with harmonic scalpel method, just minor bleeding in three patients which was significantly (P= 0.03) less than bleeding occurred in patients treated by conventional method. No statistical significant associations (P ≥ 0.05) between other surgical complications and treatment options.

Table 2: Association between surgical complication and treatment options.

Complication	Study Group		Total (%) n= 60	P - Value
	Harmonic n= 30	Conventional n= 30		
Bleeding				
No	27 (58.7)	19 (41.3)	46 (76.7)	**0.03**
Minor bleeding	3 (30.0)	7 (70.0)	10 (16.7)	
Major bleeding	0 (0)	4 (100.0)	4 (6.7)	
Wound infection				
Yes	0 (0)	1 (100.0)	1 (1.7)	**0.313**
No	30 (50.8)	29 (49.2)	59 (98.3)	
Anal fissure				
Yes	0 (0)	2 (100.0)	2 (3.3)	**0.15**
No	30 (51.7)	28 (48.3)	58 (96.7)	
Delayed discharge				
Yes	1 (20.0)	4 (80.0)	5 (8.3)	**0.161**
No	29 (52.7)	26 (47.3)	55 (91.7)	

In this study, it was obvious that pain in patients managed by harmonic scalpel hemorrhoidectomy was significantly less than that in patients managed by conventional technique in the first, 3rd and 7th day postoperatively (4.0 versus 6.9, P= 0.001; 3.1 versus 6.4, P= 0.001; and 1.71 versus 4.8, P= 0.001).

Returning to work and daily activities was significantly earlier in patients operated by harmonic scalpel method than conventional technique (9.12 versus 14.7 days, P= 0.001).

No statistical significant difference (P= 0.372) in duration of hospital stay between the patients treated by the two methods as shown in table (3).

Table 3: Comparison between treatment options regarding postoperative information.

Postoperative information	Study Group		P - Value
	Harmonic Mean ± SD	Conventional Mean ± SD	
VAS for pain			
1st day	4.0 ± 0.64	6.9 ± 0.9	**0.001**
3rd day	3.1 ± 0.42	6.4 ± 0.72	**0.001**
7th day	1.71 ± 0.35	4.8 ± 0.61	**0.001**
Hospital stay (Days)	1.44 ± 0.6	1.6 ± 0.76	**0.372**
Returning to work (Days)	9.12 ± 2.21	14.7 ± 2.6	**0.001**

DISCUSSION

Hemorrhoids are a very common anorectal condition. They affect millions of people around the world, and represent a major medical and socioeconomic problem.[18] Therapeutic treatment of hemorrhoids ranges from dietary and lifestyle modification to radical surgery, depending on degree and severity of symptoms.[19] Most common complication post operatively is pain, which results due to surgical defect in perianal skin and anoderm. Harmonic Scalpel Hemorrhoidectomy is one of surgical procedures which seems to be safe, efficient and rapid technique. Its advantages are reduced operative bleeding and effective hemostasis resulting in shorter operative time and less tissue damage than high energy cautery devices such as diathermy or laser because of less lateral thermal injury.[20] In this study, bleeding was significantly less in patients managed by harmonic scalpel than those managed by conventional technique, and this result was in line with studies conducted by Madhu BS et al in 2017 when showed that intraoperative blood loss was significantly less in Harmonic scalpel Hemorrhoidectomy than in conventional method.[8] Another agreement found in a studies conducted by Lim et al in 2016[12], by Mushaya CD et al in 2014[21], by Bulus H et al 2014[15], and by Gentile M et al 2011.[22] For a hemorrhoidectomy performed with an ultrasonic scalpel, intraoperative bleeding may be minimized, and the visibility of the surgical field is better. Performing resection and hemostasis at the same time reduces the operation time and complications, such as postoperative bleeding, pain, and infection, by reducing the damage to the surrounding mucosal tissue. In contrast, for a hemorrhoidectomy performed with conventional methods, the surrounding mucosal tissues and blood vessels can be damaged during resection of the hemorrhoidal tissue, and the time to hemostasis of the blood vessels and tissues may cause increases in both the operation times and the possibility of postoperative bleeding.[12]

In the current study, pain in patients managed by harmonic scalpel haemorrhoidectomy was significantly less than that in patients managed by conventional technique in the first, 3rd and 7th day postoperatively. This result is in accordance with results found by Madhu et al study in 2017.[8] Fayyaz MT et al study in 2017[23], and Mala et al study in 2018.[1] One of the causes of postoperative pain after a hemorrhoidectomy is excessive damage to the sensitive perianal skin or tissue, and sometimes pain occurs due to stress or strain at the site of the mucosal sutures.[12] The harmonic scalpel minimizes the damage to surrounding tissues, and suture closure is not required for hemostasis during the hemorrhoidectomy. This limited spread reduces anal spasms, allows for a bloodless hemorrhoidectomy, and can result in reduced postoperative pain and faster wound-healing.[15]

A shorter time to return to work and ordinary life have been showed in this study for patients treated by harmonic scalpel compared to those treated by conventional method which was proved by a lot of studies conducted by Nienhuijs SW et al 2009[24], Bulus H et al 2014[15], Madhu et al study in 2017.[8], Mushaya et al in 2014[21], and by gentile M et al 2011.[22]

In conclusion, both of harmonic scalpel or conventional method are an effective and safe procedures in hemorrhoidectomy. Harmonic scalpel method is preferred as it reduces the postoperative pain and bleeding and duration of returning to work and daily activities compared to conventional method.

REFERENCES

1. Mala TA, Malla SA, Shah AA, Kapoor M, Gupta VB. Comparative study of harmonic scalpel haemorrhoidectomy versus conventional (Milligan and Morgan) haemorrhoidectomy. Cerrahi Sanatlar Dergisi, 2018; 11(1): 7-12.
2. Schubert MC, Sridhar S, Schade RR, Wexner SD. What every gastroenterologist needs to know about common anorectal disorders. World journal of gastroenterology: WJG, 2009; 15(26): 3201.
3. Sun Z, Migaly J. Review of hemorrhoid disease: presentation and management. Clinics in colon and rectal surgery, 2016; 29(01): 022-9.
4. Riss S, Weiser FA, Schwameis K, Riss T, Mittlböck M, Steiner G, et al. The prevalence of hemorrhoids in adults. International journal of colorectal disease, 2012; 27(2): 215-20.
5. Margetis N. Pathophysiology of internal hemorrhoids. Ann Gastroenterol, 2019; 32(3): 264-72.
6. Madoff RD, Fleshman JW. American gastroenterological association technical review on the diagnosis and treatment of hemorrhoids1. Gastroenterology, 2004; 126(5): 1463-73.

7. Jacobs D. Clinical practice. Hemorrhoids. The New England journal of medicine, 2014; 371(10): 944-51.
8. Madhu B, Tanga V, Pawar PM. Harmonic scalpel compared with conventional open (Milligan-Morgan) method in surgical management of symptomatic haemorrhoids. International Surgery Journal, 2017; 4(6): 2010-3.
9. Dawood HK. A Comparative Study between Laser Hemorrhoidoplasty Procedure and Conventional Hemorrhoidectomy. Journal of University of Babylon, 2019; 27(1): 69-86.
10. Shaker Al Tamimi A. Classical Milligan Morgan Hemorrhoidectomy versus its Modification: Higher Risk of Fistula and Mucosal Ectropion. International Journal of Research in Pharmaceutical Sciences, 2018; 9.
11. Arroyo A, Perez F, Miranda E, Serrano P, Candela F, Lacueva J, et al. Open versus closed day-case haemorrhoidectomy: is there any difference? International journal of colorectal disease, 2004; 19(4): 370-3.
12. Lim DR, Cho DH, Lee JH, Moon JH. Comparison of a Hemorrhoidectomy With Ultrasonic Scalpel Versus a Conventional Hemorrhoidectomy. Ann Coloproctol, 2016; 32(3): 111-6.
13. Kwok S, Chung C, Tsui K, Li M. A double-blind, randomized trial comparing Ligasure TM and Harmonic Scalpel TM hemorrhoidectomy. Diseases of the colon & rectum, 2005; 48(2): 344-8.
14. Nicholson TJ, Armstrong D. Topical metronidazole (10 percent) decreases posthemorrhoidectomy pain and improves healing. Diseases of the colon & rectum, 2004; 47(5): 711-8.
15. 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; 37(1): 20-3.
16. Dumlu EG, Gürer A, Tokaç M, Özdedeoğlu M, Bozkurt B, Kıyak G, et al. Hemorrhoidectomy in Patients with Grade III or IV Disease: Harmonic Scalpel Compared With Conventional Closed Technique. International Archives of Medicine, 2015; 8.
17. Jayne D, Botterill I, Ambrose N, Brennan T, Guillou P, O'riordain D. Randomized clinical trial of Ligasure™ versus conventional diathermy for day-case haemorrhoidectomy. British Journal of Surgery, 2002; 89(4): 428-32.
18. Sanchez C, Chinn BT. Hemorrhoids. Clinics in colon and rectal surgery, 2011; 24(01): 005-13.
19. Acheson AG, Scholefield JH. Management of haemorrhoids. Bmj, 2008; 336(7640): 380-3.
20. Song S-G, Kim S-H. Optimal treatment of symptomatic hemorrhoids. Journal of the Korean Society of Coloproctology, 2011; 27(6): 277.
21. Mushaya C, Caleo P, Bartlett L, Buettner P, Ho Y-H. Harmonic scalpel compared with conventional excisional haemorrhoidectomy: a meta-analysis of randomized controlled trials. Techniques in coloproctology, 2014; 18(11): 1009-16.
22. 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: 467258.
23. Fayyaz MU. Harmonic Scalpel Hemorrhoidectomy Vs Milligan-Morgan Hemorrhoidectomy. Journal of Rawalpindi Medical College, 2017; 21(3): 233-6.
24. Nienhuijs SW, de Hingh IH. Conventional versus LigaSure hemorrhoidectomy for patients with symptomatic Hemorrhoids. Cochrane Database of Systematic Reviews, 2009; 1.