Original Article

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Comparison of Effectiveness of Harmonic Scalpel Hemorrhoidectomy with Conventional Open Hemorrhoidectomy in The Treatment of Hemorrhoids

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Author`s Contribution

[1,2]Study Design, Critical review, manuscript, Data analysis, Data analysis, [3]Critical review, Data acquisition, Data interpretation, [4,5]Conception and Approval of final version.

Funding Source: None
Conflict of Interest: None

Received: Jan 13, 2023
Accepted: July 10, 2023

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ABSTRACT

Background: Various surgical treatments are available to treat hemorrhoids, however, surgical hemorrhoidectomy has high cure rate and low recurrence rate in patients. Therefore, current study has been planned to compare the effectiveness of harmonic scalpel hemorrhoidectomy with conventional open hemorrhoidectomy in treatment of hemorrhoids.

Methodology: Sixty patients with third and fourth grade hemorrhoids were selected and randomized into Group A (harmonic scalpel) and Group B (conventional open hemorrhoidectomy) with 30 patients in each group. In Group A, the harmonic scalpel device was used to cut and coagulate the hemorrhoids. In Group B, simple scissor was used to excise hemorrhoidal tissues and vicryl 2-0 was used to ligate bleeding vessel. Independent sample t-test was used to compare operating time and post-operative pain for both groups.

Results: Mean age of the patients was 52 years. The proportion of male and female was 63% and 37%, while proportion of 3rd and 4th degree patients was 77% and 23%. The duration of surgery for Group A (17.67 minutes) was significantly shorter as compared with Group B (24.33 minutes). Post-operative pain score for Group A was significantly lowered compared with Group B after 8 and 16 hours of surgery.

Conclusion: The harmonic scalpel hemorrhoidectomy is a new surgical procedure with shorter operative time and has less post-operative pain. Thus harmonic scalpel hemorrhoidectomy is more effective method in the treatment of hemorrhoids as compared to open hemorrhoidectomy.

Keywords: Harmonic scalpel hemorrhoidectomy. open hemorrhoidectomy. post-operative pain.

Cite this article as: Jalil A, Ahmad I, Taj MN, Jalil H, Abdullah T, Shahid A. Comparison of Effectiveness of Harmonic Scalpel Hemorrhoidectomy with Conventional Open Hemorrhoidectomy in The Treatment of Hemorrhoids. Ann Pak Inst Med Sci. 2023; 19(3):381-385. doi. 10.48036/apims.v19i3.982

Introduction

Hemorrhoids are the symptomatic enlargement and distal displacement of the normal anal cushions and are one of the most common anorectal disorders.[1,2] The prevalence rate of hemorrhoids is between 4.4 to 40% in adult population[1-5] and annually more than one million peoples are affected by this disease.[6] Treatment of hemorrhoidal disease ranges from dietary and lifestyle modification to radical surgery, depending on degree and severity of symptoms of hemorrhoidal disease. Variety of surgical treatments are available to treat hemorrhoids, however, surgical hemorrhoidectomy has a high cure rate and low recurrence rate in patients with hemorrhoids[7]. In the open hemorrhoidectomy, the hemorrhoids are dissected from the underlying anal sphincter and associated structures in the rectum. Sharp dissection, electrocauterization or harmonic scalpel can be used to treat the patients with

grade 3 or 4 hemorrhoids. The complications for hemorrhoidectomy usually include bleeding, stenosis, retention, incontinence and infection. However, extreme postoperative pain is the main drawback of conventional hemorrhoidectomy[8]. Therefore, Surgeons have been trying to devise modern and invasive techniques for the relief of pain during surgery of hemorrhoids.

Harmonic Scalpel Hemorrhoidectomy (HSH) is a surgical therapy mostly used for the treatment of symptomatic hemorrhoidal disease. Harmonic Scalpel instrument has been built on ultrasonic technology, which reduces operative time and provides a dry operating field[7,9] therefore, the harmonic scalpel instrument has proven to be enormously important in abdominal surgery. Harmonic scalpel has many advantages especially to reduce postoperative pain, faster wound healing and convalescence as compared with open hemorrhoidectomy because the harmonic scalpel simultaneously uses the ultrasound waves to cut tissues and cauterize them immediately.

The harmonic scalpel has not allowed passing the electrical energy to the tissues of the body, therefore, patients felt less surgical stress[10]. In Pakistan, no such study has previously been carried out to compare the effectiveness of harmonic scalpel hemorrhoidectomy with conventional open hemorrhoidectomy in the treatment of hemorrhoids. Thus, present study was planned to investigate the effectiveness of harmonic scalpel hemorrhoidectomy with conventional open hemorrhoidectomy in the treatment of hemorrhoids. Therefore, it was hypothesized that the harmonic scalpel hemorrhoidectomy would reduce post operative pain and early recovery as compared with the conventional open hemorrhoidectomy for the treatment of hemorrhoids. The objective of the present study was to compare the effectiveness of harmonic scalpel hemorrhoidectomy with conventional open hemorrhoidectomy in the treatment of hemorrhoids in terms of operative time and post operative pain.

Methodology

The current study was carried out in the Department of Surgery, Capital Hospital, Islamabad, during the period from January 2022 to June 2022. Sixty patients with 3rd and 4th degree hemorrhoids were randomized into two groups: Group A (harmonic scalpel hemorrhoidectomy) and Group B (conventional open hemorrhoidectomy). Patients were admitted to the ward after evaluating their complete history, physical examination and investigations. An informed consent was taken from the patient. Approval of the Institutional Ethical Committee was affair.

Patients were given kleen enema twice before surgery and the prophylactic antibiotics were also given to the patients. Patients were placed in lithotomy position after digital rectal examination and Proctoscopy. Hemorrhoids were separated and dissected out from the sphincter. In Group A, the harmonic scalpel device was used to cut and coagulate the hemorrhoids. In Group B, simple scissor was used to excise the hemorrhoidal tissues and the vicryl 2-0 was used to ligate the bleeding vessel. For both groups, the wounds were left open for healing.

The operating time for both procedures was recorded from draping to final dressing. Post operative pain was calculated by visual analog scale. Patient had drawn a horizontal line and point out with 0 at one end with no pain and 10 at the other end with maximum intensity of pain with numbers from 0 to 10 according to the intensity of pain. Post operative pain was recorded on 0, 8, 16 and 24 hours after surgery. Patients were given Dicloran (75 mg) injection at 8 hours interval after the surgery. Data were recorded on a standardized proforma and analyzed using SPSS version 10.0. Descriptive statistical analysis was used to measure frequency with percentage, mean and standard deviation.

Post operative pain was calculated by visual analog scale. Independent sample t-test was used to compare the operating time and visual analog scale for pain for both groups. P value of < 0.05 was considered significant.

Results

The proportion of male was 63%, while the proportion for female was 37% from the total of 60 cases. The proportion of male and female from both groups was also 63% and 37%, respectively (Table 1). The proportion of 3rd degree and 4th degree patients for sixty patients was 77% and 23%, respectively. The proportion of 3rd degree and 4th degree patients for both groups was also 77% and 23%, respectively (Table I).

The frequency distribution for male and female age group of sixty patients in Group A and Group B was shown in Table II, where 60% of the patients (46.67% male and 18.34% female) belonged to the age group of 51-60 years.

The mean ± SD age of the patients was 52.17 ± 5.37 years and the range was 60. The mean operating time for the hemorrhoids was significantly different for patients of both groups (Table III). The mean operative time for

conventional open hemorrhoidectomy (Group B) was significantly greater as compared with harmonic scalpel hemorrhoidectomy (Group A) (Table III).

Table I: Characteristics of hemorrhoids patients in both groups studied (n=60).

Parameters		N	%
Group A	Gender		
Total patients	Male	19	63%
(n= 30)	Female	11	37%
	Degree of hemorrhoids		
	3rd degree	23	77%
	4th degree	7	23%
Group B	Gender		
Total patients	Male	19	63%
(n = 30)	Female	11	37%
	Degree of hemorrhoids		
	3rd degree	23	77%
	4th degree	7	23%

Table II: Frequency, percentage and gender distribution of hemorrhoids patients in both groups studied

Age groups	Sixty patients (n = 60)		Group A (n = 30)		Group B (n = 30)	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Male						
10-20	0	0	0	0	0	0
21-30	0	0	0	0	0	0
31-40	0	0	0	0	0	0
41-50	10	16.67%	5	16.67%	5	16.67%
51-60	28	46.67%	14	46.66%	14	46.66%
61-70	0	0	0	0	0	0
Female						
10-20	0	0	0	0	0	0%
21-30	0	0	0	0	0	0%
31-40	1	1.66%	1	3.33%	1	3.33%
41-50	9	15%	5	16.67%	4	13.67%
51-60	11	18.34%	5	16.67%	5	16.67%
61-70	1	1.66%	0	0	1	3.33%

The post operative pain was similar for both groups at 0 hours and 24 hours (Table IV; Figure 1). The post operative pain for Group A was significantly lowered compared with Group B after 8 ($P < 0.0001$) and 16 hours ($P < 0.0001$).

Table III: Mean operative time for harmonic scalpel hemorrhoidectomy (Group A) and conventional open hemorrhoidectomy (Group B) in the treatment of hemorrhoids patients.

Group	Mean	SD	Std. Error Mean	t-test	P-value
A	17.67	3.20	0.58	-15.232	P <
B	24.33	3.46	0.63		0.0001

Discussion

Hemorrhoids are recognized as a major health problem throughout the world. Treatment of hemorrhoidal disease ranges from dietary and lifestyle modification to radical surgery. In the present study, the harmonic scalpel hemorrhoidectomy had performed better as compared with conventional open hemorrhoidectomy in terms of reduced operative time and post operative pain. The duration of surgery for Group A (17.67 minutes) was significantly shorter ($P<0.0001$) as compared with Group B (24.33 minutes). Other studied also reported the similar results, where harmonic scalpel hemorrhoidectomy performed better in terms of operative time compared with the Milligan-Morgan hemorrhoidectomy.

In the present study, the mean operative time for harmonic scalpel hemorrhoidectomy was 17.67 ± 3.20 minutes, but the other studied reported different results. The mean duration for the surgical procedure for the harmonic scalpel was 10 minutes reported by one another[11] and 31.7 minutes for other study.[12] In the present study, the duration of surgery for harmonic scalpel hemorrhoidectomy was significantly shorter as compared with the Milligan-Morgan hemorrhoidectomy. Similar results were reported by other author[13] for the harmonic scalpel hemorrhoidectomy, where surgical time was significantly shorter for the harmonic scalpel hemorrhoidectomy as compared with conventional open hemorrhoidectomy.

In the present study, the post operative pain was similar for both groups at 0 hours and 24 hours. However, the mean post operative pain score for the harmonic scalpel hemorrhoidectomy was 4.47 and 5.07 after 8 and 16 hours, respectively. The post operative pain for the harmonic scalpel hemorrhoidectomy was significantly less compared with the conventional open hemorrhoidectomy after 8 and 16 hours. Similar results was observed for the efficacy of Milligan-Morgan hemorrhoidectomy with the harmonic scalpel hemorrhoidectomy in terms of postoperative pain.[9]

The patients felt 27% less post operative pain for the harmonic scalpel hemorrhoidectomy compared with the conventional open hemorrhoidectomy after 8 hours. However, the patients felt 10 % less post operative pain for

the harmonic scalpel hemorrhoidectomy compared with the conventional open hemorrhoidectomy after 16 hours. This reduction in post operative pain may be related to minimal tissue damage, improve tissue apposition promoting rapid primary healing.[14] However, another study correlated this reduction in post operative pain for Ligasure hemorrhoidectomy was linked with temporary third degree burn injury to nerve endings at the site of the wound.[15]

Table IV: Post operative pain of hemorrhoids patients recorded at different time interval for both groups studied.

Post operative pain at different time	Mean±SD	Std. Error Mean	t-test	P-value
0 hours				
Group A	2.17±0.79	0.14	0.616	0.539
Group B	2.03±0.96	0.18		
8 hours				
Group A	4.47±1.01	0.18	-5.5020	P < 0.0001
Group B	6.10±1.27	0.23		
16 hours				
Group A	5.07±0.87	0.16	-2.780	P < 0.0073
Group B	5.67±0.80	0.15		
24 hours				
Group A	3.93±1.20	0.22	0	0.9
Group B	3.93±1.01	0.19		

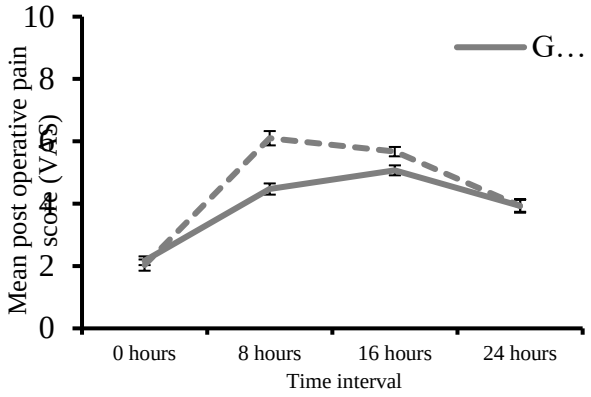

Figure 1. Mean (± SEM) post operative pain score (VAS) for both groups studied (n = 30)

The harmonic scalpel hemorrhoidectomy significantly reduced the post operative pain with better homeostasis compared with Milligan-Morgan hemorrhoidectomy.[9] Other studies also reported the similar results, where less post operative pain was recorded for harmonic scalpel compared with Milligan-Morgan hemorrhoidectomy[13]. However, Chung *et al*.[16] reported that the harmonic scalpel hemorrhoidectomy was associated with less post operative pain compared with conventional hemorrhoidectomy.

The present study had shown an overall reduction in postoperative pain which could reduce a cost benefit and is welcomed by the patients. However, a correct analysis of the cost of any surgical hemorrhoidectomy is difficult to do, and further studies should include this matter. The ideal hemorrhoidectomy procedure should combine high safety and efficacy of the treatment with less post operative pain and early recovery and with a less cost for the treatment.

Conclusion

The harmonic scalpel hemorrhoidectomy is a new surgical procedure with shorter operative time and has less post-operative pain. Thus harmonic scalpel hemorrhoidectomy is more effective method in the treatment of hemorrhoids as compared to open hemorrhoidectomy.

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