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Conventional Hemorrhoidectomy versus Ligasure Hemorrhoidectomy: A Comparative Study

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ABSTRACT

Background: Hemorrhoidal disease is one of the most common anorectal diseases and surgical hemorrhoidectomy remains one of the most common operations in general surgery. Milligan-Morgan Described the conventional hemorrhoidectomy since about 70 years ago, then surgical hemorrhoidectomy had changed little over years until the introduction of LigaSure hemorrhoidectomy. **Aim of the Work:** Is to compare between conventional (Milligan-Morgan) hemorrhoidectomy and LigaSure hemorrhoidectomy in treating patients with 3rd and 4th degree internal piles. **Patients and Methods:** This randomized control clinical trial was done at Mounira General Hospital over a period from April 2017 to March 2018 on the basis of: It included 40 adult patients with 3rd and 4th degree hemorrhoids divided randomly into 2 equal groups: Group A (n: 20 patients) underwent LigaSure hemorrhoidectomy. Group B (n: 20 patients) underwent Conventional hemorrhoidectomy. **Results:** There was a highly significant difference between the two study groups as regard the operative time, in the LigaSure hemorrhoidectomy group the mean operative time was 11.15 ± 2.68 minutes, while in the conventional technique group the mean time was 28.75 ± 4.20 minutes. As regards the post-operative pain, in the 1st day, there was a highly significant difference between the two study groups; in the LigaSure hemorrhoidectomy group the mean post-operative pain was 3.80 ± 1.54; while in the conventional technique it was 5.95 ± 0.99. Regarding the post-operative pain, in the 1st week, the LigaSure hemorrhoidectomy group mean was 2.60 ± 1.27; while in the conventional method was 4.80±0.89. As regard the intra-operative estimated blood loss, a significant difference between the two study groups was present. In ligaSure hemorrhoidectomy group 40% had almost no bleeding, 20% had minimal blood loss, 20% had mild loss and 20% had moderate blood loss in comparison with conventional method group patients; 0% with no blood loss, 15% with minimal loss, 55% with mild loss and 30% with moderate blood loss. As regards duration of wound healing, in the LigaSure group, the mean time was 2.65 ± 0.74 weeks while in the in the conventional technique group, it was 4.60 ± 0.82 weeks which was statistically highly significant. With LigaSure hemorrhoidectomy only 6 patients out of 20 needed anal packing, in contrast with conventional method group that needed an anal pack for the whole 20 patients. **Conclusion:** We conclude that LigaSure hemorrhoidectomy is better than conventional (Milligan-Morgan) hemorrhoidectomy in terms of less operative time, less intra-operative blood loss, less post-operative pain, less post-operative analgesics and earlier wound healing and return to daily work hence higher patient satisfaction. **Recommendations:** Further studies on a larger scale of patients are needed to confirm the results obtained by this work.

Keywords: LigaSure Hemorrhoidectomy, Conventional Hemorrhoidectomy, Milligan-Morgan.

INTRODUCTION

Hemorrhoids is a very common anorectal disease. Defined as symptomatic enlargement and/or distal displacement of anal cushions. Apart from abnormally dilated vascular channel and destructive changes in supporting tissue within anal cushions, there is emerging evidence that hemorrhoids is associated with hyper perfusion state of anorectal region and some degree of tissue inflammation [(1)].

For cases, that needs surgical intervention; Milligan-Morgan described the classic operation for surgical hemorrhoidectomy more than 70 years ago. Thereafter colorectal surgeons are in non-stop search for the most effective least painful technique for surgical treatment. This traditional approach is effective; however it often is accompanied by a high incidence of complications, such as urinary retention, hemorrhage, and significant pain [(2)].

On another front, **Wang *et al.*** have recently demonstrated that LigaSure hemorrhoidectomy with sub mucosal dissection is a fast, safe, and excellent modality for achieving bloodless dissection of the hemorrhoidal cushions with a limited complication rate. Compared with conventional hemorrhoidectomy, LigaSure method of dissection prominently reduces post-operative pain and numbers of parenteral analgesic injections. LigaSure also provides minimal collateral thermal spread, limited tissue charring and absence of sutures might lead to less post-operative pain, consequently the LigaSure system would facilitate earlier hospital discharge and return to normal work or activities [(3)].

Aim of the Study

Is to compare between conventional (Milliagan-Morgan Hemorrhoidectomy) and LigaSure Hemorrhoidectomy.

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PATIENTS AND METHODS

This study was done at Mounira General Hospital over a period from April 2017 to March 2018 on the basis of randomized control clinical trial. It included 40 adult patients with 3rd and 4th degree hemorrhoids; divided randomly into 2 equal groups:

- Group A (n: 20 patients) underwent LigaSure hemorrhoidectomy.
- Group B (n: 20 patients) underwent conventional (Milligan-Morgan).

These patients presented in the outpatient clinics, and divided into two groups randomly using block randomization method (odd numbers for LigaSure group and even numbers for Conventional group). Consent was taken to be included in the study. **The study was approved by the Ethics Board of Al-Azhar University.**

❖ ***Inclusion criteria*** are:

1) Patients presented with 3rd or 4th degree hemorrhoid.
2) Any age.
3) Gender: Male & Female.

❖ ***Exclusion criteria*** are:

1) Patients with previous complicated anal operations.
2) Patients with recurrent inguinal hernia.
3) Immunosuppressed patients, or on steroid therapy with delayed wound healing.
4) Patients on Anti Co-agulant therapy or those suffering from hemorrhagic disorders.
5) Patients unfit for anesthesia and surgery in general.
6) Patients under 18 years of age.

❖ **Preoperative work up:**

All Patients was subjected to:

History Taking:

Asking the patients about:

- Onset of the disease
- Predisposing and precipitating factors.
- Any systemic illness make the patient unfit for anesthesia.

Clinical Examination:

- To detect the degree of hemorrhoid.
- To exclude previous complicated surgeries.
- To exclude other anal pathology (external hemorrhoids, fissure, rectal mass causing bleeding per rectum, or any other)

Investigation:

- Complete blood count.
- Coagulation profile.
- Liver function tests.
- Kidney function tests.
- Fasting blood sugar.
- ECG.
- Chest X-ray.
- Anoscopy or sigmoidoscopy in suspected patients with atypical presentation)

❖ **Operative techniques:**

➢ **Preparation for both groups:**

- Shaving of the hair.
- Prophylactic antibiotic 2gm IV Cephalosporines were given at the time of induction of anesthesia and repeated for 2 more doses with 12 hours interval.
- Routine 8 hours preoperative fasting.
- Emptying of the urinary bladder.

➢ **Technique for LigaSure hemorrhoidectomy (Group A):**

A: Patient Position:

- The patient was placed in extended lithotomy position.
- Surgeon stands in front of the anal verge.

B: Steps of the operation:

After anesthesia, a routine skin preparation of the entire peri-anal area, the upper thigh, penis and scrotum.

1) Anal retractor is introduced to visualize the surgical field.
2) The hemorrhoidal complex is grasped by Allis clamps with curved artery for hemorrhoids itself.
3) It is important to elevate the skin to be able to see the junction between the hemorrhoid and the perianal skin (the site where the incision should be made).
4) Now the LigaSure device can be applied and start dissection in this plane, with sparing the sphincters of anal canal till the pedicle of hemorrhoid appear.
5) Pedicle of the hemorrhoid can be sealed twice to ensure it is devascularized and reduce the risk of post-operative bleeding.
6) The same will be done for the two second hemorrhoids, with skin bridges between any two adjacent hemorrhoids.
7) Assessment of the oozing or bleeding after the end of the procedure and anal pack could be used if needed.

➢ **Technique for conventional (Milligan-Morgan) hemorrhoidectomy (Group B):**

A: Patient Position and Room Setup:

- The patient was placed in extended lithotomy position.
- The surgeon stands in front of the anal verge.

B: Steps of the operation:

1) Anal retractor is introduced to visualize the surgical field.

2) Small artery forceps or Allis clamps are placed on the external component at the three main sites. Traction on these prolapses the internal components, which are likewise grasped in small artery forceps.
3) Relevant two artery forceps are grasped in the palm of the left hand and the index finger extended anally to define the triangle of exposure.
4) Using curved Mayo scissors the skin is incised.
5) The external component is dissected off the underlying superficial external anal sphincter. More cephalad dissection separates the internal component from the underlying internal anal sphincter, continually narrowing down the pedicle.
6) At this stage the surgeon may choose to transfix and ligate the pedicle (the classical operation).
7) The operation then proceeds for the other two hemorrhoids. With a great respect for the skin bridges between any 2 adjacent hemorrhoids.
8) Hemostasis is checked and anal pack is used to ensure hemostasis.

❖ **Postoperative workup:**

Immediately post-operatively the patients were admitted to the recovery room where they are closely observed by a nurse and checked on by a doctor. Then patients get admitted to the ward and checked out 2 hours post operatively and next day morning after removal of the anal pack if found and discharged to home.

Postoperative analgesia was given I.M./12hours for one day followed by oral tablets on demand later on. Antibiotic like third generation cephalosporins injection in the first 24 hours was given followed by oral antibiotics for 5 days.

They were seen one week after in the outpatient clinic and another regular follow up 2 weeks after the surgery and 1 month later.

The following points were monitored and checked post operatively:

- Postoperatively pain monitoring using the visual analogue scale [4]
- Post-operative hospital stay
- Wound healing
- Duration to return to work and activity

Data Management and statistical Analysis:

The collected data were revised, coded, tabulated and introduced to a PC using Statistical package for Social Science **(IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp).** Data were presented and suitable analysis was done according to the type of data obtained for each parameter.

i. Descriptive statistics:

1. Mean & Standard deviation (± SD) and range for parametric numerical data.
2. Frequency and percentage of non-numerical data.

ii. Analytical statistics:

1. **Student's T** Test was used to assess the statistical significance of the difference between two study group means.
2. **Chi-Square test** was used to examine the relationship between two qualitative variables.
   Fisher's exact test: was used to examine the relationship between two qualitative variables when the expected count is less than 5 in more than 20% of cells.

-P value: level of significance
-P>0.05: Non significant (NS).
-P< 0.05: Significant (S).
-P<0.01: Highly significant (HS).

RESULTS

The **Age** of the patients ranged between 16 and 62 years old with a mean 38.27 years.

Regarding the **Sex**, male patients in the study were 22 representing 55%. Female patients were 18 representing 45% of patients participated the study (table 1).

Table (1): variation of patients according to sex

	Conventional		LigaSure	
	N	%	N	%
Male	12	60%	10	50%
Female	8	40%	10	50%

Out of 40 patients only 4 patients had **previous uncomplicated anal operations** and only 4 patients had to undergo colonoscopy which excluded any other anal or rectal diseases than hemorrhoids.

Regarding the **Degree of hemorrhoids**, 12 patients were suffering from 4th degree hemorrhoids representing 30% of the cases and 28 patients were suffering from 3rd degree hemorrhoids representing 70% of the cases in the study as shown in table (2).

Table (2): variation of patients regarding degree of hemorrhoids.

	Conventional		LigaSure	
	N	%	N	%
3rd degree	15	75%	13	65%
4th degree	5	25%	7	35%

In conventional hemorrhoidectomy, the mean **operative time** was 28.75 ± 4.2037 minutes. In LigaSure hemorrhoidectomy, the mean operative time was 11.15 ± 2.6808 minutes (table 3).

Table (3): Mean and standard deviation of operative time.

	Conventional		LigaSure		P-value
	Mean	SD	Mean	SD	
Operative time in minutes	28.7500	4.2037	11.1500	2.6808	<0.0001

In conventional hemorrhoidectomy, the mean **Pain score on 1st day** postoperative was 5.9 ± 0.99. In LigaSure hemorrhoidectomy, the Mean Pain score on 1st day postoperative was 3.8 ± 1.54 as shown in table (4).

Table (4): Mean and standard deviation of pain score on 1st day post-operative.

	Conventional		LigaSure		P-value
	Mean	SD	Mean	SD	
Pain score 1st day	5.9500	0.9987	3.8000	1.5424	<0.0001

In conventional hemorrhoidectomy, the mean **Pain score on 1st week** postoperative was 4.8 ± 0.89. In LigaSure hemorrhoidectomy, the Mean Pain score 1st week postoperative was 2.6 ± 1.27 (table 5).

Table (5): Mean and standard deviation of pain score after 1st week postoperative.

	Conventional		LigaSure		P-value
	Mean	SD	Mean	SD	
Pain score 1st week	4.8000	0.8944	2.6000	1.2732	<0.0001

Regarding **Intra-operative blood loss** during conventional hemorrhoidectomy all patients suffered from blood loss; 3 patients with minimal blood loss, 11 with mild blood loss, and 6 patients with moderate blood loss. But with LigaSure hemorrhoidectomy 8 patients didn't experience any Blood loss. 4 patients with minimal blood loss, 4 mild blood loss, and 4 moderate blood loss (table 6).

Table (6): variation of intra-operative blood loss.

	LigaSure		Milligan-Morgan	
blood loss	N	%	N	%
No Blood loss	8	40%	0	0%
Minimal	4	20%	3	15%
Mild	4	20%	11	55%
Moderate	4	20%	6	30%

Only 6 patients out of 20 of LigaSure hemorrhoidectomy needed **Anal pack** after the procedure and 14 patient didn`t need an anal pack and all the patients of conventional Milligan-Morgan hemorrhoidectomy needed anal pack.

In conventional hemorrhoidectomy the mean **wound healing time** was 4.6 ± 0.82 weeks. In LigaSure hemorrhoidectomy the mean wound healing time was 2.6 ± 0.74 weeks as shown in table (7).

Table (7): Mean and standard deviation of duration of wound healing.

	Conventional		LigaSure		P-value
	Mean	SD	Mean	SD	
Duration of wound healing	4.6000	0.8208	2.6500	0.7452	<0.0001

DISCUSSION

Analysis of the results obtained from this study showed that the LigaSure hemorrhoidectomy is better than the conventional Milligan and Morgan hemorrhoidectomy regarding operative time, intra-operative blood loss, post-operative pain, and wound healing.

In our study, regarding operative time was significantly shorter in LigaSure (mean: 11.15 ±

2.68) than conventional (mean: 28.75 ± 4.20) hemorrhoidectomy (P <0.0001).

Thorbeck and Montes had a randomized clinical trial on 112 patients with third and fourth degree haemorrhoids, operating times varied from 100 seconds for each hemorrhoidal cushion with LigaSure system to the 313 seconds by the traditional technique [(5)]. Regarding intraoperative blood loss in comparison to the conventional hemorrhoidectomy in which there was a high statistical difference between both groups (P < 0.0001).

Bakhtiar *et al.* conducted a randomized controlled trial that was done at Department of Surgery Dow University Hospital Karachi during January 2013 to September 2015. Patients underwent surgical excision of complex grade III or grade IV hemorrhoids. They were divided into two groups: (A) Hemorrhoidectomy by LigaSure group and (B) Milligan Morgan hemorrhoidectomy group. The efficacy of hemorrhoidectomy by LigaSure was better than the traditional Milligan Morgan hemorrhoidectomy regarding operative blood loss. The mean blood loss of group A was 51.92 ± 15.68 ml, while it was 70.34 ± 25.59 ml in group B [(6)]. Regarding post-operative pain patients who underwent LigaSure hemorrhoidectomy, they experienced less post-operative pain on day 1 (3.8 ± 1.54) compared to patients who underwent conventional hemorrhoidectomy (5.95 ± 0.99).

Nienhuijs reported that pain after conventional versus LigaSure haemorrhoidectomy meta-analysis showed that the pain score at the first day following surgery was significantly less in the LigaSure group (p<0.00001) [(7)].

Regarding wound healing duration, the LigaSure led to more rapid wound healing ranging between 2 to 4 weeks (2.65 ± 0.74) while in conventional hemorrhoidectomy wound healing duration ranged between 4 to 6 weeks (4.6 ± 0.82). **Muzi *et al*.** conducted randomized clinical trial of LigaSure and conventional diathermy hemorrhoidectomy. The study population included 284 patients with grade III or IV hemorrhoids. The study showed that the LigaSure hemorrhoidectomy demonstrated fast and complete wound healing, and a quick return to work. (P=0·01) [(8)]. **Altomare *et al.*** made a study on two hundred seventy-three (273) patients suffering from hemorrhoidal disease, stage III and IV recruited from January to June 2005 in 15 colorectal units affiliated to the Italian Society of Colorectal Surgery. The postoperative anal pain was measured by the visual analog scale (VAS) on the 1st, 2nd and 7th postoperative days. Patients were randomized into two groups: LigaSure 146, and diathermy 127. The Mann-Whitney U test was used to evaluate the differences between diathermy and LigaSure hemorrhoidectomy for postoperative pain. They concluded that LigaSure hemorrhoidectomy is an effective procedure for Grades III and IV hemorrhoids, and facilitates a faster return to work and normal activities by reducing postoperative pain [(9)].

CONCLUSION

This study showed that LigaSure hemorrhoidectomy is superior to conventional hemorrhoidectomy due to less operative time, less intra-operative blood loss, less post-operative pain, less post-operative analgesia, and shorter duration of wound healing. According to these results LigaSure hemorrhoidectomy should be encouraged.

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