

# Ligation-anopexy versus pile suture for treatment of advanced hemorrhoidal disease: Randomized controlled study

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*The aim of this study is to compare ligation-anopexy and pile suture for treatment of 3<sup>rd</sup> and 4<sup>th</sup> degree hemorrhoidal disease.*

**Patients and methods:** *60 patients (28 females) complaining of symptoms of advanced hemorrhoidal disease were included in the study. Patients were divided into two groups, group A underwent ligation-anopexy and group B underwent pile suture. Operating time, post operative pain, time off work, complications and recurrence of symptoms were analyzed.*

**Results:** *Mean age in group I was  $42.6 \pm 14.04$  while in group II was  $40.8 \pm 11.17$  years. The operative time for group I was  $18.3 \pm 4.12$  minutes versus  $22.83 \pm 7.05$  group II and mean follow up for group I was  $13.73 \pm 2.12$  while for group II it was  $14.21 \pm 2.26$  months. Follow up showed that mean VAS pain in pile suture group was significantly higher at 1st post-operative day ( $2.43 \pm 0.94$  vs  $4.97 \pm 1.65$ ) and at the end of first week ( $0.43 \pm 0.63$  vs  $1.07 \pm 1.17$ ). Mean time needed for the patients to return to normal activity was slightly lower in group I ( $5.3 \pm 1.54$  days) than in group II ( $6.90 \pm 2.14$  days). Post-operative complications included thrombosis which occurred in 4 patients of group II, temporary anal spasm occurred in three patients of group I and two patients of group II. Skin tags were the most common complication in both groups. The recurrence of symptoms was significantly higher after pile suture (16.7%) than after ligation-anopexy (3.3%).*

**Conclusion:** *Anopexy may improve complications and recurrence rate when added to ligation for treatment of advanced hemorrhoidal disease.*

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## Introduction:

Advanced hemorrhoidal disease (third and fourth degree) is presented clinically by prolapsed lump which may require manual reduction or constantly prolapsed. Other clinical manifestations include painless bleeding, discomfort, hygiene problems and pruritus.<sup>1,2</sup> About one third of patients suffering from hemorrhoidal disease seek medical attention.<sup>3,4</sup> About 5-10% of patients do not respond to conservative treatments, so surgical procedures become the treatment of choice for such cases.<sup>5</sup>

Although some studies reported that rubber band ligation is safe and effective method compared to open technique in 3<sup>rd</sup> degree symptomatic hemorrhoidal disease,<sup>6</sup> it is stated in the revised practice parameters

for the management of hemorrhoidal disease that hemorrhoidectomy should be offered to patients with grades III or IV.<sup>3</sup> Hemorrhoidectomy is the most effective treatment for hemorrhoidal disease with the lowest rate of recurrence compared to other modalities but it is associated with high post-operative pain and the highest complication rate.<sup>7</sup>

In attempt to decrease drawback of hemorrhoidectomy, several studies tried a variety of surgical devices including surgical scalpel, scissors, monopolar cauterization, bipolar energy, and ultrasonic devices. In general, there appears to be no definitive advantage of one over the other.<sup>8-12</sup>

Aigner et al concluded that there is an association between hypervascularization

and the incidence of hemorrhoidal disease as they found that the terminal branches of the superior rectal artery in patients with hemorrhoidal disease had a significantly larger diameter, greater blood flow, higher peak velocity and acceleration velocity, compared to those of healthy volunteers.<sup>13,14</sup>

These findings may explain the success rate which occurs after procedures based on decreasing vascularity by hemorrhoidal artery ligation which can be done with or without Doppler guidance.

Pile suture is a simple method (introduced by Farag in 1978) in which three interrupted sutures are used to interrupt the blood flow leading to initial congestion followed by gradual shrinkage of prolapsed hemorrhoids.<sup>15,16</sup>

According to sliding anal canal lining theory hemorrhoid disease develop when the supporting tissues of the anal cushions disintegrate leading to downward displacement of the anal cushions.<sup>17</sup>

Depending on this theory Hussein introduced Ligation-anopexy as a minimally invasive simple method to treat advanced hemorrhoids. This procedure was designed to restore fixation of the hemorrhoids cushions to the underlying internal sphincter, reduce hemorrhoids prolapse, and minimize the hemorrhoids blood flow.<sup>18</sup>

The aim of this study is to compare ligation-anopexy and pile suture to explore the role of addition of anopexy to hemorrhoidal ligation to decrease recurrence of symptoms.

### Methods:

This is a randomized controlled trial with prospective data collection of 60 patients with grade III or IV hemorrhoid disease admitted to Unit of Colon and Rectal Surgery, Alexandria Main University Hospital.

Informed consent was obtained from each patient. The study protocol was registered and approved by the Committee of Postgraduate Studies and Medical Research, Faculty of Medicine, University of Alexandria.

The study compared 30 patients undergoing Ligation-anopexy (group I) versus 30 patients undergoing pile suture (group II) for advanced

hemorrhoidal disease, in which medical treatment failed. Patients with concomitant ano-rectal disorder were excluded.

Patients of group I underwent ligation-anopexy<sup>16</sup> **Figures (1-4)** while group II underwent pile suture according to Farag's technique<sup>18</sup> with a suture passed through the mucous membrane at the proximal end of the internal haemorrhoids in order to occlude the superior haemorrhoidal vessels as they enter the internal hemorrhoids, and then a second suture was introduced into the distal end of the internal hemorrhoids above the level of the pectinate line, thus interrupting the connection between the internal and external haemorrhoidal plexuses. A third suture was placed between the previous two.<sup>19</sup>

Variables noted included operating time, post-operative pain, time off work, complications, and recurrence of symptoms. Pain was assessed with visual analogue scale (VAS). Follow up was made in both groups for a period of twelve months.

### Statistical analysis:

Statistical analysis was done using Statistical Package for Social Sciences (SPSS/version 21) software.

The statistical test was as follow: Arithmetic mean, standard deviation, for categorized parameters Chi-square test was used. While for comparison between two groups t-test was used for parametric data. The level of significant was 0.05.

### Results:

In this study the age ranged between 22 years to 77 years with mean age in group I was  $42.6 \pm 14.04$  and in group II was  $40.8 \pm 11.17$  years. There were 15 women in the ligation-anopexy group and 13 women in the pile suture group.

Data from pre-operative history and examination showed that there was no significant difference between the two groups regarding of complaint, duration of complaint, grade of haemorrhoidal disease, number of haemorrhoidal columns affected and associated co-morbidity **Table (1)**.

The operative time for ligation-anopexy



Figure (1): A case of 4<sup>th</sup> degree hemorrhoidal disease for ligation-anopexy.

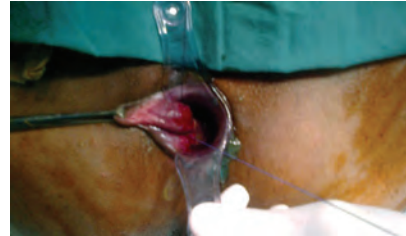


Figure (2): Introduction of the Sims' speculum and suture to fix the mucosa and the submucosa to the underlying, internal anal sphincter.



Figure (3): Redundant mucosa is pulled distally to be incorporated in the ligature.



Figure (4): At the end of the procedure.

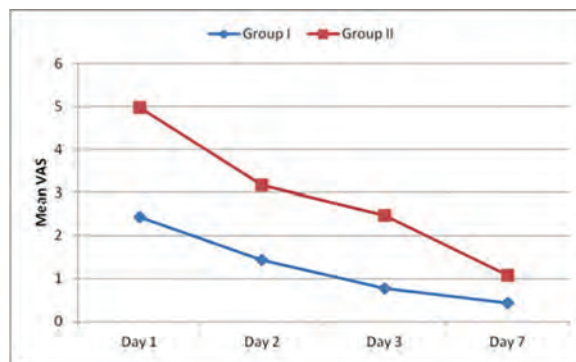


Figure (5): VAS pain score in both groups.

group was insignificantly lower than that for pile suture group with a mean of 18.3±4.12 minutes versus 22.83±7.05. Mean follow up for group I was 13.73±2.12 while for group II it was 14.21±2.26 months.

Early follow up showed that post-operative pain in pile suture group was significantly higher at 1st post-operative day (2.43 ± 0.94 vs 4.97±1.65) and remained significantly higher till the end of first week (0.43 ± 0.63 vs 1.07 ± 1.17) **Figure (5)**.

Mean time needed for the patients to return to normal activity was slightly lower in group 1 (5.3 ± 1.54 days) than in group 2 (6.90

± 2.14 days), however this was statistically insignificant.

Post-operative complications included thrombosis which occurred in 4 patients of group II and responded to medical treatment. Temporary anal spasm occurred in three patients of group I and two patients of group II. Longer follow up showed that skin tags were the most common complication in both groups as it occurred in 26.7% and 33.3% in group I and II respectively. The recurrence of symptoms was significantly higher after pile suture (16.7%) than after ligation-anopexy (3.3%) **Table (2)**.

**Table (1): Clinical data of both groups.**

	Ligation-anopexy n=30		Pile suture n=30		p
	No.	%	No.	%	
Duration of Complain: Range Mean ±S.D. Median	4 - 72 24.8±17.40 18		5-66 22.70±18.40 12		0.223
Complain: Bleeding Prolapse Both	4 7 19	13.3 23.3 63.3	3 7 20	10.0 23.3 66.7	0.919
Co-morbidity: No BHF Cardiac disease Other co-morbidity	22 3 3 2	73.3 10.0 10.0 6.7	24 4 1 1	80.0 13.3 3.3 3.3	0.265
Haemorroid Grade: Grade 3 Grade 4	9 21	30.0 70.0	11 19	36.7 63.3	0.58
No of columns 1 2 3	5 13 12	16.7 43.3 40.0	7 10 13	23.3 33.3 43.3	0.682

**Table (2): Complications and recurrence.**

	Group I n=30		Group II n=30		p
	No.	%	No.	%	
Urine retention	1	3.3	0	0	0.336
Anal spasm	3	10	2	6.6	0.254
Skin tags	8	26.7	11	33.3	0.452
Thrombosis	0	0	4	13.2	0.011*
Recurrence	1	3.3	5	16.7	0.048*

**Discussion:**

Our study compares between two minimally invasive procedures for management of advanced hemorrhoid disease; ligation-anopexy and pile suture. There were no significant difference between both groups regarding demographic data, pre-operative data and operative time.

However the follows up showed that the post-operative pain assessed by VAS was significantly higher after pile suture than

after ligation-anopexy along the whole first post-operative week which may be due to the congestion that follows pile suture.

A study on 41 patients treated by hemorrhoidal artery ligation or stapled haemorrhoidopexy reported postoperative pain on a VAS as 1.6 and 3.2 respectively at 7-day follow-up (p<0.001) and 0.2 and 1.0 respectively at 21-day follow-up (p=0.06).<sup>20</sup>

Sung et al reported post-operative pain after Doppler guided HAL comparable with that

after pile suture in our study at the end of first day and first week.<sup>21</sup> Dowidar et al reported that post-operative pain assessed by VAS was significantly higher after hemorrhoidectomy when compared with pile suture.<sup>19</sup>

In this study although pain was higher after pile suture, there was no significant difference between the two groups regarding the return to normal activity (5.3 vs. 6.9) days. In a systematic review of 17 studies on hemorrhoidal artery ligation return to normal activity occurred between 2 and 3 days after the procedure for most studies.<sup>22</sup>

Early follow up showed that there were no major complications; however thrombosis occurred in 13.2% of the patients after pile suture which can be explained by stagnation and congestion. Thrombosis was associated by anal spasm in two cases. Anal spasm occurred in three patients after ligation-anopexy this may be due to incorporation of internal sphincter in the suture.

Postoperative hemorrhoid thrombosis was reported in 18 (3.6%) and 3 (3%) patients in the case series of 507 and 100 patients respectively. In both series HAL was performed without anopexy<sup>23, 24</sup>.

In two other case series of 330 and 616 patients in which HAL was performed with anopexy, post-operative thrombosis was reported in 1.6% and 2.1% of the patients respectively. So repositioning of the anal cushions by anopexy may decrease congestion that lead to post-operative thrombosis.

Long term follow up showed that incidence of skin tags was 26.7% after ligation-anopexy and 33.3% after pile suture. Gupta reported skin tags in only 2.1% of their cases this may be because most of his 616 cases were grade II and III.

In this study one year follow up showed that recurrence of symptoms was significantly higher after pile suture as recurrence occurred in five patients (16.7%), while recurrence occurred in only one patient (3.3%) after ligation-anopexy. This can be explained by the fact that hemorrhoid disease is not caused by only simple increase of vascularity which is attacked by pile suture but the main pathology is disintegration of supporting

tissues of the anal cushions leading to downward displacement of the anal cushions which is corrected by ligation-anopexy.

In a systematic review of 17 studies on hemorrhoidal artery ligation including 1996 patients reported recurrence of bleeding and prolapse in 6% (40/638) and 8% (50/638) of patients respectively in 9 studies with follow-up of less than 1 year; these figures were 10% (49/507) and 11% (46/427) respectively in the 6 studies with follow-up of 1 year or more. Out of 17 studies in this systematic review only one study performed anopexy after dearterialisation which may be the cause of this high rate of recurrence.<sup>22</sup>

### Conclusion

Ligation-anopexy is a simple, safe, effective method for management of advanced hemorrhoidal disease with minimal complications and low recurrence rate. Anopexy may be important to decrease complications and recurrence when added to ligation for treatment of advanced hemorrhoidal disease.

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