

Comparative Study between Rubber Band Ligation versus Conventional Hemorrhoidectomy

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Abstract

Background: Hemorrhoids are distal displacement and prolapse of the hemorrhoidal cushions, distension of the hemorrhoidal arterio-venous anastomosis, or dilation of the veins of the internal hemorrhoidal venous plexus resulting from deterioration of anchoring connective tissue. Aim of this study is to compare between rubber band ligation & conventional hemorrhoidectomy in treatment of second and third degree hemorrhoids regarding feasibility, operative time, learning curve, recurrence and outcome. **Methodology:** This study was conducted in general surgery department -Benha University Hospital on 60 patients with second and third degree hemorrhoids. Patients were randomized by card system into two groups. **Group A:** 30 patients underwent rubber band ligation. **Group B:** 30 patients underwent conventional hemorrhoidectomy. **Results:** The rubber bands ligation was associated with short operative time (5- 12) minutes, mild intraoperative and postoperative bleeding, less incidence of

urine retentions, mild postoperative pain, short time of healing (14-21) days, less postoperative stenosis and less recurrence. **Conclusion:** Comparing conventional hemorrhoidectomy with rubber bands ligation, the former technique is associated with shorter operative time, less intra- and post-operative bleeding, lower incidence of urine retentions, milder postoperative pain and short time of healing.

Key-words: hemorrhoids, rubber band, anal canal

Abbreviations: RBL; Rubber band ligation, VAS; visual analog scale

Introduction

Hemorrhoids are distal displacement and prolapse of the hemorrhoidal cushions¹. The prevalence of hemorrhoids is extremely high in Western and other industrialized societies². Common symptoms include rectal bleeding, itching, swelling, anal discomfort, and pain³. Surgical treatment of hemorrhoids is either non-invasive (as sclerotherapy, rubber band ligation (RBL), cryosurgery, infrared coagulation, laser coagulation and anal dilatation) or invasive (as closed hemorrhoidectomy, submucosal hemorrhoidectomy, whitehead operation and stapled hemorrhoidopexy). Complications such as pain, anal stricture, and incontinence may develop⁴. RBL is cost-effective, safe and commonly used treatment for internal hemorrhoids⁵.

Patients and methods

Our prospective comparative study was conducted in General Surgery Department of Benha University Hospital during the period from January 2017 to June 2019, after an approval from the research ethics committee in Benha Faculty of Medicine and all patients signed informed consents prior to the study.

Sixty patients with piles were recruited from the outpatient clinic of Benha University hospital. Our inclusion criteria

included patients with second degree piles after failure of medical treatment or those with third degree piles.

Patients with either first and fourth degree piles, or anal fissure, or underwent previous any anal operation were excluded from the study

Preoperative assessment in the form of history taking, general and local examination of perineum and anal canal and laboratory work up were done.

Methods:

Patients included in our study were randomized by card system into two groups: **Group (A):** Patients were treated by rubber band ligation and **Group (B):** Patients were treated by conventional hemorrhoidectomy.

Preparation of the patient were done by an enema four hours before the procedure and local anesthesia was used (Emla 5% cream) ten minutes before procedure.

Technique of rubber band ligation:

- The procedure was performed through the proctoscope, which was inserted and placed about 1-2 cm. above the dentate line using K-Y gel as lubricant (**Figure 1**).



- The hemorrhoidal cushion was sucked into the lumen of the disposable hemorrhoid ligator.
- It was important that patient experience no pain when the cushion was sucked; but, if pain was experienced, the cup was placed in a more proximal position.
- The tissue was drawn into the drum until it was taut, and the trigger was released, expelling two rubber O-rings with an inner diameter of about 1 mm around the base of hemorrhoid (**Figure 2**). When the rings were in place the proctoscope was withdrawn.



- By the end of the procedure, each patient was kept in the outpatient clinic and was observed for one to two hours following the procedure, in order to detect any early complication as hemorrhage and pain.

- Patients were discharged after one hour with analgesic, (Diclofenac sodium) once and mild laxative to softening the stool (agiolax sachets) and patients were instructed to avoid straining.
- Patients were then asked to return to the outpatient clinic for follow up at after two weeks, one month and six months then through telephone call after one year.

Technique of conventional hemorrhoidectomy:

Either spinal anesthesia or general anesthesia was used. Then the patient was placed in lithotomy position.

The anal canal was gently dilated then a proctoscope was inserted to identify the site or three principle haemorrhoids. Artery forceps were then applied to each pile and to the skin adjacent to the haemorrhoids (**Figure 3**).



The artery forceps holding the hemorrhoids and its adjacent skin was grasped in the left hand. V-shaped incision was made in the surrounding perianal skin

with a scalpel. The cut was deepened toward the anal canal to reveal the lower fibers of the internal anal sphincter which was gently swept away with a tissue forceps from the hemorrhoids (**Figure 4**).



Then, dissection was continued by diathermy up to the pedicle which was transfixed using zero vicryl suture **Figure (5)**.



The scissor was used to excise the hemorrhoidal tissue within the anal canal. Each hemorrhoid was dealt with in the same manner. A well-established skin

bridges between each V-shaped segment of excised skin must be remained.

Postoperative follow up:

Postoperative analgesia in the form of 100 mg diclofenac intravenous drip for three days was administered for group B. Also, antibiotic and laxatives were prescribed regularly for all patients. Other local pain killer ointment for perianal application was given postoperatively. Extra need for analgesia was documented.

Patients were followed-up, one and two weeks after the operation by defined guidelines in order to detect any complications attributed to the operation and to assess the patients' well-being. Pain, as a main preoperative discomfort in our patients, was determined using a visual analog pain scale ranging from 0 to 10. A score >7 was considered as "severe pain," a score between 4 and 7 was considered "moderate pain," and a score <4 was considered as "mild pain."

Statistical analysis:

This statistical analysis was conducted using STATA/SE 11.2 for Windows (STATA Corporation, College Station, Texas). The collected data were summarized in terms of mean \pm Standard Deviation (SD) and range for quantitative data and frequency and percentage for

qualitative data. Comparisons between the different study groups were carried out using the test of proportion (Z-test) to compare two proportions. The Fisher Exact test was used to compare more than two proportions. Comparisons between paired proportions were carried out using the Exact McNemar test. The corresponding P-values were obtained. A P-value < 0.05 was considered statistically significant (S), a P-value < 0.001 was considered statistically highly significant (HS), while a P-value > 0.05 was considered statistically non-significant.

Results

This study was conducted in the General Surgery Department of Benha University Hospital on 60 patients with second and third degree hemorrhoids. Patients were randomized by card system into two groups

- **Group A:** 30 patients underwent rubber band ligation.
- **Group B:** 30 patients underwent conventional hemorrhoidectomy.

There were no significant differences between both groups as regard age and gender (table 1) There was no significant difference between both groups as regard pre-operative bleeding scale (p= 0.792). Mean operative time was significantly

higher in group B (35 minutes) compared to group A (7 minutes) ($p < 0.001$, **table 2**). Intraoperative blood loss was significantly higher in group B (100.0%) compared to group A (26.7%) ($p < 0.001$). In those experienced blood loss, mean amount of blood loss was significantly higher in group B (100 cc) compared to group A (14 cc) ($p < 0.001$). Median post-operative VAS was significantly higher in group B (8) compared to group A (0). In group B, VAS ranged from 6 to 10 while, in group A, it ranged from 0 to 2 ($p < 0.001$). Use of analgesics was significantly higher in group B (100.0%) compared to group A (66.7%) ($p = 0.001$). Morphine use was significantly higher in group B (80.0) compared to group A (0.0%) ($p < 0.001$) (**table 3**).

Post-operative bleeding scale was significantly different between both groups. 40.0% in group B showed blood with stools most of the time compared to 0.0% in group A. 13.3% of group B passed blood alone compared to 0.0% in group A ($p < 0.001$) (**table 4**). As regards complications Urine retention was significantly higher in group B (46.7%) compared to group A (0.0%). P value was <0.001. Anal discharge was significantly higher in group B (100.0%) compared to group A (20.0%) ($p < 0.001$). There were no significant differences between both

groups as regard anal stenosis (*table 5*). As regards patients' satisfactions, mean percent satisfaction was significantly

higher in group A (91.0%) compared to group B (68.0%) ($p<0.001$)

Table (1) Demographic characteristics in both groups

		Group A (n = 30)	Group B (n = 30)	P value
Age (years)	Mean \pm SD	40 \pm 14	43 \pm 18	0.603
Gender	Males n (%)	12 (40.0)	14 (46.7)	0.602
	Females n (%)	18 (60.0)	16 (53.3)	

Table (2) Operative time in both groups

		Group A (n = 30)	Group B (n = 30)	P value
Operative time (min)	Mean \pm SD	7 \pm 2	35 \pm 7	<0.001

Table (3) Frequency distribution of analgesics use in both groups

		Group A (n = 30)	Group B (n = 30)	P value
Analgesic need	Yes n (%)	20 (66.7)	30 (100.0)	0.001
Morphine use	Yes n (%)	0 (0.0)	24 (80.0)	<0.001

Table (4) Post-operative bleeding scale in both groups

			Group A	Group B	P value
			(n = 30)	(n = 30)	
Bleeding scale	No bleeding	n (%)	14 (46.7)	0 (0.0)	<0.001
	Streaks with stool less than half of the time	n (%)	16 (53.3)	14 (46.7)	
	Blood with stool most of time	n (%)	0 (0.0)	12 (40.0)	
	Blood alone	n (%)	0 (0.0)	4 (13.3)	

Table (5) Frequency distribution of complications in both groups

		Group A	Group B	P value
		(n = 30)	(n = 30)	
Urine retention	Yes	0 (0.0)	14 (46.7)	<0.001
Anal discharge	Yes	6 (20.0)	30 (100.0)	<0.001
Anal stenosis	Yes	0 (0.0)	2 (6.7)	0.492

Discussion

Hemorrhoidal cushions are anatomical structures present from early embryonic life, which play an important role in accomplishing anal continence ⁶.

The presence of hemorrhoids is not in itself an indication for treatment, which must be aimed at symptomatic relief and the correction of anatomic deformity. Both of the above are achieved by means of conservative or surgical ones which include as in sclerotherapy, cryotherapy, photocoagulation and laser; or tissue

fixation and excision as in rubber bands ligation) ⁷.

Excisional hemorrhoidectomy (Milligan-Morgan) is the standard procedure in the operative management of hemorrhoids, but, it is always associated with severe postoperative pain, long hospital stay and takes long time of healing ⁸.

Nowadays, rubber band ligation (RBL) is one of most widely used procedure, and it offers the possibility to resolve hemorrhoidal disease without the need of

hospitalization or anesthesia, and with low incidence of complication when compared to conventional surgery⁹.

This study was conducted to compare the results of rubber band ligation hemorrhoidectomy versus conventional Milligan-Morgan hemorrhoidectomy.

In our study there was no significant difference between both studied groups regarding the preoperative data. So, the correlation between the two groups could reflect the actual difference between both groups.

As regard the operative time, this study found that the mean operative time was significantly higher in conventional hemorrhoidectomy group (35 minutes) compared to the rubber banding group (7 minutes) as reported by researchers⁹.

The present study found significant difference between the two studied groups in the intraoperative blood loss, as it was significantly higher in group B (100.0%) compared to group A (26.7%). This was in accordance to others¹⁰.

In our study RBL was performed under local anesthesia as in **Goklap** et al. study¹¹ which recommend local anesthesia with RBL, as it significantly reduce the pain.

In our study, pain was experienced by all patients of conventional hemorrhoidectomy.

It was reported¹² that postoperative pain in 75% of cases, with 70% requiring repeated injection. In another study¹³ it was suggested that pain after conventional hemorrhoidectomy can be reduced by anal dilation and sphincterotomy.

In our study, postoperative pain occurred in 35% of cases in RBL group. Pain in 32% of patients with triple rubber band ligation was reported¹⁴. This was attributed to pain in rubber banding below dentate line¹⁴. RBL with infrared therapy was compared¹⁵. They reported more pain with RBL but less chance of recurrence¹⁵. Severe pain in 7.5 of cases was reported and the contributors in this study recommended injection of local injection of local anesthetic solution into hemorrhoids bundle¹⁶. Other studies reported pain in 25% of patient with RBL¹⁷.

In our study, postoperative bleeding occurred in 40.0% out of 30 patients who underwent conventional hemorrhoidectomy; all of them responded to conservative measures. A study reported bleeding in 25% of patient with conventional hemorrhoidectomy group¹⁸ while others reported bleeding in 2.8% of patient¹⁹ and still in another study²⁰ only 1% bleeding was reported.

In our study, the RBL group their mean hospital stay was three hours, while in

Milligan-Morgan group the mean hospital stay was 60.65 hours. The average stay for RBL was claimed to be one to two days while in conventional hemorrhoidectomy group it was one to four days²¹.

Urinary retention was detected in 46% of conventional hemorrhoidectomy group. Postoperative urine retention was said to occur in 20% of patient²², while in a different study the postoperative retention of urine was reported to occur in 15% of patients²³.

It was reported also that the complication rate after RBL was relatively low (4.2%) where most of the complications were minor and self-limiting. Only 1.2% of the patient had severe complications that required hospitalization²⁴. It was found that the majority of cases can be successfully managed by banding, as 83% the patients were symptom free or improved without any medical help²⁵. It was concluded that RBL and hemorrhoidectomy were both equally in controlling symptomatic prolapse but RBL was associated with increased incidence of recurrent bleeding²⁶. **O' Regan** also reported excellent results with no bleeding with a disposable RBL device²⁷.

In present series, 90% and 85% of the patients of Milligan- Morgan hemorrhoidectomy and rubber band group

have good improvement respectively. It was reported that 97% improvement after rubber band ligation (91% patients was asymptomatic and 6% improved) and 3% had no improvement at all²⁸. It was reported by a group of researchers that from one to three years after initial procedure, 82.2% of patient were either symptom free or improved and don not need any medical treatment⁹. A group of scientists reported control of bleeding in 93% and prolapse in 91% of patient after RBL²³. It was reported that RBL is an effective therapy that controls pain, bleeding, itching and discharge, however, recurrence rate may be as high as 68% at four or five years of follow up and symptoms usually respond to repeated ligation but only 10% of such patients require excisional hemorrhoidectomy^{25 & 29}.

In our study there was significant difference in patient's satisfaction between RBL groups and Milligan- Morgan group. It was proved in his study that 82% of patients with 1st and 2nd degree hemorrhoids were satisfied while 86% of patients with 3rd degree hemorrhoid were satisfied²⁵. **Watson & co-workers** in their study of 183 cases of band ligation found that only 15% of cases were unsatisfied³⁰. Some other researchers reported that in their study 98 cases of band ligation 75.5% of patients were satisfied²⁰.

Conclusion:

Comparing conventional hemorrhoidectomy with rubber bands ligation, the former technique is associated with shorter operative time, less intra- and post-operative bleeding, lower incidence of urine retentions, milder postoperative pain and short time of healing.

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