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## ORIGINAL ARTICLE

# LIGATION ANOPEXY VERSUS DIATHERMY HEMORRHOIDECTOMY IN TREATMENT OF ADVANCED HEMORRHOIDAL DISEASE

***Mahmoud A. Hemida,[1] Ahmed H. Nenaa,[1] Waleed G. El-shazly,[2] Yasser M. Zaky[2]***
[1]Department of Experimental and Clinical Surgery, Medical Research Institute, [2]Department of Surgery, Faculty of Medicine, University of Alexandria, Egypt

Correspondence to: Mahmoud A. Hemida, Email: drmahmoudhemida@yahoo.com

## Abstract

**Background and Aim:** This simple randomized study to evaluate the short term results of ligation anopexy technique in comparison to the traditional diathermy hemorrhoidectomy in management of advanced hemorrhoidal disease.

**Patients and Methods:** forty patients complaining of advanced hemorrhoidal disease (grade III and IV) were randomly assigned into two equal groups of twenty patients, Group A: underwent diathermy hemorrhoidectomy (DH), and Group B: underwent ligation anopexy (LA). Follow up for three months was done to evaluate the early and late complications and the symptoms control in both groups.

**Results:** the mean operative time was significantly shorter in patients treated with ligation anopexy, (P=0.008), and the hospital stay was longer in diathermy hemorrhoidectomy group (DH) but the difference was not significant. The intra operative blood loss was significantly less in ligation anopexy group (LA), (p=0.021). The post-operative pain in ligation anopexy group (LA) was significantly less than that in diathermy hemorrhoidectomy group (DH) with significantly shorter duration (p= 0.002)and the return to normal activity was significantly faster in ligation anopexy group, where the mean off-work time was 7.25 ± 1.55 days while in diathermy hemorrhoidectomy group it was 10.40 ± 1.85 days, ( P=0.001). By the end of follow up period ther was no significant difference between the two groups regarding the symptoms control.

**Conclusion:** ligation anopexy is an easy, safe, and cheap, technique which has a comparable success rate with diathermy hemorrhoidectomy regarding the early symptoms control with less complications rate so it may offers a good alternative to other treatment modalities of advanced hemorrhoidal disease.

**Keywords:** Ligation anopexy, advanced hemorrhoidal disease, diathermy hemorrhoidectomy.

## INTRODUCTION

Surgery is actually indicated in the treatment of third- and fourth-degree hemorrhoids. The traditional Milligan-Morgan operation still the most used and effective approach for patients with symptomatic haemorrhoids of III and IV degrees.[1-3]

Surgical haemorrhoidectomy has a reputation for being a painful procedure for a fairly benign disease;[4] also it is associated with the highest complication rates and the most post-operative disability. This can be considered as a "social"problem, since a fast wound healing would allow a quicker return to work habits and daily activities.[5]

This reputation and high rate of complications, in combination with the high prevalence of hemorrhoidal disease, has generated much interest in outpatient treatments of hemorrhoids. Rubber-band ligation,[6,7] injection sclerotherapy,[8] infrared photocoagulation,[8] and cryotherapy,[9] have been used with some success but all have been shown to be inferior to surgery in the management of third and fourth degree hemorrhoids.[8]

New devices and procedures have been proposed to overcome haemorrhoidectomy complications: such tools as stapling haemorrhoidopexy and Doppler-guided haemorrhoidal vessel ligation are based on principles conceptually different from excisional surgery.[10]

Stapled hemorrhoidectomy as initially advocated by Longo,[11] was found to be an effective and less painful procedure in treatment of hemorrhoidal prolapse. However, an expensive stapler, rare but devastating complications in the form of bleeding, stricture, rectal perforations,and anovaginal fistula are its main disadvantages.[12-14] Also it is reported by many authors that, diathermy hemorrhoidectomy is more effective than stapled haemorrhoidopexy as a definitive cure for the symptoms of prolapse and itching in patients with fourth-degree hemorrhoids.[15-16]

The procedure of ligation of hemorhhoidal cushion for management of hemorrhoidal disease, has a long history and is termed with various nomenclature like pile suture,[17] obliterative suture technique,[18] suture ligation,[19] ligation and mucopexy[20] and ligation anopexy.[21]

Ligation anopexy is a ligation procedure proposed by Hussein A,[21] as a variation of pile suture technique introduced by Farag.[17] it is based on the fact that, hemorrhoid prolapse is the result of sliding down of anal mucosa because of attenuation of anchoring elastic tissue system and this technique was designed to restore the fixation of the hemorrhoidal cushion to the underlying internal sphincter, reduce the hemorrhoidal prolapse, and minimize the hemorrhoidal blood flow. On the other hand, the pile suture technique revived by Farag,[17] and its modifications,[19,22] have failed to gain wide acceptance, because they are directed only at reduction of blood flow to the hemorrhoidal cushions, which is associated with initial painful congestion followed by gradual shrinkage of prolapsed hemorrhoids.

Multiple prospective randomized trials have compared traditional hemorrhoidectomy to stapled hemorrhoidopexy.[23-25] to our knowledge, no studies compared ligation anopexy technique to traditional diathermy hemorrhoidectomy.

**Aim of the work:** The aim of this work is to compare the short term results of ligation anopexy technique versus the conventional diathermy hemorrhoidectomy in management of advanced (grade III and IV) hemorrhoidal disease.

## PATIENTS AND METHODS

The study included 40 patients complaining of advanced hemorrhoidal disease (grade III and IV) admitted to unit of colorectal surgery, Alexandria Main University Hospital and department of clinical and experimental surgery, Medical Research Institute, Alexandria University from December 2010 to January 2012.These patients were randomly assigned into two equal groups of twenty patients, Group A: underwent diathermy hemorrhoidectomy (DH), Group B: underwent ligation anopexy (LA).

Patients with complicated hemorrhoidal disease (thrombosed or strangulated piles), patients with associated other anal pathology (perianal fistula, Crohn's disease...etc.) and patients with previous anorectal surgery were excluded from the study.

After an informed written consent all patients were subjected to the following:

- Thorough History taking with special emphasis on hemorrhoidal symptom, previous conservative or surgical treatment, and other anorectal conditions.
- Clinical examination: Anal and abdominal examination
- Routine laboratory investigation.

**Operative techniques:**

All patients were prepared with enema 24 hours before and intravenous antibiotic prophylaxis (cefotaxime) before induction of anesthesia, all operations were done in lithotomy position under general endotracheal tube anesthesia.

**Group A: Diathermy haemorrhoidectomy**

A conventional haemorrhoidectomy was performed according to the technique described by Loder and Phillips.(26) The sphincter was gently dilated; the skin covered component of each of the main pile was seized with an artery forceps and retracted outwards causing lower poles of the mucosal-covered component to protrude to a varying extent according to the size of the hemorrhoidal tissue. By another artery forceps, the purple and mucosal component of each pile was grasped and drawn downwards and outwards. The traction was maintained till pink rectal mucosa appears which means that piles have been drawn down to their maximum extent so that ligature is placed.

The 2 forceps were drawn and a V-shaped incision in anal and perianal skin was done with diathermy. The limbs of the V cross mucocutanous junction and the venous plexus was dissected from internal sphincter.

Care must be taken to avoid injury of the internal sphincter. Proceeding upwards, the mucosa must be divided on either side to the pedicle converging towards its apex; transfixation of the apex was done using absorbable polyglactin half circular rounded needle zero or one. The isolated haemorrhoid was then excised a few millimeters below apical ligature.

The transfixation suture remains long for further inspection at the end of operation then cut short. The procedure was repeated in exactly the same manner for each of the other positions. It is important to ensure intact bridge of skin and mucosa between the excised haemorrhoids to prevent anal stenosis.

**Group B: Ligation Anopexy**

The technique was performed as described by Huessein. (21) an anal speculum was introduced into the anal canal, this causes reduction of the prolapse of the anoderm and the anal mucosal membrane, After reduction of hemorrhoidal prolapse a half circular round needle (size 25- 26) with an absorbable 2-0 polyglactin suture was inserted 1.5 cm above the dentate line , The needle was inserted deep enough to fix the mucosa and the submucosa to the underlying internal sphincter.

After the suture was tied, The redundant mucosa was pulled distally to be incorporated in the ligature, and the thread was relegated around it to form a mucosal tag the size of the mucosa was pulled distally to be incorporated in the ligature and the thread varied according to the amount of the redundant mucosa The redundant mucosa had to be pulled distally to form large a mucosal tag as possible to ensure adequate retraction of prolapsed hemorrhoid, the same procedure was done for each of the other positions.

**Post-operative care:**

Patients resume oral feeding 2 hours postoperative. postoperative analgesia in both groups consisted of pethidine hydrochloride slowly intravenously in the operating room at the end of operation and single parenteral dose of (NSAID) in the recovery room immediately post-operative followed by diclofenac 50mg orally on demand. The patients were evaluated 8 hours after the procedure and were discharged if they were found comfortable on oral analgesics. All patients were instructed to wash the wound with water and bovidone iodine at least twice daily especially after defecation and to dry it with a piece of gauze.

Postoperative complications were defined as “early” within the first month after surgery and “late” after the first month.

Post-operative pain was evaluated using the visual analog scale (VAS), with pain values ranging from 0 (no pain) to 10 (unbearable pain).

The pain score was recorded daily for three days and weekly for four weeks

**Post-operative work up:**

**Early follow up:** every day for three days and every week for one month to evaluate the postoperative pain and other early post-operative complications.

**Later postoperative follow up was done:** every one month for three months to detect any late post-operative complications and evaluate the symptoms control.

## RESULTS

Forty patients with grade III and IV hemorrhoids were randomly assigned into two equal groups: group A, included twenty patients underwent conventional diathermy hemorrhoidectomy and group B, included twenty patients treated with ligation anopexy.

The demographic data of both groups were comparable with no significant difference between the two groups (Table 1).

Table 2 summarizes the baseline clinical data in both groups, the most common presenting symptoms in both groups were hemorrhoidal prolapse and bleeding, other symptoms were discharge and pruritus. There were ten patients with grade III and ten patients with grade IV in group A, while in group B, twelve patients had grade IV and eight patients had grade III, and the difference is not significant. (P=0.525).

As regard the operative data (table 3), the mean operative time for diathermy hemorrhoidectomy group (DH) was (22.85 ± 3.51minutes) while in ligation anopexy group (LA) it was (15.95 ± 2.14minutes), the operative time was significantly shorter in patients treated with ligation anopexy (P=0.008).

The mean hospital stay for the two groups was (0.90 ± 0.31) in diathermy hemorrhoidectomy group (DH) and (0.85 ± 0.37) days in ligation anopexy group (LA), and there was no significant difference between the two groups (P > 0.05).

The intra operative blood loss was significantly less in ligation anopexy group (LA), the mean number of soaked gauses was 1.4 in diathermy hemorrhoidectomy(DH) compared to 0.3 in ligation anopexy( LA) (p=0.021).

The post-operative pain in ligation anopexy group (LA) was significantly less than that in diathermy hemorrhoidectomy group (DH) from the first day, where the mean visual analogue score in group B (LA) was 3.95 ± 1.23, while in group A (DH) it was 6.70 ± 1.17 (p=0.001) till the second week (2.5±1.28 vs. 1.7 ±o.98 p=0.041).

From the third week the difference between the two groups became not significant (VAS 1.4±0.88 versus 1.35±0.88. P = 0.795) (table 4), however, the patients in ligation anopexy group were closer to the base line (no pain at all) earlier than patients in diathermy hemorrhoidectomy group (Fig. 1).

The mean total duration of pain in group A was significantly shorter in ligation anopexy group (6±3 days) than in diathermy hemorhhoidectomy group (17±5days) (p=0.002).

In ligation anopexy group (LA), 17 patients (85%) responded to a single dose of parenteral analgesia of non-steroidal anti-inflammatory group, and only three patients (15%) needed further repeated doses of oral analgesic. while all patients in diathermy hemorrhoidectomy group (DH) (100%) needed further repeated doses of oral analgesic.

In patients treated with ligation anopexy (LA), tenderness on digital rectal examination was observed in six patients in the 1st week, in three patients in the 2nd week and no patients had tenderness by the third week. While in diathermy hemorrhoidectomy, Tenderness to digital rectal examination was observed in seven patients in the 1st week, in four patients in the 2nd week, and in the 3rd and 4th weeks, still there was tenderness in three(15%) and two (10%) patients respectively and this difference is statistically significant. (p = 0.005).

As regard the postoperative complications, there was no statistically significant difference between the two groups (Table 5).

Among the post-operative complications, urine retention occurred in three patients (15%), in the diathermy hemorrhoidectomy group compared to two patients (10%) in ligation anopexy group (FEp =1.000).

Postoperative bleeding occurred in two patients (10%) treated by (DH), and in one patient (5%) in LA group, the bleeding was minimal and none of patients required intervention (FEp =0.605).

Thrombosed external piles were observed in three patients (15%) with grade IV hemorrhoids who were treated with (LA). While in diathermy hemorrhoidectomy (DH) group none of patients had thrombosed external piles. (FEp = 0.106).

Four patients (20%) had serosanginous discharge in diathermy hemorrhoidectomy group (DH), compared to three patients (15%) in ligation anopexy group (LA). (FEp =1.000).

No residual skin tags were observed in patient treated with diathermy hemorrhoidectomy. While in patients treated with ligation anopexy, residual skin tags were observed in six patients (30%) in 1st and 2nd weeks, (FEp = 0.020).

While in the 3rd and 4th weeks, only three and two patients (15% and 10%) respectively had skin tags, (FEp = 0.487).

As regard the time to return to normal activity, it was significantly shorter in ligation anopexy group, where the mean off-work time was 7.25 ± 1.55 days while in diathermy hemorrhoidectomy group it was 10.40 ± 1.85 days, (P=0.001).

By the end of follow up period of three months all patients in diathermy hemorrhoidectomy group (DH) had their symptoms controlled while in ligation anopexy group(LA) three patients (15%) still had mucosal prolapse (FEp=0.2310).

**Table 1. Demographic data of the studied groups.**

| | Diathermy hemorrhoidectomy (n = 20) | | Ligation Anopexy (n = 20) | | Test of sig. |
|---|---|---|---|---|---|
| | No | % | No | % | |
| **Sex** | | | | | |
| Male | 11 | 55.0 | 8 | 40.0 | p = 0.342 |
| Female | 9 | 45.0 | 12 | 60.0 | |
| **Age** | | | | | |
| Range | 22.0 – 56.0 | | 23.0 – 56.0 | | |
| Mean ± SD | 36.65 ± 12.40 | | 38.45 ± 11.38 | | MWp= 0.542 |
| Median | 32.50 | | 37.50 | | |

P: p value for Chi-square test. MWp: p value for Mann Whitney test.
*: Statistically significant at $p \leq 0.05$.

**Table 2. Clinical data of both groups.**

| | Diathermy Hemorrhoidectomy | | Ligation anopexy | | P value |
|---|---|---|---|---|---|
| | No. | (%) | No | (%) | |
| Prolapse | 20 | 100% | 20 | 100% | |
| Bleeding | 15 | 75% | 7 | 35% | 0.011 |
| Discharge | 7 | 35% | 4 | 20% | 0.480 |
| Pruritus | 7 | 35% | 2 | 10% | 0.127 |
| Piles grade III | 10 | 50% | 8 | 40% | 0.525 |
| Piles Grade IV | 10 | 50% | 12 | 60% | 0.525 |

**Table 3. Comparison between the two studied groups according to operative data and hospital stay.**

| | Diathermy hemorrhoidectomy (n = 20) | | Ligation anopexy (n = 20) | | Test of sig. |
|---|---|---|---|---|---|
| | No | % | No | % | |
| **Time of operation** | | | | | |
| Range | 18.0 – 30.0 | | 12.0 – 21.0 | | |
| Mean ± SD | 22.85 ± 3.51 | | 15.95 ± 2.14 | | p = 0.008* |
| Median | 22.50 | | 15.50 | | |
| **Hospital Stay** | | | | | |
| 0 day | 2 | 10.0 | 3 | 15.0 | |
| 1 day | 18 | 90.0 | 17 | 85.0 | p = 0.637 |
| **Range** | 0.0 – 1.0 | | 0.0 – 1.0 | | |
| Mean ± SD | 0.90 ± 0.31 | | 0.85 ± 0.37 | | |
| **Intra-operative blood loss** | | | | | |
| Mean no. of soaked gauses | 1.4±1.92 | | 0.3±1.21 | | P=0.021 |

p: p value for Mann Whitney test.
*: Statistically significant at $p \leq 0.05$.

**Table 4. Comparison between the two studied groups according to (VAS).**

| Visual analogue score | Diathermy hemorrhoidectomy (n = 20) | Ligation anopexy (n = 20) | P |
|---|---|---|---|
| **24 h** | | | |
| Range | 3.0 – 7.0 | 1.0 – 4.0 | |
| Mean ± SD | 6.70 ± 1.17 | 3.95 ± 1.23 | <0.001* |
| Median | 5.0 | 3.50 | |
| **48 h** | | | |
| Range | 3.0 – 7.0 | 1.0 – 5.0 | |
| Mean ± SD | 4.85 ± 1.23 | 2.70 ± 1.22 | <0.001* |
| Median | 5.0 | 3.0 | |
| **72 h** | | | |
| Range | 3.0 – 5.0 | 1.0 – 3.0 | |
| Mean ± SD | 4.40 ± 0.94 | 1.90 ± 1.02 | <0.001* |
| Median | 5.0 | 1.0 | |
| **2nd w** | | | |
| Range | 1.0 – 5.0 | 1.0 – 3.0 | |
| Mean ± SD | 2.50 ± 1.28 | 1.70 ± 0.98 | 0.041* |
| Median | 3.0 | 1.0 | |
| **3rd wk** | | | |
| Range | 0.0 – 3.0 | 0.0 – 3.0 | |
| Mean ± SD | 1.40 ± 0.88 | 1.35 ± 0.88 | 0.795 |
| Median | 1.0 | 1.0 | |
| **4th wk** | | | |
| Range | 0.0 – 1.0 | 0.0 – 3.0 | |
| Mean ± SD | 0.70 ± 0.47 | 0.45 ± 0.72 | 0.922 |
| Median | 1.0 | 1.0 | |

p: p value for Mann Whitney test.
*: Statistically significant at $p \leq 0.05$.

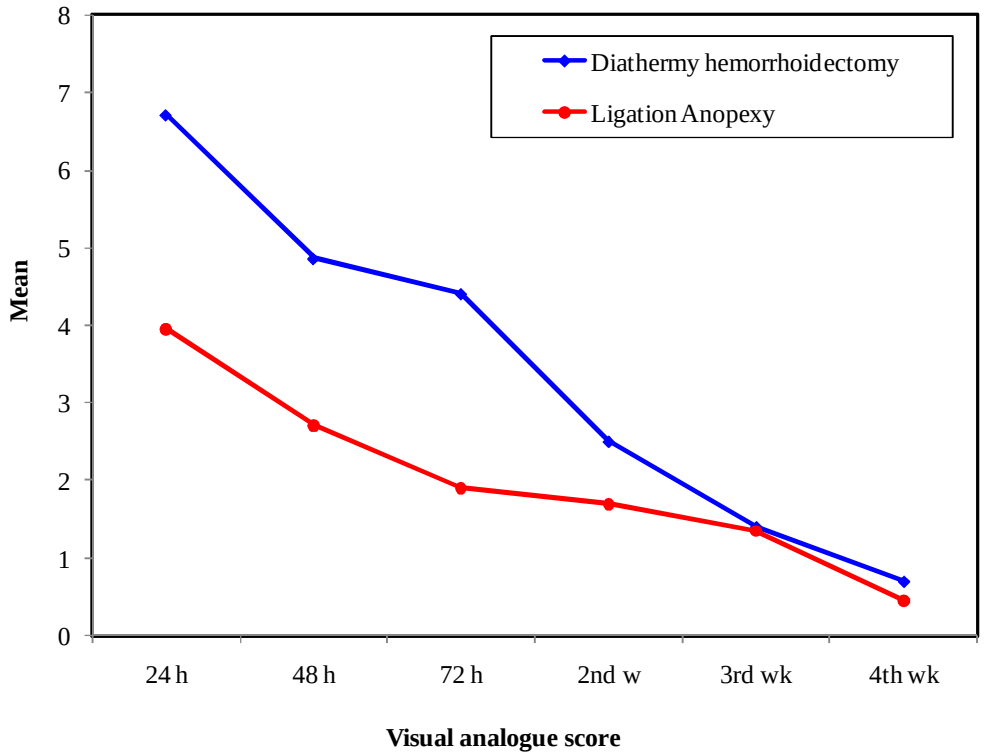
**Table 5. Post–operative complications in both groups.**

| | Diathermy Hemorrhoidectomy | | Ligation anopexy | | P value |
|---|---|---|---|---|---|
| | No | % | No | % | |
| **Urine retention** | 3 | 15% | 2 | 10% | 1.000 |
| **Bleeding** | 2 | 10% | 1 | 5% | 0.605 |
| **Perianal thrombosis** | 0 | 0% | 3 | 15% | 0.106 |
| **Skin tags:** | | | | | |
| By one week | 6 | 30% | 0 | 0% | 0.020* |
| By two weeks | 6 | 30% | 0 | 0% | 0.020* |
| By three weeks | 3 | 15% | 0 | 0% | 0.231 0.487 |
| By four weeks | 2 | 10% | 0 | 0% | |
| **Serosangenous discharge** | 4 | 20% | 3 | 15% | 1.000 |

**Table 6. Comparison between the two groups according to the off- work time.**

| | Diathermy hemorrhoidectomy (n = 20) | Ligation anopexy (n = 20) | P |
|---|---|---|---|
| **Time off work** | | | |
| Range (days) | 7.0 - 14.0 | 5.0 – 9.0 | |
| Mean ± SD | 10.40 ± 1.85 | 7.25 ± 1.55 | <0.001* |
| Median | 11.0 | 7.50 | |

p: p value for Mann Whitney test
*: Statistically significant at p ≤ 0.05




## DISCUSSION

Ligation anopexy is a method proposed by Hussein[21] as a variation of the pile suture technique introduced by Farag,[17] Which he reports to give better clinical impacts, However, the results of this technique in comparison to the conventional diathermy have not yet been established.

This randomized controlled study was done to compare the early result of this technique in comparison to the conventional diathermy hemorrhoidectomy.

Our study has shown that the duration of surgery in patients treated with ligation anopexy was significantly shorter. And this seems to be logic because in diathermy hemorrhoidectomy a longer time is consumed in excision and hemostasis of piles.

Because of the destructive nature of DH in comparison to LA, the post-operative pain intensity as assessed by Visual Analogue Score (VAS), was significantly higher in patients treated with diathermy hemorrhoidectomy with a mean VAS 6.70 ± 1.17 (range: 3-7) and the patients needed repeated doses of analgesia, and this is not unique to our study, but this reported by many other

studies.[27-29] While in patients treated with ligation anopexy, the mean VAS was 3.95± 1.23 (range: 1-4) and a single dose of parenteral analgesics was sufficient to control the postoperative pain in 85% of patients.

The Pain after diathermy hemorrhoidectomy, believed to be caused by the thermal effect of the diathermy, presence of external wounds and the anal spasm from the inclusion of muscle fiber during excision of the piles resulting in higher postoperative pain, while Lack of severe postoperative pain after ligation anopexy may be linked to the distance between the ligation and the sensitive mucosa above the dentate line, as well as the absence of surgical trauma or wounds and the low incidence of anal spasm, edema and hematoma.[21]

The intra-operative blood loss was significantly less in cases of ligation anopexy, where there is no excision of piles, only restoration of piles to their physiological site, in contrast to diathermy hemorrhoidectomy where excision of piles and the presence of wounds increase the risk of bleeding.

In our study Post-operative bleeding reported in (10%) of patients treated by diathermy hemorrhoidectomy and this consistent with many other studies,[30] while in ligation anopexy group, minimal bleeding occurred in one patient, and although the difference between the two groups is not significant in our study, the possibility of bleeding is more in diathermy hemorrhoidectomy because the external wounds made by diathermy increase the risk of postoperative bleeding. While lack of postoperative bleeding after ligation anopexy can be explained by the high ligation of the main blood supply without any wounds and restoring the normal physiological site of the piles,

The clinical implication of destructive nature of diathermy hemorrhoidectomy in the form of sever post-operative pain lasting for longer time is reflected on return to normal activities which was significantly faster in patients treated with ligation anopexy.

By the end of Follow up period of three months there was no significant difference between the two groups as regard the symptoms control. This means that ligation anopexy provide a good management of advanced hemorrhoidal disease without major complications, and the same results reported by Hussein after one year follow up.

So we can conclude that, ligation anopexy has a comparable success rate with diathermy hemorrhoidectomy regarding the early symptoms control and may have less complications rate in the form of less post- operative pain and analgesic requirements, and less intra- operative blood loss, this in addition to shorter duration of operation and earlier return to normal activities. Moreover this technique is easy to learn, safe, cheap, and obviates the need for sophisticated and expensive instrumentation and May offers a good alternative to other treatment modalities of symptomatic and prolapsing hemorrhoids; however these preliminary results need to be confirmed by other studies with larger number of patients and longer duration of follow up.

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