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Comparison of transanal Hemorrhoidopexy versus laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation

Rajkumar Verma[1], Prashant Kumar[2], Pooja Prajapati[3]

[1]Professor, [2,3]Junior Resident, Department of Surgery, M.L.B. Medical College, Jhansi, Uttar Pradesh, India

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ABSTRACT

Background: Hemorrhoids are a common proctological disease that affects the quality of life in the patient population to a great extent. Nearly 4.4–36% of population is affected by hemorrhoids. The symptoms of hemorrhoids vary from painless bleeding to embarrassing and painful prolapsing mass. **Aims and Objectives:** Comparison of transanal hemorrhoidopexy versus laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation in treatment of grade III and grade IV hemorrhoids. **Materials and Methods:** The study was conducted on 50 cases of transanal hemorrhoidopexy and 50 cases laser hemorrhoidoplasty in Maharani Laxmi Bai Medical College, Jhansi between January 2021 and June 2022. **Results:** Out of 50 cases of transanal hemorrhoidopexy, post-operative pain at 6 h was 2.02 ± 0.795, at 12 h was 4.86 ± 0.606, and at 24 h was 2.36 ± 0.525 and 50 cases of laser hemorrhoidoplasty with Doppler-guided hemorrhoidal artery ligation (DGHAL) at 6 h was 1.1 ± 0.303, at 12 h was 1.78 ± 0.648, and at 24 h was 108 ± 0.274. Mean hospital stay was 2.28 ± 0.573 days in transanal hemorrhoidopexy and 1.12 ± 0.328 days in laser hemorrhoidoplasty with DGHAL. Mean return to work in transanal hemorrhoidopexy was 7.422 ± 1.071 days and in laser hemorrhoidoplasty with DGHAL was 3.2 ± 0.80 days. **Conclusion:** Laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation procedure significantly reduced duration of hospital stay, duration of return to work, and post-operative pain as compared to open transanal hemorrhoidopexy.

Key words: Doppler-guided ligation; Hemorrhoids; Laser hemorrhoidoplasty; Transanal hemorrhoidopexy

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INTRODUCTION

Hemorrhoids are a common proctological disease that affects the quality of life in the patient population to a great extent. Nearly 4.4–36% of population is affected by hemorrhoids. The symptoms of hemorrhoids vary from painless bleeding to embarrassing and painful prolapsing mass. The etiology of hemorrhoids has been extensively researched. They result from the increased pressure in hemorrhoidal plexus of vein, with degeneration of fibroelastic tissue in anal cushions acting as a contributing factor. Increased pressure in venous plexus can be due to straining during defecation, coughing, or due to heavy weight lifting while degeneration of fibroelastic tissue may be a result of old age or due to genetic predisposition.[1]

Since the first mention of the disease in an Egyptian papyrus, the treatment of hemorrhoids has seen numerous modifications,[2] While the conservative treatment such as modification of diet, stool softners, topical medications, and sitz bath do help in grade I hemorrhoids, invasive procedure becomes necessary in grade II, III, IV hemorrhoids. Rubber band ligation, piles plication, sclerotherapy,[3] and various cauterization methods are helpful in grade II hemorrhoids. However, grade III, IV, and failed grade II piles demanded surgical intervention with the beginning of later half of the nineteenth century, and hemorrhoidectomy by either Milligan Morgan or Ferguson technique has been the gold standard. In the 90's Dr. Antonio Longo introduced stappled hemorrhoidopexy while Morinaga introduced Doppler-guided hemorrhoidal artery ligation.[4] The basis of

Address for Correspondence:
Prashant Kumar, Sri Ram Ratan Memorial Nursing Home, Shanti Nagar, Fatehpur - 212 601, Uttar Pradesh, India.
Mobile: +91-8299327167. **E-mail:** prass99nt@gmail.com

both of these techniques was cutting of the blood supply to hemorrhoidal plexus and fixation of anal cushions. Although they have gained popularity, the need for costly articles has kept them at bay in the third-world population.

Aims and objectives

Aims

Comparison of transanal hemorrhoidopexy versus laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation in treatment of grade III and grade IV hemorrhoids.

Objectives

- To compare post-operative pain pattern among trans anal hemorrhoidopexy versus laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation
- To compare recurrence of hemorrhoids among trans anal hemorrhoidopexy versus laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation
- To compare the risk of developing incontinence to flatus and for stool in patient undergoing trans anal hemorrhoidopexy versus laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation
- To compare intraoperative time period and hospital stay between transanal hemorrhoidopexy versus laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation.

MATERIALS AND METHODS

Ethical

Ethical committee's approval was duly taken. Data were collected in the department of general surgery from the bedside tickets of the patients after taking a short history and informed consent from the patient.

Source of data

The comparable study was conducted on 50 cases of Group A (transanal hemorrhoidopexy) and 50 cases of Group B (laser hemorrhoidoplasty) in Maharani Laxmi Bai Medical College, Jhansi between January 2021 and June 2022.

Inclusion criteria

- Grade 3 and grade 4 hemorrhoids.

Exclusion criteria

- Acute hemorrhoidal episodes with thrombosis
- Prior hemorrhoidectomy
- Intercurrent anal pathology (like fistula in ano and anal fissure)
- Prolapse of single anal cushion
- Anal stenosis.

Transanal hemorrhoidopexy

Patients were given PC. Enema in the evening 12 h and 6 h before the operative procedure. After giving spinal anesthesia, patients were positioned in lithotomy with a little head low, which reduced the prolapsing pile masses. The laxed mucosal and submucosal tissues were placed in their anatomical position. Anal canal was lubricated with xylocaine jelly. A self-illuminated slit with sliding valve proctoscope, designed by D Chivate, was used. After removing the sliding plate, dentate line was identified. The lax mucosa and submucosa were sutured to rectal muscles in two circumferential suture lines, 2 cm and 4 cm proximal to dentate line. The first stitch was tied and the subsequent stitches which was 0.5–1 cm in length were double interlocked. The double interlocking avoided the purse string effect and thus the anal stenosis. Care was taken to not to take the complete thickness of rectal wall in stitches. Since both the suture lines were stove the dentate line in the insensitive part of anal canal, there will no problem of post-operative pain. 2-0 polyglactin suture with round body 30 $mm^{1/2}$ needle was used. Lax mucosa and submucosa were sutured in its original position and the blood supply to hemorrhoidal plexus was cut off at two places, thus decreasing the chances of collateral formation which causes recurrence.

Procedure protocol

- Type of fiber – Conical Laser Fiber
- Mode – Pulse Mode
- Dosage
  - At the time of insertion: 8 W, 1 s pulse
  - At the time of coagulation: 6W, 3 s pulse
  - Keep on withdrawing fiber every 5 mm
  - Area covered – 4 mm diameter per activation
  - Total energy: 150–200 Joules per pile mass
  - Point of entry-dentate line because submucosa end here.

Procedure

Patients were given PC. Enema in the evening 12 h and 6 h before the operative procedure. After giving spinal anesthesia, patients were positioned in lithotomy with a little head low, which reduced the prolapsing pile masses. A c-shaped anoscope was inserted in the anal to explore each hemorrhoid. Anal canal was lubricated with xylocaine jelly. Push three gauze pieces gradually and bring them out. Now identified the dentate line, we have to go 2–4 cm above the dentate line and palpate superior hemorrhoidal artery, then by gradual pronation and supination figure of "8" stitch is taken while doing this, anoscope should be kept rotating and all vessels are ligated, normally 6–8 vessels can be palpated. Once hemorrhoidal artery ligation (HAL) is done, we should go for laser hemorrhoidoplasty. Laser fibers are taken inside through dentate line. Automatically it was stopped at tip where ligation had been done. Now, we are

in submucsal space, the dose given is 6W every 3 s and keep on. Bring the fiber out every 5 mm, the same procedure is repeated at 70 clock and 110 clock. At the end, we keep eyes to decrease the edema which may be there due to injury.

Post-operative management

Patients were managed in the surgery ward. Analgesics were given on demand. Anal canal was examined the next day for any bleeding. If no complications occurred, patients were discharged the following day. All the post-operative was noted and the pain was assessed by numeric pain score (10 points score from 0 to 10, in which 0 represents no pain and 10 represents very severe pain (the worst pain). At 3 weeks, patients were analyzed for the resolution of symptoms and overall satisfaction. Patients were assessed for recurrence at 1 and 6 months.

Statistical analysis

The data were summarized as mean values with standard deviations (SD). The statistical analysis was performed using T-test. The SPSS 20.0 for Windows computer software (SPSS Inc., Chicago, IL) was used for statistical analysis. $P<0.05$ was considered significant.

RESULTS

Out of 50 cases of transanal hemorrhoido suturopexy, post-operative pain at 6 h was 2.02±0.795, at 12 h was 4.86±0.606, and at 24 h was 2.36±0.525 and 50 cases of laser hemorrhoidoplasty with Doppler-guided HAL (DGHAL) at 6 h was 1.1±0.303, at 12 h was 1.78±0.648, and at 24 h was 108±0.274. Mean hospital stay was 2.28±0.573 days in transanal hemorrhoido suturopexy and 1.12±0.328 days in laser hemorrhoidoplasty with DGHAL. Mean return to work in transanal hemorrhoidopexy was 7.422±1.071 days and in laser hemorrhoidoplasty with DGHAL was 3.2±0.80 days

DISCUSSION

This is the comparative and prospective study of two groups of patients, Group A included 50 patients who underwent open transanal hemorrhoidopexy and Group B included 50 patients who underwent laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation. Patients were selected randomly in both groups and the period of observation and follow-up was up to 6 weeks from day of admission in M.L.B. Medical College, Jhansi.

Age

In our study, in open transanal hemorrhoidopexy (Group A), 18% were in 20–30 years, 12% in 31–40 years, 26% in 41–50 years, 30% in 51–60 years, and 14% in >60 years. In laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B), 26% were in 20–30 years, 34% in 31–40 years, 18% in 41–50 years, 14% in 51–60 years, and 8% in >60 years (Table 1).

Age distribution in both groups was same.

In our study, maximum patients are between the age of 30 and 50 years.

In study by Hassan and El-Shemy,[5] mean age of open transanal hemorrhoidopexy (Group A) was 49±12.3 (range 28–72 years) and mean age of laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) was 47±12.6 (range 24–70 years).

In study by Maloku et al.,[6] mean age for open transanal hemorrhoidopexy (Group A) was 47±12.3 (range 28–72 years) and for laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) was 47±12.6 (range 24–70 years).

Our study is comparable to the above studies with respect to age of presentation with the most common age between 30 and 50 years.

Sex

In our study, in open transanal hemorrhoidopexy (Group A), males were 66% and females were 34% and in laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B), males were 76% and females were 24%. Our study concludes that hemorrhoids are more prevalent in males (71%) than females (29%)[5,6] (Table 1).

Hemorrhoidal grade

Our study includes symptomatic Grade 3 and Grade 4 hemorrhoid patients.

Asymptomatic grade 3 and grade 4 hemorrhoid patients and symptomatic grade 1 and grade 2 hemorrhoids patients were managed conservatively.

Our study included 39 patients with Grade 3 hemorrhoids and 11 patients with Grade 4 hemorrhoids in open transanal hemorrhoidopexy (Group A) and 26 patients

Table 1: Sex-wise distribution in our study

Sex	Group A (n=50)		Group B (n=50)	
	n	%	n	%
Male	33	66.00	38	76.00
Female	17	34.00	12	24.00
Total	50	100	50	100

with Grade 3 hemorrhoids and 24 patients with Grade 4 hemorrhoids in laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B).

Mean operative time

In our study, intraoperative time for open transanal hemorrhoidopexy patients (Group A) was 20–30 min with a mean of 27.12±2.138 and mean operative time for laser hemorrhoidoplasty with digital-guided HAL patients (Group B) was 15–20 min with mean of (18.93±1.44) (Table 2).

In study by Hassan and El-Shemy,[5] mean operative time for open transanal hemorrhoidopexy (Group A) patients was 26.80±5.8 min and for laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) patients was 15.90±3.5 min.

In study by Abdulkarim et al.,[7] mean operative time for open transanal hemorrhoidopexy (Group A) was 39.20±20.7 min and for laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) patients was 29.67±17.9 min.

In study by Yahya et al.,[8] mean operative time for open transanal hemorrhoidopexy (Group A) patients was 29.53±4.05 min and for laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) patients was 14.60±3.13 min.

Our study is similar to be above studies as these studies also had significantly low intraoperative time in laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) as compared to open transanal hemorrhodosuturopexy with P=0.01.

Post-operative pain score

Post-operative pain was measured on Visual Analog Scale (VAS) pain in open transanal hemorrhoidopexy (Group A) at 6 h – 2.02±0.795, at 12 h – 4.86±0.606, and at 24 h – 2.36±0.525 and in laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) at 6 h – 1.1±0.303, at 12 h – 1.78±0.648, and at 24 h – 1.08±0.274.

Table 2: Mean age, operative time, hospital stay, and return to work

Parameters	Group A (n=50)	Group B (n=50)	P-value
Age (in years)	47.8±14.443	41.42±14.643	0.03
Mean operative times (in minutes)	27.12±2.135	18.93±1.414	0.01
Mean hospital stay (in days)	2.28±0.573	1.12±0.328	0.01
Mean Return to work (in days)	7.42±1.071	3.2±0.808	0.01

Mean post-operative pain score on VAS was significantly less at 6–24 h in laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) (Table 3).

Yahya et al.,[8] studied that there was highly significant difference between the two groups regarding pain till 6th week and analgesic used in open transanal hemorrhoidopexy (Group A) significantly higher.

In study by Abdulkarim et al.,[7] open transanal hemorrhoidopexy (Group A) patients had 66% mild pain, 20% moderate pain, and 13.3% severe pain as compared to laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) patients had 85% mild pain, 4.8% moderate pain, and 9.5% severe pain.

In study by Hassan and El-Shemy,[5] pain scores were considerably low in laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) patients. In 24 h post-operative period, open transanal hemorrhoidopexy (Group A) had 0–1 VAS score in 25% patients, 2–5 VAS score in 75% patients, and >5 VAS score in 8% patients and Group B (Laser) had 0–1 VAS score in 0% patients, 2.5 VAS score in 90% patients, and >5 VAS score in 10% patients.

Our study is comparable to the above studies in that the post-operative pain is significantly less in laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) at post-operative 6 h (P=0.01), 12 h (P=0.01), and 24 h (P=0.001).

Post-operative early complication

In our study, open transanal hemorrhoidopexy (Group A) – 22% patients complained of post-operative bleeding, 18% patients for residual prolapse, and 6% patients for hematoma, whereas laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) – 2% patients complained of post-operative bleeding, 6% patients for residual prolapse, and 2% patients for hematoma (Table 4).

In study by Abdulkarim et al.,[7] complications were observed more frequently in open transanal hemorrhoidopexy (Group A) group as compared to laser

Table 3: Post-operative pain score (VAS)

Postoperative pain score (VAS)	Group A (n=50)	Group B (n=50)	P-value
6 h	2.02±0.795	1.1±0.303	0.01
12 h	4.86±0.606	1.78±0.648	0.01
24 h	2.36±0.525	1.08±0.274	0.01

VAS: Visual Analog Scale

hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) group (such as bleeding, residual prolapse, and hematoma).

In study by Yahya et al.,[8] open transanal hemorrhoidopexy (Group A) group was significantly associated with more bleeding as compared to laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) group.

In study by Hassan and El-Shemy,[5] regarding the post-operative complication in open transanal hemorrhoidopexy (Group A), 10% patients had pain and 15% had hematoma and in laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B), 5% had pain and 5% had bleeding.

Our study is similar to the above studies as these studies also describe that post-operative complications such as bleeding, residual prolapse, and hematoma are less common in laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) group as compared to open transanal hemorrhoidopexy (Group A) group.

Mean hospital stay

In our study, in open transanal hemorrhoidopexy (Group A), mean hospital stay was 2.28±0.573 days and in laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B), mean hospital stay was 1.12±0.328 days (Table 3).

In study by Abdulkarim et al., duration of hospital stay is shorter in laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) as compared to open transanal hemorrhoidopexy (Group A) patients.

In study by Yahya et al.,[8] mean hospital stay for open transanal hemorrhoidopexy (Group A) was 36.25±6.58 h while for laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) was 7.85±2.11 h.

In study by Eskandaros and Darwish,[9] mean hospital stay for open transanal hemorrhoidopexy (Group A) was 2.1±0.6 and laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) was 0.7±0.3 days.

Our studies are similar to the above studies as their studies also described that the mean hospital stay is significantly less in laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) as compared to open trans anal hemorrhoidopexy (Group A).

Late complication

In our study in open transanal hemorrhoidopexy (Group A), 8% patients had thrombosis, 16% patients had recurrence of hemorrhoids, and 8% patients had fistula ano while in laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B), 2% patients had thrombosis, 2% patients had recurrence of hemorrhoids, and no patients had as fistula ano.

In our study in laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B), patients had very less late post-operative complication as compared to open transanal hemorrhoidopexy (Group A).

The true incidence of various complications such as thrombosis, recurrence of hemorrhoids, and fistula-in-ano is not known.

Mean return to work in days

In our study, open transanal hemorrhoidopexy (Group A) patients were advised for 10–14 days of sitz bath to subside the perianal swelling and resolve the symptoms, so duration of return work was 7–10 days with a mean of 7.422±1.071.

In laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) patients, post-operative bleeding and pain were significantly less, so duration of return to work was also very less than 3–5 days with a mean of 3.2±0.80.

In study by Maloku et al.,[6] average recovery time for open transanal hemorrhoidopexy (Group A) patients was 19.2 days (range 14–35 days) and for laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B) patients was 17.2 days (range 5–30 days).

Our study is similar to the above study as above study also describes that duration of return to work is significantly less in laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation (Group B)

Table 4: Early complication

Postoperative findings	Group A (n=50)		Group B (n=50)	
	n	%	n	%
Bleeding	11	22.00	1	2.00
Residual prolapsed	9	18.00	3	6.00
Hematoma	3	06.00	1	2.00

Table 5: Follow-up

Follow-up	Group A (n=50)		Group B (n=50)	
	n	%	n	%
Fecal incontinence at 1 month	1	2.00	0	0.00
Recurrence after 6 months	2	4.00	0	0.00

as compared to open transanal hemorrhoidopexy (Group A) patient.

Follow-up

In our study, 2% patients of open transanal hemorrhoidopexy (Group A) complained of fecal incontinence after 1 month of post-operative period and 4% patients of open transanal hemorrhoidopexy (Group A) had recurrence of hemorrhoid after 6 months of post-operative period (Table 5).

The true incidence of fecal incontinence after 1 month and recurrence of hemorrhoids after 6 months is not known.

Limitations of the study

This was a single-centered study.

CONCLUSION

- Laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation is safe and effective in symptomatic grade 3 hemorrhoid patients and grade 4 hemorrhoid patients as compared to open transanal hemorrhoidopexy.
- Laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation procedure significantly reduced intraoperative time period and post-operative pain as compared to open transanal hemorrhoidopexy.
- Laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation procedure significantly reduced post-operative complications such as bleeding and residual prolapse as compared to open transanal hemorrhoidopexy
- Laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation procedure significantly reduced the duration of hospital stay and duration of return to work as compared to open transanal hemorrhoidopexy.

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RV, PK, PP- Concept and design of the study, prepared first draft of manuscript; interpreted the results; reviewed the literature and manuscript preparation; concept, coordination, preparation of manuscript, and revision of the manuscript.

Work attributed to:
M. L. B. Medical College, Jhansi - 284128, Uttar Pradesh, India.

Orcid ID:
Rajkumar Verma - https://orcid.org/0009-0002-4645-4529
Prashant Kumar - https://orcid.org/0009-0001-8404-4398
Pooja Prajapati - https://orcid.org/0009-0008-7972-7566

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