

## Original Research Article

# Pallam's painless hybrid laser sandwich procedure for grade III and IV hemorrhoids

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**Received:** 28 March 2025

**Revised:** 05 May 2025

**Accepted:** 06 May 2025

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### ABSTRACT

**Background:** Doppler-guided hemorrhoid artery ligation with recto-anal repair (DGHAL-RAR) addresses only primary branches of superior rectal artery and do not address secondary branches of superior rectal artery (cause of recurrence) which are situated in between primary terminal branches. Mucosal prolapse part of grade 3 and 4 hemorrhoids is addressed by mucopexy (RAR) which is integral part of DGHAL-RAR. Laser hemorrhoidopexy (LHP) addresses these secondary branches of superior rectal artery. So, in Pallam's painless hybrid laser sandwich procedure, we sandwiched LHP in between DGHAL and RAR and modified Doppler guided HAL to digit (finger) guided HAL. Aim of this procedure is to prevent recurrence and decrease postop pain and to address patient's compliance.

**Methods:** All patients with grade 3 and 4 hemorrhoids who were operated in our hospital were included in prospective cohort study. All patients underwent Pallam's painless hybrid laser sandwich procedure. Post operative pain, bleeding, abscess, recurrence and anal incontinence were evaluated.

**Results:** The 493 patients with grade 3 and 4 hemorrhoids operated between January 2020 to October 2024 were included in the study. Median follow-up time was 22 (Range 6-36) months. 45 patients were excluded from analysis because of lost to follow up. No complications were observed in 442 (98.67%) patients. Bleeding was observed in 3 (0.67%) cases. Hematoma in 1 (0.22%) case and Abscess in 1 (0.22%) case incontinence for flatus in 1 (0.22%) case. No cases developed recurrence.

**Conclusions:** Pallam's painless hybrid laser sandwich procedure is a novel, effective and minimally invasive technique to decrease post operative pain and to prevent recurrence of hemorrhoids.

**Keywords:** Hemorrhoids, Grade 3 and 4, DGHAL-RAR, Secondary branches of superior rectal artery, Recurrent hemorrhoids

### INTRODUCTION

The anal canal consists of three fibrovascular cushions that are directly supplied by arteriovenous communications (superior rectal artery).<sup>1</sup> These cushions are upheld within the anal canal by a framework of connective tissue and play a crucial role in providing a watertight seal to the Anus and maintains a part of resting anal pressure along with both sphincters.<sup>1</sup> Anal cushions contribute to 10-15% of resting anal pressure.<sup>1</sup> The degenerative impact of aging can weaken or fragment the

supporting tissues and when combined with constipation create a shearing force on the cushions resulting in their descent and prolapse.<sup>2</sup> The prolapsed cushions have impaired venous return which leads to engorgement.<sup>3</sup> Bleeding from the engorged prolapsed haemorrhoid occurs whenever there is localised mucosal trauma or inflammation which damages underlying blood vessels.<sup>3</sup> DGHAL-RAR only address the primary branches of the superior rectal artery and not secondary branches which are situated in between the primary branches of the superior rectal artery.<sup>4</sup> These secondary branches are

responsible for recurrence after haemorrhoid surgery.<sup>4,5</sup> DGHAL-RAR is also a cause for post-op pain due to thrombosis of blood within sinusoidal cushion because of doing RAR on an unablated sinusoidal cushions and it also delays the fibrosis between mucosa and IAS.<sup>6</sup> LHP alone is not effective in grade 3 and 4 haemorrhoids as the prolapsed part plays a major role in grade 3 and 4 haemorrhoids and LHP does not address the prolapsed part and patient satisfaction will be less.<sup>7,8</sup> So Pallam's painless hybrid laser sandwich procedure incorporates Laser ablation of hemorrhoidal cushions (Laser hemorrhoidopexy) to address the thrombosis of blood within sinusoids by RAR and also addresses the secondary branches of the superior rectal artery which are the main root cause for recurrence and bleeding after haemorrhoids surgery. In Pallam's painless hybrid laser sandwich procedure, we sandwiched LHP in between DGHAL and RAR. We also modified DOPPLER-guided hemorrhoidal artery ligation to digit (finger) guided hemorrhoidal artery ligation to palpate primary branches of the Superior rectal artery.

The objective is to study efficacy of Pallam's painless hybrid laser sandwich procedure in grade 3 and 4 hemorrhoids and its complications like postoperative pain, bleeding, prolapse, itching, incontinence, abscess formation and recurrence.

## METHODS

A prospective study was carried out in which all the patients who have been operated on in our institute, Osmania general hospital, Hyderabad, Telangana, India between January 2020 to October 2024 are included. Consecutive Sampling technique was used for this study. Ethics committee approval was not needed for this study as both procedures are already available in the literature and we are just combining them. Informed written and verbal consent (English and native Language) was taken from every patient after explaining the principle behind the surgery and its benefits and associated complications. After discharge, patients received a specific questionnaire to record postoperative pain, bleeding, prolapse, itching, incontinence, abscess formation and recurrence. The evolution/ disappearance of the symptoms that led to the surgical intervention (bleeding, prolapse, itching and pain) was also recorded. A visual analog scale (VAS) was used to measure pain on a scale of 0-10.<sup>9</sup> Outpatient and telemedicine follow-up was carried out at 7 days, 1, 6 and 12 months and annually thereafter.

### Inclusion criteria

Patients with grade 3 and 4 internal hemorrhoids were included.

### Exclusion criteria

Patients with grade 1 and 2 internal hemorrhoids, external hemorrhoids, strangulated internal hemorrhoids and thrombosed external hemorrhoids were excluded.

## Procedure

The patient was given spinal anaesthesia (saddle block) and then placed in an extended lithotomy position. An IV antibiotic was given 1 h before the surgery. Surgery should address pain, bleeding, prolapse and recurrence.

### Step 1

To address the primary branches of the superior hemorrhoidal artery, digit (finger) guided hemorrhoidal artery ligation is performed.

Location at 1 cm above the apex of haemorrhoids.

Palpate the primary branches of the superior hemorrhoidal artery 1 cm above the apex of hemorrhoids at 3'0 clock position.

With a 2/0 vicryl suture on a 5/8 circle needle, a figure-of-8 stitch is taken at the apex of hemorrhoid at 3'0 clock. The first stitch is submucosal; the second bite is deeper, including a few fibres of the internal anal sphincter. This reduces the blood supply and fixes the prolapse to the IAS creating fibrosis and reducing the prolapsed element of hemorrhoids. Before tying the knot, we have to elevate the cushion towards the apex with the help of an S-shaped retractor or forceps and then tie the knot which elevates the prolapsed part of the cushion and fixes to IAS. After DGHAL, we have to palpate the pulsations of the branch of the superior rectal artery just above and below the knot, pulsations will be increased above the knot and absent below the knot. If the artery is still palpable below the knot then take another stitch 1 cm above the previous knot.

During DGHAL, the needle can pierce the artery causing hematoma, management is done by compressing the point of bleeding for 5 min. If there is active bleeding from the puncture site, take a second bite, tie it, and press for 5 min. If there is no relief, take a figure-of-8 suture 1 cm above the site. If bleeding still does not stop, consider hemorrhoidectomy.

### Step 2

LHP is performed by to and fro motion of bare fibre which addresses the sinusoids proper and side-to-side movements of the bare fibre address the secondary branches of the superior rectal artery which are responsible for recurrence. LHP causes the destruction of tissue which leads to inflammation which further helps in early fibrosis between mucosa and IAS leading to elevation and fixation of the prolapsed part of the hemorrhoidal cushion and decreases recurrence.

After the entry point is cleaned with Betadine, Entry is made just below the mucocutaneous junction, progressively directing the laser towards the apex stitch, taking care to stay in the sub-mucosal plane between the

mucosa and the IAS. Entry should not be at the mucocutaneous junction as injury to mucosa may lead to future postop fistula formation. Depending on the size of the hemorrhoidal cushion, 8 watts of power with 150-350 J of energy is given at the hemorrhoidal cushion. Check the intensity of light, it should not be too bright or too dull indicating that it is too close to the mucosa or IAS respectively. Keeping laser fibre too superficial may damage mucosa and cause post-op bleeding and keeping laser fibre too deep may damage EAS and cause post-op incontinence to flatus. During and immediately after the surgery, tissues must be cooled to dissipate latent heat which is detrimental to the surrounding tissues either by cold saline lavage or gloved ice finger. Usage of unsterile laser probe may lead to abscess and it is prevented by using a sterile laser probe and cleaning the entry point with betadine before LHP

### Step 3

RAR is done to treat prolapsing haemorrhoids. It involves placing a running stitch along the length of the prolapsed mucosal lining of the rectum spaced at 0.5 cm starting from the dearterialization stitch to just above the dentate line and gently tied moving the prolapsed mucosa proximally to the anatomical position above the anal canal. RAR surgery has the combined effect of drawing the prolapsed recto-anal mucosa tissue back up to its correct place by anchoring the mucosa to IAS (Mucopexy) and holding it there. During RAR, shorter interval of suture stitches increases the risk of mucosal ischaemia and if longer, creeping of mucosa occurs, as the ligature is tied, increasing tension in the suture line, thus increasing the risk of suture rupture and bleeding.

While addressing hemorrhoidal mass at 11'o clock, careful suture bite should be taken to prevent bleeding or injury to the posterior vaginal wall in females which may lead to anovaginal fistula.

All the 3 steps are repeated at the remaining 7 and 11'o clock hemorrhoidal cushions (Figure 1-3).



**Figure 1 (A and B) : Pre op and post op images of grade 4 hemorrhoids in a 41 years old male patient.**



**Figure 2 (A and B): Pre op and post op images of grade 4 hemorrhoids in a 53 years old male patient.**



**Figure 3 (A and B): Pre op and post op images of grade 3 hemorrhoids in a 38 year old female patient.**

### Postoperative period

The patient was advised to do sitz bath after 24 hrs. Laxatives, antibiotics, and analgesics were given and advised not to strain during bowel movements. The patient was discharged the next day of surgery and was advised to resume normal activities after 3 days of discharge. Hemorrhoids were said to be healed when there is no bleeding, pain or prolapse of hemorrhoids.

### Statistical analysis

Comparison of categorical variables was performed by chi-squared analysis or Fisher's exact test, where appropriate. The continuous variables were assessed by t test or ANOVA. The significant cut-off point was set at  $p < 0.05$ .

### RESULTS

A total of 493 patients with grade 3 and 4 haemorrhoids were operated in between January 2020 and October 2024 and included in the study. Male patients were 61.5% (303/493) and female patients were 38.5% (190/493). The 7.9% (39/493) were recurrent cases. The



mean age was  $46.5 \pm 2$  years. The median follow-up was 22 (6-36) months. The 45 patients were excluded from the analysis because of loss to follow-up. The 448 patients attended the follow-up after treatment.

**Table 1: Demographic and clinical characteristics of patients, (n=493).**

Characteristics	Value
Total patients	493
Male patients	303 (61.5%)
Female patients	190 (38.5%)
Grade 3 haemorrhoids	320 (65%)
Grade 4 haemorrhoids	173 (35%)
Recurrent cases	39 (7.9%)
Lost to follow-up	45 patients
Patients analyzed	448
Mean age (in years)	$46.5 \pm 2$
Median follow-up (months)	22 (range 6-36)

**Table 2: Postoperative complications, (n=448).**

Complication	N	Percent (%)	Management
No complications	442	98.67	—
Bleeding	3	0.67	Treated conservatively
Abscess	1	0.22	Treated conservatively
Hematoma	1	0.22	Treated conservatively
Incontinence to flatus	1	0.22	Kegel exercises

**Table 3: Postoperative pain scores (VAS scale).**

Time after procedure	Mean VAS score
After 6 hours	2.5
After 24 hours	1.6
On 7 <sup>th</sup> postoperative day	1.6
After 1 month	0.6

**Table 4: Symptom relief following procedure.**

Time after procedure	Patients' symptom-free	Percentage (%)
After 7 days	~358	80
After 30 days	~416	92.8
After 6 months	~443	99

**Table 5: Patient Satisfaction with Procedure**

Time after procedure	Very good/ excellent rating	Percentage (%)
After 30 days	~403	90
After 12 months	~439	98

No postoperative complications were observed in 98.67% of cases (442). 0.67% (3/448) cases developed bleeding which was treated conservatively, 0.22% (1/448) cases developed abscess which was treated conservatively, 0.22% (1/448) cases developed hematoma which was treated conservatively, 0.22% (1/448) cases developed incontinence to flatus which was treated with Kegel exercises. Pain was practically non-existent (VAS=0.6) 1 month after the procedure.

## DISCUSSION

The gold standard treatment for hemorrhoidal disease is surgical hemorrhoidectomy but it is associated with complication rate around 15%.<sup>10,11</sup> Furthermore, residual symptoms are common.<sup>12,13</sup> Newer minimally invasive techniques like DGHAL-RAR is developed to prevent prolapse, and reduce post-operative pain, but DGHAL-RAR has a higher recurrence rate if compared with hemorrhoidectomy.<sup>4</sup>

To prevent the recurrence and minimize post-operative pain, Pallam's painless hybrid laser sandwich procedure is developed. Minimal tissue destruction in this method leads to decreased post operative pain and increased comfort to patient.<sup>14</sup> Digit (finger) guided hemorrhoidal artery ligation of the primary branches of the superior hemorrhoidal artery (HAL) leads to reduced blood supply and promote atrophy of the hemorrhoidal cushions. The second step is to perform a LHP to decrease postop pain and reduce recurrence by addressing the secondary branches and early fibrosis.<sup>7</sup> The third step is to perform mucopexy or RAR to fix the prolapsed hemorrhoids into the anal canal.<sup>15</sup> Their atrophy and posterior fibrosis will keep them in their natural position preventing prolapse and recurrence. This procedure requires a short learning curve for the surgeons.

Pallam's painless hybrid laser sandwich procedure is a minimally invasive and painless technique leading to early recovery and ambulation post procedure. Postoperative pain is the most common complaint of patients and most common headache for surgeons dealing with hemorrhoids. The results of Pallam's painless hybrid laser sandwich procedure in this study show a very low postoperative pain rate (VAS always <3); which is easily controlled with oral analgesics.<sup>9,16</sup> The main goal of any treatment for hemorrhoids is to cure the symptoms with minimal rate of complications and recurrence.<sup>5</sup> In our series, this procedure has achieved complete control of symptoms in 99% of patients after one-year of follow up. Early complications of Pallam's painless hybrid laser sandwich procedure are rare, and even when present they are minor. Bleeding occurred in a small number of cases but neither reoperation nor transfusion is necessary. Thus, we can consider Pallam's painless hybrid laser sandwich procedure as a very safe and minimally invasive procedure for patients and that makes it suitable for ambulatory surgery. Reported recurrence after the DGHAL-RAR technique ranges between 4 and 14%.<sup>5,17</sup>

In our series, the recurrence rate in Pallam's painless hybrid laser sandwich procedure is minimal (<1%) after a median follow-up of 22 months. Initial results of this study confirm Pallam's painless hybrid laser sandwich procedure as almost painless procedure with a very low rate of complications if compared with other surgical options for hemorrhoids.

Limitations of this study is a short follow-up time of 22 months, so it is difficult to assess long-term efficacy, recurrence rates, and long-term influence on anorectal function, which still need to be assessed with longer follow-up period of greater than 2 years. Our study was conducted at a single tertiary care center which may limit the generalizability of the findings to other populations. Multi center studies are needed to validate these results across the different patient groups.

## CONCLUSION

Pallam's painless hybrid laser sandwich procedure is a safe, effective and almost painless minimally invasive technique; it's easy to learn and to perform, and it has very good results in the control of hemorrhoidal symptoms with very minimal complications and recurrence. This procedure should be considered as an effective first treatment option for grade 3 and 4 hemorrhoids.

## ACKNOWLEDGEMENTS

Authors would like to thank to Dr. M. A. Rahman, Dr. D. Ravi Kumar, Dr. A. Priyanka.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Praveen P. Pallam's painless hybrid laser sandwich procedure for grade III and IV hemorrhoids. Int Surg J 2025;12:1126-30.