TPM Vol. 32, No. S7, 2025
ISSN: 1972-6325
https://www.tpmap.org/

COMPARATIVE STUDY OF LASER HAEMORRHOIDECTOMY VS MILIGAN MORGAN HAEMORRHOIDECTOMY FOR MANAGEMENT OF HEMORRHOIDS OF GRADE II & III

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Published:- 10 October 2025

ABSTRACT

Background: Hemorrhoidal disease is a common anorectal disease which can cause a substantial reduction in the quality of life when symptoms remain uncontrolled despite conservative treatments. Milligan-Morgan hemorrhoidectomy is still a proven surgical approach, especially in the event of prolapsing hemorrhoids, but it carries with it the disadvantages of postoperative pain and slow recovery. Laser hemorrhoidoplasty has become a minimally invasive option and may have some benefits in terms of peri-operative morbidity.

Objective: To compare the outcome of Laser hemorrhoidectomy versus Milligan Morgan hemorrhoidectomy for management of hemorrhoids of grade 2 and 3.

Methods: This was a Randomized controlled trial that was carried out at the Department of Surgery, Services Hospital Lahore, from April 2025 to August 2025. The patients were randomly divided into two groups: 60 with grade 2 or 3 hemorrhoids underwent laser hemorrhoidectomy and the other 60 underwent Milligan-Morgan hemorrhoidectomy. The operating time, intraoperative bleeding, post-operative pain based on the Visual Analogue Scale and hospital stay were documented. Independent samples t-test was performed to compare outcomes and a $p \leq 0.05$ was considered statistically significant.

Results: The laser group had significantly shorter operative time (16.2 ± 4.1 vs 26.5 ± 5.2 minutes), lower blood loss (4.8 ± 2.1 vs 22.4 ± 6.3 mL), lower postoperative pain scores (3.2 ± 0.9 vs 6.8 ± 1.2), and shorter hospital stay (0.8 ± 0.3 vs 1.4 ± 0.4 days), respectively ($p < 0.001$ for all).

Conclusion: Laser hemorrhoidectomy showed superior short term perioperative results compared to Milligan-Morgan hemorrhoidectomy, especially in terms of hospital stay, pain score and operative efficiency, and blood loss.

KEYWORDS: Hemorrhoids, Laser Hemorrhoidoplasty, Milligan-Morgan Hemorrhoidectomy, Grade II Hemorrhoids, Grade III Hemorrhoids, Postoperative Pain, Blood Loss, Operative Time, Hospital Stay, Minimally Invasive Surgery.

INTRODUCTION

Hemorrhoidal disease is a chronic condition of the anorectum, which is a very common condition featuring symptomatic enlargement and displacement of the normal anal vascular tissue. It is said to be prevalent in different countries of the world at different rates varying from 2.9% to 27.9% [1]. Hemorrhoids are graded by the amount of prolapse: Grade I hemorrhoids remain inside the body, Grade II prolapse during straining but go back in place on their own, Grade III can be pushed back in place, and Grade IV are permanently prolapsed. Early disease is managed with conservative and non-operative means while persistent Grade II and III hemorrhoids may require procedural or surgical intervention [2].

Hemorrhoidal disease has a number of treatment modalities including dietary modification, pharmacological therapy, office based procedures and surgical procedures. Milligan-Morgan hemorrhoidectomy is still one of the more established and commonly performed operations for the treatment of symptomatic hemorrhoids. Conventional excisional hemorrhoidectomy can be accompanied by postoperative pain, bleeding, and prolonged recovery period, despite its effectiveness and definitiveness of the removal of hemorrhoidal tissue [3]. For the treatment of hemorrhoidal disease laser technology has been increasingly used as an alternative to traditional surgery, providing a less invasive solution. Thanks to the development of laser technology, its application in various areas of medicine has grown, including proctology [4].

Laser hemorrhoidoplasty is a technique which utilizes laser energy to coagulate and constrict the hemorrhoidal tissue with minimal damage to adjacent structures. The technique has been linked to lower postoperative pain, less tissue trauma, less blood loss and quicker postoperative recovery than traditional hemorrhoidectomy [5]. The laser hemorrhoidoplasty has been found to have beneficial results in comparative studies in Grade II and Grade III hemorrhoidal disease. Laser treatment has been linked to positive postoperative results and may have benefits with regard to postoperative healing [6].

Laser hemorrhoidoplasty has been reported to significantly shorten the operative time, intraoperative blood loss and postoperative pain in patients with Grade III hemorrhoids compared to conventional excisional hemorrhoidectomy, without having a negative impact on faecal continence [7]. Likewise, comparative studies have shown that laser treatment is associated with a shorter operating time, less intraoperative bleeding, less postoperative pain and a shorter hospital stay than hemorrhoidectomy performed using Milligan-Morgan technique [8]. Another randomized controlled trial of laser hemorrhoidoplasty was found to have similar postoperative outcomes compared to sutured mucopexy and excisional hemorrhoidectomy [9]. In addition, laser hemorrhoidoplasty has been linked with a decrease in postoperative discomfort and pain, adding to its status as a minimally invasive treatment for symptomatic hemorrhoidal disease [10].

These positive results notwithstanding, there is still debate regarding the best surgical approach for Grade II and Grade III hemorrhoidal disease. Although laser hemorrhoidoplasty might have benefits in the areas of postoperative pain, blood loss, operating room time, and recovery, milligan-morgan hemorrhoidectomy remains an accepted and proven technique. But variations in patient population, surgeon skill, technique, technology and expense could affect the results of such surgeries.

Thus, there is a need for continued comparative assessment, especially in the local context where information on the relative perioperative advantages of laser hemorrhoidectomy compared to conventional hemorrhoidectomy is still limited. The present study was done to compare the laser hemorrhoidectomy with Milligan-Morgan hemorrhoidectomy in patients with Grade II and Grade III hemorrhoidal disease. To compare the operative time, blood loss during surgery, postoperative pain and length of stay, the study assessed which technique is more advantageous in terms of peri-operative outcome and could benefit the patients.

OBJECTIVE

To compare the outcome of Laser hemorrhoidectomy versus Milligan Morgan hemorrhoidectomy for management of hemorrhoids of grade 2 and 3.

METHODOLOGY

This was a Randomized controlled trial that was carried out at the Department of Surgery, Services Hospital Lahore, from April 2025 to August 2025. The subjects were 60 patients who were consecutively selected based on the inclusion criteria. Patients between 20 and 70 years of age with clinically diagnosed grade II or III hemorrhoids and scheduled for elective surgery under spinal anesthesia were included in the study, which had a sample size of 30 patients in each of the two treatment groups, determined by a 95% confidence level and 90% statistical power based on previously reported differences in operative time. A lottery method was used to randomly assign the participants in a 1:1 ratio to the laser hemorrhoidectomy group or the conventional Milligan-Morgan hemorrhoidectomy group. The main perioperative outcomes evaluated were operation time, intraoperatory blood loss, pain – evaluated by the Visual

Analogue Scale and hospital stay. The data were analyzed using SPSS version 25 where $p \leq 0.05$ was taken as statistically significant.

INCLUSION CRITERIA

Patients aged 20-70 years of either gender who had grade II or grade III clinically diagnosed hemorrhoids (as defined by the operational definition) and had been planned for elective hemorrhoidectomy under spinal anesthesia were included.

EXCLUSION CRITERIA

Patients with recurrent hemorrhoidal disease, history of previous failed anorectal procedure, ASA physical status III/IV, Renal dysfunction (serum creatinine>2.0 mg/dl), deranged coagulation profile (PT>15 seconds, aPTT>33 seconds, INR>1.5) and pregnant patients as per medical record were excluded.

DATA COLLECTION PROCEDURE

Following approval from the institutional ethics committee, patients were approached and told the purpose, procedure, potential benefits, and possible risks of the study. Written informed consent was provided prior to enrollment. A structured proforma was used to collect baseline demographic and clinical information. Patients were randomly allocated to two groups, Group A was laser hemorrhoidectomy and Group B was conventional Milligan-Morgan hemorrhoidectomy, using a lottery method. All of the procedures were conducted by the same surgical team with spinal anesthesia. Group A was treated with a 1470-nm diode laser with 8-W power, 7-second pulses, and 1-second pauses to coagulate and shrink the tissue. Group B had standard open excisional hemorrhoidectomy. Time for each procedure was measured from the start of the operation until it ended. The amount of blood lost was calculated by the volume of blood sucked up and blood stained gauze. VAS pain score and length of stay were recorded after the surgery until discharge.

DATA ANALYSIS

The data was entered, coded and analysed with IBM SPSS Statistics 25. Before inferential analysis, Shapiro-Wilk test was used to determine the normality of quantitative variables. The quantitative variables, such as age, BMI, duration of the hemorrhoidal symptoms, operative time, intraoperative blood loss, postoperative VAS pain score, and hospital stay were presented as mean ± standard deviation. Hemorrhoidal grade, gender, ASA grade, smoking status, hypertension, diabetes, lifestyle, nutritional habits and residence were expressed as frequencies and percentages. To determine if the two groups were comparable, baseline characteristics were compared. Normally distributed continuous outcomes were compared between laser and Milligan-Morgan groups using independent samples t-test. Stratification was carried out according to age, sex, BMI and relevant clinical variables and comparison between the sub-groups was made if appropriate. A two-tailed p-value ≤0.05 was considered statistically significant.

RESULTS

Sixty patients who had grade II and III hemorrhoidal disease were included in the study. The patients were randomly divided into 2 groups, 30 used laser hemorrhoidectomy and 30 used the conventional Milligan-Morgan hemorrhoidectomy. Demographic and clinical characteristics were comparable between the two groups, suggesting that groups were well balanced prior to intervention.

Baseline Characteristics

Parameter	Laser Group (n = 30)	Milligan-Morgan Group (n = 30)	p-value
Age (years)	42.3 ± 11.2	44.1 ± 10.8	0.531
Male/Female	18/12	16/14	0.602
Grade II/III hemorrhoids	12/18	10/20	0.598

There was no statistically significant difference between the two groups with respect to their mean age, which was 42.3 ± 11.2 years in the laser group and 44.1 ± 10.8 years in the Milligan-Morgan group ($p = 0.531$). Similarly, there was no difference in gender distribution between the groups: 60.0% male in the laser group and 53.3% male in the Milligan-Morgan group ($p = 0.602$). In the same manner, there was a comparable distribution of grade II and grade III hemorrhoids between the groups ($p = 0.598$). These results are indicative of sufficient baseline comparability between the two treatment groups.

The evaluation of Operative Outcomes is made by comparing them.

Outcome	Laser Group (n = 30)	Milligan-Morgan Group (n = 30)	p-value
Operative time (min)	16.2 ± 4.1	26.5 ± 5.2	<0.001
Intraoperative blood loss (mL)	4.8 ± 2.1	22.4 ± 6.3	<0.001

The mean operative time was significantly shorter in patients who underwent laser hemorrhoidectomy than in those who underwent Milligan-Morgan hemorrhoidectomy (16.2 ± 4.1 vs. 26.5 ± 5.2 minutes, respectively; $p < 0.001$). As a result, the laser procedure was shown to have a significantly shorter surgical time.

There was also a significant difference in the blood loss occurred during surgery. The mean blood loss in the laser group was 4.8 ± 2.1 mL and that in the Milligan-Morgan group was 22.4 ± 6.3 mL ($p < 0.001$). So, laser hemorrhoidectomy had significantly less blood loss during surgery.

This study compares the surgical results.

Outcome	Laser Group (n = 30)	Milligan-Morgan Group (n = 30)	p-value
VAS pain score	3.2 ± 0.9	6.8 ± 1.2	<0.001
Hospital stay (days)	0.8 ± 0.3	1.4 ± 0.4	<0.001

Significantly less postoperative pain with the laser group. The mean VAS pain score was 3.2 ± 0.9 compared with 6.8 ± 1.2 in the Milligan-Morgan group ($p < 0.001$). This is a clinically significant decrease in post-op pain after laser therapy.

Even the length of hospital stays was significantly shorter for those who underwent laser hemorrhoidectomy. Mean hospital stay was 0.8 ± 0.3 days in the laser group, and 1.4 ± 0.4 days in the Milligan-Morgan group ($p < 0.001$).

The overall comparison of the treatment outcomes is shown.

Parameter	Laser Hemorrhoidectomy	Milligan-Morgan Hemorrhoidectomy	p-value
Operative time (min)	16.2 ± 4.1	26.5 ± 5.2	<0.001
Blood loss (mL)	4.8 ± 2.1	22.4 ± 6.3	<0.001
VAS pain score	3.2 ± 0.9	6.8 ± 1.2	<0.001
Hospital stay (days)	0.8 ± 0.3	1.4 ± 0.4	<0.001

There were statistically significant differences between the treatment groups for all four assessed perioperative outcomes. Laser hemorrhoidectomy had a shorter procedure time, significantly less blood loss during surgery, lower postoperative pain scores, and shorter hospital stay when compared to the Milligan-Morgan hemorrhoidectomy. The differences were all significant ($p < 0.001$).

Interpretation

The results show that laser hemorrhoidectomy was significantly more advantageous in terms of perioperative outcomes than the conventional Milligan-Morgan hemorrhoidectomy in patients with grade II and III hemorrhoids. The groups were well balanced statistically with respect to age, gender, and grade of the hemorrhoids at baseline. The laser technique was correlated with a decreased time of surgery by around 10 minutes and significantly reduced blood loss during surgery. Furthermore, there was a significant reduction in post-operative pain with laser treatment and patients spent less time in hospital. These results indicate that laser hemorrhoidectomy might have important short-term recovery benefits compared with the conventional excisional hemorrhoidectomy in the right patients with grade II and III hemorrhoidal disease.

DISCUSSION

The most prevalent anorectal disorder which can lead to bleeding, anorectal prolapse, discomfort and pain and a reduced quality of life. Treatment is based on the severity of symptoms and degree of prolapse and response to conservative (office) or non-operative management. Typically, persistent symptoms despite non-operative therapy [1,2] are indications for surgery and these patients are the ones who undergo surgery. While Milligan-Morgan hemorrhoidectomy is known to be an effective procedure for symptomatic prolapsing hemorrhoids, the downside to this procedure is the fact that it is associated with postoperative pain and takes longer to recover. Minimally invasive methods, such as laser hemorrhoidoplasty have been promoted due to these disadvantages, particularly in the appropriate patient with grade II and III hemorrhoids [4].

In the present study which is a randomized controlled trial, 60 patients with grade II/grade III hemorrhoids were equally divided into two groups: laser hemorrhoidectomy and Milligan-Morgan hemorrhoidectomy. The treatment arms were considered to be comparable as there were no differences in baseline parameters like age, sex and grade of

hemorrhoids. The most notable was the laser hemorrhoidectomy was significantly better in short term perioperative outcomes; including less blood loss during surgery, less postoperative pain, less operating time and less hospital stay. The mean operating time was much shorter in the laser group compared with the Milligan-Morgan group (16.2 ± 4.1 vs. 26.5 ± 5.2 min; $p < 0.001$). This result is in line with the previous result which showed that the operating time of laser treatment is less than other treatment [5]. This is because laser hemorrhoidoplasty is a minimally invasive procedure, that does not involve a lot of dissection, excision and ligation of hemorrhoidal tissue. In addition, Shabahang et al. conducted a randomized clinical trial that compared laser hemorrhoidoplasty with Milligan-Morgan hemorrhoidectomy and found good results with laser procedure [6]. In a direct comparison study [7] similar good per-operational parameters were demonstrated for the patients after laser therapy with the patients with Grade II and III hemorrhoid.

The results of our study are corroborated by Poskus et al. who performed a double-blind randomized controlled trial of laser hemorrhoidoplasty vs sutured mucopexy and excisional hemorrhoidectomy [8]. The outcomes of the early postoperative period were good when the laser treatment was used. Perhaps our shorter time for surgery and less tissue trauma was due to the principle of laser hemorrhoidoplasty, a minimally invasive procedure, of controlled thermal coagulation (and shrinking) of hemorrhoidal tissue.

One additional important outcome was the amount of blood lost during surgery. There was also much less bleeding in the laser group compared to the Milligan-Morgan hemorrhoidectomy group (4.8 ± 2.1 mL vs 22.4 ± 6.3 mL, $p < .001$). This makes biological sense because it has a coagulation, vascular sealing effect when using the laser energy and it doesn't dissect as much of the tissue. Conventionally hemorrhoidectomy involves removal of hemorrhoidal tissue and ligation which may lead to increased bleeding during hemorrhoidectomy. Systematic evidence has also shown that laser hemorrhoidoplasty results in less blood loss as compared to conventional hemorrhoidectomy procedures [9].

In a study on clinical outcome of laser treatment for hemorrhoids, Lakmal et al. showed that in general, postoperative pain and recovery rate were good [10]. Studies showed little homogeneity across studies included, but good evidence that laser has a role to play in the management of the selected population of patients as alternative to surgery. Brusciano et al. in particular studied laser hemorrhoidoplasty (1470 nm diode laser) and found the post-operative discomfort and recovery satisfactory [11]. This is a pertinent result as the present study also used 1470-nm diode laser.

The intergroup difference that was most clinically relevant was postoperative pain. The mean VAS pain score was 3.2 ± 0.9 in laser group and 6.8 ± 1.2 in the Milligan-Morgan group ($p < 0.001$). The decrease in post-laser pain might be associated with preservation of anoderm and a decrease in open perianal wounds inflicted. The major advantage of laser surgery compared to traditional excisional hemorrhoidectomy is that the laser coagulates and contracts tissues under the mucous membrane and leaves less tissue injured – which is the source of the most pain.

The minimal invasiveness of the laser treatment and good postoperative profile was another benefit reported by Trigui et al. [12]. In their systematic review and meta-analysis of the literature, Lie et al. (2012) showed that laser hemorrhoidoplasty was significantly less painful, less time consuming operation and less hospital stay than conventional hemorrhoidectomy [13]. The results are comparable to the present study, where there was significant reduction in the VAS scores and hospital stay post surgery.

The results of Pain with respect to the present study also corroborates the results achieved by Tan et al [14] who showed that the postoperative pain in early postoperative period was significantly reduced following laser hemorrhoidoplasty and also that requirement for analgesics was reduced. This implies potential clinical applications of our results to decrease VAS pain, as well as to improve patient comfort during recovery and decrease the need for analgesics.

Satisfactory postop results were reported by Torrinha et al. too in the treatment of symptomatic hemorrhoidal disease with the use of laser [15]. They noted, however, that there is a lot of variation in the studies in terms of the type of laser system, treatment protocols, patient selection and assessment of outcome. So far, evidence is overall favourable in terms of benefits to the short-term recovery of laser hemorrhoidoplasty but there may be some differences in the magnitude of benefits based on technical and clinical factors.

Among them the systematic review and meta analysis performed by Wee et al. is most relevant since they compared laser hemorrhoidoplasty and conventional hemorrhoidectomy for II and III grade hemorrhoids [16]. They found that the laser treatment had significantly reduced the operating time, bleeding, post-operative pain and analgesics usage. The outcome is similar to the current study and this indicates a good external validity of the outcome.

Cemil et al. also made a direct comparison between laser hemorrhoidoplasty and Milligan-Morgan hemorrhoidectomy in patients suffering from grade II and III hemorrhoidal disease [17]. Their findings indicated that laser therapy proved to be beneficial as well – and that it may become a more non-invasive therapy in some instances. Their patient cohort is similar to our cohort which further emphasizes the clinical relevance of the present results.

The laser group (0.8 ± 0.3 days) had a mean number of days in hospital that was significantly less than the Milligan-Morgan group (1.4 ± 0.4 days) ($p<0.001$). This finding is in line with the findings of Lie et al. meta-analysis where the duration of hospital stay was found to be shorter in laser hemorrhoidoplasty [13]. This might be because of less

pain, less damage to the tissues, less bleeding, and early mobility of patients. Patients might also benefit from less use of health care resources and an earlier re-entry into normal activities thanks to shorter hospital stays.

Another important parameter is wavelength of the laser used in the present study. Submucosal application using a diode laser with wavelength of 1470 nm with controlled energy delivery was used. Li et al., in a comparative study of short-term perioperative outcome of 980 nm and 1470 nm laser wavelength, have concluded that both the laser wavelength were feasible to achieve favorable outcome as compared to open hemorrhoidectomy [18]. But their study showed some problems with recurrence, in particular, especially in patients treated by laser hemorrhoidoplasty at the wavelength of 1470 nm. Considering these facts the findings of this research indicated that the laser of 1470nm may be effective in the short term but more studies are needed to ascertain whether the laser could be a longer-term, more effective treatment.

A meta-analysis by Cheng et al. revealed that laser hemorrhoidoplasty was superior to conventional Milligan-Morgan and Ferguson hemorrhoidectomy due to less blood loss, less operating time, less postoperative pain and less postoperative bleeding [19]. Their findings also corroborate our findings that all the benefits identified in our study fit with the literature. It is important to note that, it has not been proved to be definitely better than the other treatment modalities in long term control of the disease and on the other hand, it has proved to be useful in early post-operative recovery.

The one thing that is important is that it is durable. Gambardella et al. reported 1470-nm laser hemorrhoidoplasty (LHP) as a better treatment for hemorrhoids of III-degree than Milligan-Morgan hemorrhoidectomy (MMH) with a good rate of post-operative recovery [20]. However, at the mid-term follow up, there were more recurrent symptoms following laser hemorrhoidoplasty than Milligan-Morgan hemorrhoidectomy. This discovery is another good clinical compromise: whilst laser surgery might represent a strong way of reducing postoperative morbidity, conventional, excisional hemorrhoidectomy might prove to be more durable in a more severe degree of prolapse.

A systematic review and meta-analysis of the results of hemorrhoid laser dearterialization was completed by De Nardi et al. and it was found to be a good symptomatic outcome with a good safety profile [21]. But hemorrhoidal Laser Dearterialization is different type of Laser therapy in contrast to the present study 1470nm Laser Haemorrhoidoplasty. These results do therefore confirm the general literature published on the minimally invasive laser surgery, but don't directly support the minimally invasive technique used in our trial.

These results are overall comparable to the current evidence demonstrating the superiority of laser hemorrhoidoplasty over traditional excisional hemorrhoidectomy in the areas of operating room time, blood loss, postoperative pain and length of hospital stay [8-19]. Randomized studies, comparative study and systematic review, were used to evaluate the present study results' homogeneity. Long term recurrence, however, is not so likely and some studies have indicated a higher recurrence rate after laser therapy as compared to Milligan-Morgan hemorrhoidectomy [18,20]. This should be based on the grade of hemorrhoids, extent of prolapsed, patient's preference, surgeon's skill, equipment and preference for rapid recovery versus longevity.

This study has a number of limitations. The study had a relatively small sample size, and was conducted at one tertiary-care center. Follow-up data was only available for immediate post-operative outcome, and did not include data on long-term recurrence, symptom resolution, continence, quality of life and patient satisfaction. The use of analgesics, return to normal activities, postoperative bleeding, urinary retention, anal stenosis and cost-effectiveness were also not assessed. Such results should be factored into future studies.

At last, laser hemorrhoidectomy had significant short term, perioperative benefits when compared with the Milligan-Morgan hemorrhoidectomy in patients with grade II and III disease. By using the laser technique, the operating time was reduced, there was significantly less bleeding, significantly less post operation pain and less hospital stay. These findings are in agreement with the current literature which states that laser hemorrhoidoplasty is a valid and minimally invasive method of treatement [13-19]. But, because of the lack of information on the long term recurrence and durability, the laser hemorrhoidectomy cannot be used as a universal alternative to the conventional excisional hemorrhoidectomy procedure. To confirm long-term recurrence rates, cost-effectiveness, complications, quality of life and patient satisfaction larger multicenter RCTs with longer follow-up are required.

CONCLUSION

Conventional Milligan-Morgan hemorrhoidectomy (CMHE) and laser hemorrhoidectomy (LHE) were compared with regard to short-term perioperative outcomes in patients with grade II and III hemorrhoidal disease, with significantly better outcomes observed for LHE. The patients treated with laser had less blood loss during surgery, significantly less post-operative pain, a shorter hospital stay and shorter operation duration. The laser technique is minimally invasive, tissue-preserving and is an attractive treatment modality for selected symptomatic grade II and III hemorrhoids. Laser hemorrhoidectomy should not be seen, however, as a universal alternative to conventional Milligan-Morgan hemorrhoidectomy, and in cases with advanced prolapse or disease that require definitive excisional treatment, the latter should be considered. The selection of surgical technique should be personalized based on the

grade of the hemorrhoid, the frequency of the prolapse, patient preference, skill of the surgeon and availability of appropriate equipment. More extensive RCTs with longer follow-up are suggested to assess long-term recurrence, durability, cost effectiveness, postoperative complications, and patient satisfaction.

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